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1 Current State of the Institute

The past years have brought some significant developments. After twelve years since its inception, the Max Planck Institute for Research into Economic Systems, changed its name to the Max Planck Institute of Economics. It was not just the name that changed: important breakthroughs in terms of cooperation with the local universities were made. In particular, in December 2005, a formal agreement with the Friedrich Schiller University (FSU) was reached. This cooperative agreement spans a broad spectrum of activities between the Institute and the University, ranging from the appointment of additional economics professors to provisions for awarding habilitations and doctoral degrees, collaborative research projects and courses taught by Institute researchers at the FSU. Two promising major research proposals involving a network of scholars in Jena encompassing both the Institute and the University were developed and submitted. The first is the formation of the Jena Graduate School Human Behaviour in Social and Economic Change and the second is the development of an excellence cluster for cutting edge research. In addition, there were important research projects and teaching activities with the University of Erfurt as well.

The Institute consists of three main research areas. The oldest research group, Economic Change and Evolutionary Conceptions was initiated in 1995 by the current Director, Ulrich Witt. Thomas Brenner has served as the Associate Director of the Group since 2003. In July of 2001, Werner Güth was appointed to be the director of the Strategic Interaction Group. He quickly built up his group along with the requisite laboratory infrastructure for undertaking the experimental research essential to the group’s mission. At the end of 2003 David Audretsch joined the Institute as the director of the research group on Entrepreneurship, Growth and Public Policy. While Erik Lehmann served as the initial Associate Director of the research group, in 2005 he accepted an appointment as a Full Professor at Augsburg University. He has been replaced by Werner Bönte, who joined the Institute in the fall of 2005.

The managing director of the Institute rotates on an annual basis. While Werner Güth served as managing director between 2002-03 and Ulrich Witt between 2003-04, David Audretsch has filled the position most recently.

While the youngest research unit is now more than two years old, all of the research positions have been filled only in the last year. Thus, staffing the Institute is now complete and replete with vital conferences, seminars, summer institutes and hosting international guest researchers. A sense of the vitality of the Institute and its main activities are provided below.

Jena, February 2006

David B. Audretsch
2 Research on Entrepreneurship, Growth and Public Policy

(Director: David B. Audretsch)

2.1 Research Program

The Entrepreneurship, Growth and Public Policy (EGP) division celebrated its second year of existence on December 19th, 2005. Under the leadership of Director David Audretsch, EGP immediately set the goal to become the preeminent Entrepreneurship Growth Institute in the world. This ambition was matched by the quality of the international scholars and fellows EGP recruited over the past two years. Both researchers and policy makers started to put Jena on the map as a necessary location for obtaining a comprehensive understanding of economic development issues.

Entrepreneurship refers to the process of change. In a rapidly globalizing economy, as the process of change accelerates, entrepreneurship, or its absence, becomes increasingly prominent. Yet the scholarly traditions focusing on entrepreneurship have been relatively under-developed and dispersed across a broad spectrum of academic disciplines. The purpose of the EGP Division is to provide a focal point for systematic scholarly research on entrepreneurship and to develop an intellectual framework and approach to launch entrepreneurship as a \textit{bona fide} field of scholarship. Creating the field of entrepreneurship spans a number of traditional units of analysis. At one level, entrepreneurship involves the decisions and actions of individuals. These individuals may act alone or within the context of a group. At another level, entrepreneurship involves units of analysis at the levels of the firm and industry as well as government and non-profit organizations, and at spatial levels, such as cities, regions and countries. Thus, the links between society and entrepreneurship are analyzed from a wide range of scholarly approaches. The anticipated result emerging from the research undertaken by this Division will be a unified and explicit focus on the economics of entrepreneurship.

Our research program, which examines the process of change, consists of four aspects. The first area of research is to identify what the role of entrepreneurship has been and how it has evolved historically. This is a rather descriptive undertaking, the objective of which is to assess the importance of entrepreneurship.

The second aspect is concerned with determinants that shape the amount of entrepreneurial activity. In a number of empirical studies EGP researches why university spillovers are important for entrepreneurial location. We demonstrate the differences between tacit and codified knowledge. While codified knowledge, such as academic articles in the sciences, could easily be transmitted in a longer distance, this does not hold for tacit knowledge, which is bounded within a small area around the source of knowledge. Furthermore, knowledge is only one necessary source for entrepreneurs. Another important resource for entrepreneurs and New Ventures is capital. Here, we research the major role venture capitalists play in providing equity and how equity, as an asset, is related to the knowledge incorporated by the Managers and Entrepreneurs who run the firm.

The third aspect focuses on the impact of entrepreneurship on economic performance. In a number of studies EGP research shows that New Ventures with access to both, knowledge spillovers and financial resources create higher economic performance. In particular, we empirically show that those firms have higher survival rates, abnormal returns on the stock market and higher growth rates in employees.

As the fourth aspect, this research unit provides both a theoretical and empirical framework highlighting those aspects of entrepreneurship that can serve as a guiding light to direct policy makers in understanding the debates, the most important questions and issues. Just as the classical model of economic growth focused the policy debate on the policies facilitating investments in capital and access to labor, the endogenous growth model has shifted the policy focus to investments in knowledge. By contrast, focusing on the role played by entrepreneurship may suggest a very different set of policy instruments. Thus, a goal of this research unit is to suggest a new set of policy instruments to promote economic growth and
employment generation that are unique and distinct from the instruments implied by the growth models mentioned above. Here we could show empirically how important regional policy is to provide “entrepreneurship capital”.

2.2 Research Activities

2.2.1 Role of Entrepreneurship

Entrepreneurship Capital in Germany

*Contact Scientists: David Audretsch and Max Keilbach*

Can science measure the role of entrepreneurship empirically? That is, can science quantify the impact of entrepreneurship on economic performance? Do different types of entrepreneurship differ in their impact? Moreover, what variables actually have an influence on entrepreneurial behavior and at which extent? These questions are at the core of a research project that is based at the Entrepreneurship, Growth and Public Policy Division.

The empirical research has been based on data on Germany. To measure the impact of entrepreneurship on economic performance, EGP uses a production function that we augment with entrepreneurship as a production factor. The procedure is laid out in Audretsch and Keilbach (2004). This is a natural extension of the more established empirical literature on endogenous growth (e.g. Romer, 1996) and is therefore easily tractable. Entrepreneurship in this research is expressed as the number of start-ups in each German county relative to the county’s population. This captures the main impact of entrepreneurial activity: the start-up of new firms. The figure on the right hand plots the spatial distribution of entrepreneurship for Germany for the period 1998 to 2000. This figure makes evident that entrepreneurial activity is stronger in agglomerated areas. It also reveals that there are strong entrepreneurial clusters, mainly around Munich, Frankfurt, Hamburg, the Ruhr region and Berlin. Also, the eastern German regions around Leipzig and Jena/Erfurt show strong entrepreneurial activity. A closer look reveals, however, that eastern Germany is dominated by what we term “low-tech” industries, i.e. industries with low or no R&D activity (such as the retail and the hospitality industry). This pattern can be considered typical for a former centrally-planned country, where the infrastructure in these industries is underdeveloped as compared to Western Germany. However, these industries are subject to lower growth rates and higher failure rates than R&D-oriented industries. They therefore have a lower potential to create new employment.

Our empirics provide evidence that entrepreneurship in general has a strong positive impact on regional economic performance. Performance has been expressed as regional economic output (GDP) on one side and the growth of GDP per worker (labor productivity) on the other side. On a more detailed level, we found evidence that “low-tech” entrepreneurship has a stronger effect on the level of GDP, but a weaker effect on the growth rate of regional labor productivity. The immediate effect of high-tech entrepreneurship on GDP is lower, however its impact on the growth rate is stronger.

The natural next step is to investigate which variables drive high-tech entrepreneurship and which variables drive low-tech entrepreneurship. To do so, we regress a number of regionally distributed variables against our different types of entrepreneurship. The table to the right side reproduces the regression results. Two variables should be mentioned here. One is the impact of the regional unemployment rate. High regional unemployment is positively correlated with low-tech start-ups, and is negatively correlated with high-tech and Informa-
tion Communication Technology entrepreneurship. Hence high-unemployment regions have a stronger potential for low-tech startups, but a weaker potential for high-tech startups. At the same time, a high R&D intensity leads to a high rate of high-tech startups but has no influence on low-tech startups.

Taken together, these findings suggest strong policy implications. Apparently, regions with high unemployment should rather focus on the creation and survival of “low-tech” firms instead of trying to foster the establishment of a high-tech cluster in the first place. Such an attempt will become meaningful, as soon as the regional economic situation is sound again. Once this is the case, the way to high-tech startups goes via the establishment of a strong R&D-intensity by incumbent firms and universities.

The question of why entrepreneurship actually does drive economic performance is not dealt with in this project but rather in another one.

References

Entrepreneurship and Economic Evolution

Contact Scientist: Max Keilbach and Mark Sanders

That entrepreneurship is a driving force in economic evolution is not a new hypothesis. While Walras (1874) considered entrepreneurship as agents who search for arbitrage opportunities and thus drive the market to clearing, Hawley (1893) rather considered entrepreneurs as agents who are willing to deal with the risk involved in pursuing new opportunities. Marshall (1920) devoted a chapter to “organization” as fourth production factor. Here, he saw “undertakers” (which is the literal translation of “entrepreneurs”) as the agents that coordinate the other three production factors (land, capital and labor) and that are ready to tackle the risk involved in doing so.

The endogenous growth theory is based on the fact that knowledge can behave like a public good in that it is non-rivalrous and in principle non-excludable. Therefore, new economic knowledge created by economic agents can spill over to other economic agents, the economy as a whole can therefore grow constantly or even display increasing returns to scale (Nooteboom, 2000.)

Arrow (1962), put forward the idea that new economic knowledge does not only behave like a public good but it is also uncertain. The consequence is that not all new knowledge is actually used by the agents creating that new knowledge since these agents might behave risk averse. This leaves knowledge opportunities for other agents. Entrepreneurs are agents who are ready to take on the risk involved in developing this new knowledge. This is the essence of the knowledge spillover theory of entrepreneurship. Due to this behavior, entrepreneurship plays an essential role in the process of knowledge spillovers and therefore in economic growth.

Keilbach and Sanders suggest a formal model that captures these characteristics. The model consists of three types of agents, \( L \) or labor, \( R \) or R&D personnel and \( N \) or entrepreneurs. There is no unemployment in the economy, hence the population \( P \) is composed of these three types of agents or \( P = L + R + N \). Entrepreneurs are the agents who inject new ideas (i.e. products or technologies) into the economy. At the same time, R&D improves existing products or technologies. Both types of products are produced by laborers. The model therefore implicitly divides the task of creating newness into two parts: new products and improvements of existing products, thus reflecting the arguments of Baumol (1968).

The model addresses two issues. 1) What is the impact of entrepreneurs, or more specifically, can there be steady state growth without the activity of entrepreneurs? 2) Does a stable and non-trivial steady state allocation (i.e. an allocation such that the share of all three is greater than zero) between \( L, R \) and \( N \) exist that ensures steady state growth?

The approach is based on a quality ladder specification where entrepreneurs extend the variety of products and incumbent firms increase the quality of existing products. Thus, the model goes beyond the “quality versus variety” specification in Grossman and Helpman (1991).

The model shows that there is indeed a non-trivial stable state solution that ensures steady state growth of the economy. The above figure illustrates this point. On the other hand, if there is no entrepreneurial activity, the steady state growth rate converges to zero. Hence the injection of new products into the economy by entrepreneurs is an essential contribution to economic growth.
Entrepreneurship and Economic Development Nexus in a Developing Country Context

Contact Scientist: Jagannadha Pawan Tamvada

Motivation

Though there is very little agreement on the definition of entrepreneurship, existing studies predominantly assume quality of entrepreneurship to be uniform phenomena independent of the spatial and developmental dynamics. This is a major assumption that enables contemporary comparative research examine the role of entrepreneurship in economic growth across the world. The enormous reliance on data from developed economies for understanding this relationship is a major reason for this assumption of qualitative uniformity. Though the literature cognizes and differentiates entrepreneurship as being opportunity based or necessity based, there are no empirical studies that examine the quality of entrepreneurship within an economy. This study addresses this key issue of quality using data on Indian states.

Background

Using business ownership rates, spin offs, new startups, innovative firms, total entrepreneurial activity from the Global Entrepreneurship Monitor (GEM) surveys, contemporary studies have examined the role of entrepreneurship in economic growth empirically. Most of the studies confirm the “U” shaped relationship between entrepreneurship and economic development hypothesized by Wennekers and Thurik (1999). These studies find that entrepreneurial activity has started rising after declining continuously till 1970. This is attributed to the availability of opportunities that led to perception of higher opportunity costs of being self-employed before 1970. However intensified global competition, growth in market fragmentation, technological progress (Carlsson 1992) and increased labor supply, education level, changes in consumer tastes, reduced entry barriers (Brock and Evans 1989) have led

References


Nootenboom, Bart (2000), Learning and innovation in organizations and economies, Oxford University Press.

to increased entrepreneurial activity once again in developed economies after 1970, marking the beginning of the Schumpeterian Mark I regime that is characterized by creative destruction.

Entrepreneurship in Developing Countries

The remarks of Evsey Domar (Evse D. Domar 1968) highlight the intricate problem that is involved in understanding the role of entrepreneurship in less developed countries. “We cannot tell whether underdeveloped countries… really lack entrepreneurs as persons with specific traits, or whether those who do exist are prevented from functioning properly. Probably both, but an economist is more inclined to follow the second hypothesis because it is more operational.” A developing economy displays the traits of a developed as well as an under-developed economy. The process of its economic evolution presents many insights into the dynamic relationship between entrepreneurship and economic development.

The Dual Theory of Entrepreneurship

The EGP division develops the Dual Theory of Entrepreneurship highlighting the presence of different components of entrepreneurship. Total entrepreneurship (TE) consists of real entrepreneurship (RE) and necessity entrepreneurship (NE). At a very low level of development the NE is very high, and with the process of development NE reduces much faster than TE. Measures of entrepreneurial activity used in cross country studies are proxy measures of TE. A measure of entrepreneurial activity that doesn’t recognize its real and necessity components may not rightly assess the true relationship between entrepreneurship and economic development. Though there is a continuous dependence between entrepreneurship and economic development, we can assume ceteris paribus the existence of a threshold $D^*$ of economic development such that for $Dev<D^*$ it is development that has a dominating influence in determining $NE$ and $RE$, and for $Dev>D^*$ it is $RE$ that impacts further economic development. The unit estimates (Audretsch and Keilbach 2004) modified Cobb-Douglas production function to empirically examine this relationship. The results suggest the possibility of various components of entrepreneurship ‘reflecting and effecting’ differently the level of economic development in an economy. The results also indicate that aggregate measures of entrepreneurship fail to capture the real impact that it has on economic development.

References

Spatial Distribution, Agglomeration, and Entrepreneurship

Contact Scientist: Zuoquan Ahao

Economists have increasingly recognized the importance of space, geography, and spatial distribution (e.g., Thünen rings) in understanding relationships among economic growth, spatial agglomeration, knowledge spillovers, and entrepreneurship (Audretsch and Feldman 2004). The current research, however, could not give a complete account of these relationships because the methodologies and approaches used focus primarily on the size dimension of economic activity (Davis and Weinstein 2002). The EGP Division’s primary objective is to present a spatial distribution approach to examine these relationships. The spatial distribution approach emphasizes the importance of geographical range and spatial intensity in economic analysis. This approach attempts to describe the expansion and intensification of economic activity, and link them with economic growth in continuous space.

The Division’s current research extends statistics of spatial distribution to investigate relationships between growth, agglomeration, knowledge spillovers, and entrepreneurship. Our objective is first to modify the spatial statistics of Wartntz and Neft (1960) into a distance-based framework, and to extend it to agglomeration dynamics and spatial regression. Research shows that the extent of agglomeration can increase with the expansion of economic activity over space (Fig. 1). Second, our work is intended to incorporate the element of space into aggregate growth models that endogenize the distribution of, and allow for mobility of factors of production over continuous space. Third, our research argues that entrepreneurship contributes to the growth of firms, industries, cities, and countries in a way that promotes economic agglomeration whenever agglomeration economies prevail, and it disperses economic activity whenever agglomeration diseconomies become dominant.

Reference

Analyzing the linkages between Innovation, Corporate Governance and Firm dynamics

*Contact Scientist: Raquel Ortega-Argiles*

Three questions are central to this research project. The first is how different aspects related corporate governance structure have an effect on innovative activities. Moreover, the project investigates whether the evaluation of the continuous innovative activity plays an important role in the explanation of post-entry growth and survival. Finally, taking into account different firm-internal aspects related to different ownership and management structures (family vs. non-family, domestic vs. foreign, concentrated vs. diversified firms), the project analyses the determinants that cause differences in survivor functions.

**The Corporate Governance and Innovation linkage**

The separation of ownership and management is one of the main causes of agency problems in the investment decisions of the firm because of the informational asymmetries between managers and owners (Jensen, 1986; Jensen and Meckling, 1976). In this study we have analysed at great length some of the available mechanisms that the owners have to palliate this kind of internal problems in their firms.

Drawing on findings published elsewhere, the project has some hypotheses that reflect the ownership and control structure of a firm on its R&D activity:

- In terms of the level of concentration of a firm’s ownership, are diffusely-held companies more likely to undertake R&D investment because of the greater flexibility granted to the actions of their managers.

- By contrast, the incorporation of owners into the firm’s decision-making procedures may serve to control manager decision-making, and so we can expect that as a result of a lack of specialization on the part of the management team, there will be a negative effect on R&D activities.

- Finally, in line with the positive theory of agency, can debt financing discourage innovative activities because of the high specificity and intangibility of technological investments, the high risk of these activities, and the existing information asymmetries?

Following different innovation models (Pakes and Griliches, 1980; Acs and Audretsch, 1988) the project analyzes some firm internal determinants on the R&D effort per employee, on the one hand, and on innovative output (patents, utility models, process and product innovations), on the other. As the data treatment differs in both cases, the project develops a set of models in a panel of manufacturing firms (discrete choice, tobit-type model and dynamic panel count-data models –poisson, negative binomial–).

The first conclusion to be drawn is that internal variables related to the ownership and control structure of the firm have a significant effect on R&D activities. Additionally, we have observed that internal variables of this type seem to have more impact on the investment decisions to carry out R&D activity than on the results of such activity measured in the form of patents or new products.

**The active learning theory and Firm Dynamics**

It is well known that the decisions taken by the firms during their lifetime will determine their efficiency and, in turn, their survival. The analysis is based on the optimal competitive behaviour of the firms taking into account the *active learning theory* developed by Klepper, Ericson and Pakes.
The theory underpinning industrial dynamics is today richly abundant but it continues to base its main arguments on the theory of market selection formulated by Jovanovic (1982), who devised a model in which he claimed market selection is based on the business efficiency acquired by a firm operating within that market. Thus, firms that fail to learn from those that are already well established or from their own experience, because of a lack of efficiency, are forced to abandon the market leaving the firms that know how to be efficient as the market’s sole survivors. Over the years, it has been shown that in addition to the experience that a firm might acquire, other factors might also be significant in determining its competitive strategies, such as the theory that relates improvements in competitiveness with business innovation (Klepper, 1996; Ericson and Pakes, 1995).

Taking in mind the active learning theory, we account for aspects related to the capacity of a firm to become more competitive in the market where it operates based on product and process innovations strategies.

- On the one hand, the product innovation strategy is based on the introduction in the market of new products or the modification of the existing ones (new design, new material, functions or new components). These would even include the firm’s capacity to diversify itself: in other words, to operate in different markets or different industries. Given that the amounts of investment requirements are not as important as in the process innovations, it is more associated with a lower scale of operation of the production activity. Changes in a product are generally focused on differentiation from its direct competitors with the aim of finding its own market share.

- On the other hand, the strategy based on process innovation is related to the implementation of new behaviors in the production process. The new production behavior concerns the introduction of new processes in their production techniques or the implementation of new organization in the methods of operating (factors related to its management, ownership and the start of new establishments). The improvements to its processes are linked with its capacity to reduce costs and to increase productivity, which would make a firm more efficient and which would translate into a reduction in prices. Process innovation are more usual in industries situated in mature stages of their life cycle, because of this kind of innovation requires a high initial investment and is more related with sunk cost and long-term investments.

Non-parametric tests of equality of means, semi-parametric Cox models and parametric models with some different assumptions about the survivor function (log-logistic, log-normal, among others) are used for checking the importance of the active learning process theory in the survival likelihood of firms.

Some evidence about the linkage of Ownership and Management Structure and Firm Dynamics

Having in mind the importance of the corporate structure for the firm decision processes, the research project have in mind to analyze differences in the survivor functions.

In a first step, the project will analyze what are the determinants of the success of family firms. Researchers have repeatedly argued that conceptually the strategic planning processes and the resulting strategies of family businesses differ significantly from the processes and the strategies of non-family firms. For this reason, the effect of family managers, the effect of the founders and the later generations, the effect of non-owner manager are some of the hypothesis that have to be tested for making a contribution in the increasing of knowledge about the differences between family and non-family firms, taking into account the importance of this kind of business structure in Southern-European countries.

Additionally, some hypotheses about the significant differences in the probability of exit of foreign and domestically-owned firms are formulated. On the one hand, it is well known that foreign multinationals may be a risky development strategy as foreign firms are likely to be less rooted in the local economy and may be quicker to close down production. On the other hand, foreign firms use those factors that are associated with the success and viability of
firms more intensively than do their domestic counterparts and for this reason, they can compensate their disadvantage by doing business abroad (Mata and Portugal, 2004).

References


The Geography of Entrepreneurship

Contact Scientists: David Audretsch, Max Keilbach, Erik Lehmann, Pamela Mueller, André van Stel

A new literature has emerged suggesting that knowledge spills over from the firm or university producing it to a different firm commercializing that knowledge (Griliches, 1992). This view is supported by theoretical models which have focused on the role that spillovers of knowledge play in generating increasing returns and ultimately economic growth (Krugman; 1991; and Grossman and Helpman, 1991).

An important theoretical development is that geography may provide a relevant unit of observation within which knowledge spillovers occur (Metcalfe 1996.) The theory of localization suggests that because geographic proximity is needed to transmit knowledge and especially tacit knowledge, knowledge spillovers tend to be localized within a geographic region. The importance of geographic proximity for knowledge spillovers has been supported in a wave of recent empirical studies including Jaffe, Trajtenberg and Henderson (1993), Audretsch and Feldman (1996) and Audretsch and Stephan (1996).

While this literature has identified the important role that knowledge spillovers play, they provide little insight into the questions of why knowledge spills over and how it spills over. What happens within the black box of the knowledge production is vague and ambiguous at best. The exact links between knowledge sources and the resulting innovative output remain invisible and unknown. None of the above studies suggest that knowledge spillovers are geographically bounded and localized within spatial proximity to the knowledge source actually identified the actual mechanisms which actually transmit the knowledge spillover; rather, the spillovers were implicitly assumed to automatically exist, or fall like Manna from heaven, but only within a geographically bounded spatial area. This has moved Paul Krugman (1991, p. 53) to argue that economists should abandon any attempts at measuring knowledge spillovers because “knowledge flows are invisible, they leave no paper trail by which they may be measured and tracked.”

While Krugman’s (1991) observation is undeniably true, the creation of a new firm, especially in a high-technology, science-based industry produces an event that leaves traces for penetrating the black hole of the knowledge spillover process. One of the most striking features of firms making Initial Public Offerings (IPOs) in biotechnology is that they are typically able to raise millions of dollars in the absence of having a viable product at the time
when they go public. Indeed, new firms are founded and receive financing on the prospects of transforming technological knowledge created at another source into economic knowledge at a new firm through the development and introduction of an innovative product. Thus, the establishment of a new firm in a knowledge-based industry provides a unique opportunity for examining properties of the knowledge production function, and especially the links between the creation of knowledge and its commercialization.

The purpose of this project is to bring the two dimensions triggered by investments in knowledge—one organizational and the other geographic—together by asking whether the knowledge spillover theory of entrepreneurship also has a spatial component in that the startups tend to cluster within geographic proximity to knowledge sources. As Fritsch and Mueller (2004) and as the Figure shows, entrepreneurial activity varies significantly across German regions. Similarly, as Wennekers et al. (2005) show, entrepreneurial activity varies systematically across countries.

In Audretsch, Lehmann and Warning (2005) a new firm-level data base consisting of high-technology and knowledge-based entrepreneurial startups is used to analyze the geography of high-technology entrepreneurship in Germany. This new data base is drawn from the prospectus of 281 firms that made an initial public offering (IPO) in Germany between March 1997 to March 2000 to examine the impact and nature that location plays in entrepreneurial access to university spillovers.

The knowledge spillover theory of entrepreneurship suggests that investment in the creation of new knowledge will generate opportunities for entrepreneurship as a mechanism for knowledge spillovers. The Locational Hypothesis places a spatial constraint on such spillovers, particularly from universities. This project has found that, in general, those universities in regions with a higher knowledge capacity and greater knowledge output also generate a higher number of knowledge and technology startups, suggesting that university spillovers are geographically bounded. Geographic proximity is an asset, if not a prerequisite, to entrepreneurial firms in accessing and absorbing spillovers from universities.
However, this project has also shown that the role of geographic proximity in accessing university spillovers is considerably more nuanced than is suggested by the Locational Hypothesis. The importance of geographic proximity apparently depends on at least two factors: the particular type of university output and spillover mechanism. For those university outputs and spillover mechanisms which are more tacit in nature, geographic proximity plays a greater role in accessing and absorbing university spillovers. By contrast, for those university outputs and spillover mechanisms which are less tacit and more codified, geographic proximity is less important.

References


2.2.2 Determinants of Entrepreneurship

Entrepreneurial Performance

Contact Scientist: David Audretsch, Max Keilbach and Erik Lehmann

What determines the performance of entrepreneurial firms? This project operationalizes entrepreneurial performance alternatively in terms of entrepreneurial survival, growth and stock market return. The knowledge spillover theory of entrepreneurship is depicted in the following figure below. The production of new knowledge and ideas in the context of an incumbent organization, such as the research and development lab of a large corporation, or the research laboratory at a university, creates knowledge embodied in an individual knowledge worker, or team of knowledge workers. If divergences in the expected value or outcome from this new knowledge lead to the decision by the incumbent firms not to commercialize the new knowledge, the economic agent could remain employed by an incumbent firm and expect to earn incremental additions to her income over time, as depicted by the positive, linear incumbent earnings profile.

Alternatively, as a result of her endowment of ideas and knowledge that is not being appropriated or rewarded within the context of the incumbent organization, the knowledge agent could reach the decision to start a new firm, which is represented by point A. Why would a
rationale economic agent choose to settle for a lower return at point A than could be earned from a wage paid by an incumbent firm? Because of the expectation that there is some likelihood that the ideas upon which the firm is started will prove to be valuable, resulting in a growth of the firm and associated returns along the survival trajectory. As the evolutionary theories and systematic empirical evidence, shows, the likelihood of a new startup surviving is low. It is even lower for a knowledge-based startup. However, as discussed above, the same literature has provided theoretical insights and compelling evidence showing that those knowledge-based startups that do survive will actually experience higher growth rates.

One of the most important findings in the endogenous growth literature is that knowledge externalities, or what has become known as knowledge spillovers, provide a mechanism generating a superior economic performance, measured in terms of growth, in spatially concentrated areas rather than when economic activity is geographically dispersed. An important finding in both the endogenous growth literature as well as the studies on city growth, is that agglomerations of economic activity have a positive impact on economic growth. However, the actual mechanisms by which this growth takes place are less clear. An important step was made in penetrating the black box of urban space by Glaeser et al. (1992) and Feldman and Audretsch (1999), who demonstrated that not only is growth influenced by the spatial concentration of economic activity, but also the manner in which that activity is organized. In particular, they found that a diversity of complementary economic activity is more conducive to growth than specialization. Still, there is virtually nothing known about the impact of location on growth at the micro or establishment level.

Does location make a difference in terms of firm growth? Are there systematic differences in growth rates of firms engaged in the same industry across geographic space? While the recent theories and empirical evidence about the linkages between agglomerations and growth at the spatial level would certainly imply that this relationship should also hold at the micro or establishment level, in fact, very little is known about the locational impact on firm performance, as measured in terms of growth. This is because both the conceptual framework and empirical analyses have been aggregated to spatial units such as cities or industries located in cities. Insights about the impact of location in general, and agglomerations in particular on firm growth have been limited.

This omission cannot be attributed to a lack of theories and empirical evidence about growth at the firm level (Klepper 1996.) In fact, a large literature has been compiled providing both a conceptual framework as well as compelling evidence as to why performance, measured
in terms of growth, varies systematically across firms (Sutton, 1997; Caves, 1998). While the literature on Gibrat’s Law and industry dynamics has produced stylized facts about the roles that characteristics specific to the firm - such as size and age - and industry - such as high-tech versus low-tech - play in shaping growth, locational aspects have been overlooked in these studies.

This project fills these gaps in the literatures on spatial growth on the one hand and firm growth on the other, by explicitly linking the performance of new technology and knowledge-based firms, measured in terms of growth, to the geographic location. To do this, we will combine the conceptual frameworks developed in these two distinct literatures to introduce a model of growth that is specific to characteristics of the location as well as the firm and industry (Engel and Keilbach, 2005).

The findings from estimating the growth rates of high-technology German firms (Audretsch and Lehmann, 2005) suggest that not only is firm performance in general, and growth in particular, positively influenced by investments in knowledge, but accessing external knowledge generated by universities also contributes to firm performance.

References


Innovation and Entrepreneurship

Contact Scientist: Werner Bönte

Technological change is a key driver of economic growth in industrialized economies (Malerba 1997.) Technological change can be defined as "the rate at which new knowledge is diffused and put into use in the economy" (Audretsch et al. 2002, p.156). Thus, the pace of technological change is determined by the creation of new knowledge (technology) and the ability of innovators to develop new products or new production processes based on new technologies. Audretsch et al. (2002, p. 157), call this process the entrepreneurial process since the "entrepreneur is able to recognize the commercial potential of an invention and organize the capital, talent and other resources that turn an invention into a commercially viable innovation". According to this process competitive market conditions generate an entrepreneurial response which in turn leads to an innovation that generates an economic value. Our research of the past two years has dealt with the relevance of knowledge diffusion for the entrepreneurial process and for economic performance.

One important channel of knowledge diffusion is formal and informal cooperations between firms in the supply chain. The EGP Division has conducted an econometric study (Bönte/Keilbach, 2005) which examines the firms’ decisions to cooperate formally and/or informally with their customers and suppliers. Based on a sample of German innovating firms that contains information on formal and informal innovation cooperation between customers
and suppliers, it is found that firms perceive informal cooperation as being more important than formal cooperation modes. Then the determinants of firms' decisions to engage in the respective cooperation modes are investigated. In line with previous empirical work, we do not find much empirical evidence for the relevance of incoming spillovers for formal cooperations. In addition, our results suggest that this finding holds for informal cooperations as well. In contrast, a firm's ability to protect its proprietary innovations seems to be a key determinant of formal as well as informal cooperations. Furthermore, absorptive capacity and the organizational structure of in-house R&D play an important role. Another relevant driver of vertical cooperations is the innovation dynamics at the industry level. Firms that operate an R&D department and firms that are involved in costly R&D projects tend to cooperate formally rather than informally.

The strategic aspects of knowledge disclosure by customers in buyer-supplier relationships have been analyzed by Lars Wiethaus and me in a theoretical study (Bönte/Wiethaus, 2005). EGP shows that in one-shot relationships no knowledge disclosure takes place because the supplier has an incentive for knowledge transmission and, in anticipation of this outcome, buyers refuse to disclose any of their knowledge. In repeated relationships knowledge disclosure is stabilized by larger technological proximity between buyers and suppliers and destabilized by the absolute value of the knowledge.

The results of empirical studies suggest that business R&D yields high social returns due to R&D spillovers and that advanced economies may underinvest in R&D. Thus, public support to business R&D may promote economic growth. However, the bulk of public support is usually targeted to a few industrial sectors. Hence, one may ask whether or not targeted public support to business R&D does positively affect productivity growth of the business sector. Boente has examined the effects of interindustry R&D spillovers from publicly financed business R&D on private R&D efforts and productivity using data of West-German manufacturing industries (Bönte, 2004a). The results suggest that it is important to distinguish between the effects of spillovers from privately and publicly financed business R&D. In particular, estimation results provide evidence of productivity enhancing effects of spillovers from privately financed R&D while results are less clear-cut for publicly financed R&D. Moreover, there is some empirical evidence that private R&D efforts of higher-technology industries are stimulated by spillovers from publicly financed R&D but not by spillovers from privately financed R&D. However, public funding of R&D in higher-technology industries seems to induce private R&D investments within these industries.

In recent years geographical business clusters have become one of the vibrant fields of research in regional economics. It is often argued in the literature that firms in clusters benefit from the diffusion of knowledge within clusters. We have investigated the impact of various agglomeration forces on innovation performance and employment for a sample of aeronautical cluster firms in Northern Germany and a control group of geographically dispersed aeronautical firms in other German regions (Bönte, 2004b). The findings suggest that a firm's probability of innovating is positively influenced by knowledge flows from proximate scientific institutions and public information sources as well as demanding local customers. However, only the effect of demanding customers is cluster-specific. Moreover, a firm's lifetime employment growth is positively affected by labor market pooling, but this effect is not cluster-specific since it is also relevant for non-cluster firms.

Audretsch and Keilbach (2005) argue that entrepreneurship capital plays an important role in the process of knowledge spillovers. The cluster has investigated empirically the relationship between regional innovative activities, entrepreneurship and economic performance for West-German counties (Audretsch, Bönte and Keilbach, 2005). In particular, we examine whether creation of new technological opportunities through past innovative activities of incumbent firms does lead to an increase in the productivity of a region's manufacturing sector. In doing so, we distinguish between direct and indirect effects. The latter will occur if technological opportunities positively influence the regions' entrepreneurship capital and in turn productivity. In contrast to previous empirical studies in this field of research we do not employ 'classical regression analysis' but make use of the LISREL method. This is a statistical structural modeling method that allows us to estimate causal relationships among latent variables, like knowledge, entrepreneurship capital and productivity. Using data for 310 West-German counties, we test hypotheses using different proxies for new technical knowledge, one being input oriented (R&D) one rather output oriented (patents). Using the LISREL
method, we obtain the following results. First, new knowledge has a positive and significant impact on economic performance. Moreover, new knowledge has a significant positive impact on the regions' entrepreneurship capital which in turn has a significant positive impact on economic performance. Hence we can indeed identify knowledge to increase the regions' entrepreneurship capital and moreover that entrepreneurship capital to increase the regions' economic performance.

References

Compensating Employees of New Ventures

*Contact Scientists: Dr. Erik Monsen and Dr. Holger Patzelt*

**Principle Topics**
In the entrepreneurship literature, reward and incentive systems have been identified as a critical dimension of corporate entrepreneurship activity. Common survey measures, such as the Corporate Entrepreneurship Assessment Inventory (Hornsby, Kuratko, & Zahra, 2002) and Entrepreneurial Management (Brown, Davidsson, & Wiklund, 2001) respectively include „rewards/reinforcement“ and „reward philosophy“ as a factor. While rewards are important in corporate entrepreneurship, few address the theoretical foundations of incentive system design for the corporate venturing context.

In fact, the unit found only one prior study that models the corporate venturing process, including the reward system, from a theoretical perspective. Jones and Butler (1992) took an agency theory approach and found that innovations in organizational structure and organizational controls and rewards can mitigate and solve agency problems. While they make a number of prescriptive suggestions regarding reward systems (outcome based contracts, promotions, large monetary premiums tied to individual and group performance, equity ownership and stock options for employees at all levels) and identify a number of areas of concern (linking performance to reward, equity in rewards and procedures, and the time dimension), their reasoning is limited by their economic-focused agency theory perspective. Even Jones and Butler (1992) admit that behavioral and social factors are missing from their model: „Exploring the interplay amongst economic and behavioral factors would be interesting empirically.“ (1992: 747). Continuing this call for further research, Wiseman and Gomez-Mejia have more recently stated that „Further, formally incorporating goal setting theory into agency models of compensation design may provide new ways of viewing the criteria used in awarding variable pay“ (1998: 147).
Key Propositions
In this project, we take up this call for further research by introducing a more comprehensive model of compensation for corporate entrepreneurship, proposing a corresponding set of testable hypotheses and empirically testing them with a field experiment. The initial task of developing a theory of motivation for the corporate entrepreneurship context requires a multi-theoretic lens to explain the economic and behavioral factors that drive an employee-entrepreneur’s choice to either participate in a new corporate venture or not. Frequently identified factors in the corporate entrepreneurship literature include: risks, rewards, goals, abilities and expectations.

Building on prior integrative work in compensation theory, we develop an expanded incentive framework that incorporates both economic (risk) and behavioral (effort) theories. First, we review the risk dimension, which is represented by Behavioral Agency Model, an integration of agency and prospect theory (Wiseman & Gomez-Mejia, 1998). Second, we consider the effort dimension and review prior work that has integrated and expanded upon expectancy theory and goal theory (Locke & Latham, 1990). Third, we discuss and propose interactions between the risk and effort theories.

Our final model consists of three risk factors (employment risk, pay risk, and individual vs. group level effects) and three effort factors (required effort, expected performance and goal difficulty). Moreover, it takes into account that general self-efficacy of individuals (Bandura, 1997; Chen, Gully, & Eden, 2001) may have a moderating effect on entrepreneurial behavior (Markman, Balkin & Baron, 2002).

Methods
To empirically test our model, the unit designed a conjoint experiment that we will conduct with at least 100 scientific, technical and engineering employees of a large, multinational corporation active in the high technology sector. This method was chosen because it meets the basic criteria outlined by Shane, Locke, & Collins (2003) for measuring the effect of motivations on entrepreneurial decisions and it can be used efficiently to collect data from practicing managers and employees. This setting is particularly suited for our analysis since large high tech firms often form spin-offs in order to discover and develop new technologies. Therefore, these companies are intrinsically motivated to have their scientific staff participate in new venture creation. As each participant in our experiment will make 32 assessments, our analysis is based on more than 3200 data points. We will employ Hierarchical Linear Modeling (HLM) in order to account for autocorrelations between the assessments of one individual.

Implications
Based on our understanding of the behavioral theories regarding effort, EGP expects that this more integrative model will exhibit not only differences in magnitude, but also in direction of the incentive system model relationships that are based on a purely economic risk-based model. In turn, the findings may point towards an incentive package quite different than that suggested by Jones and Butler (1992) in their purely economic agency-theory based model.

The implications of this model extend beyond the corporate entrepreneurship context to broader issues of strategy and human relations. While the corporate entrepreneurship context itself is relatively narrow, its complexity allows us to push the boundaries of current theories. Our goal is to develop a more comprehensive motivational theory which is broad enough to encompass all of the complexities of the corporate entrepreneurship context, in particular, and 21st century employment, in general.

References
Commercialization of Knowledge: Exploitation of Entrepreneurial Opportunities and University-Industry Relationships

Contact Scientist: Pamela Mueller

Why do regions post different growth rates? Research and development activities are an essential vehicle for private businesses, universities, and other research institutions to generate new knowledge. The new knowledge may be a crucial input factor for innovation thereby spurring economic growth. Economic output may be the larger the stronger the region’s endowment with capital or labor, the more knowledge is created, and the more knowledge is commercialized. Entrepreneurial opportunities may arise if existing organizations do not capitalize knowledge to the full extent. Firms with abundant underexploited knowledge are a breeding ground for entrepreneurial opportunities, namely spin-offs (Agarwal et al., 2004; Franco and Filson, 2000). Furthermore, underexploited knowledge also results if research carried out at universities and research institutions is hardly translated into new products or services (Nelson 1993; Pavitt 2001). Both existing firms as well as entrepreneurs may draw from universities and other research institutions. Recent studies underlined the importance of academic research by showing that a part of new products and processes could only be developed because of academic research and would have been substantially delayed otherwise (Mansfield, 1998; Beise and Stahl, 1999).

Entrepreneurship as well as university-industry relations may serve as a conduit for knowledge spillovers. Acs et al. (2005) suggested that especially entrepreneurship may provide the missing link to economic growth by penetrating the knowledge filter and simultaneously enhancing knowledge spillovers. Mueller (2005a) extended their idea and also accounted for knowledge flows out of universities. The results indicate that the regional variation in economic performance in German regions can be explained by new business formation activity and university-industry relations. Economic performance, measured in labor productivity, is the larger, the higher the start-up rate and the greater the value of industrial grants given to universities per researcher in the region is. Furthermore, regions with a high share of knowledge-related entrepreneurship receive a premium on top of general entrepreneurship. The collaboration between industry and university especially penetrates the knowledge filter in applied sciences such as engineering sciences, which indicates that knowledge spillovers are predominant in more applied research areas. Another study by Mueller (2005b) presents that those regions that were able to increase their entrepreneurial capital also experienced higher economic growth rates. Nevertheless, it is not general entrepreneurial capital but entrepreneurship in knowledge- and technology-intensive industries that drives economic growth.
The Knowledge Spillover Theory of Entrepreneurship

Contact Scientists: David Audretsch, Werner Bönte, Max Keilbach, Pamela Mueller, André van Stel

Why do some people start firms? This question has been at the heart of considerable research, not just in economics, but throughout the social sciences. Herbert and Link (1989) identified three distinct intellectual traditions in the development of the entrepreneurship literature. These three traditions can be characterized as the German Tradition, based on von Thünen and Schumpeter, the Chicago Tradition, based on Knight and Schultz, and the Austrian Tradition, based on von Mises, Kirzner and Shackel.

It is a virtual consensus that entrepreneurship revolves around the recognition of opportunities and the pursuit of those opportunities. Much of the contemporary thinking about entrepreneurship focuses on the cognitive process by which individuals reach the decision to start a new firm. According to Sarasvathy, Dew, Velamuri and Venkataraman (2003, p. 142), “An entrepreneurial opportunity consists of a set of ideas, beliefs and actions that enable the creation of future goods and services in the absence of current markets for them.” Sarasvathy, Dew, Velamuri and Venkataraman provide a typology of entrepreneurial opportunities as consisting of opportunity recognition, opportunity discovery and opportunity creation.

In asking the question of why some do it and others do not, scholars have focused on differences across individuals. As Krueger (2003, p. 105) observes, “The heart of entrepreneurship is an orientation toward seeing opportunities,” which frames the research questions, “What is the nature of entrepreneurial thinking?” and “What cognitive phenomena are associated with seeing and acting on opportunities?”

The traditional approach to entrepreneurship essentially holds the context constant and then asks how the cognitive process inherent in the entrepreneurial decision varies across different individual characteristics and attributes (McClelland, 1961). As Shane and Eckhardt (2003, p 187) summarize this literature in introducing the individual-opportunity nexus, “We
discussed the process of opportunity discovery and explained why some actors are more likely to discover a given opportunity than others. Some of these differences involve the willingness to incur risk, others involve the preference for autonomy and self-direction, others involve differential access to scarce and expensive resources, such as financial capital, human capital, social capital and experiential capital. This approach focusing on individual cognition in the entrepreneurial process has generated a number of important and valuable insights, such as the contribution made by social networks, education and training, and familial influence (Acs and Audretsch, 2002). The literature certainly leaves the impression that entrepreneurship is a personal matter largely determined by DNA, familial status and access to crucial resources.

The purpose of this project is to invert the traditional approach to entrepreneurship. Rather than taking the context to be given and then ask how variations across individual attributes shape the cognitive process underlying the decision to become an entrepreneur, this chapter instead assumes the individual characteristics to be constant and then analyzes how the cognitive process inducing the entrepreneurial decision is influenced by placing that same individual in different contexts. In particular, we compare high knowledge contexts with impoverished knowledge contexts. This leads to a different view of entrepreneurship. Instead of being a phenomenon that is exogenously determined by pre-conditioned personal attributes and family history, entrepreneurship instead emerges as an endogenous response to opportunities generated by investments in new knowledge made by incumbent firms and organizations, combined with their inability to fully and completely exhaust the ensuing opportunities to commercialize that knowledge. In this project we show how entrepreneurship can be an endogenous response to investments in new knowledge where commercialization of that knowledge is constrained by the existence of a formidable knowledge filter (Audretsch, Keilbach and Lehmann, 2006).

We hold the individual attributes constant and instead focus on variations in the context. In particular, we consider how the knowledge context will impact the cognitive process underlying the entrepreneurial choice model. The result is a theory of endogenous entrepreneurship, where (knowledge) workers respond to opportunities generated by new knowledge by starting a new firm. In this view entrepreneurship is a rational choice made by economic agents to appropriate the expected value of their endowment of knowledge. Thus, the creation of a new firm is the endogenous response to investments in knowledge that have not been entirely or exhaustively appropriated by the incumbent firm.

In the knowledge spillover theory of entrepreneurship, the spillover of knowledge and the creation of a new, knowledge-based firm are virtually synonymous. Of course, there are many other important mechanisms facilitating the spillover of knowledge that have nothing to do with entrepreneurship, such as the mobility of scientists and workers, and informal networks, linkages and interactions. Similarly, there are certainly new firms started that have nothing to do with the spillover of knowledge. Still, the spillover theory of entrepreneurship suggests that there will be additional entrepreneurial activity as a rational and cognitive response to the creation of new knowledge (Klepper and Buenstorff, 2004.) Those contexts with greater investment in knowledge should also experience a higher degree of entrepreneurship, ceteris paribus. Perhaps it is true that entrepreneurs are made. But more of them will discover what they are made of in a high-knowledge context than in an impoverished knowledge context. Thus, we are inclined to restate the conventional wisdom and instead propose that entrepreneurs are not necessarily made, but are rather a response – and in particular a response to high knowledge contexts that are especially fertile in spawning entrepreneurial opportunities.

Not only does holding the individual attributes constant but varying the knowledge context give rise to the knowledge theory of entrepreneurship, but the view of entrepreneurship as an endogenous response to the incomplete commercialization of new knowledge results in entrepreneurship as providing the missing link in recent economic growth models (Acs et al., 2005). By serving as a conduit of knowledge spillovers, entrepreneurship serves as an important source of economic growth that otherwise would not have occurred. Thus, entrepreneurship is the mechanism by which society more fully appropriates its investments in the creation of new knowledge, such as research and education.
References


Financing Entrepreneurship

Contact Scientists: David Audretsch, Max Keilbach and Erik Lehmann

It is often argued that a bank-based system like Germany suffers from inadequate financing of young and innovative firms. An important implication from the famous Modigliani/Miller theorem (Modigliani/Miller 1958) is that the way a project or firm is financed does not matter. Thus, high-tech firms could either be financed by banks via debt or venture capitalists, via equity. However, an implicit assumption of Modigliani/Miller (1958) is the existence of an ideal world without taxes and incentive problems. Since taxes could not be the main reason explaining the bias of small business financing in favor of debt over equity, an alternative explanation could be the greater incentive problems resulting from greater information asymmetries. Although there is overwhelming evidence that banks as financial intermediaries play a major role in the reduction of agency costs (Diamond 1984), they may fail in providing debt when the degree of asymmetric information is too high. In this case, a profit maximizing bank cannot capture the expected costs of debt by the interest rates of the loan (Stiglitz/Weiss 1981). As a consequence, the lack of venture capital in Germany would hinder young and innovative firms from competing with firms from other countries, especially the US.

Gompers/Lerner (2001) have identified the important role that venture capital plays in financing young and innovative firms in the U.S. However, virtually nothing is known whether this role is the same or different in a bank-based country such as Germany. In fact, there are some reasons casting doubt that the role of venture capital is invariant between countries with bank-based systems and those with more specialized markets (Black/Gilson 1997). On the one hand, Germany has a long tradition of specific regional and national financial institutions financing the German Mittelstand, or small- and medium-sized enterprises. On the other hand, a new generation of venture capitalists has emerged that provides finance to highly innovative firms. The findings summarized by Gompers/Lerner (2001) suggest that banks are incapable of adequately financing innovative firms, and in particular, high-tech startups. Rather, venture capital proved to be a superior form of finance in innovative industries. These findings posed a challenge to the bank-based finance countries, such as Germany. Is it possible to sustain high growth and generate innovative startups in countries dominated by traditional banking systems?
Audretsch and Lehmann (2004) analyze the mode of finance in general and the role of venture capitalist, in particular, on the performance of young and innovative firms. In particular, they focus on whether debt and equity are complements or rather substitutes in financing young and high-tech firms. They then examine the impact of the mode of finance on firm performance as measured by growth rates. These hypotheses are tested using firm-level data from Germany’s Neuer Markt, or New Market, consisting of innovative and mainly young and small firms from 1997 until March 2003. Using a probit model, the results show that a higher amount of debt financing is associated with a lower likelihood of receiving venture capital. The tobit estimation shows that the share of financing accounted for by venture capital is lower for firms with higher amounts of debt.

In addition, they find striking evidence that venture-backed firms outperform non-venture-backed firms. Based on quantile regressions, the results indicate that venture backed firms are associated with higher post-IPO growth rates. However, to the degree to which new institutions can be developed facilitating venture capital, high-growth innovative firms can be generated. Thus, the constraint on innovation is not necessarily specific to the country, but rather to its institutions, in this case the need to develop an equity market facilitating the development of venture capital finance.

Engel and Keilbach (2005) and Audretsch and Lehmann (2004) provide evidence for the necessity for institutions such as the former Neuer Markt, because venture capital and debt provided by banks are found not to be complements but substitutes. Banks are found to play only a minor role in financing and controlling innovative firms. Engel and Keilbach (2005) use the German IPO data from the Neuer Markt to analyze the impact of venture capital finance on entrepreneurial growth and innovation, measured by patent applications. They create a control group of non-venture funded but otherwise benchmark (comparable) firms. Their study finds that venture capital funded firms in Germany exhibit a higher number of patent applications than do their counterparts in the control group.

A great debate has raged about the efficacy of debt finance relative to equity (Myers, 2001). The results of Audretsch and Lehmann (2004) suggest this may be the wrong question for high-tech firms. While it is clear that equity is a superior mode of finance for innovative activity (Hart, 2001), it is less clear about how the source of that equity shapes performance. However, one drawback of this study is the lack of information of the investment decisions in the founding time of the firm. This restricts the results to the pre and post IPO year. Future research needs to focus directly on the impact of the source of equity on subsequent firm performance.

References


Strategic alliances of high technology ventures

Contact Scientist: Holger Patzelt

The unit empirically investigated whether the factors that the theoretical literature on strategic alliances (Gomes-Casseres, 1996) proposes as motivating a technology venture to seek to enter an alliance with another company are in fact considered in its managers' decision policies. Are managers primarily driven by a need to find complementary assets to leverage their firms' capabilities? Are the primary considerations those of their environment, such as the competitive environment or the environment for financing technology ventures? How does their perceived ability to control and protect their key knowledge assets impact their decision to seek a new alliance?

Patzelt addressed these research questions by performing a conjoint experiment with 51 top managers in the German biotechnology industry. The division found that venture managers' decisions to seek a new alliance do indeed depend on the capabilities (liquidity, early and late product candidates, scientific team, networks), governance (patent situation), and context (financing and competitive environment) of their firm. However, the decisions are complex since these factors interact. EGP found that considerations of venture liquidity are central in managers’ decision policies, and that the liquidity of the venture moderates the impact of other variables. Figure 1 illustrates the managers’ decision model.

The results of the study help to explain prior findings of other scholars which highlight overcommitment to alliances (Deeds and Hill, 1996), higher rates of renegotiation for alliances entered during poor funding environments (Lerner and Tsai, 1999), and that alliances are in fact detrimental to venture survival (Alvarez and Barney, 2001). Prior explanations have relied primarily on the bounded rationality, hubris, and other non-rational explanations for these outcomes. But when the decisions are placed in the context of low levels of firm liquidity and the threat this poses to the venture's survival, technology venture managers' decision policies appear to be a rational attempt to make the best of bad circumstances. Venture managers seem to prefer internally controlled resources and funds raised via the capital markets to those accessed via alliances, which indicates that they recognize the risks of alliances and may in fact view entering an alliance as “making a deal with the devil.” An important implication for going forward researchers examining alliance performance and their impact on firm performance is that they need to assess the condition of the venture at the time in which it entered the alliance. This condition appears to play a major role in the motivation for the alliance and will quite possibly have significant explanatory power for alliance performance and venture survival. For practitioners, the findings emphasize the necessity for the alliance target firm to understand the motives why they are approached by the alliance seeker. Since in many cases the major driver appears to be lacking venture liquidity, the alliance seeker may not bring sufficient resources to the table to make the alliance successful, but instead employ it only as a measure of short-term financing in order to ensure venture survival.
2.2.3 Impact of Entrepreneurship

Entrepreneurship and Economic Growth

Contact Scientists: David Audretsch, Max Keilbach, Jagannadha Pawan Tamvada, Pamela Mueller, Mark Sanders and Andre van Stel

Why does one Standort, or location, experience stronger economic performance than another? One answer was provided by neoclassical economics. The classical model of the production function suggests that economic performance, measured as economic output, is the larger, the stronger the location’s endowment with capital and labor. Robert Solow (1956), on the other hand, argued that economic growth, another measure of economic performance, is determined explicitly by investment in physical capital. In this growth model, technical change was specified as an exogenous shift factor. More recently, Paul Romer (1986), Robert Lucas (1988) and others extended the neoclassical model of growth by suggesting that not only is knowledge an important factor generating growth but also, because it spills over for use by third-party firms, it is actually the most potent factor. Formally, their analysis implied augmenting the production function with knowledge capital as an additional factor. In this project we certainly do not dispute the importance of the traditional factors, but suggest an additional factor as well: the degree of entrepreneurship capital specific to a Standort.

In fact, public policy spanning a broad range of contexts, ranging from the European Union, to states, cities and local communities around the globe, has turned to entrepreneurship to provide the engine for economic growth, competitiveness in globally linked markets, and jobs. This project explains why entrepreneurship has emerged as a bona fide instrument of growth policy. The knowledge spillover theory of entrepreneurship suggests that entrepreneurship provides a crucial mechanism in the process of economic growth by serving as a conduit for knowledge spillovers. Investments in new knowledge and ideas may not automatically spill over and result in commercialization, as has typically been assumed in models of economic growth. Rather, the existence of what is introduced as the knowledge filter impedes the spillover and commercialization of investments in new ideas and knowledge. By penetrating the knowledge filter and facilitating the spillover of knowledge that might otherwise not be commercialized, entrepreneurship provides the missing link to economic growth (Acs et al., 2005).

Entrepreneurship capital refers to the capacity for the Standort, i.e. the geographically relevant spatial unit of observation, to generate new business startups (Audretsch and Keilbach, 2005). As with the traditional framework for economic growth, which assumes the factors of production to be given, we take the endowment of entrepreneurship capital at the Standort as exogenous, and then ask, “Do variations in the amount of entrepreneurship capital across geographic space help explain spatial variations in economic performance?” (van Stel et al., 2005).

The answer to this question is of considerable importance to public policy (Nelson 2006.) A negative answer would suggest that there is no reason to promote entrepreneurship, at least not for the purpose of generating economic growth. By contrast, an affirmative answer...

References


Academic Entrepreneurship and the Knowledge Filter

Contact Scientist: Taylor Aldridge

Why and how will scientists decide to commercialize their scientific research? The answers to these questions are not only important to institutions and scientists engaged in research. The New Endogenous Growth models and theories highlight the central role that investments in science and research play in generating economic growth (Romer, 1985; and Lucas, 1993). But more recently, public policy makers, ranging from local communities, to states and even entire countries have pointed out that such investments in knowledge and research do not automatically spill over into commercialized new products and innovations. Rather, what Audretsch et al. (2005) term as the knowledge filter effectively impedes the spillover and commercialization of investments in knowledge, thereby limiting the rate of return in terms of employment creation and economic growth accruing from public and private investments in science and research. In the presence of a high knowledge filter, investments in science and research do not automatically spill over and become commercialized, resulting in vigorous rates of economic growth and employment generation, as assumed in models of endogenous growth. The combination of high investments in science and research but low rates of economic growth and employment generation led first to what was termed as the Swedish Paradox and somewhat later adapted by European Commission as The European Paradox. Audretsch et al. (2005) and Acs et. al (2004) identify activities that involve the commercialization of science and research as the Missing Link in the process of economic growth. In the absence of scientist commercialization of research, investments in science and research will not generate an adequate rate of return, in terms of economic growth and job creation.

Our research examines the prevalence and determinants of the commercialization of research by examining the top 20 percent of funded grantees from the National Cancer Institute (NCI) from 1998 to 2002. Because the two publicly available modes of scientist com-
Commercialization — patents and Small Business Innovation Research (SBIR) grants — do not cover the full spectrum of commercializing activities undertaken by individual university scientists, my research also includes many additional measures obtained from surveys and the science citation index. Such measures include professional connections to industry, as well as the type of technology transfer office. These measures are used both to assess the prevalence and determinants of scientist commercialization of research. In particular, some empirical findings suggest that:

- Scientists receiving funding from the National Cancer Institute exhibit a robust propensity to commercialize their research. However, the prevalence of commercialization depends highly upon the actual mode of commercialization. Some modes of commercialization, such as patents, are more prevalent, while other modes, such as funding by the SBIR program are rarely used.

- The determinants of scientist commercialization involve four sources— scientist-specific personal characteristics, such as professional connections to industry, gender and age, amount of resources provided by the grant, scientific human capital and qualifications, and the institutional and geographic contexts. However, the exact role played by each factor varies considerably across the different modes of commercialization. For example, factors that are important in influencing the decision to patent are not necessarily the same as those influencing the decision to start a new firm.

- The easily accessible publicly available databases measuring patents and SBIR grants are important but limited in their scope in covering the broad spectrum of diverse modes of commercialization. Given the heterogeneous nature of both the prevalence and determinants of scientific commercialization, research guiding public policy should not be limited to the traditional publicly-available modes of commercialization. Instead, it needs to be invested in the development of new measurement uncovering other modes of scientist commercialization, such as new-firm start-ups.

The graph below represents the responses of 75 interviewed NCI commercializing scientists and the mode of their commercialization.

EGP research has found that scientists whose research is supported by grants from the National Cancer Institute are active in commercialization. However, the extent and nature of scientist commercialization is shaped by the particular mode of commercialization pursued by the individual scientist. In particular, the research has found that, when it comes to commercializing research, the five different modes considered here — patents, licensing, SBIR, selling and new-firm start-ups — are anything but interchangeable or homogeneous. Rather, each mode represents a distinct and very unique conduit for commercializing science. While
just over one-third of the NCI scientists had filed for a patent, slightly over half of the patenting scientists responding to the survey reported that they had licensed their intellectual property, around one-fifth of the survey respondents had started a new firm and five percent had sold their respective patents. By contrast, only eight of the entire group of 1,693 scientists had been awarded an SBIR grant. Thus, the prevalence of commercializing science varies substantially across the different commercialization modes.

Similarly, the heterogeneity of scientist commercialization applies not just to the prevalence of commercialization across the different modes, but also to those factors conducive to commercialization. The empirical evidence suggest that the factors conducive to scientist commercialization of research, such as professional connections, gender, age, scientific human capital and quality, and institutional and geographic contexts, are strikingly specific to the particular mode of commercialization.

The heterogeneity of scientist commercialization of research with respect to both prevalence and determinants is particularly important for public policy. The perception of scientist commercialization of research should not be based on a singular mode of commercialization. Policy conclusions reached from studies focusing on a singular mode of commercialization may actually obscure as much as they reveal about how and why scientists commercialize their research.

References


The impact of Entrepreneurship on Employment in OECD Countries

*Contact Scientist: André van Stel*

This research deals with the consequences of entrepreneurship at the macro level. Employment in OECD countries is under pressure from global competition of low-cost countries in Asia and Eastern Europe. Many policy makers in Western countries believe that ‘entrepreneurship’ offers a way out and are inclined to promote entrepreneurship policies. However, remarkably little is known about the exact nature of the relationship between entrepreneurship and economic growth, let alone about the influence of policy measures. In part this has to do with the elusive nature of entrepreneurship; people have different ideas about what actually constitutes entrepreneurship. The lack of research is also due to the limited availability of data bases concerning numbers of entrepreneurs, particularly at the country level. As a result, to date almost no scientific evidence on the relationship between entrepreneurship and economic growth is available. The research focuses on measuring this relationship empirically. For this purpose I use different concepts of entrepreneurship for which measures from different data sources are used. These measures include indicators of the number of new entrepreneurs such as the Total Entrepreneurial Activity index, as operationalized by the Global Entrepreneurship Monitor (see e.g. Reynolds et al., 2002), as well as indicators of the number of incumbent entrepreneurs such as the number of business owners, as operationalized in the COMPRENDBIA database (see Van Stel, 2005). As these measures are related to economic growth in different ways, different scientific models are used in which
these indicators of entrepreneurship play a role. In investigating the relation between entre-
preneurship and economic growth at the macro-economic level, the research has provided
empirical evidence that the relation varies with a country’s stage of economic development,
with the sector of economic activity, and with the quantity and quality of entrepreneurial
supply. This implies that effective entrepreneurship policy may vary according to these di-
mensions.

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Management and Governance of Entrepreneurship

Contact Scientists: David Audretsch, Max Keilbach and Erik Lehmann

Recent literature has found that entrepreneurial firms, particularly in science-based and
high-technology industries, tend to locate within close geographic proximity to a knowledge
source. Audretsch, Keilbach and Lehmann (2005) found out why – location matters. Location
matters for accessing knowledge spillovers that bestow competitive advantage. However,
while close geographic proximity may facilitate access to external knowledge spillovers,
it does not necessarily guarantee that the entrepreneurial firm can absorb such external
knowledge spillovers and transform them into a competitive advantage. An important in-
sight introduced by Cohen and Levinthal (1989) is that firms need to invest in the capacity to
access and absorb external knowledge (Nooteboom, 1994).

The purpose of this project is to suggest two factors in particular that facilitate entrepreneur-
ial access to and absorption of external knowledge spillovers. While Cohen and Levinthal
(1989) focused on investments in R&D as the mechanism facilitating the absorption of ex-
ternal knowledge, the size constraint of entrepreneurial startups may constrain the magni-
tude of their R&D investments, at least in absolute terms.

However, as Audretsch and Stephan (1996) identified, there is a very different mechanism
facilitating the access and absorption for entrepreneurial firms in high-technology and sci-
also found compelling evidence implying that geographic proximity is a pre-requisite to
board members accessing and absorbing external knowledge.

Thus, the Entrepreneurial Access Hypothesis suggests a very different role for board mem-
bers. Rather than the conventional view, which focuses on the function of boards in control-
ling managers to reduce problems of economic agency, a new role is introduced in the
following section, which is to help the entrepreneurial firm access and absorb external knowl-
edge spillovers. The composition of boards is found to be endogenously influenced by the
degree to which the firm is in a science-based or high-technology industry, as well as the
potential pool of external knowledge spillovers emanating from knowledge sources within
close geographic proximity. Based on IPO data from Germany, this project finds that a
strategy deployed by entrepreneurial firms is to select boards and managers with the hu-
man capital and knowledge capabilities to contribute to the access and absorption of exter-
nal knowledge spillovers.

Previous work has shown that the potential access to external knowledge spillovers influ-
ences entrepreneurial location, which in turn influences entrepreneurial competitive advan-
tage. External knowledge spillovers can be accessed by close geographic proximity to a
knowledge source through the locational choice of an entrepreneurial firm.

The results of this project suggest, however, that it does not suffice to only provide entrepre-
curial access to knowledge spillovers through geographic proximity to knowledge sources.
In addition, such external knowledge spillovers need to be absorbed. In particular, this chapter
has identified two factors facilitating the absorption of external knowledge spillovers – a spillover conduit, such as a Board Director or Manager and close geographic proximity. These findings not only suggest that the composition of boards is endogenous to the relative importance of absorbing external knowledge spillovers for the entrepreneurial firm, but also that the composition of boards may be influenced by factors other than controlling managers to reduce agency problems. The evidence in this chapter suggests that board directors and managers can also play an important role by facilitating the access to and absorption of external knowledge spillover, thus enhancing the competitive advantage of entrepreneurial firms. However, to facilitate the entrepreneurial access and absorption of such external knowledge spillovers, not only must the entrepreneurial firm be in the right place, it must also have the right composition of board members.

References


### Labor Demand and New Firm Formation

**Contact Scientist: Daniel Liviano Solis**

The research project “Labor demand and New Firm Formation” investigates the dynamic relationship between employment growth and firm entries. The main assumption of the project is that there is a dynamic relationship between employment growth and firm entries, as a result of the creation of employment that newcomers bring to the market, the destruction of employment caused by exiting firms, and the potential long-term effects of this process.

At the theoretical level, Hamermesh (1993) stated that changes in employment can be decomposed in four parts, which are: (i) births of plants, (ii) growth of existing plants, (iii) death of existing plants and (iv) contraction of existing plants. The author provided several stylized facts, such as the fact that births and deaths of firms are the main mechanisms of employment change in sectors characterized by a high capital/labor ratio, and the fact that job turnover through the opening and closing of plants is less volatile in manufacturing than in any other industry. The main conclusion of the author is that most of the net expansion of jobs is due to the creation of new jobs through the birth of small establishments.

The empirical literature on regional economics provides considerable empirical evidence for understanding the importance of firm entries in productivity and efficiency improvements. Geroski (1995) and Caves (1998) provided several stylized facts regarding this relationship, and some of the findings were that (i) entry stimulates growth and development in markets and that (ii) entry-exit turnover is important for industry-level productivity gains, especially in the long run. However, there are not stylized empirical results about the dynamic effects of entry on employment. For the Spanish case, Arauzo et al. (2005) provided evidence on the relationship between the growth rate of (i) the gross rate of entry in the manufacturing industry (GRE), (ii) employment change (EC) and (iii) Gross Value Added (GVA).

Graph 1 shows that the cyclical evolution of the variables analyzed is very close, and that there is a common trend, which corresponds to the economic cycle that characterized the Spanish manufactures through the period considered.

Fritsch and Mueller (2004) provided empirical evidence on the dynamic relationship between new firm formation and employment change for West Germany. This paper employed a distributed lagged model where the entry rate and its temporal lags are the regressors and the employment change is the dependent variable:

$$Y_t = \alpha + \beta_0 X_{t-1} + \beta_1 X_{t-2} + ... + \beta_k X_{t-k} + \epsilon_t$$
Because of the high correlation between the regressors, the authors considered the Almon lag model. The value and the magnitude of the estimated coefficients allowed the authors to conclude that the impact of entries on employment change is positive in the short-term, negative in the medium-term and positive in the long-term, result that proves the existence of positive supply-side effects related to an increase in the efficiency and the competitiveness of the industry.

The days 11 and 12 of July, 2005, the Max Planck Institute of Economics held a workshop called „The Effects of new Businesses on Economic Development in the Short, Medium and the Long Run”. In this workshop, several researchers from different countries provided empirical evidence on the dynamic relationship between firm entries and employment change.

The aim of the project presented here is to specify and analyze econometric methods and models aimed at the analysis of the dynamic relationship between firm entries and employment change. Depending on the characteristics of the available data set (especially if the time dimension is not large enough), the estimation of (1) could be problematic, due to the loss of degrees of freedom caused by the inclusion of time lags. Following Koyck (1954), the weights of the parameters of a distributed lag model such as (1) can be interpreted probabilistically, assuming that they follow a geometric distribution. The result of the imposition of such assumption to (1) is the Koyck model:

\[ Y_t = \alpha + \beta (1-y) X_t + \gamma Y_{t-1} + \epsilon_t \]

In this model, the problem of having to estimate a large number of coefficients has been reduced to estimating two coefficients, \( y \) and \( \beta \). The short-term effect of a unit change in \( X_t \) on \( Y_t \) is given by \( \beta (1-y) \), while the long-term effect is \( \beta \).

The issue of the estimation of (2) is worth analyzing, especially if (2) is a panel data specification, where the dimensions could be region and/or sector, and time. Dynamic panel data models are characterized by two sources of persistence over time: autocorrelation due to the presence of a lagged dependent variable among the regressors and individual effects characterizing the heterogeneity among the individuals. These facts make the OLS estimator biased and inconsistent even if the error term is not serially correlated. Arellano and Bond (1991), for example, proposed a GMM estimation method that involves using the additional instruments that can be obtained in a dynamic panel data model if the orthogonality conditions between lagged values of the endogenous variable and the disturbances are used. However, there are other contributions in the field of dynamic panel data estimation that are worth considering.
International Entrepreneurship – the impact of finance and the internationalisation path

Contact Scientist: Joerg Zimmermann

Several studies, especially from the 90s onwards, identified a new pattern of internationalization. Instead of following the traditional stages pattern, the so-called international entrepreneurs choose to be extensively present abroad right from their birth or very shortly thereafter. Profound explanations about these strategies and related effects have remained scarce so far. This is partly due to the lack of a viable approach to identify and quantify the contribution of finance and related internationalization strategy.

McDougall (1989) defined international entrepreneurship “as the development of international new ventures of start-ups that, from their inception, engage in international business, thus viewing their operation domain as international from the initial stages of the firms operation”. But, international entrepreneurs face a superior level of risk compared to domestic entrepreneurs. When going international, new firms face the liability of foreignness (Hymer 1976). In comparison, they seem to have a stronger ability to absorb relevant knowledge than experienced firms, labeled as ‘learning advantage of newness’ (Autio et al. 2000). Therefore, the impact of potential determinants of firm success in the international case could differ compared to the domestic ones. For example, as potential investors for domestic entrepreneurs are venture capitalists, financing through venture capitalist seems to have no measurable advantage for international entrepreneurs (Bürgel 2000). The question raised is this: Is the impact of customization and tacit knowledge of the entrepreneur more important than the financial and managerial support of the Venture Capitalist?

The focus of the research is to outline in more detail the impact of finance on firm internationalization and the internationalisation strategy of international entrepreneurs. Research questions that should be answered include: in what way financiers contribute to the internationalization decision, what is the impact of the non-financial support of the financiers on firm performance in the international case, what kind of competitive advantages leads young firms to internationalize, what is the internationalization path of international entrepreneurs, and in what way differ the financiers support in the international case compared to the domestic one?

The data set used are listed firms at the German and British stock exchange. This dataset is obtained by combining individual balance sheets data form IPO prospectus, publicly available information from on-line data sources, and the related stock exchange. In addition, a case study approach is used to outline more in detail the internationalization path.

In principle, like Oviatt and McDougall (1994) outline, new ventures create new ideas and then develop into large firms as they directly market their products on a steadily larger global scale. As international entrepreneurs are most time located in innovative markets...
they can become main job creators in the future. The outlined research seeks to contribute to a better understanding of the internationalization process and therefore support future international entrepreneurs, gain interesting insights for mature firms, and outline concrete economic policy advice.

References


Identifying Nascent Corporate Entrepreneurs

*Contact Scientist: Dr. Erik Monsen*

**Principle Topics**

The successful transfer and commercialization of technology from governmental and corporate research laboratories to the commercial marketplace depends on technology, market, as well as human factors. Relative to our understanding of the technology and market factors, we are only beginning to integrate human and social elements into our understanding of the technology commercialization process. Given that innovator involvement is critical to the transfer of detailed technical knowledge, it is important to find ways to identify researchers with natural or nascent entrepreneurial tendencies and to find ways better involve and engage them in learning about and participating in the technology transfer and commercialization process.

**Key Propositions**

There already exists a substantial theoretical and practical groundwork for a discussion of human and social factors that can impede or promote the success of commercialization efforts. In particular, current entrepreneurship research has identified a number of individual factors that can drive entrepreneurial behavior, including personality and propensity (Stewart et al., 1999), thinking and cognition (Gatewood, Shaver & Gartner, 1995; Baron & Markman, 1999), general self-efficacy (Markman, Balkin & Baron, 2002), and context-specific self-efficacy, in both independent (Chen, Greene & Crick, 1998; De Noble, Jung & Ehrlich, 1999) and corporate (Ehrlich, De Noble & Singh, 2005) settings. However, as commented by Shane, Locke & Collins (2003) in a recent review article on entrepreneurial motivation, few of these factors consistently correlate with entrepreneurial performance over time as the new venture grows and evolves. Instead, different motivational factors are more significant than others in different stages of the entrepreneurial process.

Given that it is important for the researcher to be engaged in the technology transfer and commercialization process over a significant amount of time and through various stages of the entrepreneurial process, our goal is to identify a set of motivations and behaviors that contribute to ongoing entrepreneurial success through the various phases of the technology transfer and commercialization process. Shane, Locke & Collins (2003) suggest that one enduring factor is *drive*. They define drive as having four aspects: ambition, goals, energy and stamina. Further they suggest drive is sustained over long periods through high self-efficacy as well as a passion, defined as a “selfish love of the work” (2003, p. 268). In order to be passionate about one’s work, we propose that there has to be a good fit between the individual and the entrepreneurial environment.
Methods

After reviewing the relevant literature, the next step was to develop a questionnaire which could reliably identify those individuals who demonstrate a good potential fit with an entrepreneurial environment. In addition to the above literature, we also drew upon the literature on entrepreneurial culture and environments (Miller, 1983; Covin & Sievin, 1989; Lumpkin & Dess, 1996), recent efforts to model the fit between the individual and entrepreneurship (Markman & Baron, 2003) as well as recent empirical findings regarding the relationship between entrepreneurial strategies and individual performance (see dissertation described elsewhere in this report; Monsen, 2005). The initial pilot questionnaire includes items addressing job-environment preferences, personal and interpersonal orientations, self-efficacy, stress tolerance, current job behaviors, as well as basic demographic data. The initial pilot study will be conducted at national laboratories in the U.S. Based on the results of the pilot study, a final, compacter version of the questionnaire will be developed and tested with a wider sample of scientists and engineers, both in government laboratories and in private enterprises, in the U.S. as well as in Germany.

Implications

If we can reliably identify human factors that significantly contribute to the success of technology transfer and commercialization over multiple phases of the entrepreneurial process, we will be in a position to better assess a project’s human feasibility and thus be better able to predict its overall success. Furthermore, if there is a weakness in the human element, initial suggestions can then be made how to strengthen the individuals and teams involved in order to improve the chances of long-term success. As a result, technology will move faster and more efficiently from laboratory shelves to the commercial marketplace.

References


How to Measure the Competitiveness of Places? The Free State of Thuringia in a Transitional Context

Researchers: Stephan Schütze, Heike Grimm (University of Erfurt)

Places across the world face different challenges in a global environment depending on their individual historical, cultural, social, economic and political experiences. Increased globalization has triggered a shift in the competitive advantage away from traditional manufacturing towards knowledge-based economic activity.

In this research project, Grimm and Schütze aim at evaluating the competitiveness of the German Bundesland Thuringia more than 15 years after German re-unification by examining a set of indicators. With this case study, the researchers want to contribute to the identification of environmental conditions needed within a regional territory to compete at a global scale. Until now, there is a lack of case studies in regional development analysis with a comprehensive analytical approach, bringing economic, socio-political and cultural factors together which are all pivotal for the competitiveness of spaces.

To fill this gap, Grimm and Schütze are working on the development of an integrative approach to evaluate the socio-political, cultural and economic framework conditions for Thuringia. The researchers pinpoint the policy changes which have been pursued before, during and after the unification process while differing between West and East German realities. They will review which policies and strategies have been transferred to the new Bundesland to accomplish an overall unification process. The impact of an increased globalization on public policy formulation and the “strategic management of places” in highly industrialized countries is taken into account, resulting in an accelerated re-territorialization process, the regionalization and a strong specialization of places, and the development of new policies to attract creative human capital.

Ultimately, a framework of benchmarking indicators to measure the political, economic and social development in Thuringia since unification will be developed. Grimm and Schütze are combining political as well as economic indicators since they assume that the existent indicators have been insufficient to assess whether the policy framework conditions have been carefully designed and implemented according to global challenges.

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The emergence of entrepreneurship policy

Contact Scientist: Iris Beckmann

Policymakers in many countries in the world face the problem of slow economic growth rates, even stagnation, and massive unemployment rates. However, some countries are better off than others, and within countries great regional differences in economic prosperity can be observed. The well-known success story of Silicon Valley is just one example that makes policymakers think about the key mechanisms that stimulate economic growth. Research has provided some evidence that business start-ups are an essential source of economic growth (Van Stel 2005; Carree/Thurik 2003) and that they contribute considerably to job creation.

In fact, a shift in the focus of economic policy occurred in the 1990s. The promotion of start-ups has become a major economic policy strategy in many countries, including Germany. Lundström and Stevenson (2005) have meticulously classified the broad and diverse range of instruments which are being used in 10 OECD countries to promote entrepreneurship. The authors define entrepreneurship policies as “measures taken to stimulate more entrepreneurial behavior in a region or country […], measures intended to directly influence the level of entrepreneurial vitality in a country or a region”. This new economic policy approach to stimulate economic growth differs considerably from the focus of economic policy after the Second World War. The most important economic policy issue then was how to deal with the negative impact of market concentration on welfare and the inefficiency of small and medium sized enterprises (Scherer 1970). SMEs and start-ups were perceived as inefficient entities in the economy that had to be preserved for social and political reasons. Today, this perception has changed, and with it the respective policy paradigm. Lundström and Stevenson particularly emphasize the difference between small business policies that focus on existing businesses and entrepreneurship policies that aim at stimulating the realization and even the creation of business ideas.

Entrepreneurship policies are all implemented as economic growth strategies. One of the most important issues is how these public support schemes can influence entrepreneurship dynamics. With regard to single support programs evaluation and research has acknowledged a positive impact on the supported start-ups and entrepreneurs (Almus, Prantl 2001; Sternberg 2001). However, the instruments in use differ greatly across countries and regions. Research has shown that different policy regimes to support entrepreneurship and start-ups exist in regions (Beckmann 2005). Building on the entrepreneurial process as described by Shane (2003) the paper differentiates between entrepreneurship policies and small business policies. These two policy approaches support different phases of the entrepreneurial process. Entrepreneurship policies target the entrepreneurial process before the business concept is complete and before the entrepreneur starts to organize the business. Small business policies on the other hand support the realization of a business plan and the young start-up. Looking at three regions in Germany, Beckmann shows that the availability of entrepreneurship policies versus small business policies differs across regions so that one can speak off different policy regimes - a finding that will be further studied in Beckmann’s research collaboration with Stephan Schütze.

The Entrepreneurial Process (Shane 2003)

- Existence of opportunity
- Discovery of opportunity
- Decision to exploit opportunity
- Resource Acquisition
- Entrepreneurial strategy
- Organising Process
- Performance

Entrepreneurship Policy

Small Business Policy
A major focus of the EGP’s policy research is to analyze the determinants of the emergence of entrepreneurship policy. What caused the shift in the focus of economic policy from small business policy and industrial policy to the promotion of start-ups and entrepreneurship? Iris Beckmann’s research project contributes to the development of a new framework of analysis for entrepreneurship policy by a political economy perspective. Hence, the difference between economic and political efficiency is important when investigating the determinants of the implementation of different economic policies. Building on Grossman and Helpman (1994) a theoretical model is developed that combines economic as well as political factors and explains the emergence of entrepreneurship policy.

References

Researching Entrepreneurship Dynamics: The International Consortium for Dynamic Entrepreneurship Benchmarking

Contact Scientists: Iris Beckmann, Manfred Fleischer, Dirk Fornahl, Stephan Schütze,

The Organisation for Economic Co-operation and Development (OECD) is in the process of analyzing the principal factors of growth - the so-called innovation drivers. Four main drivers have been identified: Human resources, knowledge building and knowledge sharing, ICT and entrepreneurship. To evaluate the influence of various policy areas on each of the growth drivers, the OECD has initiated an international benchmark study focusing on entrepreneurship. Several countries participate in this work, drawing on experience from the OECD, Eurostat and the US Key Indicator project. The International Consortium for Dynamic Entrepreneurship Benchmarking is headed by FORA, an independent division for research and analysis under the Danish Ministry for Economic and Business Affairs. The “Entrepreneurship, Growth and Public Policy” group is representing Germany in this project. The goal of this pilot project is to develop a comprehensive and dynamic benchmarking model that captures various measures relating to entrepreneurship, including measurements related to performance indicators and policy indicators. By participating in this project,
the Max Planck Institute will have an opportunity to benchmark German entrepreneurial performance against those of other participating countries on a year-to-year basis as the Entrepreneurship Index is developed. This Index will also make it possible for project participants to compare relevant national policy conditions across countries and across time. Countries involved in the project will be encouraged to adopt the results of the benchmarking analysis and to formulate nation-specific policy setting recommendations. At this stage, we are involved in the development and application of a measurement tool aimed at the definition of specific data indicators for each of the agreed underlying performance and policy-setting drivers. Specific data needs and the sources of this data are identified, and dynamic availability of this data is assessed. We are also already providing data for the region of Jena (Thuringia) as a stand-out example for German economic development. A series of qualitative and quantitative interviews with Thuringian network providers and business representatives complements this effort. Later project phases will include the actual benchmarking analysis, development of policy implications, and the institutionalization of the capability to conduct this research annually. This will involve constant refinement of the model and data acquisition tools as needed.

The European Initiative for Policy Research in Entrepreneurship and Growth (IPREG) - A European Network of National Networks

Contact Scientists: Iris Beckmann, Erik Monsen

The European Initiative for Policy Research in Entrepreneurship and Growth (IPREG) is in the process of creating a European network of national networks to initiate and disseminate policy and policy oriented research focusing on entrepreneurship and economic growth. The idea is to bridge the gap between policymakers and researchers to establish a scientific basis for more efficient growth policies. The focus of IPREG contributes to the revitalisation of the Lisbon strategy that was launched by the European Union in 2000. The idea originates from the Swedish Foundation for Small Business Research (FSF). To realize this vision, IPREG concentrates its activity in several fields. First, national IPREG networks will be established, bringing together all key actors from respective national scenes covering SMEs, policy making and research. The European IPREG Network will serve the national networks, becoming an arena for interaction between national networks by arranging activities at the European level. A central focus is on conducting major pioneering policy oriented research projects to find better entrepreneurship and economic growth policies. Furthermore, IPREG will initiate research projects that are of high interest to researchers and policymakers. At the first meeting it was decided that IPREG should focus on the Analysis of Entrepreneurship Policy in the first phase since this is a field where there are few other actors involved. Plans for comparative studies of Entrepreneurship Policy in 10 European countries were presented. For the second phase a “task force” of researchers will be established to decide on a research project focusing on economic growth. Another core goal of IPREG is to find interactive ways of disseminating research results and to act as an information resource for policy makers. A major field of activity will be to create a mechanism for effective knowledge transfer.

The first IPREG meeting was in Brussels on October 3-4, 2005, hosted by the Swedish Foundation for Small Business Research (FSF) with participants from eight European countries – Austria, Belgium, Germany, The Netherlands, Norway, Sweden, and the United Kingdom - as well as the European Commission. The Entrepreneurship, Growth and Public Policy Group of the Max Planck Institute of Economics is a member of IPREG and will be responsible - together with the University of Reutlingen - to create Germany’s national IPREG network and coordinate national IPREG activities.
2.2.5 Editorial Office

Editorial Office for Entrepreneurship Journals

**Small Business Economics: An International Journal**
The research group on Entrepreneurship, Growth and Public Policy serves as the editorial office of the *Small Business Economics* Journal, published by Springer since 1989. *Small Business Economics* ranks among the leading journals in the world focusing on Entrepreneurship, Innovation and Small Business. During 2005, the *Small Business Economics* Journal has made significant strides. In addition to fully implementing a system utilizing Associate Editors to assist with the editorial process, the journal has transferred its submission, review, and editing processes to a web-based platform which has resulted in less paperwork and significantly fewer manuscripts lost due to incomplete information and communications from the publisher. After moving to the web-based editorial platform in early February 2005, the journal had 144 submissions up until the end of November, averaging throughout the year (under both the old and new systems) just over 15 submissions a month. Additionally a database containing abstracts of all articles ever published in the journal will soon be made available on the Internet.

**Foundations and Trends in Entrepreneurship**
*Foundations and Trends in Entrepreneurship*, is a new journal established in 2005 by David Audretsch and Zoltan Acs. Each issue of the journal is a single extended length article focused on reviewing and compiling the state of research on a significant issue in the field of entrepreneurship. To date, three issues have been published, featuring works by Simon C. Parker, Sharon Alvarez, and one joint paper by Phillip H. Kim and Howard E. Aldrich.

**International Journal of Entrepreneurship Education**
David Audretsch serves as one of three editors of the *International Journal of Entrepreneurship Education*, which is published by Springer. The journal has three principle aims which compliment the goals of the Entrepreneurship, Growth and Public Policy group. The first aim is to publish cutting edge articles about Entrepreneurship research. The second category of articles falls under advancing entrepreneurship education, looking at how it can be improved for the recipients. Finally, the journal publishes case studies that evaluate specific entrepreneurial cases discerning the critical lessons that can be learned from empirical experiences.

**International Entrepreneurship and Management Journal**
David Audretsch serves as a co-editor of the *International Entrepreneurship and Management Journal*, which is published by Springer. The journal has the goal of publishing state-of-the-art research of entrepreneurship management.
Entrepreneurship and Economic Growth: Some Empirical Studies

ANDRÉ VAN STEL (Ph.D. Erasmus University Rotterdam)

The importance of entrepreneurship for achieving economic growth in contemporary economies is widely recognized, both by policy makers and economists. However, empirical evidence linking entrepreneurship to economic growth is scarce. This thesis investigates the relation between entrepreneurship and economic growth at the country and regional level. It contributes to our understanding of how entrepreneurship may affect economic growth. Among others, it is investigated whether the impact of entrepreneurship on economic growth varies with a country’s stage of economic development, with the sector of economic activity, and with the quantity and quality of entrepreneurial supply. Empirical evidence is provided showing that the impact is dependent upon all these three aspects.

Stage of economic development
In particular, as regards the stage of economic development, Chapter 2 of this thesis shows that deviations from the ‘equilibrium’ rate of entrepreneurship (here defined as business ownership) negatively affect economic growth. The estimated model implies that the ‘equilibrium’ number of entrepreneurs is different at different stages of economic development. Accordingly, a given level of entrepreneurship may be below the optimum for a higher level of economic development while the same level of entrepreneurship is above the optimum for a lower level of economic development. Hence, a further increase in entrepreneurship positively affects economic growth in the higher income country while it negatively affects growth in the lower income country (as the gap between the actual and the equilibrium rate of entrepreneurship becomes bigger). This is consistent with the results from Chapter 7, where increases in entrepreneurship (here defined as the sum of nascent entrepreneurs and young businesses) affect national economic growth positively in high income countries and negatively in low income countries. Hence, entrepreneurship plays a different role in economies in different stages of economic development.

In modern, highly developed economies, growth is powered by their capacity to innovate and to win new global markets for their technologically advanced products (McArthur and Sachs, 2002). Entrepreneurship is an important aspect of this capacity. Entrepreneurs may introduce important innovations by entering markets with new products or production processes (Acs and Audretsch, 2003). They may enhance our knowledge of what is technically viable and what consumers prefer by introducing variations of existing products and services in the market. The resulting learning process speeds up the discovery of the dominant design for product-market combinations. In other words, in highly developed economies entrepreneurship contributes to growth by shifting the technology frontier (technological innovation).

Economies at lower stages of economic development may grow through exploitation of economies of scale and scope by large firms and by rapidly absorbing the advanced technologies and capital of the highly developed economies (technology transfer), for example through high levels of foreign direct investment from high-tech multinationals (McArthur and Sachs, 2002). In addition, smaller firms may also flourish as they may act as suppliers for large firms (outsourcing) and may learn a lot from the large companies. However, in these economies small and new firms are not at the front of the innovation process and hence their impact on economic growth is smaller compared to entrepreneurs in modern economies. In fact, in Chapter 7 their impact on economic growth is even estimated to be negative, which may point to a lack of large companies in these countries. High levels of entrepreneurship in poorer countries may reflect hidden unemployment as there may not be enough large companies to employ them as wage-earners.

In terms of the different types of economies –managed versus entrepreneurial– Audretsch and Thurik (2001) distinguish, the role that entrepreneurship plays in lower developed economies is more in line with the managed economy, while the role of entrepreneurship in higher developed economies is more in line with the entrepreneurial economy.
Sector of economic activity

As regards the sector of economic activity, results from several studies in this thesis are consistent with a stronger effect of entrepreneurship on growth for manufacturing compared to services. For instance, Chapter 3 shows that the penalty related to deviating from the ‘equilibrium’ rate of business ownership is more severe for manufacturing than for services. In Chapter 5, the impact of local competition (the number of firms in the region) on regional economic growth is investigated. We find a significantly positive effect for manufacturing but no effect for services sectors. Finally, in Chapter 8 we examine the effect of business dynamics on employment growth at the country-industry level. Again the impact of business dynamics (net-entry and volatility of firms) on growth is found to be stronger for manufacturing than for services.

The stronger effect in manufacturing may be related to the greater importance of innovation in manufacturing, compared to services. Innovation in service firms has a different character than in manufacturing. In particular, innovations in service industries are often non-technological and they mostly involve small and incremental changes in processes and procedures (De Jong et al., 2003, p. 16). To the contrary, innovations in manufacturing require more R&D and are more radical in nature. In modern entrepreneurial economies, radical innovation is more conducive to economic growth than incremental innovation. This is because industry life-cycles are shorter and hence, at a given point in time, more (niche) markets are in an early stage of the life cycle where R&D is highly productive and the costs of radical innovation tend to be relatively low (Audretsch and Thurik, 2001). Hence, a lack of entrepreneurship in manufacturing industries may be particularly damaging to economic performance, as it may imply a lack of incentives to create (radical) innovations.

Quantity and quality of entrepreneurial supply

The conclusion that the quantity and quality of entrepreneurial supply also plays a role in the effect on economic performance, is based on Chapter 6 of this thesis. If government policy is directed towards maximising the number of startups by subsidising entry, this may stimulate individuals to start businesses for the wrong reason, i.e. not because, for instance, they have an idea that they want to try and commercialize, but simply because they can get an amount of money for starting a business. Unemployed individuals may be particularly attracted to start subsidised businesses, as the opportunity cost of not starting a subsidised business is higher for them, compared to wage-earners. As the unemployed often have relatively low human capital levels, the new firms are likely to be unsuccessful once the subsidy is removed. The effect is to erode confidence, both of the customers and of the failed business owners, which leads to declining economic performance of the region. Hence, policies focusing only on the quantity of entrepreneurial supply without considering the quality of the entrepreneurs may not lead to the intended results. Chapter 6 provides empirical indications that policies of subsidising entry may indeed not be very successful in creating jobs.

In Chapter 2 of this thesis it is concluded that low barriers to entry and exit of businesses are important for a sound economic development. However, although subsidising entry may be seen as an (extreme) example of lowering entry barriers, the lesson from Chapter 6 is that such policies do not contribute positively to economic development. A policy that could contribute is to lower administrative burdens related to starting a new business (Van Stel and Stunnenberg, 2004). However, enterprise policies that involve creating a financial advantage for some business owners over others (e.g. subsidising entry) should be avoided, as it may attract individuals who are not intrinsically motivated to start a new firm. In particular, it may attract a substantial number of marginal entrepreneurs, absorbing capital and human energy that could have been allocated more productively elsewhere.

References


**Employees Do Matter: Autonomy, Teamwork and Corporate Entrepreneurial Culture**

ERIK MONSEN (Ph.D. University of Colorado)

This dissertation demonstrates that autonomy and teamwork are critical moderating factors in the relationship between entrepreneurial strategy and performance, when one considers the perspective of the individual employees in an entrepreneurial venture, which has implications for the research and practice of corporate entrepreneurship.

**Motivation**

In the field of entrepreneurship we know quite a lot about the founders of new independent and corporate ventures, but relatively little about the employees who work in these ventures. In order to develop better business strategies and to improve the performance and increase chances of success of these new independent and corporate entrepreneurship efforts, the unit adopts the perspective of the employee to gain a fresh perspective into the relationship between entrepreneurial strategies (e.g. entrepreneurial orientation) and the performance of individual employees.

**Theory**

Given that I am studying individual employees, we have included corresponding mediating and moderating factors in my research model. Drawing on social identity theory, important mediating factors including an individual’s job role identity and organizational identification were built into the model. Integrating aspects of empowerment theory and organizational learning theory, we further proposed that autonomy and teamwork are critical moderating factors that are in fact complementary instead of contradictory with regards to entrepreneurial strategy and performance.

**Methods**

The research model was tested with data from employees and managers from 208 departments in a public and very innovative healthcare system. The healthcare system, which is located in the southeast of the United States, is a public and very innovative healthcare system with approximately 5000 employees divided into 4 strategic operational units. Drawing on individual survey responses and performance appraisal data from archival records, complete datasets were collected for 1653 full-time employees in all organizational units and from all organizational levels. In the survey employees and managers were asked about their perceptions of the entrepreneurial orientation of their department (e.g. risk-taking, proactiveness, and innovativeness), the clarity of their job role, their identification with their department, their sense of personal autonomy in their job, and their opinions regarding teamwork in their work group. From archival sources, data on performance reviews, which are conducted annually by an individual’s direct supervisor, was collected and integrated with the survey results.

**Results**

The data was analyzed with structural equation modeling and several important results emerged:
- First, without autonomy and teamwork as moderating factors, there is only a weak relationship between entrepreneurial orientation and individual performance. The addition of mediating factors, such as role clarity and organizational identification, do not change this observation. Only after autonomy and teamwork are included as moderating factors, do we see strong relationships between entrepreneurial orientation and individual performance.

- Second, with autonomy and teamwork in the model as moderating factors, it becomes apparent that different strategies result in more (or less) performance under different conditions. In particular, risk-taking strategies work best under conditions of high-autonomy and low-teamwork; proactive strategies work best under conditions of low-autonomy and high-teamwork, and innovative strategies work best when autonomy and teamwork are both in balance and as high as possible.

- Third, autonomy and teamwork can be complementary. In general, the higher both factors are, the more entrepreneurial the employees and the greater their performance. With regards to the individual strategy-performance relationships, autonomy and teamwork are complementary for innovative strategies, but contradictory for risk-taking and proactive strategies.

Discussion and Conclusions
In summary, this model and these results have implications for both researchers and managers. For researchers, these results explain why different researchers have found contradictory results regarding the impact of entrepreneurial and corporate venturing strategies on the financial performance of firms. Depending on the psychological and sociological context of the firms and industries studied, different levels of autonomy and teamwork will dramatically impact the nature of the strategy-performance relationship. For managers, these results demonstrate how entrepreneurial strategies can be selected and adapted to better fit current employees, as well as how employees can be trained to better fit to specific entrepreneurial strategies. In conclusion, this dissertation demonstrates how entrepreneurial strategies and employees can be better adapted to one another, for the mutual benefit of both the firm and its employees.

Ownership and Control Structure, Technological Innovation and Firm Survival: Some Empirical Evidence
Companies are becoming increasingly aware of the need to foster their innovative capacity to the extent that the activities this involves - be they scientific, technological, organisational, financial or commercial in nature - form part of a continuous process that is not so much directed at achieving a specific objective, but rather forms an institutionalised part of company strategy (Scherer, 1965). However, empirical evidence linking firm ownership and control structure and business agency problems to innovative activity is scarce.

It is well-known that the company’s ability to innovate depends on a series of factors like the existence of favourable conditions in the demand structure and in the market size or the resources the company allocates to engineering, design, research and marketing. These favourable conditions together with the company’s technical capacity need to be integrated within the framework of an innovative strategy in order that the company’s management and organisational structure, and the company’s desire to differentiate its products or processes from those of its competitors, can be called into play. The factors intervening in the efficient management of a company’s financial and physical resources are innumerable, but they determine the degree of success enjoyed by a company’s innovative processes, which in turn determine its growth and future prospects.

This thesis investigates the ownership and control structure in Spanish firms and the impact of the firm-ownership determinants on the innovative activity. In addition, taking into account the importance of the active learning process in firm performance, we analyse the effect of the adoption of innovation on firm survival. Several non-parametric, semi-parametric and parametric techniques are computed to check the effect of these determinants on the innovative activity using an unbalanced panel of Spanish manufacturing firms for the period 1990-2002.

Agency control mechanisms in Spanish firms
In recent years, Spanish companies are developing different methods to organise the company’s management and internal organisation. An important aspect of this change is the decision-making and ownership structures. Agency theory specifically recognises the
conflict of interests in companies with various owners who in turn relate to a non-owning administrator (Jensen and Meckling, 1976). There are various control mechanisms, which the company can use to alleviate agency problems arising from the lack of identity between ownership and control in decision-making positions. Chapter 2 of this thesis analyses the most important theories regarding the informative asymmetries in the firm and evaluates empirically the role of this kind of control mechanisms to palliate the firm agency problems in the Spanish firms (i.e. who owns it and how control over decision-making is distributed, the nature of this control, the percentage of company capital owned by managers and the degree of concentration of ownership, among other issues).

Ownership Structure and Innovation: Is there a real link?

The relationship between the ownership and control structures of a company and its innovative activity is analysed in Chapter 3. In a first step, the chapter presents a brief revision of the empirical literature related to the link between business internal structure, firm value and investment and investment decisions. An accurate explanation about the definition, typologies and measurement problems in the evaluation of the firm innovative activity is also presented. After presenting the revision of the determinants that the literature in innovation tends to include and a descriptive analysis of these in Spain, the chapter seeks to analyse the effect of the internal features of a company’s ownership structure on decisions to initiate research and development activities and on the output of this innovative process. Our results are consistent with the hypothesis that internal factors are significant for the undertaking of R&D activities (Berle and Means, 1932; Hall, 1992). The probability and the volume of research and development costs, the probability and the amount of obtaining patents, models of use, new products and process innovations are taken into account. As can be seen in our results, an increase in the participation of owners in management positions will lower the probability of adopting R&D projects. In particular, the thesis also reports that the ownership concentration and the use of debt financing serve to dissuade a firm from incurring R&D expenditures and do not favour R&D output.

The active learning theory and the likelihood of survival

Chapter 4 deals with the effect of the managerial competitive strategies on the likelihood of firm survival. Although there exists a huge amount of papers that consider the impact of internal aspects of the firms on its survival, there is scarce evidence of the empirical analysis of the ideas given by Ericson and Pakes (1995) about the “active learning process”, based on having a continuous innovative competitive strategy. In order to analyse the impact of the main strategies determining this competitive way of operation, the thesis incorporates a revision about the main important theories of Industrial dynamics and the empirical works related to firm survival. Taking into account the analysis of the main business competitive strategies, in a first step the thesis includes the elaboration of the conceptual framework result of the revision of theoretical literature about market behaviour.
Although, the thesis focuses the analysis on the introduction of new ways of operating in the market, it also considers classic strategies related both to product and price differentiation that are more related to the Jovanovic work (1982). Among the former ones, one may think of the specific differentiation due to advertising and the presence of new products introduced in the market (Audretsch and Mahmood, 1994) or the technological differentiation based on R&D expenses or new production organization (Klepper, 1996). Among the strategies of the second group, some are based on capital accumulation, or advantages of fixed costs, such as scale economies or absolute cost advantages thanks to production techniques introduced by experience of process innovations. Several non-parametric, semi-parametric and parametric techniques are computed to check the active learning theory and the effect of the different competitive strategies that the firm applies to become more competitive.

References


Economics of technical change and labour market implications

MARK SANDERS (Ph.D. University of Utrecht)

Mark Sanders' thesis investigates the interaction between technical change and the labour market. Its purpose is to explain key labour market trends in the OECD over the past few decades and to investigate the implications for policy in general and science and technology policy in particular.

In the economic literature there are many ways in which technology has been approached. As bulky as that literature may be, it is dwarfed by the infinite number of contributions in which the interaction between labour demand and labour supply has been analysed. Both strands of literature then naturally also produced a huge amount of policy proposals. An attempt to be complete would therefore be futile from the outset.

Surprisingly, however, the link from technology to labour demand in general and relative demand for unskilled labour in particular was left virtually unexplored in the literature. The interaction with the labour market and the corresponding policy analysis in light of that link has been all but absent. This thesis establishes first contact between these fields in economic research and concentrates on bringing some of the mainstream ideas on technical change, labour markets and policy together.

Part I starts with a rather broad survey of the economics of technical change in Chapter 2. The tools, concepts and ideas developed there are used in Chapter 3 to show how technical change can be modeled as an economic activity. Chapter 4 synthesises these ideas into a model in which endogenous innovation determines the relative demand for high skilled
labour. The main conclusion there is that the interaction between technology and relative demand is largely determined by the parameters of the innovation function. In plain English that means that returns to scale and knowledge spillovers in R&D are not only crucial in determining the speed or rate of technical change, but also play a key role in determining its bias or direction. Consequently these parameters are of crucial importance in explaining labour demand trends over the past few decades.

Part II introduces labour market extensions to the model. Chapter 5 surveys the mainstream ideas on such issues as labour supply, unemployment and wage formation. In Chapter 6 those ideas are introduced into the model of Chapter 4. The interaction between demand and supply, perhaps surprisingly, hardly plays a role in the determination of relative wages. Technology is shown to be the key factor in explaining relative wage behaviour, whereas unemployment levels can largely be attributed to labour market institutions and wage rigidity.¹

Part III analyses the obviously profound policy implications of these findings. In Chapter 7 it is concluded that technology policy can have serious equity implications. Also it concludes that there is no trade-off between high unemployment levels and wage inequality, that many economists have suggested. Part of a strategy to combat US wage inequality could be to shift public R&D funds to Development rather than Research, such that new general purpose technologies age faster and products move to their mature stage in the life cycle more quickly. That would make wages more equal at virtually no costs to employment. Such policies would probably be inadequate to solve the huge problems of low absolute wage levels for an underclass of working poor, but current US policies do not indicate that this is a high priority issue.

In Europe, on the other hand, restructuring social security and benefit systems can bring down unemployment at little costs in terms of inequality. Reintroducing progression into the tax and social contributions system can prevent what income inequality might arise. The model in this thesis suggests that European ambitions in science and technology are a much larger and stealthier threat to the relative position of low skilled labour than a well-balanced reform of rigid labour markets.

¹ It must be noted that education and shifts in the educational composition of the labour force have not been considered in the model. The long run interaction between supply and demand was not part of the analysis. The strong technology response to exogenous supply shocks does suggest a key role for education as well. Only the demand side of Tinbergen’s “race between technology and education” has been analysed here. The extension ranks high on the agenda for further research.
2.4 Workshops and Lectures

The conferences and workshops are among our greatest accomplishments. Having visiting scholars on a regular basis provides an exchange for scholars and highlights EGP’s ability to host and facilitate important conferences, workshops and lectures. The following is a summary of each event (some workshops are cross-listed in the outreach section):

Entrepreneurship Research

The following presenters explore different issues related to entrepreneurship.

Marco Vivarelli (Università Cattolica, Italy) begins by analyzing Gibrat’s Law and the market selection in the radio, TV, and telecommunication equipment industry. By focusing on the entire population of firms (including nascent ones) in the Italian Radio, TV & Telecommunication equipment industry and tracking them along seven years, this author tries to test the Law taking into account both the entry process and the role of survival/failure in reshaping a given population of firms over time. His main finding was that the rejection of Gibrat’s Law, common to most of previous empirical research, may be due to market dynamics and selection, namely to the entry process and the presence of transient smaller firms. However, a convergence of firms towards a Gibrat-like behavior over time can be detected. Thus, market selection “cleans” the original population of firms and the resulting industrial “core” (mature, larger, well-established and most efficient firms) does not seem to depart from a Gibrat-like pattern of growth.

Rui Baptista (Technical University of Lisbon, Portugal) examines the effects of national cultural values on government attitudes towards new firm creation by testing whether there is a significant correlation between entry regulation practices and basic cultural value dimensions. The results suggested that entry regulation is not exclusively a result of strategic interaction and conflicts of interest between entrepreneurs, politicians, public administration officials and incumbents; it is also a product of a country’s cultural attitudes towards inequality of power within society and collective responsibility for decision-making, as well as of society’s propensity to avoid the uncertainty associated with market restructuring, thus relying more on government’s regulatory intervention. Thus higher levels of entry regulation appear to emerge, at least partially, as a reaction to government institutions and societies’ needs deriving from basic cultural values. Differences in cultural values and entry regulation practices are also strongly correlated with perceived levels of corruption. Such results hold when one controls for differences in economic development.

Michael Fritsch (TU Freiberg), for his part, analyzes the impact of new firm formation on regional employment change and identified considerable time lags. He began by investigating the structure and extent of these time lags by applying the Almon lag model and found that new firms can have a positive and a negative effect on regional employment. The results indicate that the indirect effects of new firm formation (crowding-out of competitors, improvement of supply conditions and improved competitiveness) are of greater magnitude than the direct effect, i.e. the jobs that are created in the new businesses. Therefore, the peak of the positive impact of new firms on regional development is reached about eight years after the new firms have been started.
Roy Thurik began his presentation by affirming that the study of predictors of entrepreneurial activity at the country level has been dominated by economic influences. For him, the relative stability of differences in entrepreneurial activity across countries suggest that other forces such as institutional and/or cultural factors are at play. The objective of his paper is to explore how post-materialism may help to explain differences in total entrepreneurial activity across countries. Because known interactions between economic, cultural, and social factors is found in previous research, the author included a set of economic demographic and social factors to investigate the independent role post-materialism plays in prediction of entrepreneurial activity levels. Thurik’s findings confirmed the significance of post-materialism in predicting total entrepreneurial activity.

Space, Location and Agents

In recent years, the notion of space and location gained growing importance in the social sciences through two avenues. Firstly, spatial models of political and economic action became increasingly sophisticated. Today, such models are used to deal with a wide variety of issues, ranging from multi-party competition to the emergence of clusters of economic activity in international trade. Secondly, space in the geographic sense re-emerged as an issue on the scientific agenda. This development is amply reflected by a growing body of literature that takes location either as dependent or independent variable. The workshop Space, Location and Agents seeks to bring together both strands of research. Issues of interest include: Spatial models of decision making; spatial models of competition; migration; regional entrepreneurial activity; and local networks.

In regard to spatial models of decision making, Christian W. Martin, research scholar at Max Planck Institute, EGP Unit, addressed the issue of moving beyond the two-party, one-dimensional case, from which unique equilibrium no longer naturally emerges. He introduced a technique that allowed him to systematically analyze the properties of a model in which more than two parties compete in a two-dimensional policy space. By applying this model to the case of electoral abstention in multi-party multidimensional competition, he concluded that the numbers of parties present in the political arena conditions the influence of two motives for abstention, indifference and alienation. All three factors affect the policy positions a party takes in order to maximize vote shares; particularly, the turnout decreasing effect of both abstention motives increases with the size of the political system. By the same token, parties take more radical policy positions when abstention propensities loom large and/or the number of parties is high.

Along the same lines, Thomas Bräuninger examined how spatial models of committee voting predict convergence among outcomes. Yet, the notorious instability of simple majority decisions in theory stands in contrast to the stability observed in experiments. Based on this he examined the effects of relaxing the assumption that voting is costless. Using both an analytical and a computational model his paper estimated the minimal agenda costs that guarantee stable outcomes. According to him, the results suggested that even for medium sized committees, small agenda costs are likely to generate stable outcomes.

Max Keilbach highlighted the significance of regional interaction for entrepreneurial growth and suggested that geographical factor spillovers were one of the primary drivers of growth. Referring to Alfred Marshall, who had argued that spatial external effects lied at the origin of industry concentration, Keilbach introduced a model that demonstrated regional factor spillovers as the driving force of agglomeration. He concluded that even though spatial aggregates of regions may display convergence of growth rates, it is possible that single regions show diverging behavior.
Therefore, he suggested spatial spillovers as a possible explanation of the non-uniform result of convergence regressions on a regional disaggregate level.

Eckhardt Bode also concentrated on spillovers addressing the following issue. On the one hand, literature shows a long-lasting process of de-surbanization in several developed countries including Germany. Workers and firms have tended to prefer locating in non-metropolitan areas. From an economic point of view, higher real costs of living and producing in metropolitan areas should have played some role. On the other hand, recent studies (Ciccone & Hall, 1996; Ciccone, 2002) reported econometric evidence suggesting positive nominal productivity and wage effects resulting from externalities of economic density.

The studies suggest that metropolitan areas should have been more attractive locations because of positive agglomeration externalities. Since adequate data on the urban-rural price gradient is not available, it is not clear whether or not the econometric evidence actually reflects positive real effects of density externalities. The present paper argues that it may not, at least not in Germany, and shows the nominal productivity effects of economic density to be negligible.

Iris Beckmann, PhD student at University of Erfurt and research fellow at the Max Planck Institute, presented a comparative study examining national and regional differences and changes in start-up policy in Germany and the U.S. By looking at start-up policies at all levels of government, her paper aims to find out if there are differences in start-up policies across different spatial contexts. The analysis showed a changing focus in policies for start-ups over time. This development can be observed in all regions - in some regions, however, with delay. Looking at the two countries, the new focus on start-up policies emerged earlier in the US than in Germany. The observed changes in public policies for start-ups indicate that start-ups have gained a new significance in economic policy. In recent years public policies for start-ups have been designed to promote innovation and economic change.

Andrea Kreideweiss engaged a theoretical discussion on the epistemology of proximity and space. Kreideweiss noted that economic reasoning is embedded in representations of reality. These representations are collectively generated and provide the basis from which to take action, judge situations, and make sense of everyday life and economic processes. Kreideweiss interviewed civil servants and start up consultants to see in which context the terms “industrial region” and “entrepreneur” were used. She highlighted the importance of separating these terms in daily discourse on business support.

Heike Grimm proposed a comprehensive definition of entrepreneurship policy, to create a general understanding of the term among policy makers, regional planners and researchers. For her a comprehensive definition is key to evaluating “entrepreneurship policies” and to develop a policy approach with respect to challenges regions are facing in a global world.

Empirical Issues in Measuring Small Firm Performance

“Shareholder Protection and the Cost of Capital: Empirical Evidence from German and Italian Firms”
Julie Ann Elston (MPI), Laura Rondi (CERIS-CNR)

Elston and Rondi investigated the cost of capital in a model with agency conflicts between inside and outside shareholders, where the severity of agency costs depends on a parameter representing investor protection which is expected to vary between countries with different degrees of shareholder protection. Using recent firm-level data from two countries with low shareholder protection, Italy and Germany, the researchers, studied the predicted
relationships among investor protection, inside ownership, and the marginal cost of capital for both old-economy and young new-economy firms. The lectures' results indicate that in Italy, a high concentration of insider ownership results in a higher cost of capital, while R&D intensive firms in both countries are more likely to have strong insider ownership.

“Testing the Significance of Valuation Differences: Empirical Evidence from Germany’s Neuer Markt”
Julie Ann Elston, Steven Thomburg (UCF) and Alois Weidinger (Kaiser College)

These authors presented their analysis about the sources and extent of valuation differences in firm performance measures between the German Commercial Code (Handelsgesetzbuch or HGB), International Accounting Standards (IAS) and US Generally Accepted Accounting Principles (US GAAP). Using results of paired sample means tests, these lecturers revealed that net income and total assets were significantly lower when reported under HGB than when reported under IAS or US GAAP. Further, all performance variables were significantly lower when reported under HGB than IAS. Evidence from underpricing estimates supports the theory that when firms additionally report under one of the international accounting standards it reduces asymmetrical information problems between the underwriter and the firm, resulting in lower costs of certification and higher underpricing.

The Relationship between Entrepreneurship and Unemployment: Is Portugal an Outlier?

Topic by Rui Baptista (Technical University of Lisbon) and A. Roy Thurik (Rotterdam School of Economics)

Prof. Dr. Rui Baptista examined the relationship between entrepreneurship, as measured by the variation in business ownership rates, and unemployment in Portugal from 1972 – 2002. In this seminar the author concluded that Portugal has been a relative outlier in regard to the effects of entrepreneurship on unemployment when compared with the OECD average. Although, the nature of entrepreneurship may be different in the Portuguese case, due to a high proportion of “micro-businesses” created for subsistence which have little impact on growth and employment, he explained that this factor does not seem to be the primary reason for the observed discrepancies. Instead, he explained that the differences between observed levels of unemployment for Portugal and those predicted by a model based on OECD data seem to be mostly associated with macroeconomic fluctuations associated with European business cycles and EU “cohesion” funding, as well as with adjustment costs to new technology adoption which lead to productivity slowdowns, thus increasing the time lag for the effect of entrepreneurship on employment beyond the OECD average.

Creativity and Entrepreneurship

Topic by Sam Youl Lee, Richard Florida (both Carnegie Mellon University, Pittsburgh) and Zoltan Acs (University of Baltimore)

Sam Youl Lee, Richard Florida and Zoltan Acs, submitted a paper on “Creativity and Entrepreneurship.” Lee provided a seminar discussion on the habitat of entrepreneurship, arguing that open and diverse systems were crucial to attracting human capital and creating an area of dynamic economic growth. The paper found that tolerance, low barriers to entry and retention of human capital were significant to creation of high economic growth patterns across the board.
An Empirical Examination of the Entrepreneurship Knowledge Filter

Topic by Lawrence A. Plummer (University of Colorado) and Zoltan J. Acs (University of Baltimore)

Plummer, by employing a spatial econometric technique, examined the findings of Acs, Audretsch, Braunerhjelm, and Carlsson (2003), who proposed a new growth theory model featuring a geographical constrained spillover mechanism provided by new ventures and incumbent firms that convert a region’s stock of knowledge into economically useful, firm-specific knowledge. This implies that knowledge creation is a necessary, but not sufficient, condition for growth and that new ventures and incumbent firms are a missing element in new growth theory modeling. Plummer’s results support the contention that the distribution of knowledge to economic growth depends on new ventures, but does not support the same conclusion regarding incumbent firms.

Conflict Processes as a Complex Adaptive System

Topic by Allison Stanger (Rohatyn Center for International Affairs, Middlebury College, Vermont)

Prof. Dr. Allison Stanger presented an agent-based model of the iterated prisoner’s dilemma (TopolCon, for Topology of Conflict) that replicated Robert Axelrod’s main findings. TopolCon is then deployed to conduct an experiment in which Axelrod’s American TFTers are replaced with Balkan TFTers (Balkan TFTers defect rather than cooperate on the first move but are otherwise identical to American TFTers), demonstrating that this simple tweak in the model’s ontology undermines entirely the prospects for cooperation based on reciprocity. She goes on conducting a second experiment with TopolCon, and introduces the possibility of difference-conscious learning (whereby agents will only “see” and learn from the success of those who resemble them). Her results demonstrated that difference-conscious learning diminishes the prospects for cooperation, but ironically in some contexts produces better results for society as a whole than when difference-blind learning prevails. The profound consequences of subtle changes in initial conditions for simulation outcomes demonstrates the importance of historical context as well as game structure in understanding how any given iteration is likely to unfold. Axelrod’s long shadow of the future, it turns out, is in reality a prisoner of the past to a much greater extent than has been generally acknowledged.

Technological and Organizational Changes as Determination of the Skill Bias: Evidence from a Panel of Italian Firms

Topic by Mariacristina Piva (Catholic University Piacenza, Italy), Enrico Santarelli (University of Bologna, Italy) and Marco Vivarelli (Catholic University Piacenza, Italy)

Professor Santarelli analyzed the recent empirical literature that has introduced the “Skill Biased Organizational Change”, which asserts that organizational change can be considered as one of the main causes of the skill bias (increase in the number of highly skilled workers) exhibited by manufacturing employment in developed countries. By concentrating on a specific branch of the Italian capital goods industry, which produces specialized industrial machinery, and by estimating a transcendental logarithmic firm cost function, Santarelli found that skill upgrading is not a consequence of technological change alone, but is also an effect of the overall reorganization of the firm, which in turn may be linked to technological change.
September 8, 2004


gt;ents and the Technological Performance of District Firms, Evidence for the Emilia-Romagna Region of Italy

Topic by Enrico Santarelli (University of Bologna, Italy)

This lecture investigated some crucial aspects of the recent development of industrial districts in the Emilia-Romagna region of Italy, where a spatial agglomeration of industrial firms has flourished since the period immediately after the Second World War. In particular, this paper compares the technological strength (in terms of patents registered with the European Patent Office) of innovative firms located within and outside industrial districts in order to determine whether the prediction that innovative activity favors those firms or industries with direct access to knowledge producing inputs applies also to the case of industrial districts in the Emilia-Romagna region. The analysis deals with the population of firms with their headquarters in the region that register at least one patent with the European Patent Office during the 1986-1995 period. The results from panel model estimates showed that location within an industrial district resulted in a technological advantage during the overall studied period. However, on breaking down this period into two sub-periods (1986-1990 and 1991-1995) he found that such advantage was strong in the first one, whereas it was lost in the first half of the 1990s.

September 17, 2004

Beyond the Entrepreneur versus Wage Worker Dichotomy. Accounting for Entrepreneurial Type and Persistence

Topic by Andrew E. Burke (University of Warwick), Felix R. FitzRoy (University of St. Andrews) and Michael A. Nolan (University of Hull)

Dr. Andrew Burke (University of Warwick), Felix R. FitzRoy (University of St. Andrews) and Michael A. Nolan (University of Hull) made three contributions to the economics literature on entrepreneurship. In addition, Burke has offered a new measure of entrepreneurship, literature which accounts for variations in persistence in self-employment. By outlining an econometric methodology this author found that his approach is superior to probit/logit models, which have dominated the literature. While the results indicate that this existing literature is good at explaining an individual’s propensity for self-employment, he found that entrepreneurial persistence is determined by a different mode and unearths some new insights into the roles of early career experience, finance, role models, gender, and unemployment push effect.

October 4, 2004

Organizing a Firm under Knightian Uncertainty

Topic by Sharon A. Alvarez (Fisher College of Business, The Ohio State University, USA) and Jay B. Barney (Fisher College of Business)

Prof. Dr. Sharon Alvarez discussed two theories that currently dominate the management literature: transactions cost economics, and incomplete contract theories. Most of the literature has applied these theories under conditions of risk, where decision makers are assumed to know the mean and variance of the distribution of possible outcomes associated with a decision before that decision is made. However, this paper examines the implications of these two theories under conditions of Knightian uncertainty, where decision makers do not know the mean or variance of the distribution of possible outcomes associated with a decision before that decision is made. Alvarez concludes that this has a variety of implications, especially for the study of the organization of rent generation and appropriation, and for decisions by entrepreneurs about whether or not to start a firm.
Neugründermentalität und Kultur in Großfirmen

Erik Monsen (University of Colorado at Boulder)

Monsen is interested in how corporate strategy impacts the development of an entrepreneurial culture. In particular, he studies the impact of strategic decisions by the corporate entrepreneurship culture on employee perceptions, attitudes, and performance. By analyzing employee surveys from a regional U.S. public healthcare organization, Monsen believes this employee feedback will improve the design of corporate entrepreneurship and innovation programs and perhaps the design of governmental entrepreneurship programs.

Workshop on Entrepreneurship and Culture

What about co-authors?

Differences in the level of entrepreneurial activity across countries are a puzzle for researchers. One of the various factors that have been identified as possible determinants of these differences is culture. The workshop on Entrepreneurship and Culture, held February 7, 2005, investigated how much different cultural values and institutions affect the level of entrepreneurship. A major focus was on attitudes towards risk and uncertainty, as well as on regulatory procedures, such as intellectual property rights regimes.

The workshop started by looking at the impact of cross-cultural differences on entrepreneurial performance from a psychology perspective. Michael Frese from the University of Giessen presented a paper on the effect of different psychological action strategies on entrepreneurial performance. The paper argued that different psychological action strategies inherent to the entrepreneur's behavior lead to different levels of organisation in the start-up process reaching from comprehensive planning to reactive planning.

A new explanatory perspective was presented by Lorraine Uhlaner who discussed how post-materialism can explain the differences in entrepreneurial activity across countries. The measure for post-materialism is based on Inglehart’s four-item-post-materialism index. The model tests for nascent entrepreneurship, new business formation and the total entrepreneurial activity as well as for the rate of established businesses, controlling for various economic, demographic and social factors. Uhlaner used data for 27 countries, world-wide, and was able to confirm the significance of post-materialism in predicting new business formation rates.

Uwe Cantner and Anderas Freytag from the University of Jena investigated the effect of “Leitbilder” (informal institutions) in innovation systems as a possible explanatory variable for differences in entrepreneurship and innovative activity. The intense cooperation between universities and firms in Jena and the attitude towards the use of technology and technological change (Zeissianertum), as well as successful role models in the region determine the “Leitbild”. Looking at different innovation systems in Thüringen (Jena, Erfurt, Ilmenau) using network analysis, the authors concluded that a “Leitbild” has a long term influence on the way entrepreneurship and innovation are shaped in a region and that it governs the interaction between entrepreneurship and innovation. Determining how much in social capital and/or the “Leitbild” explain differences among systems of innovations has to be further investigated.

Rui Baptista, Professor at the Technical University of Lisbon and Research Fellow at the Max Planck Institute of Economics, looked at the relationship between cultural values, political institutions, and business entry regulation. Based on the idea that a society’s general attitude towards risk, uncertainty and power inequality is embedded in its institutions, Baptista examined if such values have an impact on a society’s economic incentives,
because they shape regulatory procedures for business entry. Using data for 53 countries from a variety of sources he found a positive relationship between the level of entry regulation and the way people in different countries deal with risk and uncertainty. Sjoerd Beugelsdijk presented the results of an empirical study showing that differences in the regional entrepreneurial culture have an impact on the regional rates of innovation and regional economic growth. Analysing a sample of 54 European regions Beugelsdijk was able to confirm the hypothesis that regions with an entrepreneurial culture are more innovative and grow faster.

Geert Hofstede highlighted the finding that entrepreneurship differences across European countries are persistent and have a strong cultural component. Looking at the level of entrepreneurship by using data from a joint EIM and IRIC database, Hofstede found that more entrepreneurs can be found in countries where people are in general less satisfied with their life and with the way democracy works. Hofstede emphasized, however, that within countries the effect can be inverted, meaning that entrepreneurs can be more satisfied with their lives than those who are not entrepreneurial. Consequently, it is important to analyse the level of entrepreneurship with regard to its cultural context.

Arjo Klamer’s presentation switched the focus away from the impact of cultural factors on entrepreneurship towards entrepreneurship in the cultural field. Klamer elaborated on the specifics of cultural entrepreneurship and provided insights regarding the determinants of successful entrepreneurship in the arts.

One major aspect of cultural differences that might affect the level of entrepreneurship is the attitude towards uncertainty. Sander Wennekers examined the influence of this aspect on the level of business ownership across OECD countries. Looking at three specific years (1976, 1988, and 2000) results show that the influence of uncertainty avoidance on business ownership rates has changed over time. Whereas this is positively correlated in 1976 and 1988, there is evidence for a compensating pull mechanism in countries with low uncertainty avoidance in the year 2000. Looking at two different cultural country clusters, there is a strong negative relationship between GDP per capita and the level of business ownership in the group of high-uncertainty avoidance countries. In a group of low uncertainty avoidance countries, this longstanding negative influence of per capita income is no longer found.

Picking up Rui Baptista’s results on differences in regulatory procedures, Andrew Burke from the University of Warwick focused on the effects of intellectual property rights regimes on the entrepreneurial economy, specifically the self-employment sector. The focus was on various elements of an IPR regime, such as the political system, laws, and institutions as well as a general familiarity with and respect for IPR-related products. Andrew Burke showed that a well developed IPR regime has a net positive effect on the self-employed sector.

Entrepreneurship and Growth: The Nature of Opportunity

The workshop, organized by Prof. Dr. Zoltan Acs (University of Maryland) and Larry Plummer (University of Colorado) brought together professors and doctoral students from both economics and management to discuss and debate the nature of opportunity in an inductive process that draws insights from a variety of perspectives, including:

- from economics, the origins and expansion of the opportunity set
- from entrepreneurship, opportunity recognition and discovery
- from strategy, opportunities to establish and sustain superior firm performance

In doing so, the goals were to isolate and classify the opportunity construct and suggest an agenda for further research suitable for publication.
Frederick Lehman (University of Michigan, USA), in his essay “A Peregrine Inquiry on the Existence of Opportunity under the Individual-Opportunity-Nexus Framework”, showed that the individual-opportunity-nexus (ION) framework set a standard for frameworks in entrepreneurship research and forced this field to clarify its working assumptions about what entrepreneurial opportunities are, the role of individual in the creation of opportunities, and the relationship between entrepreneurial individuals and entrepreneurial opportunities. In particular, it challenges entrepreneurship researchers to explain the existence of opportunity, the nature of the opportunity set and the forces behind its expansion. To this end, he demonstrated that too narrow a definition of entrepreneurial opportunities and too strict an assumption of objective existence dangerously limits the phenomena available for study and hinders the relevance of entrepreneurship research. He showed that some of the existing frameworks offer insight in ways in which the objective existence assumption can be abandoned, and subjective sources of entrepreneurial opportunity can be incorporated into the current ION framework. He also advanced explanations for the expansion of the definition of the opportunity set and the ways human agency can turn potential opportunity into entrepreneurial opportunity.

Dr. Mark Sanders (Utrecht University & MPI of Economics, Jena), in his paper “The Origin of Technical Change; Knowledge Generation, Opportunities and Entrepreneurship”, addressed the role of science and the research and development (R&D) sector in as a source of opportunities to invent new or improve upon old goods and questioned the traditional assumption of macro-economic growth models that that innovations and opportunities fall like manna from heaven. The crucial point of his paper is seeing that entrepreneurship can use the knowledge accumulated in science as their raw material for thinking up new products and services. In that sense the stock of knowledge can be translated directly into stock of potential innovations or “opportunities” developed by scientists and constitutes the universe of opportunities for the entrepreneur. Vision and entrepreneurial talent are then required to formulate commercially viable ideas for products and services from this stock of fundamental knowledge. He then applied this expanded growth model to explain the cyclical nature of R&D activity and the R&D labor market, as well as corresponding cycles of product innovation and entrepreneurial activity.

Prof. Dr. Jeffery S. McMullen (Baylor University, USA), in his paper “Reconciling Entrepreneurship’s Tower of Babel: Four Paradigms of Entrepreneurial Action and Their Implications for Management Research”, built on Burrell and Morgan’s (1979) typological framework of different theoretical perspectives in sociology and organization studies and derived four research paradigms of entrepreneurial action. He argued that underlying assumptions about the nature of social science and the nature of change determine a scholar’s understanding of the nature of entrepreneurial action, which, in turn, dictates the meaning of key constructs such as motive, means (resources) and, perhaps most importantly, opportunity. After engaging in a discussion of each paradigm’s dominant theoretical anchor, understanding of the entrepreneurial process, view of opportunity, and variables emphasized, he used his proposed map of the field (1) to highlight research possibilities and problems that are unique to each paradigm, (2) to clarify the similarities and differences that arise from shared and conflicting assumptions, and (3) to reveal commonalities among all four paradigms in the hope that scholars may enjoy the benefits of emerging paradigms without suffering the costs that often accompany them.

Dr. Guido Bünstorf (MPI of Economics, Evolutionary Economics Group) presented an alternative view in his paper “On the discovery of entrepreneurial opportunities: some remarks from evolutionary economics”. The basic point of his essay was that with regards the discovery and pursuit of entrepreneurial opportunities, an important element of what scholars of entrepreneurship, strategic management and evolutionary economics can learn from each other is the similarity of their issues and concepts, which often can be traced back to
the same roots. In the first half of his talk he sketched some of the parallels between evolutionary economics, entrepreneurship and strategic management. He demonstrated the striking similarity of parts of these fields and called for closer mutual attention to the research done in the respective fields. In the second half of the essay, he pursued the “positive” benefits of cross-disciplinary communication. In particular, drawing on recent findings on industry evolution, he drew attention to developmental patterns at the firm and industry levels that may cause systematic changes in the nature of entrepreneurial opportunities and agents’ ability and willingness to pursue these opportunities. In addition, he discussed recent findings on the role of pre-entry experience in opportunity recognition and firm performance.

Yosem E. Companys (Stanford University, USA), in his paper “Strategic Entrepreneurs at Work: The Nature, Discovery and Exploitation of Entrepreneurial Opportunities”, explored the question, what do entrepreneurial opportunities look like? How do firms discover and exploit these opportunities to create value and sustain competitive advantage? Reviewing the strategic management and entrepreneurship literatures regarding the nature and character of entrepreneurial opportunities and the entrepreneurial strategies that firms employ to seize and commercialize these opportunities, he identified three emerging views. The economic view argues that entrepreneurial opportunities exist as a result of the distribution of information about material resources in society. The cultural cognitive view argues that entrepreneurial opportunities exist as a result of environmental ambiguity and the cultural resources available to interpret and define these opportunities. Finally, the sociopolitical view stresses the role of network and political structures in defining entrepreneurial opportunities. He offered an integration of these perspectives as a way to improve our understanding of the opportunity creation and exploitation process.

Prof. Dr. Zoltan Acs (University of Baltimore, USA, & MPI of Economics, Jena), in his paper “Could The Irish Miracle Be Repeated in Hungary?”, discussed how in today’s global knowledge economy, foreign direct investment (FDI) and the internationalization of firm activities enable the transfer of intangibles to another country and play a major role in the economic development of emerging economies. He outlined how foreign direct investment (FDI) can lead to the establishment of new indigenous enterprises in the host country and knowledge spillovers create entrepreneurial opportunities. Then he proposed that these knowledge spillovers should have a positive effect on entrepreneurial activity and entrepreneurial activity should have a positive feedback on additional capital inflows. Using data from Global Entrepreneurship Monitor (GEM), he explored how inward FDI impacts indigenous entrepreneurial activity at different stages of development. He found significant differences in entrepreneurial activity between Ireland and Hungary and reviewed those differences in his talk.

Larry Plummer (University of Colorado at Boulder, USA, and MPI of Economics, Jena) was prevented by a skiing accident from presenting his paper, “The Origins of Entrepreneurial Opportunity: Notes and Insights from Strategic Management”, so Prof. Dr. Zoltan Acs presented it in his stead. The central question of the paper was, why and how do entrepreneurial opportunities emerge? While this is a fundamental to the development of entrepreneurship theory, he points out that questions regarding the origins of entrepreneurial opportunity remain unanswered. In his article he proposed that the descriptions and prescriptions developed in the strategic management literature can inform our understanding of how, and with what consequence entrepreneurial opportunities are exploited – thus subsequently highlighting the discrete characteristics of opportunities that can offer clues as to their origin. He contended that this approach may avoid the slippery slope of logical regression, and confer insights to further the development of a robust theory of entrepreneurship. To this end he surveyed five extant theories of strategy, and in this context introduced two, new
conceptualizations representative of possible origins of entrepreneurial opportunity: imperfect or incomplete opportunity exploitation.

Pamela Müller (then Technical University Bergakademie Freiberg, now MPI of Economics, Jena), in her paper “Exploring the Knowledge Filter: How Entrepreneurship and University-Industry Relations Drive Economic Growth”, recognized knowledge as a crucial element of economic growth, in addition to physical capital and labor. She outlined how knowledge can be transformed into products and processes and that can be exploited commercially. She examined how the ability to produce, identify, and exploit knowledge depends on the existing knowledge stock and the absorptive capacity of actors like employees at firms and researchers at universities and research institutions. In particular, if the existing knowledge stock is not commercialized to its full extent, knowledge spillovers must occur and other transmission channels are needed. Entrepreneurship and university-industry relations can therefore contribute to knowledge spillovers and thus spur economic growth. Her paper tested the contribution of new ventures and university-industry relations to economic growth on the regional level empirically. The results support that entrepreneurial activity and universities are essential transmission channels for knowledge spillovers and have a positive impact on economic growth.

EGP hosted its first ever residence week. The week served as a forum for top new scholars to present and review new themes in the Entrepreneurship field.

Cacophony or harmony? Multivocal logics and technology licensing by the Stanford University Department of Music

Topic by Andrew J. Nelson (Stanford University)

This lecture was a case study of how Stanford University’s Center for Computer Research in Music and Acoustics (CCRMA) became the world leader in FM synthesis. Mr. Nelson investigated how this technology assisted the Yamaha Corporation to develop the world’s largest selling set of musical instruments through licensing. His technique consisted of conducting interviews with key individuals and evaluating the institutional context of Stanford University, concluding that the most critical factor was individual agency—in essence that there were a series fortunate coincidences that facilitated the development of the technology. In addition, there was a discussion about the importance of licensing technology and its benefits.

From Innovation to Firm Formation in the Windsurfing, Skateboarding, and Snowboarding Industries

Topic by Sonali Shah (University of Illinois at Urbana-Champaign)

This lecture evaluated how three different sports grew in popularity and how innovations from both users and firms fueled each sport’s growth and the growth of firms supporting the sports. The three sports were chosen because each is relatively young, having had most of its developments and innovations within the last 40 years, as well as having a supportive community participants and equipment sales around $100 million annually in the late 1990s. Consistently the first innovations in each sport (Skateboarding, Snowboarding, and Windsurfing), were from the original users and many of the following innovation were made by user-founded firms. The principle finding of the work is that much of the innovation, development, and selection activities were a direct result of a feedback loop from the participants to the manufacturers, who coincidently in the early stages were users in all of the sports.
The Entrepreneurship-Philanthropy Nexus: Implications for Internationalization

*Topic by Zoltan J. Acs (George Mason University) and Pontus Braunerhjelm (Linkoping University)*

Professor Acs presented an evaluation of the differences between universities in Sweden and those in the United States. Of particular note is that despite the fact that the Swedish government invests more in R&D at its universities than any other nation, little of the Swedish investment seems to result internally in terms of new technologies, goods and services, or entrepreneurial firms. On the other hand, the United States is the source of most of the world’s technological innovations in the last decade. Professors Acs and Braunerhjelm propose that much of the difference might be due, in part, to the differing amounts of philanthropy. Using a comparable set of universities from the United States and Sweden found that Swedish universities were capturing only a fraction of private donations, relative to US institutions. The differences between the two nations studied mirror the differences of philanthropy, thus suggesting that academic institution in countries where philanthropy is not traditional should encourage and seek out philanthropic behavior in order to help create a more diversified knowledge base, which would, in turn, improve economic performance.

Globalization, Employment, and Poverty Reduction

*Topic by Eddy Lee and Marco Vivarelli*

Professor Vivarelli presented a discussion about globalization, employment, and poverty reduction which came to several conclusions. First, among the highlighted conclusions, was that due to absorptive capacity, productive growth may exceed output growth to the detriment of job creation. Another interesting finding showed that short-term financial portfolio flows and domestic policy reforms seemed to play a more critical role in the level of income equality for developing countries. Thirdly, open economies have decreasing poverty levels, absolutely speaking, but that the relative levels poverty are unaffected.

Clusters, Knowledge Spillovers and New Venture Performance: An Empirical Examination

*Topic by Brett Gilbert, Patricia P. McDougall, and David Audretsch*

Professor Gilbert presented this paper, which examined the relationships between a cluster location, knowledge spillovers and new venture performance. Using institutional theory, she explained how knowledge spillovers from a venture's industry cluster region affect sales growth and product innovation. The relationships were tested using path analysis on a sample of 129 technology-based IPO new ventures. The results indicate that, as expected, knowledge explains the relationship between industry clustering and growth, but exhibits a complex relationship with product innovation.

Knowledge Spillovers, Geographic Clusters and the Product Development Activities of New Ventures: An Empirical Examination

*Topic by Brett Gilbert and Mika Tatum Kusar*

Professor Gilbert presented this paper which examined the track records of geographic clusters, picking this focus because such clusters are known for producing innovative firms.
Geographic cluster locations and the location of knowledge spillovers firms were examined to determine the influence that the explorative and exploitative innovation activities of new ventures have. The authors felt that a stronger relationship of industry clustering on exploitative innovations and a stronger relationship of knowledge spillovers on explorative innovations was possible. Further, they predicted that the interaction of industry clustering and knowledge spillovers would result in more exploitative innovations than explorative innovations, but that explorative innovations will have the greatest impact on new venture performance. The empirical examination provided results that confirmed the expectations.

Enterprise Development: A Conceptual Framework, a Case Study of the U.S. National Capital Region and Public Policy

Professor Stough's paper examined the role of entrepreneurial development in regional economic development in general, specifically evaluating its expression in U.S. National Capital Region. After presenting a general assessment of enterprise development patterns nationally and globally, the scale was adjusted to examine the trends and institutional infrastructure in the Washington, D.C. region. The analysis found that enterprise development has become a central component of regional and national development strategy globally in part because new businesses are increasingly being created to enable developed countries to compete in the global marketplace. The evaluation of the US Capital Region found that global trends were mirrored in local policies and behaviors, including that institutional infrastructure to support small ventures has increased during the last 5 years, although it also found that were the region to support its ventures more fully, it would be able to have significantly greater growth.

Localized Knowledge Spillovers and New Venture Creation

Professor Plummer evaluated new growth theory and highlights knowledge as a contributor to economic growth. Acs, Audretsch, Braunerjhelm, and Carlsson (2005) contended that incumbents and new ventures together are the mechanism by which the link between knowledge and growth is established, also suggesting that, in a given region, higher rates of innovation will lead to higher levels of entrepreneurial activity while a greater number of incumbents will diminish this relationship. The paper presented used spatial econometrics to evaluate the relationship between localized knowledge spillovers and new venture creation. The results supported the two hypotheses as put forth by the original paper.

Workshop on “The Effects of New Businesses on Economic Development in the Short, Medium and Long Run”

The Entrepreneurship, Growth and Public Policy Group organized a workshop with Prof. Dr. Michael Fritsch from the Technical University Freiberg, with the aim of discussing results about the effects of new businesses on economic development of different countries. The workshop took place July 11-12 at the Max Planck Institute. Empirical evidence about the relationship between entrepreneurship and economic development from eight different countries and a study based on OECD countries was presented.

The workshop provided an opportunity to discuss the old/long standing question if a high level of new business formation in a region stimulates economic development. Recent empirical has suggested that the unclear evidence may be attributed to long time lags that are needed for the main effects of entrepreneurship to become evident (Audretsch and Fritsch, 2002; Van Stel and Storey, 2004; Fritsch and Mueller, 2004). Long time series data on start-ups and employment as well as economic output are finally available and allow comparing different country results.
**Workshops and Lectures**

*Michael Fritsch and Pamela Mueller* presented new results about the effects of start-ups on employment growth and economic growth in Germany (1983-2002). According to them, the effect of new entrants is threefold: the first effect is to increase employment, the second is to lower employment and the third is to increase employment. The total effect upon employment can therefore be either positive or negative and depends upon the magnitude of the three elements. The easily identifiable short term direct effect of new businesses is in creating employment. A medium term effect is that new firms displace inefficient incumbents, leading to job losses. Another medium and long term consequence is that new firms enhance the competitiveness of firms that remain in business, by exerting a powerful threat upon incumbent firms inducing improved performance from them. The positive impact of new business formation is maximized after seven years and fades away after about ten years.

*Pamela Mueller, André van Stel and David Storey* analyzed the employment effects of new business in Great Britain (1981-2003) and confirmed the German results. The broad key finding is that, for Great Britain as a whole and England in particular, the effect of new firm formation on subsequent employment growth is positive. Hence raising new firm formation, given that this is possible, will lead to subsequent increased employment in this country. However, the results for Scotland and Wales are different. Here the impact of increased new firm formation is negative – causing lower subsequent employment. Especially, increased rates of new firm formation in Scotland lead to less, rather than more, employment.

*André van Stel* and Kashifa Suddle examined the relationship between new firm formation and regional employment change in the Netherlands between 1988 and 2002. André van Stel presented that the maximum effect of new businesses on regional development is reached after about six years. The results also suggest that the immediate employment effects of new-firm start-ups may be small in the Netherlands. The employment impact of new firms is strongest in manufacturing industries, and the employment impact of new firms is stronger in areas with a higher degree of urbanization.

A study by *Zoltan Acs* and Pamela Mueller based on the workshop is able to differentiate between the employment effects of small and large new businesses in Metropolitan State Areas between 1990 and 2001. The short term effect is dominated by small new business and the long term effect by large new businesses. In contrast to Germany, the Netherlands and Great Britain the maximum effect of new businesses on regional employment change is reached earlier after about four or five years.

*Rui Baptista* presented the results regarding Portuguese regions for the years 1983 until 2002, a study conducted together with Victor Escaria and Paulo Madruga. Interestingly, the direct short term effects of new firm births on employment growth seem to be at least as important as the indirect long term effects. The long term effects are most prominent after eight years. In the medium run, new firm formation has a negative effect on employment change.

The Spanish case was presented by *Daniel Liviano*, a study by Josep-Maria Arauzo, Daniel Liviano and Mónica Martin. The main findings are that the effect of firm entry in Spanish regions is positive in the short and the long run, while the effect is stronger in the short term. These results are different to the other country studies and the research team offered the following explanation: the manufacturing sector experienced a great restructuring process during the inspected time period, which led to a significant destruction of employment. Therefore, incumbents rather than new ventures might have caused employment changes.

The Greek results are hardly comparable since the data availability is limited (1996-2003). *Georgios Fotopoulos* together with Helen Louri focused on the short and medium term effects of self-employment on employment growth and economic output. Applying a Cobb-Douglas production function, the results indicate that self-employment positively accounts for interregional differences in output. Furthermore, increases in self-employment positively affect regional employment growth with a 2-year lag. Some evidence is provided that entry affects both regional employment and labor productivity growth with a 2-year lag.

Due to data limitations *Mark Hart* could only examine the relationship between entry and exits and the regional economic structure between 2000 and 2004 in Ireland. He focused on the research question to what extent the observed spatial differences in start-up rates reflect the sectoral composition of the business stock in previous time periods. The findings
indicate that the production sector rather than business services had the largest influence on the overall net birth rate in Ireland between 2000 and 2004.

David Audretsch, Martin Carree, André van Stel and Roy Thurik analyzed the number of businesses as an indicator of entrepreneurial energy and investigated to what degree it affects economic performance. The analysis was performed at the country level for 21 OECD countries. The results suggest that business ownership has a positive effect on economic growth – measured as employment and GDP growth. However, changes in the number of business owners have no effect on labor productivity.

The workshop concluded with a discussion about possible future cross-country studies. A selection of research studies are planned to publish in a journal.

Guest Lectures

June 2004

Prof. Dr. Marcus Dejardin, Namur (Belgium)
Some Cross-Sectoral Aspects in Retailing Firm Demographies

Prof. Dr. Rui Baptista, Instituto Superior Técnico, (Portugal)
The Relationship between Entrepreneurship and Unemployment: Is Portugal an Outlier?

Adam Lederer, Bloomington (USA)
Small Business Economics

Allison Stanger, Rohatyn Center for International Affairs, Middlebury College, (USA)
Conflict Processes as a Complex Adaptive System

September 2004

Enrico Santarelli, Bologna (Italy)
Technological and Organizational Changes as Determinants of the Skill Bias: Evidence from a Panel of Italian Firms
Patents and the Technological Performance of District Firms Evidence for the Emilia-Romagna Region of Italy

Andrew Burke, Warwick Business School, University of Warwick (UK)
Beyond the Entrepreneur versus Wage Worker Dichotomy. Accounting for Entrepreneurial Type and Persistence

Lois Stevenson, Ottawa (Canada)
Entrepreneurship Policy

October 2004

Sharon Alvarez, Fisher College of Business, The Ohio State University (USA)
Organizing a Firm Under Knightian Uncertainty

Erik Stam, Utrecht (Netherlands)
The Growth and Spatial Organization of Young Firms: Evolutionary Perspectives

Erik Monsen, University of Colorado at Boulder (USA)
Neugründermentalität und Kultur in Großfirmen

November 2004

Anders Hoffmann, OECD and Danish Government Research & Analysis Center for Growth Policies (Denmark)
Critical Policy Areas for Entrepreneurship

December 2004

Daniel Liviano Solis, Universitat Rovira i Virgili (Spain)
Entrepreneurship and Regional Development

Raquel Ortega-Argilés, University of Barcelona (Spain)
Agency Control Mechanisms and Innovative Effort
February 2005

Elisabeth Müller, Mannheim (Germany)
*Underdiversification in Private Companies – Required Returns and Incentive Effects*

March 2005

Mark Sanders, Utrecht (The Netherlands)
*Explaining Real Firm Performance Through Efficiency: Evidence from the European Insurance Industry*

Catharina Leilich, Trier (Germany)
*Flache und steile Hierarchien in Forschungsinstituten*

Jaap Bos, Utrecht (The Netherlands)
*What can we expect from Consolidation in the European Insurance Industry: Evidence from an Efficiency and Productivity Analysis*

April 2005

Erik Monsen, Jena (Germany)
*Employees Do Matter: Autonomy, Teamwork and Corporate Entrepreneurial Culture*

Erik Stam, Utrecht (The Netherlands)
*Starting Anew: Entrepreneurial Intentions and Realizations after Firm Exit*

May 2005

Naomi Lederer, Colorado (USA)
*Economics and Communication*

Klaus Nathusius, Kassel (Germany)
*Das START Netzwerk für Intra+Entrepreneurship im EXIST-Programm – Theoretische Fundierung, Umsetzungsstatus und Erkenntnisse zur Einführung des Entrepreneurship-Themas an deutschen Hochschulen*

June 2005

Maria Minniti, Babson (USA)
*I think I can, I think I can ...: Overconfidence and entrepreneurial behavior*

Julie Ann Elston, Oregon (USA)
*Characterizing the Entrepreneur Using Field Experiments*

July 2005

Andrea Conte, Jena (Germany)
*Homogeneous or Heterogeneous Innovative Processes? Determinants of Innovation by Firm’s Size and Sector Belonging*

August 2005

Ingrid Verheul, Rotterdam (The Netherlands)
*Allocation and Productivity of time in New Ventures of Female and Male Entrepreneurs*

Rui Baptista, Lisbon (Portugal)
*Entrepreneurial Backgrounds and the Early Survival Chances of New Startups: The Influences of Necessity Based Entrepreneurship*

Alok Chakrabarti, Newark (USA)
*Building Social Capital and Learning Environment in University – Industry Relationships*

September 2005

Zuoquan Zhao, Jena (Germany)
*Incorporating Space into Growth Models*

October 2005

José Maria Millán Tapia, Huelva (Spain)
*Which Europeans are the best Job Creators? Which Europeans are more likely to become Job Creators?*
Philipp Köllinger, Berlin (Germany)
*The Endogenous Acceleration of Technical Change — Evidence for a Growing Digital Divide*

November 2005

Koen Frenken, Utrecht (The Netherlands)
*Why is Economic Geography not an Evolutionary Science? Towards an Evolutionary Economic Geography*

Max Keilbach, Jena (Germany)
*Linnovation Regimes and the Demography of Firms*

December 2005

Mario Coccia (Italy)
*Measuring Regional Growth and Convergence Analysis: Theory and Empirical Evidence*

Erkko Autio (Switzerland)
*Internationalization, Survival, Dynamic Capability, and Growth*

Christian Schade, Berlin (Germany)
*Differences in the Decision Behavior of German and Russian Entrepreneurs*

2.5 Visiting Scholars 2004/2005

In the years 2004 and 2005 we were happy to host the following guest scholars at our department for a lot of interesting exchange and mutual research:

2004

Dejardin, Marcus (June 14 – 16, 2004)
Professor at « FASEG » (Adult Education in Economic Sciences and Management)
Department of Namur University, Facultés Universitaires Notre-Dame de la Paix, Belgium, Member of the Center for Research on the Economy of the Walloon Region (CREW).
Research Interests: Economics of Entrepreneurship, Industrial and Regional Economics, Firm Demography, Economic Growth, Regional Development.

Professor of Economics at the Technical University Bergakademie Freiberg, Germany.

Grilo, Isabel (June 19 –22, August 18 –22, November 6 –10, 2004)
Visiting Professor, Université catholique de Louvain, 1994-2001 (Institut d'administration et de Gestion); Principal Administrator, European Commission (Enterprise Directorate-General), 2000-present.
Research Interests: Economic Theory, Industrial Organization.

Lee, Sam Youl (June 24 –28, 2004)
Research Associate, Sloan Software Industry Center, Carnegie Mellon University, USA, Research with Dr. Richard Florida, Heinz Fellowship.
Research Interests: Innovation, Human Capital, Economic Development

Müller, Pamela (March 9, June 21 –26, July 19, 2004)
Research and teaching assistant at the Chair of Economic Policy at the Technical University of Freiberg, Germany.
Parker, Simon (July 18 –20, 2004)
Professor and Subject Head of Economics, School of Economics, Finance & Business, University of Durham, UK, and Director of the Centre for Entrepreneurship, Durham Business School.
Research Interests: The Economics of Entrepreneurship and Self-employment.

Doctoral student in the strategy and entrepreneurship program at the University of Colorado's Leeds School of Business. University of Colorado at Boulder, USA.

Reynolds, Paul (June 23 –25, 2004)
Paul Reynolds & Associates, USA.
Prof. Dr. Paul D. Reynolds was a Professor of Entrepreneurial Studies at Babson College and a Research Professor of Entrepreneurship at the London Business School from 1999 to 2004. He served as the director of the annual Babson-Kaufman Entrepreneurship Research Conference (1996-2000) and was the Coleman Foundation Chair in Entrepreneurial Studies at Marquette University (1990-1995).

Rondi, Laura (May 17 –20, 2004)
Senior Researcher for the Italian National Research Council (CNR) at CERIS, Economic Research Centre on Firms and Growth.

Santarelli, Enrico (June 19 –26, September 5 –10, 2004)
Professor of Economic Policy: University of Bologna - Faculty of Statistics; Member of the Academic Board of the Ph.D Program in Economics (“Dottorato di Ricerca in Economia”) offered by the Department of Economics at the University of Bologna.
Research Associate, Max Planck Institute, Entrepreneurship, Growth and Public Policy Group, Jena, Germany.
Research interests: New-firm entry, growth, and survival; small business economics; theoretical models of innovation and technological change in the data processing industry; technological change in consumer goods industries; internal organization of the firm; competition policy and antitrust legislation; FDI in transition economies; labour economics.

Schulze, Günther, (September 1 –10, 2004)
Professor at the University of Freiburg/Br., Germany.

Stanger, Allison (June 26 – July 2, 2004)
Associate Professor of Political Science and Director of the Rohatyn Center for International Affairs at Middlebury College, USA.
Research Interests: Comparative Democratization, Ethnic Conflict, European Politics, Social Science Applications of Agent-Based Modelling.

Stevenson, Lois (September 16 –19, 2004)
Professor at the University of Ottawa, Canada.
Prof. Lois Stevenson is a former Director, Entrepreneurship Development with the Atlantic Canada Opportunities Agency and former Director of Policy and Liaison in the Entrepreneurship and Small Business Office of Industry, Canada. In 2002, she served as Deputy Executive Director of Industry Canada’s Innovation Secretariat and leads the Practice of Innovation Initiative, profiling highly innovative firms and their CEOs. Prior to joining the Government of Canada in 1990, she spent ten years as a university professor teaching and researching in the areas of entrepreneurship and small business management.
Storey, David (June 23 – 25, 2004)
He is Associate (Research) Professor at Warwick Business School, Visiting Professor at the University of Manchester, Reading and Durham, UK.
David Storey’s work has focused on small firm growth and on the evaluation of the impact of public policies to assist SMEs. He is the author of several books on small firms, the best known of which is “Understanding the Small Business Sector”.

van Praag, Mirjam (July 18 – 20, 2004)
Associate Professor of Economics of Organization and Personnel, University of Amsterdam, The Netherlands.
Research Interests: Economics of Performance Measurement and Reward Systems and Entrepreneurship.

Varga, Attila (June 23 – 28, 2004)
Associate Professor, Head of the English Language Ph.D. Program in Business Administration at the Faculty of Business and Economics, University of Pecs, Hungary.
Research Interests: Regional Economic Development Policy, Regional Innovation Systems, Economics of Technological Change.

Vivarelli, Marco (March 8 – 10, July 18 – 19, 2004)
Full Professor of Economic Policy (permanent) at the Catholic University (UCSC, Milan), Italy. Since 2004: Research Scholar at the Max Planck Institute for Research into Economic Systems, Entrepreneurship, Growth and Public Policy Group.
Research Interests: Relationship between technological change, employment and skills; the labour market and income distribution impacts of globalization and the entry and post-entry performance of firms.

2005

Acs, Zoltan (June 25 – July 19, 2005)
Doris and Robert McCurdy Distinguished Professor of Entrepreneurship and Innovation, Professor of Economics and Director of the Entrepreneurship Program in the Robert G. Merrick School of Business, University of Baltimore, USA; Census Research Fellow at the U.S. Bureau of the Census.
Research interests: the relationship between economic growth and entrepreneurship.

Aldrich, Howard (June 26 – 30, 2005)
Professor & Department Chair, Sociology, and Adjunct Professor of Management in the Kenan-Flagler Business School, University of North Carolina, Chapel Hill, North Carolina, USA.
Research interests: social networks and business performance, nascent entrepreneurs and social networks, human resource management, cross-national study of gender and family business, commercialization of the world wide web, cross national study of research and development consortia.

Alvarez, Sharon (June 28 – July 8, 2005)
Professor of Economics at Ohio State University, Fisher College of Business, Founder and Academic Director of the Center for Entrepreneurship.
Research interests: entrepreneurial theory, high technology alliances between entrepreneurship firms and larger established firms, entrepreneurial decision making and women entrepreneurs, entrepreneurship and strategy.

Auhtio, Erkko (December 11 – 13, 2005)
Professor in Technology-Based Venturing, Director at the Institut Stratége of HEC Lausanne.
Research interests: growth, alliance strategies, and rapid international growth of technology-based new firms

Baptista, Rui (June 25 – July 13, and August 16 – 23, 2005)
Associate Professor of Strategy and Organizations at the Department of Engineering Management of Instituto Superior Técnico, Technical University of Lisbon, Portugal;
Co-ordinator of the Laboratory of Technology Policy and Management of Technology, Center for Innovation, Technology and Policy Research; Senior Research Fellow at the Max Planck Institute of Economics, Jena, Germany.

Research interests: entrepreneurship, technological innovation, firm and labor mobility, and their relationship with economic growth and regional development, relationship between cultural values, governance, economic regulation and political economy.

Beugelsdijk, Sjoerd (February 6 – 8, 2005)
Associate Professor at the Radboud University Nijmegen, NL.
Research interests: the role of trust in the economy, innovation, regional development and cooperative relations between enterprises.

Burke, Andrew (February 6 – 8, 2005)
Holds the Bettany Chair of Entrepreneurship, Cranfield University, UK, Research Professor at the Max Planck Institute of Economics, Jena, Germany.
Research interests: economics and finance of entrepreneurship & small firms, law and economics in entrepreneurial/dynamic markets (particularly competition and copyright laws), industrial economics, and cultural economics (particularly, the music industry).

Cantner, Uwe (February 6 – 8, 2005)
Professor of Economics at the Friedrich-Schiller University Jena, Germany.
Research interests: economics of innovation, evolutionary economics, industrial economics, productivity, theory and measurement, public economics, public finance.

Distinguished Professor and Foundation Chair in Management of Technology at New Jersey Institute of Technology, Senior Fellow at the Industrial Performance Center at Massachusetts Institute of Technology, USA.
Research interests: technology management, productivity and economic development.

Coccia, Mario (November 14 – December 13, 2005)
Researcher at Italian National Research Council (Ceris-cnr, Torino-Italy), visiting researcher at Max Plank Institute of Economics, Jena, Germany.
Research interests: history of economic thought on technological innovation and science, managerial and organizational behavior of public research labs, research and innovation policies, technometrics, technology transfer and commercialisation, scientometrics, R&D evaluation and management, economic growth, and technological forecasting.

Company, Yosem (March 20 – 25, 2005)
Ph.D. student in Policy and Strategy in the Management Science and Engineering Department at Stanford University, USA.
Research interests: applying concepts from complexity and evolutionary theory to enhance our understanding of the dynamics of organizational formation and strategic evolution, exploring how strategies are formed and evolve over time through multiple agent interactions.

Elston, Julie Ann (June 1 – 25, 2005)
Professor at Oregon State University; USA; Research Fellow at the Max Planck Institute of Economics, Jena.
Research interests: firm investment and financing behavior in the context of country-specific institutional relationships.

Fleischer, Manfred (March 21 – 23, 2005)
Wissenschaftszentrum Berlin für Sozialforschung, Berlin, Germany.
Research interests: regulation and innovation in the chemical and pharmaceutical industry.

Fotopoulos, Georgios (July 10 – 12, 2005)
University of Patras, Greece.
Research interests: entry and exit of firms: sectoral, temporal and spatial variation and determinants; location effects on firm productivity - stochastic frontiers approach; post
entry performance of firms and financial constraints on new firm growth, the effects of
entry and exit of firms on sectoral market functioning and spatial markets; local
conditions for small business performance, SMEs -local strengths and international
competition; regional growth and convergence; geography of FDI patterns; multina-
tional firm location and effects on host countries (regions).

Frese, Michael (February 6 – 8, 2005)
Professor for work and organizational psychology at the Justus-Liebig-Universität
Giessen, Germany; Visiting Professor at the London Business School, UK; Adjunct
Professor at the University of Pennsylvania, USA (Psychology).
Research interests: longitudinal studies on psychological effects of unemployment,
impact of stress at work, predictors of personal initiative in East Germany and psycho-
logical success factors in small scale entrepreneurs, errors and shift work, the
concept of error training and psychological training for increasing entrepreneurship
and personal initiative, cultural factors in organization and across nations, psychologi-
cal success factors in entrepreneurs in developing countries and in Europe.

Frenken, Koen (November 24 – 26, 2005)
Assistant Professor at the Utrecht University in the Faculty of Geosciences, NL.
Research interests: evolutionary economics, complexity theory, geography, urban
growth, innovation, networks.

Freytag, Andreas (February 6 – 8, 2005)
Professor for Economic Policy, Friedrich-Schiller-University Jena, Germany.
Research interests: political economy of reforms; general economic policy, telecom-
munications; economic policy in MOE-countries; economic policy in Estonia; new
political economy; international currency policy; institutional economics.

Fritsch, Michael (July 5 - 12, 2005)
Professor of Economic Policy at the Technical University Bergakademie Freiberg,
Germany.
Research interests: markets and market failure; new firm formation processes and
their impact on economic development; innovation systems and innovation behavior;
regional development strategies.

Furman, Jeffrey (June 26 – July 1, 2005)
Assistant Professor at Boston University, USA.
Research interests: strategy, international business, and innovation, investigates the
factors driving firm-specific and location specific differences in innovation and scien-
tific output, examines the drivers of country-level innovative output, the economics of
institutions affecting knowledge diffusion in the life sciences, and the historical
relationship between universities and private firms in the pharmaceutical industry.

Gilbert, Brett (July 3 – 8, 2005)
Assistant Professor at Georgia State University, USA.
Research interests: understanding the conditions under which new ventures thrive,
understanding the factors that contribute to or detract from the success of new firms in
geographic cluster regions (such as Silicon Valley).

Golpe, Antonio (March 1 – September 1, 2005)
PhD-student at the Universidad de Huelva, Spain.
Research interests: entrepreneurship, macroeconomics, labor market,
microeconomics.

Hart, Mark (July 10 – 12, 2005)
Professor at Kingston University, UK, worked and published extensively in the general
area small business and local economic development in Ireland and the UK.
Research interests: the effectiveness of public policy support to the SME sector
overall and to individual communities.

Hofstede, Geert (February 5 – 8, 2005)
Professor at University of Maastricht, Netherlands.
Research interests: influential expert on the interactions between national cultures
and organizational cultures, author of several books including 'Culture's Consequen-

Visiting Scholars
quences and Software of the Mind, demonstrated that there are national and regional cultural groupings that affect the behaviour of organizations.

**Klamer, Arjo (February 6 – 8, 2005)**
Professor of the Economics of Art and Culture at Erasmus University in Rotterdam, Netherlands.
Research interests: issues in the world of the arts, brings the cultural dimension of economic life to the fore.

**Klepper, Steven (June 26 – July 1, 2005)**
Professor at the Department of Social and Decision Sciences, Carnegie Mellon University, USA.
Research interests: involved in two programs of research: one deals with the evolution of industries beginning with their commercial inception, the second deals with making inferences about unobservable constructs through the use of proxy variables.

**Köllinger, Philipp (October 18, 2005)**
PhD candidate in Economics and Management Science at the Humboldt University Berlin, Institute for Entrepreneurial Studies and Innovation Management, Berlin, Germany.
Research interests: technological change, entrepreneurship and behavioral economics.

**Lederer, Naomi (May 1 – 5, 2005)**
Associate Professor, Reference Librarian at the Colorado State University, USA.

**Lehmann, Frederick (March 21 – 24, 2005)**
University of Michigan, USA.
Research interests: entrepreneurship theory and modeling: determinants of entrepreneurship activity, returns to entrepreneurship, firm behavior and entrepreneurial behavior in transition and emerging economies, geographic localization of foreign direct investment, firm location strategy, impact of foreign direct invest and international trade on transition economies.

**Leilich, Catherina (February 21 – March 4, 2005)**
IAAEG, Germany.
Research interests: knowledge-based firm, research and university management, economics of education, personnel economy, industrial relations.

**Liviano Solis, Daniel (July 25 – 13, 2005)**
University Rovira I Virgili, Spain.
Research interests: microeconomics, microeconometrics, macroeconometrics.

**McMullen, Jeffrey (March 21, 2005)**
Assistant Professor at the Baylor University, USA.
Research interests: strategy/entrepreneurship, social/cognitive psychology.

**Millán Tapia, José María (March 1 – September 1, 2005)**
PhD-student at the Universidad de Huelva, Spain.
Research interests: entrepreneurship, microeconometrics, labor market, public policy.

**Minniti, Maria (May 16 – July 8, 2005)**
Associate Professor at Babson College, USA; participates in the Global Entrepreneurship Monitor (GEM) Project and is a member of the Entrepreneurship Research Consortium.
Research interests: economics, entrepreneurship and industrial organization.

**Müller, Elisabeth (February 3 – 4, 2005)**
Research Fellow at the ZEW Mannheim, Germany, in the field of innovation research „Industrieökonomik und Internationale Unternehmensführung“.
Research interests: patent research and financing of innovative companies.
Müller, Pamela (June 26 – July 2, July 10 – 12, 2005)
Research and teaching assistant at the Chair of Economic Policy at the Technical University of Freiberg, Germany.
Research interests: entrepreneurship and the process for new firm formations and their impact on economic development; regional economic development and regional development strategies.

Nathusius, Klaus (May 18, 2005)
Honorary Professor for Entrepreneurship at the University of Kassel, Germany; Managing Director of the START network.

Nelson, Andrew (June 26 – July 8, 2005)
Stanford University, USA.
Research interests: commercialization of university research and university-firm relations; institutional theory; social network theory; entrepreneurship; economics of science and technology, including path dependence, distributed collaboration; music technology.

Oettl, Alexander (June 26 – July 9, 2005)
PhD student at the Rotman School of Management at the University of Toronto, Canada.
Research interests: innovation, the management of technology, knowledge diffusion, and economic geography.

Parker, Simon (June 26 – July 2, 2005)
Professor and Subject Head of Economics, School of Economics, Finance & Business, University of Durham and Director of the Centre for Entrepreneurship, Durham Business School, UK.
Research interests: the economics of entrepreneurship and self-employment.

Plummer, Lawrence A. (June 26 – July 7, 2005)
PhD-student at the University of Colorado at Boulder, USA; research fellow at the Max Planck Institute of Economics, Jena, Germany; doctoral student in the strategy and entrepreneurship program at the University of Colorado’s Leeds School of Business.
Research interests: the intersection of corporate strategy, new venture creation, and economic geography; the competitive disciplining effect of innovative new firm entry on incumbent firm performance.

Santarelli, Enrico (July 3 – 8, 2005)
Professor of Economic Policy, University of Bologna, Faculty of Statistics; Member of the Academic Board of the Ph.D Program in Economics at the University of Bologna, Italy; Research Associate, Max Planck Institute, Jena, Germany.
Research interests: new-firm entry, growth, and survival; small business economics; theoretical models of innovation and technological change in the data processing industry; technological change in consumer goods industries; internal organization of the firm; competition policy and antitrust legislation; FDI in transition economies; labor economics.

Schade, Christian (December 15 – 16, 2005)
Professor at Humboldt-University Berlin, Director of the Institute for Entrepreneurial Studies and Innovation Management, Research Professor of the German Institute of Economic Research (DIW) Berlin, Germany.
Research interests: behavioral decision and game theory, experimental economics, risk-taking behavior of entrepreneurs, consumer behavior with innovations, and innovation diffusion modelling.

Shah, Sonali (June 30 – July 8, 2005)
Assistant Professor at the University of Illinois at Urbana-Champaign, USA.
Research interests: the social structures that support innovation and entrepreneurship, creation and maintenance of “innovation communities” that support the development and diffusion of new technologies in fields ranging from software to sports equipment to medical imaging devices, investigates the processes underlying the formation of new industries and product markets.
Stam, Erik (March 21 – 24, and November 24 – 26, 2005)
ERIM research fellow at Erasmus University Rotterdam, Assistant professor of
Economic Geography at Utrecht University, Netherlands.
Research interests: new firm growth, the spatial organization of (young) firms, the
theory of the firm, network dynamics of young firms, the entrepreneurial conse-
quences of firm exit, the creative class, and the emergence and evolution of the ICT
industries.

Storey, David (June 23 – 25, 2005)
Associate (Research) at Warwick Business School, UK; Visiting Professor at the
University of Manchester, Reading and Durham, UK.
Research interests: small firm growth and on the evaluation of the impact of public
policies to assist SMEs.

Thurik, Roy (July 25 – 29, 2005)
Professor of economics and entrepreneurship at Erasmus University Rotterdam and
professor of entrepreneurship at the Free University in Amsterdam, scientific advisor
Research interests: the role of small firms in markets, the role of business owners in
firms and the consequences and causes of entrepreneurship in economies.

Uhlaner, Lorraine (February 6 – 8, 2005)
Director of the European Family Business Institute and Associate Professor in the
Rotterdam School of Economics, Erasmus University Rotterdam, The Netherlands.
Research interests: a variety of topics in entrepreneurship and family business, at
both the micro-level of the organization as well as macro-topics, such as the role of
family business and entrepreneurship within the economy.

Veciana, José (July 3 – 6, 2005)
Professor at the University of Barcelona, Spain.

Verheul, Ingrid (August 10 – 19, 2005)
Research Assistant at the Center for Advanced Small Business Economics at the
Erasmus University in Rotterdam, The Netherlands.
Research interests: research in the field of female entrepreneurship and determinants
of entrepreneurship.

Vivarelli, Marco (July 3 – 8, 2005)
Professor at the University Cattolica Del Sacro Cuore, Italy; Research Scholar at Max
Planck Institute of Economics, Department Entrepreneurship, Growth and Public
Policy, Jena, Germany; Senior research economist at the International Labor Office
Geneva, Switzerland.
Research interests: relationship between technological change, employment and
skills; the labor market and income distribution impacts of globalization and the entry
and post-entry performance of firms.

Van Stel, André (June 26 – July 2, and July 10 – 15, 2005)
Researcher at EIM Business and Policy Research in Zoetermeer, Erasmus University
Rotterdam, The Netherlands.
Research interests: the relationship between entrepreneurship and economic growth.

Wennekers, Sander (February 6 – 8, 2005)
EIM Small Business Research and Consultancy; he is in charge of the national
research program of the Netherlands in the field of SMEs and entrepreneurship.

Wessner, Charles (July 3 – 7, 2005)
National Academy of Sciences, USA; policy advisor, expert on public-private partner-
ships, early-stage financing for new firms, and the special needs and benefits of high-
technology industry, advisor to agencies of the U.S. government and to international
organizations.
Research interests: the linkages between science-based economic growth, new
technology development, university-industry clusters, regional development, small
firm finance and public-private partnerships.
3 Research on Strategic Interaction

(Director: Werner Güth)

3.1 Research Topics – Introduction

The Strategic Interaction Group was established when Werner Güth joined the institute in July of 2001. Early in 2002 the computer laboratory (located close to the main campus in the shopping mall „Goethe-Galerie“) with 32 visually isolated terminals and two server terminals was ready. About two years later, a video laboratory with eight soundproof cabins, located in the basement of the institute, became available. Since then, we have been using it mainly in order to collect data on how experimental participants mentally and emotionally perceive a decision task and generate their decision behavior.

The group is mostly concerned with strategic interaction in small groups. The theoretical work therefore concentrates on

- orthodox (normative) decision and game theory
- evolutionary theory, mostly in the tradition of indirect evolution combining forward looking deliberation and path dependence, and
- behavioral or boundedly rational decision emergence in decision tasks and interactive situations.

Our theoretical approach is mostly applied to economics but has partly been inspired by other social sciences like philosophy, social, cognitive and development psychology, sociology, political science, and evolutionary biology. This is reflected by the network of research contacts and co-authors, by the interdisciplinary composition of the group, and by the applications to various social decision problems.

The empirical work of the group is mostly based on laboratory (rather than field) data. Most but not all experimental studies of the group members are performed in one or both laboratories or by using the laboratory equipment of partner institutions. We have also run newspaper experiments and used internet platforms and panels to perform experiments, e.g. of the SFB 580 in which we have taken part since 2003. Due to our generous funding, the institute has become one of the most active centers for experimental economics in the world.

Among other objectives, our experimental studies aim to

- check the predictive power of normative solutions or solution ideas for abstract game models,
- explore the path dependence of behavior and whether and how boundedly rational participants combine such path dependence with forward looking deliberation, and
- collect data to establish stylized facts to develop behavioral approaches to decision making in both decision theoretic as well as strategic tasks.

The group has been quite productive when considering its output (publications as well as working papers). For the purposes of this report, we divide the various projects into major research topics, including

- Normative (Decision and Game) Theory
- Behavioral Finance
- Indirect Evolution
- Labor Markets and Industrial Organization
- Fairness, Methodology and Behavioral Heterogeneity
- Bounded Rationality
- Public Goods
- Public Choice
- Network Formation
- Auction (Markets)
- Other Topics
Of course, the more fundamental aspects of our research agenda, namely
- the task to develop Bounded Rationality Theory
- the program of Indirect Evolution
- our research based on Normative (Decision and Game) Theory
still dominate our selection of topics.

This does not exclude research activities which do not fit in the three categories since, like other scholars, we are often inspired by what others do and what others appreciate. And due to our many research links we also engage in research topics which were suggested by our coauthors and partner institutions. In the following, some major topics will be separately introduced in more detail together with the abstracts of our completed research projects. Of course, in some cases a specific project addresses more than one of the above mentioned topics. So assigning them to just one topic below will not always be convincing. In all publications and working papers, authors are listed in alphabetical order.

3.1.1 Normative (Decision and Game) Theory

It is important to keep close contact with normative decision and game theory, based on (common knowledge of) perfect rationality. Since
- rational choice explanations often have their behavioral analogue and predict the same qualitative effects in most decision problems,
- neoclassical repairs or game fitting attempts provide inspiration for bounded rationality explanations if they can account for many empirical findings (and not only for eclectic evidence), and finally
- we, like most social scientists, are intrinsically interested in rational decision making as such.

Published Papers


In plausible theories of bounded rationality actors are not stimulus-response machines but human beings. As such they are guided by theories that predict the course of the world and prescribe how they should try to intervene in that course. Since boundedly rational human beings cannot only observe but can also modify their theories, in particular if they are not satisfied with the results, a self-application of concepts of boundedly rational behavior to theory choice and an inquiry of theory absorption seems natural. The paper explores by means of specific examples some issues that are raised by combining the concept of satisficing behavior with that of theory absorption.


Subjective payoffs that represent given preferences „all things considered“ together with strictly uncommitted opportunity taking cannot account for the behavior of personal actors. It is shown how agent based approaches can explicitly capture internal commitments of persons while sticking to conventional utility cum probability representations of desires and beliefs. However, if rational choice modeling is taken to this extreme, conventional analyses in terms of reasoning become implausible since sub-personal agents are not persons endowed with higher cognitive faculties. Starting from preference representations without looking into the black box of mental processes will hinder theoretical progress.

Working Papers

No. 19-2004: Martin Dufwenberg, Werner Güth

The Psychological Game of Trust

Two traditional assumptions in neo-classical economics have been material self-interest and (commonly known) decision rationality. Since there is ample contradictory empirical
evidence, many recent attempts have been made to remodel the situation so that rational behavior is more in line with actual results (game fitting). Here we concentrate on intrinsic let-down aversion whose strength can depend on the relative frequency of such concerns, i.e. on a sociological aspect, and examine how these ideas apply to a game of trust. We discuss whether the flexibility of the approach is a virtue or a vice.

No. 25-2004 Luis G. González, Werner Güth, Wiebke Kuklys
The Consistency Axiom – An Experimental Study
Assume that a strict equilibrium is suggested as the solution of a strategic game in normal form. If some but not all players are committed to their solution strategy, a reduced game results with only the still non-committed as active players. The reduced game property (also often described as the consistency axiom) says that the solution of the reduced game is given by the solution strategies of the still active players.

Actually consistent equilibrium selection in general is not possible if certain other requirements (existence and optimality) are granted (Norde et al., 1996), i.e. postulating the reduced game property is asking for too much. Does the reduced game property at least have some behavioral appeal? We test this experimentally by confronting players either with a solution proposal or with a selection criterion before letting them decide for themselves for the original games as well as for some of its reduced games.

No. 38-2004: Geoffrey Brennan, Werner Güth, Hartmut Kliemt
Approximate Truth in Economic Modelling
Economic intuitions concerning rational behaviour in interactive social situations are shaped by idealized models which are regarded as „approximately true“. But ideal models cannot be meaningfully deemed approximately true unless asymptotically convergent processes imply them as limit cases. We illustrate by various examples – infinitely patient customers on durable monopoly markets, homogeneity of commodities, super-games etc. – how this necessary methodological requirement is almost routinely neglected. On this basis we draw some conclusions concerning the continuity between abstract and less abstract models on the one and the world modelled by them on the other hand.

No. 01-2005: Luis G. González
Approximate Quantal Response Equilibria in Bargaining
The Nash Bargaining problem in the context of a random utility model yields a stochastic demand for each player, conditional on his or her beliefs regarding the other player’s behavior. We derive a symmetric logit equilibrium under naive expectations that converges to the Nash axiomatic solution as noise in utility vanishes. A numerical approximation to the symmetric logit equilibrium under rational expectations (Quantal Response Equilibrium) solution is also computed.

No. 26-2005: Werner Güth, M. Vittoria Levati, Matteo Ploner
‘Buying a pig in a poke’: An experimental study of unconditional veto power
We study an ultimatum experiment in which the responder does not know the offer when accepting or rejecting. Unconditional veto power leads to acceptances, although proposers are significantly greedier than in standard ultimatum games, and this is anticipated by responders.
3.1.2 Behavioral Finance

Behavioral finance is a field where economists and psychologists most frequently interact. Several studies consider markets, others just decision tasks without any social interaction.

Published Papers


This paper investigates egocentric biases in financial decisions. Subjects first design a portfolio, whereby each combination of assets yields the same expected return and variance of returns. They are then confronted with two alternative portfolios; the average portfolio and the portfolio of one’s selected expert. Illusion of expertise prevails if one nevertheless prefers the own portfolio. Using the random price mechanism reveals that most subjects prefer their own portfolio to the average or the expert’s portfolio. Illusion of expertise is shown to be stable individually, over alternatives, and for both elicitation methods, willingness to pay and to accept.


The results of an asset market experiment, in which 64 subjects trade two assets on eight markets in a computerized continuous double auction, indicate that objectively irrelevant information influences trading behavior. Moreover, positively and negatively framed information leads to a particular trading pattern, but leaves trading prices and trading volume unaffected. In addition, we provide support for the disposition effect. Participants who experience a gain sell their assets more rapidly than participants who experience a loss, and positively framed subjects generally sell their assets later than negatively framed subjects.


A vast literature shows that individuals frequently violate normative principles in reasoning. In evaluating the relevance of these findings for psychology, economics, and related disciplines, it is natural to ask whether reasoning errors reflect random aberrations or systematic biases. One straight-forward way to approach this question is to test their persistence at the aggregate level. In this paper, we report results of four studies designed to determine if information dissemination in competitive auctions can reduce, or even eliminate, logical errors in the Wason selection task. Our results show that payoff feedback and exposure to the information flow drive the aggregate behavior toward the normative solution. We also found evidence of spillover effects from informed to uninformed traders in one-sided combinatorial auctions as well as positive transfer effects from competitive to individual settings. We discuss the implication of our results for future research at the interface of psychology and economics.

Working Papers

No. 28-2004: Gerlinde Fellner

Illusion of control as a source of poor diversification: An experimental approach

This paper investigates factors influencing individual portfolio allocations with particular focus on the role of illusion of control. By forming their portfolio of two risky lotteries and one risk-less alternative, subjects are requested to reach a target investment profit, whereby equal diversification between the two risky lotteries is part of the solution space. Subjects however excessively invest in the lottery for which they can determine the outcome by rolling the die themselves indicating that they are prone to illusion of control. However, the effect vanishes with experience. In contrast, presenting random sequences of prior outcomes reduces biased investments. In line with the excessive extrapolation hypothesis, the
more positive outcomes observed from past draws, the more likely is a positive prediction for this lottery, which is then followed by higher investment. Also, offering a default portfolio strongly determines final allocations.

No. 12-2005: Frédéric Koessler, Charles Noussair, Anthony Ziegelmeyer
Individual Behavior and Beliefs in Experimental Parimutuel Betting Markets

We study experimental parimutuel betting markets with asymmetrically informed bettors. We propose a theoretical model, the Adaptive Model, which serves as our source of null hypotheses about individual behavior and the capacity of the markets to aggregate information. In one treatment, groups of eight participants bet against each other in twenty repetitions of a sequential betting market. The second treatment is identical, except that bets are observed by other participants who assess the winning probabilities of each outcome. In the third treatment, the same individuals place bets and assess the winning probabilities of the outcomes. A favorite-longshot bias is observed in the first and second treatments, but it is sharply reduced in the third treatment. Information aggregation is better in the third than in the other two treatments, because contrarian betting is almost completely eliminated by the belief elicitation procedure. Placing bets improves the accuracy of belief statements. A statistical generalization of the Adaptive Model explains the data very effectively.

No. 13-2005: Jürgen Huber, Michael Kirchler, Matthias Sutter
Is more information always better? Experimental financial markets with asymmetric information

We study the value of information in financial markets by asking whether having more information always leads to higher returns. We address this question in an experiment where single traders have different information levels about an asset's intrinsic value. In our treatments we vary the nature of the information and the trading mechanism. We find that only the very best informed traders (i.e. insiders) significantly outperform less informed traders. However, there is a wide range of information levels (from zero information to an average information level) where additional information does not yield higher returns. The latter result implies that the value of information is not strictly monotonic.

No. 15-2005: Gerlinde Fellner, Matthias Sutter
Causes, consequences, and cures of myopic loss aversion – An experimental investigation

Myopic loss aversion (MLA) has been established as one prominent explanation for the equity premium puzzle. In this paper we address two issues related to the effects of MLA on risky investment decisions. First, we assess the relative impact of feedback frequency and investment flexibility (via the investment horizon) on risky investments. Second, given that we observe higher investments with a longer investment horizon, we examine conditions under which investors might endogenously opt for a longer investment horizon in order to avoid the negative effects of MLA on investments. We find in our experimental study that investment flexibility seems to be at least as relevant as feedback frequency for the effects of myopic loss aversion. When subjects are given the choice to opt for a long or short investment horizon, there is no clear preference for either. Yet, if subjects face a default horizon (either long or short), there is rather little switching from the one to the other horizon, showing that a default might work to attenuate the effects of MLA. However, if subjects switch, they are more often willing to switch from the long to the short horizon than vice versa, suggesting a preference for higher investment flexibility.

No. 20-2005: Andrea Morone
Comparison of Mean-Variance Theory and Expected-Utility Theory through a Laboratory Experiment

In the 40’s and early 50’ two decision theories were proposed and have since dominated the scene of the fascinating field of decision-making. In 1944 – when von Neumann and Morgenstern showed that if preferences are consistent with a set of axioms then it is possible to represent these preferences by the expectation of some utility function – Expected
Utility theory provides a natural way to establish „measurable utility“. In the early 50’s Markowitz introduced the Mean-Variance theory that is the basis of modern portfolio selection theory. Even if both models were analyzed from virtually all possible points of view; although they were tested against several generalizations; even though they seem to be the most attractive theories of decision making, they were never tested against each other. This paper will try to fill this gap. It investigates, using experimental data, which of these two models represent a better approximation of subjects’ preferences.

No. 27-2005: Andrea Morone
Financial Market in the Laboratory, an Experimental Analysis of some Stylized Facts
This paper purports to provide experimental evidence explaining a number of stylized facts associated with the behaviour of financial returns, in particular, the fat tailed nature of their distribution and the persistence in their volatility. By means of a laboratory experiment, we will investigate the effect of quantity and quality of information, present in a financial market, upon its stylized facts, showing how both quality and quantity of information might have an impact on volatility clustering and the emergence of fat tail returns.

No. 28-2005: Andrea Morone, Ulrich Schmidt
An Experimental Investigation of Alternatives to Expected Utility Using Pricing Data
Experimental research on decision making under risk has until now always employed choice data in order to evaluate the empirical performance of expected utility and the alternative non-expected utility theories. The present paper performs a similar analysis which relies on pricing data instead of choice data. Since pricing data lead in many cases to a different ordering of lotteries than choices (e.g. the preference reversal phenomenon) our analysis may have fundamental different results than preceding investigations. We elicit three different types of pricing data: willingness-to-pay, willingness-to-accept and certainty equivalents under the Becker-DeGroot-Marschak (BDM) incentive mechanism. One of our main result shows that the comparative performance of the single theories differs significantly under these three types of pricing data.

3.1.3 Indirect Evolution

The tradition of endogenously deriving the rules of the game, e. g. in the form of preference or belief evolution or the adaptation of timing dispositions, has been continued at the institute. The main topics were aiming at
- endogenously deriving instead of imposing certain modelling assumptions in orthodox game theory, e. g. the one of consistent beliefs as propagated by Harsanyi,
- the co-evolution of multiple (legal) institutions (like courts and legal insurance) together with morality (trustworthiness) or intrinsic motivation,
- demonstrating the possible spectrum of analysing the same situation by relying more or less on forward looking deliberation rather than less or more adaptation, i.e. path dependence as in evolutionary theories or in learning studies, and
- going beyond one game by extending evolutionary analysis to the „game of life“ where the habitat in which evolution takes place is composed of at least two structurally different games.

As usual, we engaged in a few more programmatic studies defending, clarifying the indirect evolutionary approach.

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The variable threat-bargaining model of Nash (1953) assumes that threats in the sense of binding commitments as to what one will do if bargaining ends in conflict, are chosen before bargaining. By comparison, late threats to be chosen after bargaining end in conflict, ap-
peer more natural and would be self-enforcing, i.e., require no commitment power. Instead of exogenously imposing the timing of threats, they are derived endogenously as in indirect evolution or endogenous timing. Based on a duopoly market, we first derive the equilibrium for all possible constellations regarding the timing of threats. From these results we can show that the evolutionary analysis surprisingly justifies the early timing of threats as suggested by Nash (1953).


This paper focuses on the uneasy alliance of rational choice and evolutionary explanations in modern economics. While direct evolutionary explanations of „optimality“ rule out „purposeful“ rational choice by assuming zero-intelligence and pure rational choice explanations leave no room for „selective“ adaptation the indirect evolutionary approach integrates both perspectives. Subsequently we go stepwise „from teleology to evolution“ and thereby study the model spectrum ranging from pure rational choice over indirect to direct evolutionary approaches. We believe that knowledge of this spectrum can help to choose more adequate models of economic behavior that incorporate both teleological and evolutionary elements.


Even if contract enforcers are as opportunistic as ordinary traders, a system of adjudication can increase the degree to which contractual obligations on large anonymous markets are fulfilled. Only if arbitrators receive a fixed income, occasional mistakes will not favour the untrustworthy. It can be shown that the presence of the courts may further the prospects of the trustworthy in a large class of situations. But under non-optimal court policies and unfavorable parameter constellations introducing courts may crowd out trustworthiness.


The aims of this comment are critical as well as constructive. First we shall critically assess which aspects of fundamentalism, its emergence, and its dynamics are captured by the basic model presented in the paper (Section 2). Since we believe that the approach is interesting and merits further exploration and development, we shall indicate some ways of embedding the models of the paper in a broader context (Section 3). Concluding remarks wrap up our discussion (Section 4).


Economists usually treat human behavior as being determined by the shadow of the future, while most other social scientists point to the shadow of the past. This paper considers experimental evidence relevant to the controversy and tries to reconcile both explanations of human behavior with each other by integrating them in a unified evolutionary framework. The possible emergence and survival of intrinsically motivated resentment against being treated „unfairly“ is analyzed as a case in point. The results shed light on the (in-)stability of different combinations of plain opportunism and social or ethical motives behind human behavior.

run evolutionary success of motivational types depends on objective factors only. This can justify intrinsic aversion to inequality in reward allocation games, though earlier analysis has typically been restricted to a particular game. We consider a more complex environment by combining two games that – studied in isolation – yield opposite implications for inequality aversion. Persistent divergence between intrinsic motivation and true material success is possible. It depends on the type of inequality aversion considered and, importantly, agents’ ability to discriminate between the qualitatively different games they face.


Due to the shadow of the future, exchange and the division of labor can be self-organizing on a small scale while it seems impossible for large interaction systems. The paper indicates that the survival conditions for trustworthiness can be met even in large interaction systems and large markets can emerge or be created without the helping hand of the state and its legal staff. Relying on an „indirect evolutionary approach“ necessary conditions for the evolutionary stability of trustworthiness in large interaction systems in general are characterized. More specifically, the main results of our indirect evolutionary approach to trust suggest that trustworthiness must exist and be detectable if good conduct in trust-relationships is to survive. If so there is a niche for an organization offering the costly service of facilitating transactions and of keeping track of the conduct of participants on the net. We compare traits of an organizational design as suggested by economic reasoning with those that actually emerged in form of, for instance, eBay and ask whether eBay will increasingly have to „economize on virtue“ although it so far could rely on its spontaneous provision.


Evolutionary game theory is often used to analyze the evolution of moral preferences. A few studies also examine the coevolution of preferences and an institutional aspect of the decision environment. Allowing the adaptation of just one institutional aspect such as litigation or legal insurance to coevolve with morality, however, may be inadequate. If court rulings coevolve with morality the need for legal insurance may vary over time. Applying the indirect evolutionary approach, we therefore analyze the coevolution of morality in the sense of trustworthiness, court rulings (based on rational belief formation), and the population share which is legally insured. If type detection is not possible, the evolutionary interaction of the legal institutions may play a decisive role for the emergence of morality.

Working Papers

No. 07-2004: Werner Güth, Manfred Stadler
Path Dependence Without Denying Deliberation – An Exercise Model Connecting Rationality and Evolution -

Traditional game theory usually relies on commonly known decision rationality meaning that choices are made in view of their consequences (the shadow of the future). Evolutionary game theory, however, denies any cognitive deliberation by assuming that choice behavior evolves due to its past success (the shadow of the past) as typical in evolutionary biology. Indirect evolution does not consider the two opposite approaches as mutually exclusive but allows to combine them in various ways (Berninghaus et al., 2003). Here we provide a simple application allowing any linear combination of rational deliberation and path dependence, i.e. of the two „shadows“.

No. 21-2005: Susanne Büchner, Werner Güth, Luis M. Miller
Conventions for Implementing Conventions - An Evolutionary and Experimental Analysis

Conventions are interpreted in the narrow sense of coordinated equilibrium selection, i.e. a behavioral convention tells all players in a game with multiple strict equilibria which strict equilibrium to play. What we are interested in are more realistic environments where coordination takes place before learning about the games to be played. Here coordination aims at
a normative convention, i.e. a principle of equilibrium selection, which selects a strict equilibrium for all games with multiple equilibria. In a subclass of 2x2-bimatrix games with two strict equilibria we analyze the evolutionary stability of various normative conventions. In our experiment, we allow participants to first coordinate on a normative convention before playing various games. Agents in different treatments do this behind a complete (they know neither their role nor the game parameters), a partial (they know either their role or the game parameters) veil of ignorance, or with no ignorance (they know their role and the game parameters).

3.1.4 Labor Markets and Industrial Organization

Common research in labor economics can mostly be divided into two categories. The first is primarily empirical and tries to find patterns in field data. It is characterized by a more or less ad-hoc hypothesis formation. This stands in contrast to the second research tradition which heavily leans on theoretical methods in the analysis especially of market forces and market relations. While trying to explain empirical observations the theoretical branch of labor economics can only hardly be tested by field data. Thus, by and large the cross fertilization is rather limited. Models often make assumptions concerning preferences which field research can not control for. Abstraction required for the tractability of models sometimes implies that they reflect real world institutions only insufficiently. Due to endogeneity of market aspects and especially changes, as well as due to the limited number of „natural experiments“ (which, furthermore, are not replicable) models can hardly be tested by field data. Experimental research can fill this gap, either by directly testing the models in a controlled laboratory environment, or, by complementing empirical research in order to overcome its' identification problems that limit its' scope.

However, experimental economics has its limitations, too. Financial constraints limit the number of market players and time and cognitive constraints of subjects the complexity of situations which can be tested in the laboratory. This explains why most experimental research focuses on rather stylized interactions and often automatises some market actors or institutions. The focus therefore lies on employer employee interaction and on competition among employees.

In many experimental observations reciprocity is an important determinant of behavior. In labor economics, reciprocity is a driving force behind the efficiency wage model. The resulting model sees wage rigidity as a potential consequence of strong labor bargaining power and strong reciprocal preferences. The subsequent experimental observations are „compatible with the rent-sharing approach augmented by reciprocity“. Reciprocal kindness is one possible determinant of what generally is termed fairness. With the increasing importance of temporary work agencies in labor markets, especially in highly regulated ones like Germany, a new important question arises. While mostly doing similar work, temporarily employed labor usually earns less than their colleagues. In a stylized labor market including a production firm and a temporary work agency as well as rented and hired hands, Alewell at. al. (2005) are able to replicate the field data observation of wage differences. Another aspect of inner firm relations is that of employee incentive schemes. Leaned on new laws concerning the inner organization of universities in Austria, Sutter (2004) theoretically and experimentally examines the effects on employee effort of tournaments concerning the entitlement to suggest the distribution of group bonuses.

In a merely theoretical analysis, González and Gurtoviy (2004) investigate how a company facing short term liquidity problems can retain qualified personnel by offering stock options. An unorthodox example for the first mentioned empirical branch of research is the survey on age discrimination in labor markets in Norway and Germany by Büsch et. al. 2004. It shows exemplary the difficulties one faces when analyzing field data. Particularly, when investigating whether older workers have fewer opportunities which can not be explained by differences in productivity or ambitions it is difficult to control for exactly these possible factors. In addition, when making between country comparisons one has to keep in mind that institutions may differ. For these reasons Büsch et. al. ran questionnaire surveys in Germany and Norway which somewhat resemble a controlled experiment. Norway and Germany have similar labor market institutions but strikingly different unemployment rates.
and age structures of the unemployed workforce. To control for characteristics of applicants they used imaginary job applicants with the age being the only treatment variable. They conclude that while perceptions of age requirements for certain positions do differ only marginally between the two countries, older workers in Germany have a lower hiring probability even when controlling for perceived productivity.

Güth et. al. (2005) analyze the effects of commitment on a goods market. On a Bertrand market both sides, suppliers and buyers, can first decide whether to preempt by making a quantity commitment or to join the competitive fringe, which consists of price takers guaranteeing market clearing. With only one exemption (namely for very centralized markets) in equilibrium only one market side preempts.

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In an experiment, two players bargain with a third party, either separately or collectively after forming a joint venture. Our theoretical benchmark solution predicts decentralized bargaining, as only one of the players has an interest in forming a joint venture. However, we observe a significant share of collective bargaining. When compared with decentralized bargaining, centralization has no significant effect on the payoffs of the merged partners, but reduces the payoff of the third player due to more frequent conflicts caused by higher ambitions of the merged party.


One of the long-standing puzzles in economics is why wages do not fall sufficiently in recessions so as to avoid increases in unemployment. Put differently, if the competitive market wage declines, why don’t employers simply force their employees to accept lower wages as well? As an alternative to reviewing statistical data we have performed an experiment with a lower competitive wage in the second phase of an employment relationship that is known to both parties. Our hypothesis is that employers will not lower wages correspondingly and that employees will resist such wage cuts. Our experiment casts two subjects in the highly stylized roles of employer and employee. We find at most mild evidence for resistance to wage declines. Instead, the experimental results can be more fruitfully interpreted in terms of an „ultimatum game“, in which some surplus between employers and employees is split. In this view, wages and their lack of decline are simply the mechanical tool for accomplishing this split.


We present an overlapping generations model with two interacting teams, where young team members earn an income, whereas old team members depend on either intra-team transfers from young members (voluntary solidarity) or tax-financed transfers (compulsory solidarity). We derive the individually and team-specific optimal decisions and present further behavioral hypotheses like the crowding out of voluntary by compulsory solidarity. We test our hypotheses in an experimental study and examine (1) whether raising taxes crowds out voluntary transfers, (2) how income distributions influence voluntary and compulsory solidarity, and (3) whether participants prefer more to less compulsory solidarity.


We present a model where compensation within a workteam is determined endogenously by the use of a rank-order tournament. Team members compete in their efforts for the right to propose the distribution of a prize within the team. The implementation of a proposal requires the approval of other team members. Failure to reach an agreement is costly and the role of proposer rotates in the order of members’ efforts. We show in an experiment that tournaments elicit higher efforts than random determination of the proposer role. Proposers get a significantly larger share of the prize than non-proposers.
Working Papers

No. 14-2004: Victoria Büsch, Sven-Åge Dahl, Dennis A.V. Dittrich
Age Discrimination in Hiring Decisions – A Comparison of Germany and Norway
The workforce in all industrialized countries is aging. To forecast future challenges, it is important to understand the impact of a worker’s age on the labor market. In this paper, we analyze whether older workers in Germany and Norway are treated differently in the hiring process. Students and personnel managers from both countries answered a questionnaire regarding the evaluation of three different applicants with varying age specifications and the respective hiring decisions. The investigation clearly shows that in Germany older applicants have a much lower hiring probability. In Norway, age does play a smaller role in hiring decisions.

No. 18-2004: Dennis A.V. Dittrich
Wages, Length of Relationship and Bargaining Power: An experimental study in a world of complete contracts
To explain potential sources of wage rigidity this article analyzes a model of reciprocal kindness applied to a repeated ultimatum game with changing and nonzero conflict payoffs. The model is also tested in a laboratory experiment. The results are compatible with the rentsharing approach to wage rigidity. Wages adjust to ‘market pressure’ but are less flexible when employees demand their wages, i.e. when they are in a relatively strong bargaining position.

No. 24-2004: Luis G. González and Ruslan Gurtoviy
How Much to Pay in Cash? Employee Retention via Stock Options
Stock option grants may allow to retain employees in firms facing short-term financial constraints. We investigate the optimal combination of cash and stock options that a firm can use to keep qualified personnel to avert bankruptcy. Parties first bargain about a compensation scheme. On the labor market, the employee then decides between a stock option grant and alternative job offers. We use the cooperative Nash bargaining solution to distribute a surplus of random size and find the structure of the optimal compensation scheme.

No. 08-2005: Dorothea Alewell, Colette Friedrich, Werner Güth, Wiebke Kuklys
Co-Employment of Hired and Rented Hands – An Experimental Study
A firm with stochastic demand can rely on hired hands to satisfy low demand and rent additional labor when demand is larger. In case of high demand this can imply the co-employment of hired hands, paid directly by the firm, and of rented hands who are paid by a rental agency. This may cause severe problems: will, for instance, rented hands accept lower wages than hired hands? Or will rented hands even demand higher wages as a compensation for flexibility? We will explore this by solving the game and by performing an experiment.

No. 25-2005: Werner Güth, Wieland Müller and Jan Potters
Endogenous preemption on both sides of a market
We study a market in which both buyers and sellers can decide to preempt and set their quantities before market clearing. Will this lead to preemption on both sides of the market, only one side of the market, or to no preemption at all? We find that preemption tends to be asymmetric in the sense that it is restricted to only one side of the market (buyers or sellers).

Work in progress
Avrakami, J., Güth, W., Kareev, Y. and Tobias Uske: ‘On the incentive effects of random sample size in monitoring agents’
Güth, W. and Marc Willinger: ‘Hiring and Sales Competition - A Theoretical and Experimental Analysis’

3.1.5 Fairness, Methodology and Behavioral Heterogeneity

Both, in our theoretical as well as in our empirical work we are confronted with ethical and emotional aspects of behavior which we partly try to explain by tracing differences in personal characteristics and partly try to induce experimentally what requires more often than not methodological innovations.

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Threat power is the ability to impose a great loss on someone else at relatively low own cost and can be measured by the ratio of other’s and own loss. It can be varied by assuming that rejecting an ultimatum reduces the payoff of the proposer to its $\frac{1}{G}$-share and that of the responder to its $(1 - \frac{1}{G})$-share where $0 < \frac{1}{G} < 1$. Results demonstrate that proposers become more greedy when $\frac{1}{G}$ is high whereas responders adjust to threat power, but punish greed to a high extent irrespective of own rejection cost.


In this paper we consider conventions as regularities in behavior which help to solve coordination problems in a society. These problems can be formalized as non-cooperative games with several equilibria. We know that in such situations serious problems of equilibrium selection arise which cannot be solved by traditional game theoretical reasoning. Conventions seem to be a powerful tool to solve equilibrium selection problems in real world societies. Essentially, two questions will be addressed in this paper: a) Which conventions will emerge in a society? b) How can a society break away from an inferior and reach a superior convention? It turns out that „risk dominance“ of a convention plays a crucial role in dealing with both questions and generally in the evolution of conventions.


The present research experimentally examines the influence of group identity on trust behavior in an investment game. In one treatment, group identity is manipulated only through the creation of artificial (minimal) groups. In other treatments group members are additionally related by outcome interdependence established in a prior public goods game. In moving from the standard investment game (where no group identity is prompted) to minimal group identity to two-dimensional group identity, we find no significant differences in trust decisions. However, trust is significantly positively correlated with contribution decisions. This suggests that cooperative attitudes are idiosyncratic preferences, which are not affected by the creation of an arbitrary group identity.

Working Papers

No. 01-2004: Matthias Sutter, Martin G. Kocher
Age and the development of trust and reciprocity

We examine the degree of trust and reciprocity in an experimental trust game with 662 participants from six different age groups, ranging from 8 year old primary school children to retired persons in their late sixties. Although both trust and reciprocity have been identified as fundamental pillars for smooth and efficient economic interactions, economic research has devoted surprisingly little attention to their development with age. Our results provide...
clear evidence that trust in anonymous partners increases almost linearly from early childhood to early adulthood, but stays constant afterwards. Reciprocity prevails in all age groups, although its degree also seems to increase with age.

No. 22-2004: Siegfried K. Berninghaus, Werner Güth, Annette Kirstein
Trading Goods versus Sharing Money - An Experiment Testing Whether Fairness and Efficiency are Frame Dependent
Systematic experiments with distribution games (for a survey, see Roth, 1995) have shown that participants are strongly motivated by fairness and efficiency considerations. This evidence, however, results mainly from experimental designs asking directly for sharing monetary rewards. But even when not just one kind of monetary tokens is distributed efficiency and fairness are less influential. We investigate and confirm this frame dependency more systematically by comparing net-trade-proposals and payoff-proposals for the same exchange economy with two traders, two commodities and multi-period-negotiations.

No. 33-2004: Werner Güth, M. Vittoria Levati, Georg von Wangenheim
Relatives versus Neighbors - An Experiment Studying Spontaneous Social Exchange - Social institutions regulating group conduct have been regarded as necessary for human cooperation to transcend family bonds. However, many studies in economics and biology indicate that reciprocity based on repeated interaction suffices to establish cooperation with non-kin. We shed light on the issue by a voluntary social exchange experiment where related (via mutual shareholding) players coexist with unrelated ones. Systematically varying the degree of shared interests and the length of the time horizon, we provide evidence that repeated interactions play a crucial role in human cooperation, although humans remain attentive to relatedness. Keywords: Reciprocity; Relatedness; Social institutions; Voluntary social exchange.

No. 36-2004: Andreas Nicklisch
Express Yourself: The Price of Fairness in a Simple Distribution Game
A simple two-person distribution game similar to the ultimatum game is introduced. However, unlike the standard ultimatum game, responders can determine the payoff for the proposer in case of rejection. Therefore, they can express their concerns in monetary quantities. The experimental data are analyzed with respect to inequity aversion and intended punishment. The analysis casts doubt on a single motivation of responders’ actions, but supports a combination of reciprocity and inequity aversion. Based on these findings, the data support a simple model for distribution preferences based on an increasing price for exposing responders to unkind offers.

No. 02-2005: Gary Bornstein, Martin G. Kocher, Tamar Kugler, Matthias Sutter
Trust between individuals and groups: Groups are less trusting than individuals but just as trustworthy
We compared the behavior of groups and individuals in a two-person trust game. The first mover in this game, the sender, receives an endowment and can send any part of it to the responder; the amount sent is tripled, and the responder can then return to the sender any portion of the tripled sum. In a 2x2 design, the players in the roles of sender and responder were either individuals or groups of three players (who conducted face-to-face discussions to decide on a collective group strategy). We found that groups in the role of sender sent smaller amounts than individuals, and expected lower returns. In particular, groups sent nothing more often than individuals did (and were more likely to do so when the responder was another group). Groups and individuals in the role of responder returned on average the same fraction of the amount sent. Hence, we conclude that groups are less trusting than individuals, but just as trustworthy.
No. 04-2005: Werner Güth, Judit Kovács
Effective equity experiences from an ultimatum experiment
Fairness like other social norms is usually stabilized by punishing norm deviations. Reward uncertainty, however, questions whether norm deviations can be detected and thus punished. By investing in information acquisition, a responder in an ultimatum experiment determines endogenously whether unfair offers are detected and sanctionable. In our experiment a proposer and a responder can distribute among themselves 12 black and 12 white chips where the monetary value of a white chip for the proposer can be rather high (‘high payoff mode’) or low (‘low payoff mode’). The responder can buy information about the proposer’s reward type, resulting in commonly known monetary rewards.

No. 14-2005: Uwe Cantner, Andreas Nicklisch, Torsten Weiland
Innovation races: An experimental study on strategic research activities
In an experimental setting, firms in a duopoly market engage in a patent tournament and compete for profit-enhancing product advancements. The firms generate income by matching exogenously defined demand preferences with an appropriately composed product portfolio of their own. Demand preferences are initially unknown and first need to be revealed by an investigation of the possible product variations. The better firms approximate demand preferences, the higher their profits. In the ensuing innovation race, firms interact through information spillovers resulting from the imperfect appropriability of research successes. In the random period of the experiment, the continuity of the search process is disturbed by an exogenous shock that affects both the supply and demand side and again spurs research competition. Firms may henceforth explore an enlarged product space in attempting to match the equally modified demand preferences. In our analysis, we explore the behavioral regularities of agents who are engaged in innovation activities. As a key element we test to what extend relative economic performance exercises a stimulating effect on the implementation of innovation and imitation strategies.

No. 19-2005: Werner Güth, M. Vittoria Levati, Matteo Ploner
The impact of payoff interdependence on trust and trustworthiness
In one-shot investment game experiments where each player’s payoff is a convex combination of own and other’s profit, trust remains unaffected by the extent of interdependence whereas trustworthiness reacts positively to it.

No. 22-2005: Geoffrey Brennan, Luis G. González, Werner Güth, M. Vittoria Levati
Attitudes toward Private and Collective Risks in Individual and Strategic Choice Situations
Idiosyncratic risk attitudes are usually assumed to be commonly known and restricted to own payoffs. However, the alternatives faced by a decision maker often involve risks for others’ payoffs as well. Motivated by the importance of other-regarding preferences in social interactions, this paper explores idiosyncratic attitudes toward own and others’ risks. We elicit risk attitudes in an experiment involving choices with and without strategic interaction.

No. 24-2005: Werner Güth
On Inequity Aversion
In close interaction, group allocations are often fair due to our desire to be treated fairly and to act fairly. When this desire conflicts with other strong motivations a typical reaction is to trade off fairness against these other concerns. Inequity aversion allows capturing such trade off considerations in various ways (Bolton, 1991, Bolton and Ockenfels, 1998 and 2000, Fehr and Schmidt, 1999, are examples).
Such trade off analysis measures how far one deviates from fairness what requires a unique fairness benchmark. More often than not there exist, however, multiple standards. In our view, this should not discourage using inequity aversion altogether but limit it to where its prerequisites are granted.
Assuming inequality averse subjects as modeled by Fehr and Schmidt (1999) or in the ERC model by Bolton and Ockenfels (2000) in ultimatum games with asymmetric conflict payoffs allows to make predictions especially concerning responder acceptance thresholds. These predictions are tested in a laboratory experiment eliciting proposer offers and respondent’s acceptance thresholds using the strategy vector method. By and large both models make good predictions. However, they are unable to convincingly explain the observed selfishness on behalf of responders in ultimatum games favoring them in conflict. Overall, observed behavior gives rise to a context dependent interpretation of inequality aversion and to Knez and Camerer’s 1995 observation that subjects form ‘egocentric assessments of fairness’.

3.1.6 Bounded Rationality

There is no reason to abandon the rational choice approach since it satisfies our scientific curiosity and guides our thinking in various ways. What the rational choice approach, however, cannot provide except in some rare simple instances is behavioral advice. This is true since its outrageous cognitive requirements cannot be met by homo sapiens who is limited in his mental modelling, information processing and other cognitive abilities. Practical advice has to be based on
- rather crude concerns instead of well-behaved cardinal preferences,
- a few relevant alternatives instead of all possible choices,
- satisficing rather than optimizing.

It would be naive to expect generally applicable decision algorithms as the research output of bounded rationality theories (where, of course, such an algorithm is also not provided by the rational choice approach per se but only when it is nailed down by very restrictive assumptions). Progress will be slow but this cannot justify to limit ourselves to programmatic appeals although they seem still rather unavoidable (due to the predominance and partly obstinacy of hard-nosed rational choice theorists). The charm of orthodox economic modeling is that one throws in a few assumptions about preferences, beliefs, the interaction process and presupposes that this is all (at least probabilistically) commonly known so that one can apply normative decision or game theory. Empirical facts only play a minor role as stylized facts motivating the model or to check conclusions. Compared to this (social) psychology and its neighboring social sciences immediately focus on empirically testable hypotheses which often concern just one causal relationship and not a full fledged interaction problem with several possible feedback effects.

In bounded rationality theory one soon or later has to engage in both methods. On the one hand one has to develop formal theories of boundedly rational decision emergence allowing to derive informative predictions, on the other hand these theories should be based on observable aspects to allow an empirical validation. Instead of distinguishing or even separating economics and (social) psychology one rather has to merge the two research traditions and learn from both. Scholars of bounded rationality are not identifying border lines between scientific fields, but rather try to close the gaps between them and to learn from all of them.

When speaking to economists it is not an easy job to propagate bounded rationality theory. One is not only more or less explicitly attacking the orthodox tradition of economic thought relying on common and commonly known decision rationality. One is also partly questioning the rather recent school of evolutionary or learning studies, at least when it rules out cognition more or less completely as, for instance, by importing the replicator dynamics from evolutionary biology or by applying stimulus response learning. Denying with perfect rationality also any kind of forward looking deliberation definitely means to throw out the baby with the bathwater. Whenever homo sapiens has to decide he will try to mentally
model the decision environment in an attempt to cognitively perceive how choices affect what one aspires. One often gets the impression that economists prefer to study:
- most rigorously something which is definitely wrong than
- something which in all likelihood is true but rather vague and based on supporting empirical evidence.

By this we do not deny the beauty of rigor. Rather our hope is that our theoretical and experimental studies will finally help to develop formally defined and statistically testable theories of bounded rationality. Our research so far has been partly
(i) conceptual by trying do develop a general frame for boundedly decision emergence as a dynamic intellectual process
(ii) applying the basic ideas of aspiration formation, satisficing and aspiration adjustment to study theoretically and experimentally specific decision tasks
(iii) explore task transcending satisficing asking for personal characteristics in satisficing behavior in order to predict satisficing behavior in new tasks based on former observations.

More specifically, our research can be categorized as follows:
- Justifying and propagating bounded rationality theory and distinguishing it from perfect rationality.
- Developing a comprehensive framework to incorporate the various ideas in bounded rationality–theory.
- Trying to render bounded rationality theory applicable.

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This paper brings together views on choice making as have been developed in philosophy, psychology, and economics. Starting from specific examples the relative merits of different approaches are discussed. The conclusion that models of boundedly rational behavior are the future of social science research is strongly endorsed. But we also admit that it is not completely clear what this implies and take the liberty to speculate on where future research might go.


The paper focuses on empirical studies of a class of very simple games of the reward allocation, dictator and ultimatum type. It is demonstrated that true explanations of social phenomena cannot conceivably be derived in terms of the perfect rationality concept underlying neo-classical economics. Analyzing the simple paradigm games it is explored in some depth, if speculatively, how experimental game theory might bring us closer to a new synthesis or the nucleus of a general theory of games and boundedly rational economic behavior, with more explanatory power.


Deriving advice that can in fact be utilized by boundedly rational decision makers is a central function of modeling choice making. We illustrate why this role is not being fulfilled well by standard models of full rationality and that theories of bounded rationality are needed not only for better predictions, but also for developing better advice. Our main point is that one cannot succeed here without studying how theories of bounded rationality causally influence the behavior of boundedly rational individuals. In view of such a causal role of theories we discuss how advice of a theory of boundedly rational behavior can become known, be followed among boundedly rational individuals and still be good advice.


Economics has devoted little attention so far as to whether the type of decision maker matters for economic decisions. However, many important decisions like those on monetary policy or a company’s business strategy are made by (small) groups rather than an individual. We compare behaviour of individuals and small groups in an experimental beauty-contest game. Our findings suggest that groups are not smarter decision makers per se, but that they learn faster than individuals. When individuals compete against groups, the latter significantly outperform the former in terms of payoff.

**Working Papers**

No. 09-2005: Annamaria Fiore, Andrea Morone

Is playing alone in the darkness sufficient to prevent informational cascades?

Seminal models of herd behaviour and informational cascades point out the existence of information negative externalities, and propose to destroy information in order to achieve social improvements. Although in the last years many features of herd behaviour and informational cascades have been studied, this particular aspect has never been extensively analysed. In this article we investigate, both theoretically and experimentally, whether and to which extent destroying information can improve welfare.

No. 23-2005: Gerlinde Fellner, Werner Güth, Boris Maciejovsky

Satisficing in Financial Decision Making – A Theoretical and Experimental Attempt to Explore Bounded Rationality

In the simple setting where an investor essentially decides between riskless bond and risky asset we distinguish three aspiration levels: a lowest threshold which one wants to guarantee, the aspiration level given by investing all risklessly, and an even higher return level representing a real success. The ranges for such aspirations are naturally determined by the parameters of the setup. Our analysis assumes that investors try to improve the chances of reaching higher aspiration levels. Given these three aspirations, we can classify investors as risk shy or more open to risky investments. In the experiment participants are first asked for their lowest and highest aspiration before actually designing their portfolio. Thus we can test whether they behave as predicted by their aspiration type. By presupposing a specific type of cardinal utility functions, we can also compare this to the rational choice-approach.

**Work in progress**

Werner Güth, Andreas Ortmann

Decision Making by Deliberation, Adaptation and Routines

Our private and professional lives abound with more or less important choice events. To manage the barrage of decisions that these choice events require, we often have adopted routines, deliberately or otherwise (e.g. through adaptation), to deal with the majority of these choice events. Deliberation, because it is costly, is reserved for mainly two choice events:

1. One decides on a routine by anticipating its average adequacy (to yield reasonable success). In case of adaptation one will, for instance, carefully consider how to adapt to which feedback information.

2. In case of single decision events deliberation is applied when structurally novel or very important choice problems come up.

We develop a process model capturing how the different ways of generating choices jointly determine decision making and try to justify it by reference to experimental findings.
Research Topics

3.1.7 Public Goods

Public goods are essential elements of all societies. Collective efforts to shelter, protect, and nourish the group have formed the backbone of human evolution from prehistoric time to civilization. They confront individuals with the temptation to defect, i.e., to take advantage of the public good without contributing to it. This is known as „tragedy of the commons“, „free-rider problem“, or „social dilemma“ the diversity of the names underlines the ubiquity of the issue.

Theorists and experimental economists investigate this issue using public goods games, which are characterized by groups of cooperators doing better than groups of defectors, but defectors always outperforming the cooperators in their group. In typical examples, the individual contributions are multiplied by a factor $r$ and then divided equally among all players. With $r$ smaller than the group size, this is an example of a social dilemma: every individual player is better off defecting than cooperating, no matter what the other players do. Groups would therefore consist of defectors only and forego the public good.

Despite such a theoretical prediction, economists who study public goods in the laboratory observe that a significant number of people contribute more than what would be implied by pure self-interest. The major findings to date are that, in one-shot trials and in the initial stages of finitely repeated trials, individuals contribute around halfway between the Pareto-efficient level and the free-riding level. Furthermore, contributions typically decline over time and reach their minimum when the interaction terminates. The usual experimental practice is to publicly inform all participants (so as to establish common knowledge) about the terminal period, which is the same for all individuals. Yet, in real life, one hardly knows in advance when a social relationship will end, but has at best some subjective expectations about the minimum and the maximum number of interactions. Thus, a commonly known and symmetric time horizon, as typically implemented in the laboratory, appears highly artificial and unrealistic.

González, Güth and Levati (2005) deviate from this typical practice, so as to investigate the robustness of the end-game effect in repeated linear public goods experiments. Participants in their experiment receive information about an interval of possible terminal periods, which can be commonly or privately known as well as symmetric or asymmetric. The study shows that asymmetric information about the number of periods to be played induces people to delay free-riding. In contrast, replacing a definite endpoint by a commonly or privately known symmetric interval does not have a significant impact on overall efficiency or contribution dynamics, although initial contributions are slightly increased. Hence, at least for linear public goods games, the standard (and unrealistic) laboratory practice of publicly announcing the same definite time horizon does not appear to alter results significantly.

Besides studying how manipulating the „environment“ affects behavior, researchers in our group have tried to shed light on what causes decisions to differ from those predicted by reward maximizing models. Theories of cooperative behavior in public goods games can be classified, broadly speaking, in two categories. The first one – called the random utility approach – focuses on the dynamics of learning and the stochastic nature of deviations from equilibrium predictions. Here, the influential idea of quantal response equilibria, combining the familiar tools of game theory with models of random choice, has been particularly successful in explaining the heterogeneity of observed individual decisions. The second category, i.e., the neoclassical approach, incorporates motives different from own monetary
income like pure altruism, fairness, and efficiency concerns. By combining these two approaches, González, González and Levati (2005) test whether intrinsic preferences for conditional and unconditional cooperation can account for observed behavior in a public goods experiment. Unconditional cooperation may include, for instance, altruism and efficiency concerns, whereas conditional cooperation is more closely related to reciprocity, which can be expressed by fairness and inequity aversion. Within the framework of a random utility model, the authors derive a ‘naive’ logit choice function, which is characterized either by a truncated exponential distribution (in the absence of conditional cooperation) or by a family of truncated normal distributions that vary only in their location parameter (if conditional cooperation is an argument of the utility function). Their results suggest that preferences differ among subgroups of individuals, with approximately 55% of the population being conditional cooperators, 11% being purely opportunistic, and the remaining 33% being relatively opportunistic albeit with a tendency to contribute higher average amounts. The authors conclude that the decline in contribution levels can be at least partially attributed to heterogeneity of preferences and initial beliefs in the population.

Further attempts to account for people's behavior in public goods experiments include work on leadership. The latter has been an important topic in the political science and sociological literature for quite some time, but only recently has received some attention in the economics literature. Economic experiments thus far have focused on one of the simplest forms of leadership, namely leading by example. In these experiments, leadership is typically implemented as a sequential public goods game where one group member contributes first (the leader) and all the others follow.

Güth, Levati, Sutter and van der Heijden (2004) provide a comprehensive experimental study on three aspects of leading by example. First, they examine the effects of leadership and the influence of leader's strength on contribution levels in public goods games; in particular, in one of their treatments, leading by example is strengthened by the leader's power to exclude one follower from the group in the ensuing period. Second, they check whether it makes a difference for overall contributions if one single group member is always the leader or if all group members rotate in the leader's role. Third, they address whether groups want to install a leader by voting and how the outcome of the vote is related to contribution behavior. Their results provide a compelling case for the effectiveness of leading by example because private contributions to the public good are substantially higher in the presence of a leader than when there is no leader. Leaders with the authority to exclude other group members are even more efficient in achieving – and sustaining – very high cooperation levels, as compared to relatively weak leaders who can only commit to a certain contribution level. The experiment also shows that determining a leader either once and for all or in a predetermined and rotating order does not have a noticeable influence on cooperation levels within groups: what matters is the presence of a leader as well as his strength, but not the way in which a group member becomes leader. Concerning the endogenous determination of a leader, the authors find that only about 40% of groups succeed in appointing a leader, even though groups with a leader outperform groups without a leader by far.

Levati, Sutter and van der Heijden (2005) investigate whether the (positive) effects of leadership also prevail in more natural environments where subjects are heterogeneously endowed and may not know the others' endowments. The main findings of this study reveal that leadership works less when people are asymmetrically endowed, especially so in case of incomplete information: only if the endowments of the other group members are commonly known, average contributions are significantly higher with (than without) a leader. If, instead, subjects do not know the distribution of endowments, leadership is practically ineffective in raising contribution levels. Furthermore, while granting the leader exclusion power fosters cooperation significantly when all subjects have the same endowment, this form of leadership does not result in significantly higher contributions in case of heterogeneous endowments, regardless of the information structure. Hence, the overall conclusion is that leading by example works very well in the symmetric case, less so in the asymmetric case, and least when asymmetry is combined with incomplete information.

Published Papers

In repeated public goods experiments, ruling out information about an exact, commonly known, and symmetric terminal period does not alter average contributions significantly, although asymmetric information about the time horizon reduces the frequency of end-game effects.

**Working Papers**

No. 29-2004: Werner Güth, M. Vittoria Levati, Matthias Sutter, Eline van der Heijden

Leadership and cooperation in public goods experiments

Leadership is important for the well-functioning of organizations. We examine the effects of leadership on contributions in public goods experiments. Leadership by example is implemented by letting one group member contribute to the public good before followers do. Such leadership increases contributions in comparison to the standard voluntary contribution mechanism, especially so when it goes along with authority, which we implement by granting the leader ostracism power. Whether leadership is fixed or rotating among group members has no significant influence on contributions. Only a minority of groups succeeds in endogenously installing a leader, even though groups with leaders are much more efficient than groups without a leader.

No. 05-2005: Luis G. González, Graciela González-Farías, Vittoria Levati

Logit estimation of conditional cooperation in a repeated public goods experiment

A conditional cooperator in a public goods game wants to match his partners’ expected contribution. We investigate theoretically and empirically, whether (and to what extent) conditional cooperation can explain how individual contributions evolve in a repeated two-person public goods experiment using a perfect strangers design. To identify a random utility model including non-pecuniary preferences we also elicit participants’ beliefs. Our econometric results show that the distribution of preferences in the population can be captured by a latent-class mixed logit specification with three subpopulations, and that 55% of participants can be regarded as conditional cooperators. Thus, the decline in average contribution levels may be attributed to the presence of conditional cooperators who have to revise their expectations about the others’ behavior.

No. 10-2005: Robert E. Goodin, Werner Güth, Rupert Sausgruber

Early versus Late Coalition Announcement in Experimental Democracies

Sometimes parties decide ahead of an election with whom they would (if possible) join in a coalition together. Other times they leave it completely open, until after the election, with whom they would coalesce. Observations from the political arena itself do not allow us to determine the differing effects of coalition forming before or after the election. We therefore explore the question experimentally, in a situation with three parties and seven voters. There are striking effects regarding party behaviour: coalitions formed before the election are much more likely to be ideologically better-connected but larger than necessary and contain superfluous parties. Voters, however, seem not to vote strategically more often in cases of preannounced coalition intentions in ways we might expect.

No. 17-2005: M. Vittoria Levati, Matthias Sutter, Eline van der Heijden

Leading by example in a public goods experiment with heterogeneity and incomplete information

We study the effects of leadership on the private provision of a public good when group members are heterogeneously endowed. Leadership is implemented as a sequential public goods game where one group member contributes first and all the others follow. Our results show that the presence of a leader increases average contribution levels, but less so than in case of homogeneous endowments. Leadership is almost ineffective, though, if subjects do not know the distribution of endowments. Granting the leaders exclusion power does not lead to significantly higher contributions.
3.1.8 Public Choice

Public Choice can be defined as the economic study of non-market decision making in groups. Alternatively, it can be defined as the application of methodological individualism and rational choice theory to political science. The subject matter of public choice includes the theory of the state, voting rules, voter behavior, committee decision making, party politics, bureaucracy etc.

The members of the Strategic Interaction Group have predominantly contributed to the study of committee decision making and institutional choice in democracies. Sutter (2002) is an experiment in which groups have to decide by majority voting on the internalization of a public bad. In a similar spirit, but sharply focused on a real political institution, Irlenbusch, Leopold-Wildburger, Schütze and Sutter (2003) have examined in the frame of a public bad experiment the voting procedure of the Stability and Growth Pact in the European Monetary Union, finding that the present rules are clearly unsatisfactory because they allow fiscal ‘sinners’ to pass judgment on other sinners. Waldner, Kocher and Sutter (2003) have run an experiment to study the effects of the introduction of rotating schemes in European institutions, as it is intended in the Treaty of Nice. Waldner et al. show that rotation (i.e. only part time representation of some members in the decision making body, like the European Commission or the European Central Bank) does not harm the cooperative behavior of committee members, whether they are allowed to vote on a given issue or whether they are temporarily excluded due to the rotation scheme.

Topics on institutional, respectively constitutional, choice have been covered, for instance, by Güth, Levati and Sausgruber (2003), who show in an experiment that centralization induces lower tax morale and less efficient provision of public goods than a decentralized organization of a state. The reasons are that centralization gives rise to an interregional incentive problem and creates inequalities in income between regions. Güth, Kocher, Pantz and Sutter (2004) address the efficiency of direct versus indirect democracy, finding that direct democratic decisions are closer to the electorate’s preferences than indirect democratic ones.

An innovative approach for studying bureaucratic behavior has been taken by González, Güth and Levati (2002), who study whether bureaucrats can be induced to speed up decision making by greasing (i.e. bribing) them. More specifically, there are two bureaucrats who independently can grant a permit to a company. The authors refer to greasing as offering bureaucrats higher reward for granting a permit quicker. Experimental data suggest that greasing bureaucrats is moderately efficient in speeding them up.

A fundamental issue of public choice – how group decisions differ from individual decisions – has been addressed in several papers on group versus individual decision making. Kocher and Sutter (2002, 2004) and Sutter (2004) show that groups are more rational in the sense of payoff maximization in a variety of games than individuals are, supporting the conclusion that the aggregation of individual preferences into a group decision making (i.e. a public choice) leads to different decisions than individuals would take.

In addition to these experimental studies, the group is also engaged in the development of theoretical models and the analysis of field data. Vanberg (2005) develops a model of campaign fund raising and advertising to investigate the assumptions underlying a common argument in support of campaign contribution limits. The model suggests that the argument is based on the hypothesis that reliance on large contributions is negatively correlated with public support. This hypothesis is investigated using data on U.S. congressional elections held between 1990 and 2002.

There are several other papers related to the issue of tax morale, tax evasion and institutional design (Güth, Strauß and Sutter, 2002, Bayer and Sutter, 2003, Güth and Sausgruber, 2004). A different aspect of institutional design in democracy is covered in Güth and Ockenfels (2002) who examine the coevolution of morality and legal institutions and in Güth, Klient and Ockenfels, who explore whether punishment should depend on intentions or consequences.

The Stability and Growth Pact (SGP) in the European Monetary Union shall deter countries from running excessive deficits by the threat of punishment, executed conditional on the outcome of a multistage voting procedure. We examine voting behaviour in an experiment which closely resembles the SGP's design and find that the SGP enables larger countries to block punishment more often than smaller countries. In addition, we study an institutional modification of the SGP by excluding countries with excessive deficits from voting on other 'fiscal sinners'. Our findings clearly suggest that this innovation would give the SGP sharper teeth than it actually has in reality.

**Working Papers**

No. 03-2004: Wiebke Kuklys, Ingrid Robeyns
Sens's Capability Approach to Welfare Economics

We describe Amartya Sen's Capability Approach to welfare evaluation in the language of standard welfare economics, and assess to what extent it provides a genuine alternative for individual welfare measurement and policy evaluation. We review the nascent empirical literature on the capability approach and assess whether it makes a genuine difference with standard welfare evaluation.

No. 04-2004: Werner Güth, Martin Kocher, Katinka Pantz, Matthias Sutter
Public Choice by Referenda or Delegation. An Experimental Comparison of Direct and Indirect Democracy

Direct democracy with its use of referenda avoids the prototypical principal-agent problems of delegation in indirect democracies, especially since elected representatives are usually not committed by law to keep their promises. Sequential or more complex referenda may, however, result in an inferior combination of realized policy measures. Thus, it is an open question which type of institution (direct or indirect democracy) will be more efficient. Our experimental study explores this issue and finds that direct democracy seems to perform better.

No. 12-2004: Werner Güth, Rupert Sausgruber
Tax Morale and Optimal Taxation

We study experimentally how taxpayers choose between two tax regimes to fund a public good. The first-best tax regime imposes a general, distortion-free income tax. However, this tax cannot be enforced. The second-best alternative supplements the income tax by a specific commodity tax. This tax cannot be evaded but distorts optimal consumption choices, instead. The result is that a large majority of subjects prefer the general income tax regime. The bulk of votes is consistent with actual payoffs. We isolate tax morale as cause for payoffs above theoretical predictions.

No. 29-2005: Robert E. Goodin, Werner Güth, Duncan Snidal
Strategic Aspects of Hegemony

Hegemony is a central feature of contemporary international politics but it remains seriously under-theorized. We draw on cooperative game theory to represent and analyze different aspects of hegemony. After developing a general conception of hegemony, we analyze the circumstances under which a Hegemon needs assistance from allies, examine when prospective allies have incentives to cooperate with or challenge Hegemon and evaluate the prospects for exploitation by Hegemon. Throughout, we connect the analytic analysis to the existing theories of international hegemony and illustrate the models with real world examples.
No. 30-2005: Susanne Büchner, Andreas Freytag, Luis Gonzales, Werner Güth
Bribery and Public Procurement – An Experimental Study

A procurement contract is granted by a bureaucrat (the auctioneer) who is interested in a low price and a bribe from the provider. The optimal bids and bribes are derived based on an iid private cost assumption. In the experiment, bribes are negatively framed (between subjects treatment) to capture that society is better off if bribes are rare or low. Although bids are lower than predicted, behavior is qualitatively in line with the linear equilibrium prediction. When bribes generate a negative externality, there is a significant increase in the variability of the data.

No. 31-2005: Christoph Vanberg
‘One Man, One Dollar?’ Examining the equalization argument in support of campaign contribution limits

Arguably the most important campaign finance regulations in U.S. federal elections are limits imposed on the amount that an individual or organization may donate to a federal campaign. Such contribution limits are advocated on two separate grounds. The first is that they prevent corruption, the second is that they democratize the financing of campaigns by equalizing the relative influence of donors. According to the latter argument, an equalization of donor influence is desirable because it causes campaign resources to more accurately reflect public support for candidates and their political ideas. I construct a formal model to illustrate this equalization argument in support of contribution limits. The analysis calls attention to a number of implicit assumptions underlying the corresponding money primary analogy for campaign fund-raising. The central assumption is that a candidate’s reliance on large contributions is an indicator of negative characteristics not revealed through her campaign communication. The model also suggests a method for testing this assumption, as it implies a negative relationship between a candidate’s reliance on large contributions and her electoral success. Using data on elections to the House of Representatives between 1990 and 2002, I find no evidence that such a negative relationship exists. This empirical result casts doubt on the equalization argument in support of campaign contribution limits.

No. 37-2005: K. Boun My, F. Cochard, A. Ziegelmeyer
The Regulation of Nonpoint Emissions in the Laboratory: A Stress Test of the Ambient Tax Mechanism

We investigate the ability of the damage based tax mechanism to induce socially optimal outcomes in a controlled laboratory environment which incorporates important aspects of nonpoint pollution problems. Our experimental setting combines a strictly convex damage function with uncertainty in measuring the ambient level of pollution, indefinitely repeated interactions among heterogeneous polluters, limited information on the regulator’s side about the polluters’ profit functions, and, in half of the experimental conditions, limited information on the polluters’ side about the strategic environment. We additionally investigate whether the relative position of the social optimum in the polluters’ emission space has an impact on the efficiency of the fiscal instrument. In almost all implemented conditions, the observed total pollution level is not significantly different from the socially optimal level but compliance at the individual level is rarely observed. Experimental conditions in which polluters have to dramatically reduce their emissions in order to comply with the fiscal instrument lead to higher efficiency levels than those where compliance implies less dramatic reductions. Our most striking result is that less information on the polluters’ side is beneficial from a social point of view as the performance of the damage based tax mechanism is higher the less information polluters have about the strategic environment.
3.1.9 Network Formation

Risky Choices among Households and Retirement Planning

Many important economic decisions are taken within multi-adult *households*. De Palma, Picard and Ziegelmeyer (2005) have designed economic experiments to test theories of household choice (see Chiappori, 1988). Concretely, established couples face individually and jointly decisions involving monetary payoffs. When jointly decisions are taken, the couple’s decision process is video-recorded. Preliminary analyses of the choice data suggest that most couples are composed of decisions makers who have opposite risk-attitudes, one being risk averse whereas the other is risk lover. The couple therefore serves as an assurance-scheme for the risk lover spouse. Video data suggest that couples easily achieve a consensus about which joint decision to take. However, very few of the couples’ decisions belong to the Pareto-frontier, contradicting collective choice models.

Work in progress

De Palma, Picard and Ziegelmeyer (2005)

Risky Choices among Households in the Laboratory

Strategic formation of social networks

A recent strand in the economic literature has set out to capture the actual embeddedness of economic actors into concrete and enduring social relations. The empirical evidence that these are relevant is pervasive and well documented for various areas of economic interest. Social relations facilitate the circulation of information on market opportunities (Kranton, 1996) and the sharing of risk (Coate and Ravallion, 1993; Murgai, Winters, Sadoulet, and de Janvry, 2002; Townsend, 1994; Udny, 1994). They spread information about contractual breaches and on this note complement formal state-supported legal systems (McMillian and Woodruff, 2000). They play a role in the screening of credit and of job applicants, and relay information about job opportunities. Here their impact is known to be considerable. About half of all available job vacancies are filled through personal referrals. In this sense direct personal contacts complement more formal sources of employment information such as public advertisements and employment agencies (Granovetter, 1986, 1995; Montgomery, 1991). In the last few decades the importance of spot exchange in input procurement has decreased in favor of other methods of input acquisition such as manufacturer-supplier long-term contracting. Consequently, patterns of informal agreements increasingly typify practices of relational contracting and collaborative manufacturing (Powell and Smith-Doerr, 1994). The acceleration in the creation of strategic alliances, joint ventures and joint production and research facilities since the 1960s has given rise to a new strategic environment in which firms cooperate in some domains while competing in others (Caloghirou, Ioannides, and Vonortas, 2003; Hagedoorn, 2002; OECD, 2001a). Several research centers such as MERIT which is affiliated to the university of Maastricht or the group maintaining the NCRA-RJV database based at George Washington University have been tracking this development and found that while the overall number of strategic alliances between 1989-99 increased almost sixfold there has been a clear decrease in the share of joint ventures since 1995. The implied greater use of non-equity arrangements indicates an increasing relevance of concrete but informal cooperative relations between firms.

The reason why economic analysis started to take this evidence into account comparatively late is not so much that economists were not aware of it or considered it irrelevant before. Instead, they have been missing the appropriate analytical tools to rigorously formalize social relations. The defining event at the heart of economic theory enabling the inclusion of social structure has been the adoption of non-cooperative game theory. According to Manski (2000) it provided the up to then missing language to formalize both market and non-market interactions in a unified way, viz., as games. On this basis it became possible to broaden economic interest beyond the market and to rigorously relate observed social structures to underlying individual incentives, aiming at an explanation of their existence, pervasiveness, and their form both in terms of systematic patterns and differences across communities and time.

The economic study of social structure as pattern of enduring social relations ‘stands on the shoulders’ of both anthropology and sociology (Collins, 1988; Granovetter, 1985; Powell
These two disciplines have developed important descriptive devices (Scott, 1991; Wasserman and Faust, 1994) and established most of the known stylized empirical facts. Nevertheless, there is a clear value-added from economic analysis on the topic. First of all, by translating existing, often discursive studies into relatively simple formal models economic theory attempts to reproduce and thereby explain those among the stylized facts which are of economic relevance. To do so, economic analysis incorporates social structure as a deliberately used and instituted pattern of identifiable relations that link individuals. Social structure is hence not conceptualized as an unintended, incidental and in this sense historical fact but as a strategic phenomenon. For this reason these models explicitly spell out how social relations affect individuals, how individual relations affect each other and how individuals strategically make use of either. But even more importantly, economic research takes a distinctive perspective by focusing on an investigation of the welfare implications of social structure in different economic environments. The latter are far from straightforward as forcefully argued by Durlauf and Fafchamps (2005) and Fafchamps (forthcoming). The authors draw attention to the fact that whether or not the actual embeddedness of economic agents in patterns of enduring social relations leads to an increase in efficiency is most likely context-dependent. They argue that observing that social relations do play a role in some markets does not by itself suffice to prove that this is efficient. Furthermore, even if social relations could be shown to foster cooperation or the evolution of norms, this may not be generally desirable. In a competitive setting, cooperation as observed in strategic alliances may induce collusion which is detrimental for consumers and therefore can reduce social welfare. Furthermore, whenever social relations imply economic benefits Durlauf and Fafchamps stress that relying on them has distributional consequences that may raise equity concerns. Depending on the circumstances, the establishment of formal institutions may be economically advisable. But again, the authors rightly demand caution, as the establishment of formal institutions may be prohibitively expensive. Intervention should nevertheless be discussed also here - they argue - as intervention may still improve the dissemination of information, facilitate search and prevent the manifestation of inequalities or arising discrimination by enforcing open entry to social groups. As the efficiency implications of social relations are not well understood yet, Durlauf and Fafchamps’s argumentation remains purely speculative. But it nicely outlines the set of open, genuinely economic research questions.

Part of the economic literature has conceptualized social relations as bilateral, where all bilateral relations taken together define a network. Consequently, networks describe situations in which individuals are related only to some not all other individuals or - which amounts to the same - in which agreements are not assumed to be perfectly transitive. The original contribution of these models is their focus on how the geometric details of the overall architecture of social relations influence individual behavior and aggregate economic outcomes. The study of stable, i.e., individually incentive-compatible networks in economics has been initiated by Jackson and Wolinsky’s (1996) seminal contribution who characterize a genuine tension between stability and efficiency whenever players have the discretion to strategically form and sever own relations. This tension result is especially grave and has triggered a considerable amount of interest as it arises in an environment featuring complete information and given a very minimal stability notion, which merely enforces necessary but not sufficient conditions.

Guiding all current theoretical efforts on strategic social networks is the research agenda formulated by Jackson (2005b): How are network relationships important in determining the outcome of economic interaction? Which networks are likely to form when individuals have the discretion to choose their connections? How efficient are the networks that form in this way and how does their efficiency depend on the way that the value of a network is allo-
Three experimental studies investigating the behavioral relevance of the theoretically suggested models on endogenous network formation both in a stylized and in different applied contexts have been conducted at the Max Planck Institute. Their common objective is to investigate the behavioral relevance of the conceptual core of the economic research program on network formation, viz., the assumption that social networks are formed strategically. Strategic models of network formation draw on the standard modeling principles and solution concepts of game-theoretic analysis. This foundation guarantees clear-cut predictions. But as a social science discipline economics has to testify their empirical value. Up to now, economic network research has been predominantly theoretical. The proof that the principles underlying network formation in the field are adequately captured by the suggested strategic network formation models is pending.

Pantz and Ziegelmeyer (2005a) aim at establishing the fundamental behavioral relevance of strategic network formation models. It does so in a highly simplified, stylized setting, viz., in a 'pure linking game', in which experimental subjects exclusively decide whether or not they want to form or delete bilateral relations with other subjects, where the costs and benefits from linking are exogenously imposed according to the rules of Jackson and Wolinsky's (1996) symmetric connections model. This setting provides a natural starting point as it gives best-chances to strategic considerations to play a role. If they are shown to not matter here, they can hardly be expected to be relevant in field settings in which the incentive structure is far more intricate. Pantz and Ziegelmeyer test 1) to which extent observed network formation processes are strategic at all, and 2) what length of foresight best captures them. They compare behavior to predictions for myopic and rational play, i.e., to behavior characterized by a zero and an infinite length of foresight. In different treatments the cost of direct links is manipulated which allows the two authors to investigate to what extent the applied length of foresight depends on the relation between incentive-compatible and efficient networks. Pantz and Ziegelmeyer find that network formation processes are not random but indeed strategic. By investigating the adequacy of observed to predicted behavior both on and off the equilibrium path they find that the observed behavior is perfectly in line with the predictions in the low cost condition, in which the predicted network is the complete network irrespective of the assumed length of foresight. Instead, in the medium and high cost condition, in which the predicted network depends on the assumed length of foresight, observed behavior is less in line with either of the benchmarks. When comparing the predictive success relative to the two benchmarks, subjects' length of foresight is found to be not zero but of a non-negligible length. This allows subjects to form a considerable number of links in the high cost condition in which myopic players would get stuck in the empty network. But clearly the length of foresight is not infinite as the fraction of observed networks that match the particular network which is predicted for subgame perfect play of the network formation game is quite low. Concluding, the results suggest that even though they are strategic, network formation processes are influenced by limits in subject's cognitive rationality, expressed in a limited length of foresight.

Pantz and Ziegelmeyer (2005b) look at an industrial organization context, and investigates the impact of strategic network formation on subsequent market competition. The two authors test the behavioral adequacy of Goyal and Joshi's (2003) model which formalizes the strategic formation of collaborative alliances between firms that are competing on the same product market. The model assumes a two-stage game in which firms decide to form collaborative links, whose formation is costly but reduces marginal production costs, before they compete on the market. Attention is restricted to the case of triopolies under Cournot competition and the original game is adapted (replacing the originally assumed simultaneous by a sequential formation process). Pantz and Ziegelmeyer test the predictive success of the model in terms of 1) equilibrium networks, and 2) production quantities. With respect to the second point, they are interested in whether collaboration on the pre-competitive network formation stage -- contrary to the assumptions of the model -- carries over and induces collusion on the production stage. Results of a series of experiments is reported. The first experiment is designed as a straightforward theory-test simulating the theoretically assumed one-shot interaction. The authors manipulate the cost of link formation in different treatments. Experimental data almost perfectly match the predictions for both stages.
whenever the link formation costs are extreme and the predicted networks both straightforward and symmetric (empty or complete networks). Instead, in the case of intermediate link formation costs, where the predicted networks are non-trivial, i.e., asymmetric, the experimental data are rarely in line with the model predictions, both in terms of predicted networks and production quantities. Nevertheless, irrespective of the actually formed network - be it predicted or not, symmetric or not - Pantz and Ziegelmeyer do not observe collusion. In a second experiment they reject the conjecture that these findings are driven out by experience in a setting in which the implemented number of repetitions of the two-stage game is increased. Finally they show in a third experiment in which the complexity of the setting is reduced (by transforming the original two-stage game into a one-stage game) that it is experimental subjects’ limited capacity to foresee the outcomes of the market stage which is driving the results. This finding relates to a strand in the empirical literature that has evaluated the actual performance of strategic alliances and found a high failure rate and a negative correlation between alliance participation and profitability, which again underlines the empirical relevance of limits in individuals’ cognitive rationality. 

Pantz and Ziegelmeyer (2005c) consider a 2-stage game in which individuals can non-cooperatively decide to form bilateral cooperation agreements on a first stage. By forming a cooperation agreement the involved pair of individuals agrees to set their respective subsequent contribution levels to a pure public good to maximize the joint payoff of the pair. Agreements are assumed to be binding. The pairwise agreement mechanism renders the free-rider problem solvable at the pair but not at the population level and consequently does not implement the efficient outcome. Qualifying these theoretical results, Pantz and Ziegelmeyer experimentally evaluate the actual behavioral efficacy of the suggested pairwise agreement mechanism in inducing and stabilizing cooperation. To address this research question, they report the results of two separate experiments. The objective of the first experiment is to provide all necessary prerequisites, viz., to establish a standard of comparison, to identify potentially relevant explanatory approaches and to settle some methodological issues. A repeated non-linear pure public good game with an unknown end, in which individuals have no possibility to form pairwise agreements is implemented. The objective is to test the role of 1) voluntary but costly individualized monitoring and of 2) repetition with an unknown end as independent mechanisms for solving the public good provision problem. Both features serve to more closely reflect likely effects in naturally occurring social dilemma situations, where behavioral information is - unlike in most voluntary public good provision experiments – not automatically and costlessly available and where individuals have no ex-ante information about the actual length of their interaction. The results of the first experiment show that 1) the cost of voluntary monitoring has no significant impact on behavior, and 2) repetition with an unknown end does not induce strategic supergame play, while it helps to circumvent otherwise observed artificial end-game effects. In fact, the experimental findings clearly demonstrate that the observed over-contribution relative to the predicted level of the stage game under the assumption of individual greed (static Nash equilibrium) results from the interplay of self-interested subjects and subjects who are also concerned about the payoffs of others. In a second experiment, Pantz and Ziegelmeyer introduce the possibility to form pairwise cooperation agreements. The formation of pairwise cooperation agreements is 1) optional meaning that the negotiation stage is entered only on demand rather than mandatorily, and 2) cooperative networks are renegotiable in regular intervals. Moreover, agreements are 3) consensual meaning that an agreement is formed and becomes effective (creates a binding obligation) only if both involved individuals agree on its formation, where the implemented protocol allows experimental subjects to correct errors and to iteratively respond to others’ decisions. The authors find that experimental subjects make use of the mechanism and that a considerable fraction of the observed networks are pairwise stable. The implemented mechanism induces and stabilizes aggregate cooperation rates both beyond those observed under the voluntary contribution mechanism and beyond the rate induced by the formation of pairwise stable networks. Subjects especially in pairwise stable networks go beyond the committed level, which suggests that the mechanism provides a social context that supports ‘genuine cooperation’ beyond what

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3 Cognitive rationality is one of the three aspects of the full rationality assumption. Full rationality assumes 1) that players optimize their true payoffs given their expectations (instrumental rationality), 2) that players form correct expectations about other players’ behavior (cognitive rationality), and of course 3) that players have a correct perception of the game that is played.
can be accounted for by self-interest. The efficacy of the mechanism in this respect depends on the cost of individual monitoring. Where individual monitoring is relatively cheap, the pairwise agreement mechanism increases and sustains cooperation at a very high level. When monitoring is comparatively expensive, the mechanism cannot sustain high cooperation rates. A large heterogeneity in the ability of different groups to make use of the pairwise agreement mechanism is observed. While some groups succeed in using the mechanism to coordinate on full cooperation by building efficient networks, networks unravel and cooperation breaks down in other groups.

These three experimental studies underline that strategic considerations play a role in the observed network formation processes in all induced environments. However, the evidence also shows that some relevant features of the actually observed network formation processes cannot be understood on the basis of the currently suggested models. Irrespective of the required future extensions and robustness checks, these results secure a place for social network formation on the economic research agenda, but they recommend to redirect current research efforts from, e.g., trying to derive general results for stability notions that accommodate perfectly farsighted strategies towards the development of a behavioral foundation for network formation. The evidence that has been gathered indicates that farsighted stability notions will not be behaviorally relevant, while the application of approaches incorporating ‘limited foresight’ (Jehiel, 1995) to strategic network formation models may promote our understanding of network formation processes observed in the field. Additionally, the results suggest that network formation models that attempt to replicate stylized empirical facts will need to recognize that not all individuals are exclusively motivated by self-interest when they decide to form and delete social relations. It remains to be investigated when exactly it is that deviations from the self-interest hypothesis play a role in the particular context of strategic network formation processes. Different from most other areas in economics in which behaviorally informed models have been developed on the basis of already existing well-established standard models, behaviorally informed network formation models may be a way to answer questions that have hitherto remained on uncharted territory. Strategic network formation research may be an area in which concerted theoretical, experimental and empirical efforts guarantee the empirical meaningfulness of the research program.

Working Papers

No. 17-2004: Siegfried Berninghaus, Werner Güth, Katinka Pantz, Bodo Vogt
Evolution of Spontaneous Social Exchange - An Experimental Study
Each of several exchange partners is the monopoly owner of a specific commodity which she can share with others. It is optimal to keep the own endowment, but all would gain by mutual gift exchange. Participants play the game repeatedly in constant groups (partner design) and can establish stable exchange relations over time. Will they include all group members, as suggested by efficiency, will early exploiters be permanently isolated (ostracism) and will groups become more efficient over time? To answer these questions the game is repeated once with a new group. We also vary the group size.

No.38-2005: Katinka Pantz, Anthony Ziegelmeyer (2005b)
Collaborative Networks in Experimental Triopolies
This paper experimentally investigates the interdependence between market competition and endogenously emerging inter-firm collaboration. We restrict attention to arrangements resulting from bilateral collaboration agreements that typically characterize real world applications in which the activity concerned is a core activity of the partnering firms and risk sharing, contract enforcement and protection of proprietary knowledge are central issues. We rely on a baseline model by Goyal and Joshi (2003) which formalizes the strategic formation of collaborative networks between firms that are competing on the same product market. This model predicts strategically stable patterns of inter-firm collaboration which are empirically observed but have been ruled out in the previous theoretical literature. In a two-stage game, firms decide to form bilateral collaboration links, whose formation is costly
but reduces marginal production costs, before they compete in quantity on the market. We report the results of a series of experiments. The first experiment is designed as a straightforward theory-test simulating a one-shot interaction. We manipulate the cost of link formation in different treatments. Our data almost perfectly match the predictions for both stages whenever the link formation costs are extreme and the predicted networks symmetric (empty or complete networks). In the case of intermediate link formation costs where the predicted networks are asymmetric, subjects rarely form asymmetric networks. When they do, observed and predicted quantities are less in accordance than for symmetric networks. Collusion cannot account for the observed behavior. In our second experiment we reject the conjecture that these findings are driven out by experience in a setting in which we increase the implemented number of repetitions of the two-stage game. Finally, in our third experiment we reduce the complexity of the setting by transforming the original two-stage game into a one-stage game where the formation of inter-firm networks directly determines firms' payoffs. These are derived from assumed equilibrium market outputs on the here absent competition stage. In this case, observed networks coincide with the predicted ones indicating that experimental subjects’ limited capacity to foresee the outcomes of the market stage may be driving the earlier discrepancies.

No. 32-2005: Katinka Pantz, Anthony Ziegelmeyer (2005c)
Cooperative Networks: Theory and Experimental Evidence
We consider a modified pure public good game characterized by a pre-play negotiation stage, on which pairs of players can form binding cooperation commitments. As the introduced mechanism only supports pairwise rather than more inclusive commitments, it does not implement the efficient outcome. We theoretically derive the incentive compatible and efficient cooperative networks and evaluate the behavioral efficacy of the suggested mechanism to promote and stabilize cooperation. We present the results of two separate experiments. The first experiment serves to provide necessary methodological prerequisites and establishes that neither repetition with an unknown end nor voluntary costly monitoring are behaviorally sufficient to induce cooperative outcomes. In the second experiment we introduce the pairwise commitment mechanism. We show that the mechanism induces aggregate cooperation rates not only beyond the rates observed under the voluntary contribution mechanism operationalized in the first experiment, but also beyond the rate which is supported by the formation of incentive compatible networks. We observe a large heterogeneity between groups: while some groups converge to full cooperation by managing to coordinate on the formation of efficient networks over time, both networks and cooperation rates unravel in other groups. An extended version of our theoretical setting with inequity averse players in the form suggested by Fehr and Schmidt (1999) captures the stylized facts of both experiments.

Work in progress
Katinka Pantz, Anthony Ziegelmeyer (2005a)
An Experimental Study of the Network Formation Game

3.1.10 Auctions (Markets)
Markets are the paradigm examples of strategic interaction. Auctions are markets for indivisible commodities and typically studied by assuming private information of at least some market agents.

Published Papers
Güth, W., R. Ivanova-Stenzel and E. Wolfstetter (2005), Bidding Behavior in Asymmetric Auctions: An Experimental Study, European Economic Review 49, 1891-1913.

We review an asymmetric auction experiment. Based on Plum (1992) private valuations of the two bidders are independently drawn from distinct but commonly known distributions, one of which first-order stochastically dominates the other. We test the qualitative proper-
ties of that model of asymmetric auctions, in particular whether the weak bidder behaves more aggressively than the strong, and then test bidders’ preference for first—vs. second—price auctions.

Güth, W., Nikiforakis, N., Hans-Theo Normann, H.-T., Vertical Cross-Shareholding - Theory and Experimental Evidence, *International Journal of Industrial Organization*, forthcoming. This paper analyses vertical cross-shareholding, that is, the mutual holding of a minority of shares between vertically related firms. We investigate the conditions under which cross-shareholding improves efficiency. First, we explore the issue in a game-theoretic model and find that cross-shareholding is sufficient to obtain the first-best solution. We then proceed by testing these predictions experimentally. Our findings are that the theory predicts the sellers’ decisions accurately and to some extent the price of the buyers. Cross-shareholding appears to occur more frequently than predicted and it enhances efficiency even where not predicted.

**Working Papers**

No. 30-2004: Tanga McDaniel, Andreas Nicklisch
Prices as indicators of scarcity — an experimental study of a multistage auction
The price mechanism is the primary means of information transfer in decentralized economic systems. High prices indicate high demand, whereas low prices indicate low demand. Thus prices are the signals for accelerating or slowing production. However, using sequential, multi-unit auctions, we show that the price mechanism fails to be beneficial for producers in every case. As an example we discuss auctions for future access rights to a network. We use experiments to show that the incentives for free-riding inherent in auctions for future access provide inaccurate signals for investment.

No. 03-2005: Dennis A. V. Dittrich, Werner Güth, Martin Kocher, Paul Pezanis-Christou
Loss aversion and learning to bid
Bidding challenges learning theories since experiences for the same bid vary stochastically: the same choice can result in a gain or a loss. In such an environment the question arises how the nearly universally documented phenomenon of loss aversion affects the adaptive dynamics. We analyze the impact of loss aversion in a simple auction for different learning theories. Our experimental results suggest that a version of reinforcement learning which accounts for loss aversion fares as well as more sophisticated alternatives.

No. 07-2005: Andreas Nicklisch, Leon Zucchini
Dynamic Efficiency of Emission Trading Markets: An Experimental Study
This study investigates the dynamic efficiency of an emission regulation regime where companies competitively pay for emission licences. We embed the emission licence market in a Cournot model where the price of emission licences is subject to strategic tradeoff between licences and abatement technologies. Unlike the standard Cournot model, agents have two action parameters, quantities bought on the licence market and investments into abatement technology. We want to investigate the implications of this market design on the strategic behavior regarding companies’ incentives to invest in those technologies. Data from a series of laboratory experiments supports the theoretical predictions for subjects’ investment into abatement technology. With respect to the adaptation process of individual quantities for licences we find that a majority of subjects adjusts on the market by imitation while a minority entertains a trial and error notion.
3.1.11 Other Topics

By definition this residual category has no programmatic aspect. We therefore confine ourselves to listing the published papers and working papers:

**Published Papers**


Even though decision-making in small teams is pervasive in business and in private life, little is known about subjects’ preferences with respect to individual and team decision-making and about the consequences of respecting these preferences. We report the results from an experimental beauty-contest game, where subjects could endogenously choose their preferred way of decision-making. About 60% of subjects prefer to act in a team, and teams win the game significantly more often than individuals. Nevertheless, both individuals and team members are highly satisfied with their chosen role, but for different reasons.


Many decisions in economics and finance have to be made under severe time pressure. Furthermore, payoffs frequently depend on the speed of decision-making, like, for instance, when buying and selling stocks. In this paper, we examine the influence of time pressure and time-dependent incentive schemes on the quality of decision-making in an experimental beauty-contest game. We find that convergence to equilibrium is faster and payoffs are higher under low time pressure than under high time pressure. Interestingly, time-dependent payoffs under high time pressure lead to significantly quicker decision-making without reducing the quality of decisions.


We examine the influence of team size on decision making in a beauty-contest experiment. Teams with four members outperform teams with two members and single persons significantly, whereas the latter two types of decision makers do not differ.

**Working Papers**

No. 02-2004: Uwe Cantner, Werner Güth, Andreas Nicklisch, Torsten Weiland

*Competition in Innovation and Imitation - A Theoretical and Experimental Study -*

For given product specifications by two competing firms the demand levels are determined by a randomly generated ideal composition of aspects. Firms can vary some demand. Although the product space is much too large to be explored systematically, we expect (and test for) rather reasonable innovative success and welfare levels due to own innovative attempts and imitation of a successful other. Parameter variations concern the pioneer advantage and search costs.

No. 08-2004: Wiebke Kuklys

*A Monetary Approach to Capability Measurement of the Disabled – Evidence from the UK*

In this paper we attempt to assess empirically the capability set of the disabled. We formulate the assumptions under which capability can be interpreted as needs-adjusted disposable household income, and use equivalence scales methodology to estimate it for households in the UK. We identify a positive cost of disability to the households and state, to what extent a disability can reduce an individual’s capability set. The use of the derived capability measure instead of traditional income in poverty measures leads to a dramatic increase of poverty among the families with disabled members.

No. 11-2004: Wiebke Kuklys

*Measuring Standard of Living in the UK – An Application of Sen’s Functioning Approach Using Structural Equation Models*
This paper contributes to the multidimensional welfare measurement literature inspired by Sen’s functioning approach. After reviewing the different statistical techniques used in multidimensional welfare measurement, we suggest structural equation modelling as an appropriate alternative to measure and model the achievement of welfare. Functionings are conceptualised as latent variables which can only be measured with error. We assess what determines the achievement of these functionings, and compare the numerical functionings values with income in a simple poverty analysis.

No. 13-2004: Carsten Schmidt, Tobias Uske
Reputationsmechanismen für Informationsgüter auf Internet-Meinungsportalen

No. 23-2004: Eric Danan, Anthony Ziegelmeyer
Are preferences incomplete? An experimental study using flexible choices
Completeness, the most commonly assumed axiom in preference theory, has not received much attention from the experimental literature. Indeed, incomplete preferences model a cognitive phenomenon (an agent’s inability to compare alternatives), and therefore cannot be directly revealed through choice behavior. Implementing a solution to this methodological issue recently proposed by Danan [A behavioral model of individual welfare, mimeo EUREQua University Paris 1, 2003], we build an experimental protocol involving choices among menus of lotteries, and reveal cognitive preferences’ incompleteness by means of the concept of preference for flexibility. Our experimental protocol is designed to assess the descriptive validity of the completeness axiom, as well as to relate its possible violations to lotteries’ riskiness. Two-thirds of the subjects whose choices reveal preferences in accordance with the underlying theory exhibit a strictly positive measure of incompleteness. The observed average measure of incompleteness equals approximately 17 percent and it is significantly greater than 10 percent. We do not find a significant relationship between a lottery’s riskiness and its cognitive comparability with certain payoffs.

No. 26-2004: Andreas Nicklisch
Perceiving strategic environments - An experimental study of strategy formation and transfer-
Within the setting of two simple two-person coordination games the formation of subjective strategies is observed experimentally. Though the structure of the game is unknown players use their actions in order to coordinate on a specific equilibrium. Strategies enable them to interpret the opponent’s behavior in an appropriate way. It turns out that more informed players coordinate faster while the strategy of less informed players is more robust with respect to changes in the game structure.

No. 16-2005: James B. Davies, Martin G. Kocher, Matthias Sutter
Economics research in Canada: A long-run assessment of journal publications
We examine the publications of authors affiliated with an economics research institution in Canada in (i) the Top-10 journals in economics according to journals’ impact factors, and (ii) the /Canadian Journal of Economics/. We consider all publications in the even years from
1980 to 2000. Canadian economists contributed about 5% of publications in the Top-10 journals and about 55% of publications in the /Canadian Journal of Economics/ over this period. We identify the most active research centres and identify trends in their relative outputs over time. Those research centres successful in publishing in the Top-10 journals are found to also dominate the /Canadian Journal of Economics/. Additionally, we present data on authors’ Ph.D.-origin, thereby indicating output and its concentration in graduate education.

No. 33-2005: W. Güth, K.-D. Koschmieder, M.V. Levati, E. Martin
How to Preserve a Fortune: An Experimental Comparison of Foundations and Direct Transfers to the Heir
Direct transfers allow heirs to freely use what has been passed on to them. Bequeathers who do not trust their descendants to make proper use of the fortune may prefer investing it in a safe foundation, thereby limiting their descendants’ autonomy. In our study we compare experimentally these two institutional arrangements. Although bequeather and descendant have specific personal interests, they agree in their concern for preserving the fortune. Our results show that bequeathers tend to trust their descendant. When transfers to the descendant are less efficient than investments in a foundation, due to, e.g., inheritance taxation, overall bequests decrease significantly.

Strategic Delay and Rational Imitation in the Laboratory
This paper investigates market failures due to strategic delays. We test experimentally a discrete model of dynamic investment, where two privately informed agents have an option to invest at the time of their choice in the presence of waiting costs. The equilibrium outcome of our experimental game is characterized by efficient imitation but complete revelation of information is time consuming. In accordance with the equilibrium solution, subjects better informed take investment decision before subjects who are less informed and subjects’ decisions exhibit rational imitation. Still, subjects do not play exactly in accordance with the equilibrium sequence and we interpret their deviations from equilibrium play as an attempt to internalize the information externalities.

No. 40-2005: A. Morone, O. Ozdemir
Measuring the Degree of Ambiguity about Probability: Experimental Evidence
Different from previous studies that use a best estimate, interval, or sets of probabilities, we represent the degree of ambiguity through levels of information provided to subjects. The willingness to pay is higher when more amount of information is provided.

3.1.12 The Jena computer and video laboratories
Experimenters use visually isolated cabins and computerized software to provide a constant and anonymous environment. For this, we use nearly all year round our computer laboratory with 32 visually isolated (but not soundproof) terminals. In the video laboratory one can control for the effect of communication in games, which is known to induce more cooperative behavior in a variety of games. The video equipment allows for controlled communication channels between the eight cabins. Up to 4 cabins can communicate with each other via the audio and video hardware. The 8 soundproof cabins can be filled with up to 4 subjects in each cabin. Each cabin provides in- and output for video and audio signals. In addition, each cabin is equipped with a personal computer for subjects’ decisions. The equipment allows running computerized experiments with additional recording of audio/video communication between cabins or video recording of group discussions in single cabins.
**Working Papers**

No. 06-2004: Thomas Baumann, Carsten Schmidt  
The Jena video laboratory for economic experiments  
This paper describes the video laboratory at the Max Planck Institute for Research into Economic Systems in Jena. The idea is to give the experiment designer an overview on the functionality of the video laboratory, to provide the first time user a quick overview of the control system and preset experiment configurations, and the advanced user finds references for programming the central video-/audio hardware. The laboratory allows conducting video experiments using 8 soundproof cabins with up to 4 subjects in each cabin. Each cabin provides in- and output for video- and audio signals. In addition, each cabin is equipped with a personal computer for subjects' decisions. The equipment allows the researcher to run a computerized experiment with additional recording of audio/video communication between cabins or video recording of group discussions in single cabins.

No. 35-2004: Carsten Schmidt, Ro'i Zultan  
Unilateral face-to-face communication in ultimatum bargaining – A video experiment  
It is commonly accepted that face-to-face communication induces cooperation. The experiment disentangles communication and social effect (replication of Roth, 1995) and examines the components of the social effect with the help of unilateral communication. Results suggest that separate processes, both of a strategic and of an affective-social nature may induce cooperative outcomes in ultimatum bargaining with pre-play communication, depending on the communication protocol. Unilateral communication is found to have weaker effects than bilateral communication, and affects especially the recipient of the communication.

No. 18-2005: Ben Greiner, Werner Güth, Ro'i Zultan  
Let the Dummy Talk – Unilateral Communication and Discrimination in Three-Person Dictator Experiments  
To explain why pre-play communication increases cooperation in games, one refers to a) strategic causes such as efficient communication or reputation effects, and b) changes in the utilities due to social processes. Hitherto experimental support for both explanations is mixed and confounded. Our experimental design eliminates all strategic factors and allows to focus on the effects of communication processes. We clearly find social effects, but none of revealed anonymity or salient communication. The social processes invoked are very heterogeneous but not irregular for different communicators.

No. 34-2005: D. Dittrich, A. Ziegelmeyer  
Laboratory Bilateral Gift Exchange: The Impact of Loss Aversion  
We present a systematic robustness test of the persistence of gift-exchanges in the laboratory. Our data clearly establish that the effect of social forces is dramatically crowded out by loss aversion. This was not observed before, as in other studies that allow for nominal losses participants were endowed with a substantial lump sum payment. We did not endow our participants with some initial wealth (they also got no show-up fee). Instead, participants were required to sign an agreement before the start of the experimental session in which they agreed to cover losses by either incomes from future participation in experimental sessions or by their own money. We conjecture that by providing some initial endowment to their participants, previous experimental studies have clearly failed to investigate the impact of losses on the level of gift exchange reported. Further, we observe a considerable between treatment variability in the effort–wage relation. Small lump-sum payments to the first-mover reduce the effort–wage slope significantly. A reduction in the profitability of effort increases the effort–wage slope.
3.2 Theses Completed in 2004/2005

Amartya Sen’s Capability Approach: Theoretical Insights and Empirical Applications

WIEBKE KUKLYS (1971 - 2005)

The dissertation addresses two questions. First, what is Sen’s capability approach and what, if any, theoretical insights can standard welfare economics gain from them. Second, how should this approach be empirically implemented. After an introduction to the topic of individual welfare measurement and an overview of the thesis the theoretical basis is developed underlining the empirical relevance of implementing Sen’s approach. Amartya Sen’s capability approach to welfare evaluation is described in the terminology of standard welfare economics. The question is to what extent it provides a genuine alternative for individual welfare measurement and policy evaluation. After reviewing the nascent empirical literature on the capability approach it is examined whether it makes a significant difference in comparison to standard welfare evaluation.

The multidimensional welfare measurement literature inspired by Sen’s functioning concept is applied in the form of structural equation models to the measurement and modelling of the achievement of individual welfare. The functioning “being healthy” and “being well-sheltered” are conceptualised as latent variables, which can only be measured with error. In an application to welfare measurement in the UK, we assess what determines the achievement of the functionings, and compare the numerical functionings values with income in a simple poverty analysis.

Further a sensitivity analysis is performed to investigate how composite welfare measures based on several functionings react to changes in weights and substitution elasticities between functionings. This allows us to assess how fragile the results based on such composite measures are and in what way they provide an alternative to income.

Finally the capability set of the disabled in the UK is assessed empirically. By formulating the assumptions under which capability can be interpreted as needs-adjusted disposable household income, a psychometric equivalence scale methodology is used to estimate it for households in the UK. The author can identify a positive cost of disability to the households and demonstrate to what extent a disability can reduce an individual’s capability set. The use of the capability measure instead of traditional income in poverty measures leads to dramatic increase of poverty among the families with disabled members.

Experimental Studies on Investor Behavior

GERLINDE FELLNER

This thesis illuminates investment decisions from a behavioral point of view and thereby attempts to advance the understanding of cognitive and social forces that affect behavior. Psychological processes do not only shape behavior on the individual level but subsequently also on the aggregate market level. This topic is important to study for various reasons: first, it has been established that contrary to the classical view, markets are not always efficient and the principles of human psychology are indeed relevant for the market outcome. Second, what happens on capital markets is undeniably linked to the growth and performance of the overall economy. And third, recent economic developments, particularly the trend to privatize social security and retirement savings, have attracted a number of new investors in the stock market, many of them amateurs. Therefore, it is increasingly important to study the psychological factors that influence the judgment market participants and that most likely translate into investment decisions.

Lessons from behavioral finance

Standard finance theory draws upon the assumption that market actors are rational, implying two things in particular: first, individuals correctly form their expectations by updating
their beliefs according to Bayes’ rule, and second, individuals make choices that are consistent with the axioms of expected utility theory. Based on these assumptions, prices of stocks on the market reflect their fundamental values, which is the discounted sum of all future cash flows.

A central aspect for the functioning of financial markets is arbitrage. This implies that whenever prices deviate from fundamentals, rational investors can earn excess profits at no risk and thus will soon drive prices to fundamental values again, which represents the central claim of the efficient market hypothesis (see Fama, 1970, for a comprehensive overview). The paradigm of efficient markets has long been regarded as one of the best established facts in economics, and has dominated the finance literature for a long time. However, in the early 80s, Shiller (1981) and Leroy and Porter (1981) started to point out that some empirical observations can – despite best efforts – not be reconciled with the claims of standard theory. Ever since the efficient market hypothesis has rapidly lost ground. Subsequently, the need arouse to study the various empirical phenomena on the grounds of human psychology, and the emerging field is now known as behavioral finance. The rationale of introducing psychology to economic thought is the evidence that deviations from rationality are not random, but systematic. On this premise, traditional assumptions can be relaxed in order to account for behavioral regularities and build more accurate models of financial markets, which represents one of the main goals of behavioral finance (Barber and Odean, 1999).

Two major topics constitute the pillars of behavioral finance: limits to arbitrage and investor psychology. Whereas the latter investigates why and how market behavior deviates from rationality, the former explains why market forces do not eliminate these ‘errors’ immediately. Contrary to the classical view, arbitrage is risky and limited. In particular, there are three sources of risk or cost potential arbitrageurs face: fundamental risk, so-called noise trader risk, and implementation cost (see also Barberis and Thaler, 2003, for an overview). Fundamental risk pertains to the fact that the fundamental value of a stock is difficult to determine and mispricing therefore hard to detect. Noise-trader risk entails the danger that the mispricing the arbitrageur wants to exploit even worsens in the short run. The psychological forces that drive markets away from their fundamentals might continue to divert them even further. Furthermore, arbitrage usually requires to take short positions for which fees are charged, and many pension fund and mutual fund managers are even legally prohibited to short sell.

The second pillar of behavioral finance, investor psychology, ultimately leads to the question of what characterizes noise-traders. Or put differently, what drives prices away from fundamental values? The answer lies in a number of idiosyncratic cognitive biases and decision heuristics that human beings are prone to. A large part of what is noteworthy in this context relies on the work of Kahneman and Tversky (1979) and Tversky and Kahneman (1974). A main category of psychological factors that severely influence investment and trading behavior relates to self-deception. The best established sub-category are egocentric biases, that are dealt with in two of the empirical studies of this thesis (chapter 2 and 3). Overconfidence, the systematic overestimation of one’s knowledge and ability (Alpert and Raiffa, 1982), leads in the context of market behavior to more aggressive trading strategies and to less attention to others’ information (Bloomfield et al., 1999). Illusion of control (Langer, 1975) refers to the overestimation of one’s chances at a random task, particularly when the task is spuriously associated with skill. Another major exponent of investor psychology is social influence. Herding behavior, that is usually modelled via information cascades (see Banerjee, 1992 for a theoretical model), is often responsible for large price movements. However, chapter 4, advocates yet another concept of social psychology, i.e. social identity, to play a role for investment decisions. So far, this particular incitement has not received attention in the field of behavioral finance.

The question recurs why so-called noise traders do not adapt to rational behavior over time. A possible answer is that irrational strategies are sometimes beneficial. There is, of course, still evidence in favor of the efficient market hypothesis. However, it does not preclude the market from undergoing significant periods of mispricing. In fact, the debate on the relevance of the reported market irregularities and the predictive power of the efficient market hypothesis is ongoing (see, for instance, Fama, 1998). Still, it is widely accepted that, overall, noise trading has an adverse effect on society. In this light, the deviations from market efficiency as well as investor sentiment deserve the attention of researchers.
Experimental Methodology

Many psychological phenomena, especially those addressed in this thesis, cannot be easily measured in the field. Despite higher external validity, evidence gathered in the field is likely to be confounded by various factors, since naturally occurring phenomena are usually very complex. Financial markets often provide an abundance of data on bids, asks, prices and trading volume. Nevertheless, much of the information on individual investment behavior is protected by privacy policy. Empirical data also fails to include expectations that are not only important for fundamental values but also market sentiment. Moreover, it is difficult to identify the “right” prices, i.e. the fundamentals, of stocks in the field. The laboratory provides the opportunity to induce these values and make them common knowledge to participants.

Hence, this thesis pursues an experimental approach. Controlled experiments allow for concise hypotheses testing by varying independent variables and observing their impact on decisions. Economic theory usually provides precise benchmarks of optimal behavior that serve as a comparative standard. Of course, experimental settings do not reflect the intricacy of the real world, but neither do they intend to. If relationships between variables can be identified in very basic and transparent settings, they usually reflect fundamental structures that also hold on a more general level. The fact that decisions are costly for participants and earnings usually exceed opportunity costs emphasizes the relevance of psychological principles for real financial decisions in the presence of monetary consequences. Experimental methods thus provide an essential advantage to real world observations and are therefore an indispensable element of a behavioral approach to finance.

Overview of chapters

This thesis focuses on the second building block of behavioral finance, i.e. individual investor behavior. The goal is to advance the understanding of behavioral principles that are relevant for investment decisions and that help to understand particular market phenomena. However, individual investors include both private and institutional investors, like portfolio managers, financial planners, brokers and traders, because they are essentially liable to the same psychological principles.

Although the use of heuristics need not always result in inferior performance (see, e.g., Borges et al., 1999), it usually leads to systematic deviations from optimal choice and thus to noise on the market. The category of biases to which this thesis draws special attention are egocentric biases, among which overconfidence, illusion of control, and unrealistic optimism are counted. Moreover, it is argued that also social forces, particularly social identity, can have a major impact on investment strategies; a relation that has been neglected so far.

Illusion of expertise in portfolio decisions

Chapter 2 (first formulated in Fellner et al., 2004) starts with investigating individuals’ overestimation of their ability to create portfolios. In real life, overconfidence is difficult to measure, since the majority of situations lack an objective standard of what is a well-calibrated perception of own ability. When asked, for instance, if one feels to be a superior investor, there are several possible reference points to think of: e.g., beating the market over a certain period of time, earning higher returns than fellow investors, having higher expected, risk-adjusted portfolio return, and so on. In the experiment, we are able to avoid such ambiguity by providing a situation where superior skills are irrelevant. In the specific investment setting, every possible portfolio allocation is equally good from a theoretical point of view.

Observation 1: Participants overestimate their ability to create good investment portfolios, resulting in an illusion of expertise.

By employing an incentive compatible mechanism to elicit subjects’ evaluation, it is confirmed that the majority prefers their self-selected portfolio. Indeed, individuals are willing to give up money in order to keep or obtain the portfolio they previously picked instead of receiving an equally good alternative. This effect was found with respect to an average portfolio that was offered and with respect to the portfolio of a fellow subject who was considered to have high expertise in financial matters. This evidence, termed illusion of expertise, is closely related to overconfidence. It is shown to be robust against task experience, it
An overly optimistic view of own abilities as well as the illusion to have more control over a situation than actually justified can have tremendously negative financial consequences. A prominent case is the crash of Barings Bank in Singapore caused by the fatal trading strategy of its former chief derivatives trader Nick Leeson. While in this particular case the actions of a single man had a major impact on the market, a larger number of overconfident and excessively trading investors are even more likely to produce price bubbles and market crashes.

**Illusion of control and portfolio diversification**

Chapter 3 (first formulated in Fellner, 2004) deals with the role of illusion of control for investment decisions. This bias is of particular interest in consideration of many poorly diversified portfolio allocations, made by financial planners and private investors alike. Especially, private retirement savings contain a high proportion of own company stock. From the perspective of diversification this is an alarming strategy, because investments and human capital are highly correlated. The study proposes the illusion of control on the performance of the own company to drive poor diversification strategies and explores this relationship on a fundamental basis. The feeling to have some control on the performance of the own company might lead employees to think that they actually apply a low risk strategy when purchasing own company stock. A dramatic example is provided by the Enron bankruptcy and employees’ lack of diversification: workers of energy trader Enron held large proportions of their assets in own company stock and ultimately lost not only their job, but also their savings. Additionally, further determinants of portfolio composition are addressed in this chapter, i.e. the influence of a default portfolio, the number of alternatives one can choose from, or the trend to predict high returns for and invest more in shares that recently performed well. Field studies have shown that overpriced companies frequently experienced superior market performance in the past. This attraction to investors can also lead to poor diversification.

Observation 2: Subjects invest more in an alternative when they exercise control on its return and less in the alternative where they do not. This is especially pronounced when subjects can choose the investment alternative on which to exercise control. However, the effect of illusion of control on investments abates over time.

The experimental results demonstrate that indeed already a weak inducement of illusion of control distorts investments; however, the effect subsides with experience. This finding suggests that a straightforward way to debias behavior is swift and precise feedback.

Observation 3: On aggregate, individuals are overly optimistic in their predictions for investment options. The prediction of a high return is more likely the more high returns subjects see in a randomly determined history. Also, a high return prediction is followed by a higher investment confirming excessive extrapolation.

As a further explanation of poorly diversified investments, the hypothesis of naive extrapolation of past trends is confirmed to be behaviorally relevant, even when lacking extensive historical trend observations.

Observation 4: The final portfolio allocations are considerably affected by the default portfolio offered.

Diversification strategies are shown to be highly anchored to the default portfolio offered. Consequentially, financial managers should confront the problem how to choose default portfolios and design the funds offered in retirement saving plans.

**Social identity and international diversification**

Chapter 4 (first formulated in Fellner and Maciejovsky, 2003) addresses another instance of poorly diversified portfolios, i.e. the equity home bias. It refers to the empirically well established fact that portfolio allocations are biased towards domestic equity, although the low correlation of international markets offers additional risk-adjusted returns from diversification. Previous institutional explanations of this puzzle stress hedging possibilities, high trans-
action costs, higher taxes on foreign equity, and information arguments, meaning that investors have superior information on domestic companies. So far, however, none of the theoretical models can satisfactorily account for the extent of the bias. Alternatively, a number of behavioral explanations have been proposed, like investment in the familiar, or in those firms one feels more competent about. This study offers a novel contribution to the existing literature: national identity might already lead to a higher attractiveness of domestic stock. This claim is contrasted with the institutional explanation that calls asymmetric information to account for biased investments.

**Observation 5:** Loose affiliation with a particular group of firms (social identity) already leads to overproportional investment in these firms. Also, the provision of asymmetric information leads to biased investments. Social identity is indeed as strong as asymmetric information in the Equity Home Bias in the laboratory.

Setting up an investment situation where it is optimal to diversify equally across firms, we establish that mere group affiliation can already cause as much home biased investments as asymmetric information. Excessive own company investment that is regarded as a subphenomenon to the equity home bias plays only a role when subjects are less experienced.

**Observation 6:** Individuals are generally overly optimistic towards the companies they feel affiliated with, even when provided with information on others. Having superior information about specific firms alone also induces overoptimism.

Assessing the relevance of behavioral principles is fundamental to understand why markets are sometimes not efficient and eventually devise specific policy to counter these effects. Especially lay-people should be pointed to the adverse effects, e.g., that poor diversification implies huge risks. The danger of overconfident trading should be called to the attention of fund managers, analysts, and traders. Institutions like investment banks should be well aware of overoptimistic expectations and overconfident trading by their financial managers, which can create or at least augment price bubbles. Calling the traps to mind is the first step to increase self-monitoring of financial professionals. It is important to note that swift and constant feedback can be used to attenuate egocentric biases. In the context of social factors, campaigns appealing to investors to leave their money in the country should be well considered to avoid feeding the equity home bias additionally.

**Summary**

This thesis comprises three studies that serve the common objective to investigate the relation between cognitive or social principles underlying human judgment and investment behavior. This topic is particularly relevant because financial markets often considerably deviate efficiency, which is for a large part caused by the “irrationalities” of investors. Investor psychology is also one of the two building blocks of behavioral finance that tries to uncover institutional constraints to arbitrage and to relate findings on the idiosyncrasies of the human mind to developments on the market. The studies that are outlined in this thesis contribute to understand the extent to which investment strategies are driven by psychological, i.e., cognitive and social, forces. In the end, all accurate modelling of the human nature requires a close inspection of actual behavior. Therefore, economics and finance must generally be behaviorally inspired rendering the distinction between finance and behavioral finance obsolete for the future. To conclude with a quote, Richard Thaler’s words (1999, p. 16) hit the mark: “In their enlightenment, economists will routinely incorporate as much ‘behavior’ into their models as they observe in the real world. After all, to do otherwise would be irrational.”

**References**


Theses Completed

Labor Economics: Experiments and Empirical Research

DENNIS DITTRICH

The thesis Labor Economics: Experiments and Empirical Research focuses on behavioral economics and its application to labor relations. It consists of several self-contained chapters on experimental and empirical research that try to shed some light on the social forces – like the norm of reciprocity, or the dislike of certain groups – that affect behavior.

The goal of behavioral economics is to increase the explanatory power of economics by providing it with a more realistic foundation. This may then lead to better predictions of field phenomena, better policy advice and better understanding of human behavior in general.

One might guess that behavioral economics would have made its greatest impact on empirically oriented and data driven subfields of economics, such as labor economics. However, it were not applied labor economists relying on large sample data sets containing observations from the field who advanced the recent behavioral movement, but theorists drawing on the data from laboratory experiments (see Berg, 2004, for a recent survey on the impact of behavioral economics on labor economics).

Thus, the progress of behavioral economics is closely related to the use of experiments. Experiments allow a tight control and direct test of basic assumptions about rationality and preferences. In fact, the essence of experiments is control. By monetary rewards the experimenter can control the preferences, the technology, and initial endowments. By the rules of the game the experimenter defines the institution, i.e. possible actions, the sequence of actions, and the information conditions.
As a result the experimenter knows what is exogenous and what is endogenous. Causality problems – problems that arise very often with field data – are mitigated. Compared to field data, there are rather few unobservable variables. And what may be most appealing, the experimenter knows the theoretical equilibrium. He, therefore, can observe and identify equilibrium and off-equilibrium behavior and is able to examine adjustment behavior.

Laboratory experiments have a further advantage over happenstance data. In contrast to evidence from field data, experimental evidence is replicable since the experimenter controls the conditions under which the evidence is generated. Those who question results can therefore replicate the experiment, test the robustness of the results and explore the effects of systematic changes to the environment.

However, there are some frequent objections against experiments (see Falk and Fehr, 2003). First, experiments are unrealistic – as most economic models are unrealistic in the sense that they leave out many aspects of reality. Yet, the simplicity of a model or an experiment is often a virtue because it enhances our understanding of the interaction of relevant variables. Whether realism is important depends on the purpose of the experiment. If one wants to test a theory or understand the failure of it, the evidence is important for theory building but not for a direct test of reality. Second, experiments are artificial due to a subject pool bias, low stakes, and small number of (inexperienced) participants. However, all these potential problems are not necessarily associated with experiments as one can easily use other subject pools (Cooper, Kagel, Lo and Gu, 1999; Güth, Schmidt and Sutter, 2003), increase the stakes (Holt and Laury, 2002) and the number of participants (Güth et al., 2003; Bellemare and Kröger, 2003). Third, experiments investigate only special cases. However, general theories and models should also work in the special cases of a laboratory experiment. Though laboratory experiments are simple in comparison to real life situations, they are real, too, in the sense that real people participate for real and substantial profits (Plott, 1982).

Finally, laboratory experiments raise the question of internal and external validity. While internal validity is a matter of proper experimental controls, design, and data analysis, the question whether the results can be generalized to the field remains. An experiment cannot prove that under the same circumstances the same will happen again. If an experiment implements, however, certain conditions that generate robust and replicable regularities, the assumption that the same regularities will occur in reality given that the conditions are met is well-founded.

Yet, whether the conditions implemented in the laboratory are sufficiently similar to reality is subject to some uncertainty. Consequently, laboratory experiments are no substitute for the analysis of field happenstance data, the conduct and analysis of field experiments, and for survey data, but only a complement. Serious research calls for a combination of all empirical methods.

Overview

The thesis Labor Economics: Experiments and Empirical Research is structured as follows. It comprises of two parts where research on behavioral regularities using two different methods is presented. In the first part, i.e., chapters 2 to 5, experiments in a labor economics context are discussed. To this end, chapter 2 first introduces to the relevant literature on experiments in labor economics. Chapter 3 discusses the robustness of gift exchanges in the laboratory. A shirking model is tested in chapter 4, and finally, chapter 5 analyzes the impact of reciprocal behavior on wage rigidity. The second part consists of a single chapter, where a more traditional research approach is used. By analyzing questionnaire data, the degree of age discrimination in hiring decisions and differences therein between Germany and Norway are investigated.

In more detail, chapter 2 is a selective survey of the experimental literature where only those experiments are discussed that are most relevant for the subsequent chapters. The literature provides clear evidence for the existence of reciprocal behavior. Reciprocal behavior is usually characterized by ‘nice’ reactions to ‘nice’ actions by others, and accordingly by ‘hostile’ reactions to ‘hostile’ actions. In the labor relations context, this usually translates to a high effort choice by the worker in response to a high wage. In the laboratory the employer–employee relation is investigated by the means of gift-exchange games and more sophisticated principal–agent models. The chapter reviews the results of such experiments
and focuses on robustness tests of laboratory gift exchanges and the effects of explicit incentives.

Chapter 3 (which is based on joint work with Anthony Ziegelmeyer), presents a systematic robustness test of the persistence of gift-exchanges in the laboratory. The data clearly establishes that the effect of social forces is dramatically crowded out by loss aversion. This was not observed before, as in other studies that allow for nominal losses participants were endowed with a substantial lump sum payment. In this study, however, participants were not endowed with some initial wealth (they also got no show-up fee). Instead, participants were required to sign an agreement before the start of the experimental session in which they agreed to cover losses by either incomes from future participation in experimental sessions or by their own money. The results indicate that by providing some initial endowment to their participants, previous experimental studies have clearly failed to investigate the impact of losses on the level of gift exchange reported.

Chapter 4 (which is based on joint work with Martin Kocher) introduces and presents an experimental test of a shirking model. The experiment has two distinctive features. First, in contrast to earlier experiments investigating shirking models the monitoring intensity is endogenous. Second, feasible efforts are not restricted to a small set of discrete levels, but are chosen on a continuous scale. Wage level, monitoring intensity and consequently the desired enforceable effort level are jointly determined by the maximization problem of the firm. As a result, monitoring and pay should be complements. This is in contrast to simpler shirking models where desired effort is exogenous, and where effort is only chosen from a small discrete set (low and high): These oversimplifications would lead to the conclusion that monitoring and pay are substitutes.

If the participants in the experiment are strongly influenced by a norm of reciprocity, the theoretical model may fail to explain the observed decisions as principals might pass on monitoring and offer only ‘gifts’ in anticipation of a gift-exchange, i.e. a non-minimal and positive correlated effort choice by the respective agent.

Though in the experiment participants do not find the optimal contract, the model is qualitatively confirmed. Between and within treatment variation is qualitatively in line with the normative predictions of the model. Yet, reciprocal behavior can be found, too. The data analysis shows, however, that it does not pay for the employer to rely on the reciprocal behavior of employees. Indeed, the employers need to monitor (at least a little) to induce any non-minimal effort choices. Without any monitoring the employees fully shirk and to not respond to higher wages.

Chapter 5 is motivated by the substantial overlap of efficiency wage models (that assume a causal relation between wages and effort as implied by reciprocity) and rent-sharing models (that concentrate rather on bargaining power), both trying to explain wage rigidity. The impact of reciprocity and bargaining power on wage adjusting behavior in a complete contract context is analyzed, both theoretically and in a laboratory experiment. The experiment implements a repeated ultimatum game with exogenous shocks, i.e. changes in the total amount to distribute and in the conflict payoffs. Without reciprocity, wages (ultimatum offers / demands) would adjust perfectly to exogenous shocks. However, the experiment confirms the theoretical prediction which accounts for the existence of reciprocity: Wages are prone to rigidity when employees are in a relatively strong bargaining position.

Finally, chapter 6 (which is based on joint work with Victoria Büsch and Svenn-Åge Dahl) deals with a more traditional labor economics topic: Discrimination. First the literature on age discrimination, to which this chapter is also a novel contribution, is discussed. Then a questionnaire design that allows to investigate age discrimination in hiring decisions is introduced. The questionnaire design shares some features of an laboratory experiment. Though participants’ decisions are not motivated by financial incentives, the questionnaire does not directly ask for the participants tendency to discriminate but was used to elicit hypothetical hiring decisions of German and Norwegian personnel managers and students. In the questionnaire the task was to hire one of three hypothetical applicants whereby only the age of the applicants was systematically manipulated. Age discrimination is defined by a higher hiring probability of younger but otherwise equivalent applicants.

The comparative data analysis shows that within one country, the degree of discrimination is the same, i.e. there is no significant difference in the hypothetical hiring decisions between personnel managers and students. However, the degree of age discrimination in
hiring decisions between Germany and Norway differs considerably. In Germany, age discrimination is much more severe than in Norway. Further, this age discrimination can be attributed to a ‘dislike’ of older applicants that is not justified by perceived productivity differences or the prospective employment duration.

References


The Strategic Formation of Social Networks: Experimental Evidence

KATINKA PANTZ

One of the central insights of anthropology and sociology is that market relations coexist with, are shaped by and depend on non-market relations. The empirical evidence that social relations influence market outcomes is pervasive and well-documented for various areas of economic interest. Social relations for example facilitate the circulation of information on job opportunities and the sharing of risk, and they play a role in the screening of credit applicants. A recent strand in the economic literature conceptualizes social structure as networks which are sets of bilateral relations between economic actors. The value-added from this network research stems from its systematic formal analysis of how incentives of individuals to form networks align with social efficiency. In line with standard economic modeling, most of the suggested network models are based on the assumption of rationality and self-interest. This foundation guarantees clear-cut predictions, but the proof that the principles underlying network formation in the field are adequately captured by the available models is pending. In this dissertation we attempt to take a first and consequently preliminary step in this direction. The common objective of the experimental studies collected in this dissertation is 1) to investigate the behavioral relevance of the conceptual core of the economic research programme on network formation, viz., the assumption that social networks are formed strategically, and 2) to characterize some of the aspects that a behaviorally informed theory of strategic network formation would have to account for. The reported studies share a joint basis: Opposed to almost all existing experimental studies, we assume that the establishment of a bilateral relation necessarily requires the mutual consent of both involved individuals and specify a sequential rather than a simultaneous network formation game. This reflects an essential feature of most naturally occurring network formation processes and rules out otherwise confounding coordination failures.

In the first study, entitled ‘Strategic formation of networks and length of foresight’, we investigate network formation in a stylized setting in which four individuals exclusively decide whether or not they want to form/delete bilateral relations, while the costs and benefits from linking are exogenously imposed according to the symmetric connections model intro-
duced by Jackson and Wolinsky (Journal of Economic Theory, 1996). The objective of our experimental design is to give best-chances to strategic considerations, while at the same time be able to identify potential deviations from the cognitive rationality assumption according to which players form correct expectations about other players’ behavior. We compare observed behavior to two benchmarks, one derived from assuming a zero length of foresight (myopic behavior) and the other from assuming an infinite length of foresight (rational behavior). We manipulate the cost of direct links in different treatments, in which subjects go through several repetitions of the network formation game. The order of play is varied between repetitions, which allows us to discriminate the impact of symmetry features of the predicted networks on the applied length of foresight. Our results show that network formation processes are not random but responsive to the cost of direct links and to the symmetry features of predicted networks. The predictive success at the outcome level is almost perfect when the costs of direct links are low in which case the predicted network is complete and identical for both length of foresight, but merely moderate in the case of medium and high costs of direct links, for which the predicted networks differ contingent on the assumed length of foresight. When recurring to best response functions to evaluate the adequacy of observed with predicted behavior not only on but also off the equilibrium path, the relative predictive success of myopic behavior is rather low. Still, subjects’ length of foresight is very limited.

The second study, entitled ‘Strategic formation of networks and market competition’, tests the behavioral adequacy of Goyal and Joshi’s model (Games and Economic Behavior, 2003) which formalizes the strategic formation of collaborative alliances between firms that are competing on the same product market. This model predicts strategically stable patterns of collaboration between firms which are empirically observed but have been ruled out in the previous literature. In a two-stage game, firms decide to form collaborative links, whose formation is costly but reduces marginal production costs, before they compete in quantity on the market. We report the results of a series of experiments. The first experiment is designed as a straightforward theory-test, simulating a one-shot interaction. We manipulate the cost of link formation in different treatments. Our data almost perfectly match the predictions for both stages whenever the link formation costs are extreme and the predicted networks symmetric (empty or complete networks). In the case of intermediate link formation costs where the predicted networks are asymmetric, subjects rarely form asymmetric networks. When they do, observed and predicted quantities are less in accordance than for symmetric networks. Collusion cannot account for the observed behavior. In our second experiment we reject the conjecture that these findings are driven out by experience in a setting in which we increase the implemented number of repetitions of the two-stage game. Finally, in our third experiment we reduce the complexity of the setting by transforming the original two-stage game into a one-stage game where the formation of inter-firm networks directly determines firms’ payoffs. These are derived from assumed equilibrium market outputs on the here absent competition stage. In this case, observed networks coincide with the predicted ones indicating that experimental subjects’ limited capacity to foresee the outcomes of the market stage might be driving the earlier discrepancies.

In the third study, entitled ‘Strategic formation of networks and public good provision’, we investigate the capacity of decentralized bilateral arrangements to promote and stabilize cooperation in a collective action problem. We suggest a theoretical model in which pairs of players can form mutually binding cooperation agreements (commitments) - which taken together form a cooperative network - before they confront a pure public good provision problem. By implementing a parameterized version of the model in the laboratory, we evaluate the behavioral efficacy of the suggested pairwise commitment mechanism. We find that a considerable fraction of the observed networks are incentive-compatible and aggregate cooperation rates exceed those induced by the formation of incentive-compatible networks. In other words, the formation of cooperative networks provides a context which furthers cooperation beyond what can be accounted for by self-interest. Still, individuals are heterogeneous concerning their deviation from selfish behavior, a consequence of which is that groups differ largely in their ability to cooperate. While some groups succeed in using the mechanism to support full cooperation, cooperation completely breaks down in others. This replicates the empirical fact that only some communities in the field successfully solve collective action problems by relying on informal organizational modes. Interestingly, the efficacy of the pairwise commitment mechanism depends on the cost of individual monitoring:
Knowledge, ignorance, and adaptive learning: The use of information for interactive decisions

ANDREAS NICKLISCH

The issue of persistent economic change appears to be very important for economics if we understand competition as an inherently dynamic process where markets continuously evolve. There is a rich theoretical (e.g., Dasgupta & Stiglitz, 1980, Harris & Vickers, 1987, Kamien, Muller & Zang, 1992) and empirical literature (e.g., Lerner, 1997, Cassiman & Veugelers, 2002) extending this idea. Yet experimental evidence on this topic is rare (e.g., Isaac & Reynolds, 1988, Zizzo, 2002). Of course, laboratory experiments cannot provide a framework in which actual invention processes are observed. Nevertheless, experimental studies illustrate important aspects of this problem as they focus on the strategic interaction between agents engaged in activities on research and development (hereafter R&D). Most prominently, the influence of market concentration on the level of research expenditures is analyzed (e.g., Isaac & Reynolds, 1992). This thesis attempts to provide a further step in exploring individual research behavior. The studies that are outlined in the three chapters analyze the process of investment decisions for search activities. Thereby, this study attempts to advance the understanding of factors that control search activities by observing behavioral regularities in experimental settings. The main experimental findings indicate that competitors in this context base their decision whether to increase or decrease search effort on comparison of relative performances.

In order to explore search investments systematically, we introduce in a first study a prototype experiment that allows an investigation of individual R&D decisions. Of course, in a laboratory setting we do not observe actual invention processes but processes of strategic interaction on research decisions. Firms attempt to improve their products by varying some or all aspects of their products. Search investments subsequently reveal ideal aspects which yield payoffs. The effects of information spillovers result from the imperfect appropriability of research successes. We identify the relative performance of firms (measured as the relative distance between accumulated payoffs) as the crucial factor in determining the timing of innovative attempts. If competitors possess a rather homogenous economic wealth, we observe a significantly higher probability of further search investments than if competitors maintain a large difference in their economic wealth.

The second study applies the idea that relative performance promotes search activities to sequential patent races. Therefore we extend the prototype game for individual R&D decisions by an exogenous shock which affects both the supply and demand side and again spurs research competition. Consequently, after the exogenous shock, heterogeneous firms – a well established market participant and a less successful, economically lagging market
participant – invest in search activities. Thus, the experiment allows for an analysis that explores the relation between market concentration and innovative activities. Again, we find that relative economic performance exercises a crucially stimulating effect on the implementation of innovation and imitation strategies. Particularly, we can differentiate among different types of innovation. Homogeneous economic wealth promotes intensified search investments for incremental innovation. However, we observe more investment for fundamental innovation if competitors possess a rather heterogeneous economic wealth.

Finally, a third study investigates the relationship between innovation competition and price competition. Here, firms are engaged in Bertrand competition for heterogeneous goods. Additionally, similar to the study by Nagel & Vriend (1999), they can invest in product quality. The investments affect their payoffs by increasing the maximal demand of the product. Yet player’s investment shifts not only the own demand function but also the opponent’s demand function. Thus, the imperfect appropriability of investments creates spillover effects between firms. The experimental results allow us to analyze the individual adaptation processes in this complex environment. Again, we find that the relative competitiveness exercises an important influence on investment decisions. A poor relative performance leads to a change in investments. Moreover, we can formalize the relation between relative competitiveness and behavioural change in a model of interactive learning which anticipates competitors’ response on differences in relative performances. This approach of social learning is rarely recognized in the economic literature on learning (e.g., see Huck, Norman & Oechssler, 2004).

Analyzing the relevance of behavioural principles is fundamental to understand market dynamics; therefore, the experimental approach has been pursued. Of course, this thesis provides only a starting point for the assessment of individual search decisions. In particular, further studies have to generalize the approach of social learning. Nonetheless, the results of this thesis indicate that relative competitiveness is a crucial factor for decisions in complex environments.

Literature

Theories and Patterns of Bargaining Behavior: If Conflict is Unfair

SVEN FISCHER

Bargaining constitutes one of the most simple and fundamental forms of strategic interaction. The two seminal papers by John Nash (1950 and 1953) with their tremendous impact on game, and subsequently economic, theory are a testimonial to the importance of this core element of human interaction. Almost every interaction has aspects which can be described or understood as a process of bargaining about the division of a surplus or in many other situations, costs. Consequently, understanding how people behave in bargaining situations is a prerequisite to understand economic behavior itself. Better models of economic behavior, on the other hand, may help to make better predictions about effects of economic policies.

Early bargaining experiments already, inspired by the Nash bargaining solution and (still) trying to address the inherent problem that the Nash bargaining solution is only defined up to the „black box“ of players' expected utility functions, observed behavior questioning the theory. Specifically, e.g., Roth and Malouf (1979), using a binary lottery technique, found out that — contrary to the theoretic predictions, different cash prizes for lottery tickets among subjects have considerable effects on behavior (even in private information treatments). They conclude that there are „social effects“ influencing behavior, which have both, a strategic and fairness related component.

Inspired by such results and driven by the idea that „human decision making will be characterized at most by limited rationality“ (Güth and Tietz, 1990, p. 446.), Güth et al. (1982) analyzed an archetype of extensive form bargaining games — the ultimatum game. In an ultimatum game one subject, the proposer, can impose an ultimatum on the other, the responder. Applying subgame perfection to this extensive form game results in the very extreme prediction that proposers should offer (almost) nothing of the available surplus to the responder, who in turn accepts the offer. Güth et al. (1982) intended to develop a behaviorally founded bargaining theory by first looking at the most basic situation and then gradually proceeding to more complex situations. However, despite numerous research being made since then, Güth and Tietz's (1990) comment that „although ultimatum bargaining seems to be the most primitive form of negotiations, a satisfying descriptive theory of ultimatum bargaining is not yet available“, is still valid today.

Contrary to the theoretic predictions, responders frequently reject advantageous offers of up to about one third of the available pie. Furthermore, proposers frequently make considerable offers of up to 50%. Although some variation can be observed, the basic patterns of experimental behavior are rather stable in subject pool, pie size and experimental procedure (see e.g., the survey on bargaining experiments by Roth, 1995).

Nevertheless, in an alternation between theory formation and -testing (mostly in laboratory experiments), a better understanding of behavior — not only in bargaining situations — has emerged. Early explanations of ultimatum behavior which assumed cultural or social norms were mostly rejected by comparisons of behavior in several countries (see e.g., Roth et al., 1991). Several other studies helped to obtain a more detailed picture about what drives behavior. Among the most noteworthy are, e.g., the analysis of the impunity game (see Güth and Huck, 1997; Bolton et al., 1998), studies on asymmetries, e.g. in information or payoff space (see e.g., Kagel et al., 1996; Mitzkewitz and Nagel, 1993) and the investigation of a three person — two stage ultimatum game with incomplete information by Güth et al. (1996).

Subsequent models and (sometimes ad-hoc) explanations of behavior are, e.g. Andreoni's (1989) model of warm glow giving or the suggestion by Binmore et al. (1985) that learning may crowd out such anomalies (which subsequent studies refuted).

1 As of August 2005, searching in an online database of literature in the fields of economics (EconLit) and psychology (PsycINFO) for refereed articles including the terms „ultimatum game“ or „ultimatum bargaining“, results in altogether 407 hits.

Theses Completed

STRATEGIC INTERACTION GROUP
To date, the two most acclaimed approaches are social utility theories of fairness. The first models fairness as reciprocal kindness (Rabin, 1993; Dufwenberg and Kirchsteiger, 2004), the other formulates a model of distributive fairness (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999), which is basically an extension of players’ utility functions by inequality aversion, therefore implementing a purely outcome based valuation.

This thesis first tests these two well established theories of social utility — ERC by Bolton and Ockenfels (2000) and the model formulated in Fehr and Schmidt (1999) (F&S) — which model fairness as an outcome based distributive motivation. Within a generalized Bayesian equilibrium framework they assume that subjects have inequality averse utility functions. Applying these two models to a simple variation of the standard ultimatum game — the ultimatum game with (positive) asymmetric conflict payoffs — allows to make clear predictions about subjects’ behavior, which is subsequently tested in a controlled laboratory experiment.

Among others, both models predict that if conflict favors the responder, no responder should reject an offer above his own conflict payoff. Furthermore, if one does not allow for fully selfish types, no subject should reject an offer equal to his conflict payoff. Concerning proposers, predictions are made concerning correlations between dictator giving and proposer offers.

In the laboratory, both models prove to be rather accurate in predicting aggregate behavior. However, if one does not allow for fully selfish responders, both models significantly underestimate acceptance thresholds in situations favoring the responder. Whereas in situations favoring the proposer behavior by and large reflects inequality aversion, responders become rather selfish in treatments where in conflict they get more than the proposer. This is also reflected by a significantly higher predictive success in some situations favoring the responder in conflict, of the traditional subgame perfect solution assuming selfish payoff maximizing players. Furthermore, responder behavior is, ceteris paribus, rather stable with respect to changes in proposer conflict payoffs. The slightest change in responder conflict payoff, however, triggers significant marginal reactions.

Therefore, while being accurate on the aggregate level, models of inequality aversion do not convincingly capture certain patterns of individual behavior. The results give rise to Knez and Camerer’s, 1995 hypothesis that subjects form an "egocentric assessment of fairness", i.e., that inequality aversion does not describe a person’s characteristic, but rather a context dependent decision norm.

Comparing predictive success of the two models, F&S, due to it’s more restrictive approach, makes narrower and subsequently more precise predictions. Similar to findings by Charness and Rabin (2002) and Engelmann and Strobel (2004) ERC makes some inaccurate predictions due to its measurement of the degree of inequality by the relative share of payoffs. Furthermore, under asymmetric conflict payoffs, a considerable divergence of behavior, leading to considerably higher rejection rates is observed.

This is also the case in the experimental analysis of the as-if hypothesis presented in chapter 3, a more behavioral explanation of bargaining behavior. The as-if hypothesis states that subjects, rather unfamiliar with the extreme setting of an ultimatum game in a laboratory, behave ‘as-if’ in a symmetric Nash-demand environment. Parallel to the analysis of inequality aversion, this study explores differences in marginal reactions to changes in the composition of conflict payoffs between the ultimatum and the simultaneous Nash demand game. As marginal reactions to changes in the conflict payoffs differ significantly between the two games, the as-if hypothesis is rejected. Similar to results in the analysis of models of inequality aversion, asymmetry leads to considerably higher conflict and rejection rates. Furthermore, observed behavior shows that in the Nash demand game, the composition of conflict payoffs affects behavior in a way contradicting the conflict invariance of the Nash solution. Specifically, asymmetry in conflict results in bargaining outcomes which differ from the midpoint of the efficient set above conflict payoffs. Those being favored in conflict give more and those getting less in conflict demand more of the surplus. Nevertheless, outcomes are still favoring those with the higher conflict payoff.

The last study in chapter 4 investigates bargaining behavior in a more complex and realistic setting. Specifically, instead of looking just at one round interactions, a multi stage conces-
sion bargaining game resembling Zeuthen’s (1930) concession model is implemented and studied in the laboratory.

Besides effects of asymmetry of initial conflict, two other questions are analyzed: What effects does reliability of early concessions have on bargaining behavior and outcomes, and what effects can be related to dynamic interaction, i.e. what differences are there between a dynamic and a static implementation of the game.

Although reliability in concessions has considerable effects on the frequency of agreements, efficiency remains unaffected. Also, the protocol of play, i.e. whether the game is played dynamic or static, has no effects on the efficiency of outcomes. Nevertheless, in the dynamic protocol subjects coordinate on observed previous concessions.

As predicted by theory and already observed in other surveys, bargaining over time depicts a deadline effect. Contrary to predictions, however, there are high initial concessions. As high initial concessions are predominantly observed in the dynamic protocol, it appears that subjects use high initial concessions to signal their intentions. This result is stressed even more so, as the combination of the dynamic protocol with symmetric initial conflict yields significantly higher initial concessions than any other combination of treatment conditions. Results of this and the previous experiments show that asymmetry of conflict leads to a considerable divergence in behavior. Under symmetric conflict payoffs, however, behavior is extraordinarily homogenous, making it more likely that the other party actually understands the signal of high initial concessions correctly.

All three experimental surveys show that asymmetry in conflict payoffs has considerable effects on behavior, effects existent theories can only explain insufficiently. Furthermore, results, especially those observed in the tests of inequality aversion in chapter 2, suggest that actual behavior can not simply be explained by including additional motives in the utility function. Rather, it appears that subjects are guided by sometimes conflicting behavioral norms.

References


3.3 Conferences and Workshops

Ringberg Symposium on “Social Institutions”

From March 8 to 10, the Strategic Interaction Group organized a symposium in the Ringberg castle together with the ABC group of the MPI for Human Development (Berlin) and the MPI research group on Collective Goods (Bonn). The aim of this interdisciplinary symposium was to exchange ideas and identify complementarities between the different research approaches of the three groups involved.

The main focus was on the economics of social institutions, and in particular participants were asked specific thematic questions: “How much common ground is there between economic, psychological, and legal conceptualizations of the commons?”, “What are the framework conditions for cooperation without formal intervention and the emergence of formal institutions?”, or “How can the interaction between formal and informal institutions be understood in a behaviorally informed perspective?” Individual presentations approached these questions from very different perspectives, providing the setting for fruitful and rich discussions, both during and after the formal sessions.
Workshop on “Motivation and Behavior”

October 25, 2004

The Strategic Interaction Group organized a workshop with the DFG research group “Discrimination and Tolerance in Intergroup Relations”, with the aim of promoting scientific exchange between the two research groups. The workshop was held on October 25 in the Max Planck Institute. Overall there were 12 talks, including two introducing talks by Prof. Amélie Mummendey and Prof. Werner Güth.

In her talk Amélie Mummendey gave an overview of the DFG research group’s projects. These examine issues of discrimination and tolerance in intergroup relations from the different perspectives, including: cognitive psychology, differential psychology, developmental psychology, educational psychology, social psychology, and communication and media sciences.

Thorsten Meiser spoke about mental representations of social categories. Jörg Neumann’s talk was about the limits of tolerance, focusing on conditions and determinants of explicit rejection and exclusion of outgroups. In the area of educational psychology, Peter Noack reported about school-based effects on the political and social (in-)tolerance of juveniles. Johann Jacoby talked about social identity and social interaction. The main focus of this research project is on the role of group membership in the perception, interpretation, and action selection in social conflict. Georg Ruhrmann and Denise Sommer, who have a background in Media Sciences, talked about news selection and effects in coverage about immigrants. The last talk of the DFG research group was by Rainer Riemann about the source of interindividual differences in social attitudes, social identity, and discrimination.

Werner Güth introduced the work of the Strategic Interaction Group, giving some insights about the importance of modeling bounded rationality in economics. Torsten Weiland presented an experimental study on competitive research. Dennis Dittrich spoke about “Wages, Length of Relationship and Bargaining Power”, followed by Katinka Pantz on “Network Formation in the Presence of Negative Externalities.” The last talk of the Strategic Interaction Group was held by Anthony Ziegelmeyer. He gave answers to the question “What have we learned from social learning experiments?”

The workshop concluded with a discussion about possible future collaborations. The members of both groups discussed what either of both disciplines (economics and psychology) could contribute to the research of the other.

Workshop on “The Architecture of Social Interaction”

November 5 - 8, 2004

A workshop on “The Architecture of Social Interaction” was held during the weekend of November 5-8 at the Max Planck Institute, which brought together an international group of researchers who work in theoretical and behavioral economics.

The first talk of the workshop was held by Werner Güth and Hartmut Kliemt, who presented their views on the “Approximate Truth of Economic Models,” and opened the stage for an intense discussion among workshop participants. The first day also included a talk by Dennis Dittrich on “Learning to Bid and Loss Aversion,” which explored the effect of loss aversion on adaptive learning dynamics. Luis González presented some theoretical and experimental results about “Bribing in Procurement Contracts.” Bettina Rockenbach reported her
findings about “Evolvement of Institutions in Social Dilemmas”. Friday’s session concluded with the talk by Sven Fischer, who discussed experimental evidence about the effects of “(Un)Reliable concessions in Static and Dynamic Bargaining.”

The Saturday session began with a presentation by Marlies Ahlert on “Public and Private Choices in Organ Donation”, in which she compared the decision theoretic properties of alternative institutions of organ donation and allocation. Siegfried K. Berninghaus reported laboratory findings about coordination in “Network Formation in Continuous Time.” José Apesteguia discussed some theoretical implications and experimental evidence on the effect of information on “Imitation.” Radosveta Ivanova-Stenzel then explored in her talk “Behavior in Combined Mechanisms” the way in which a pre-negotiation affects bidding behavior in auctions. Simon Gächter discussed experimental results on the “Psychology of Strategic Choice”, and in particular regarding the interaction of beliefs and framing effects. The presentation by Jordi Brandts, “It’s What you Say, Not What You Pay,” examined ways in which communication can help overcome coordination failure in manager-employee relationships. In a related talk, Matthias Sutter discussed “Communication, Cooperation, and Collusion in Team-Based Competition.” The concluding talk of the day was given by Helmut Bester, with the title “Exter-}

nalities and the Allocation of Decision Rights in the Theory of the Firm,” in which he explored authority in principal-agent in-
teractions.

Torsten Weiland opened the last day of presentations with his talk “Competition in Innovation.” This was followed by Peter Ockenfels’s discussion of “Experiments on Dynamic Coordination Games”. Robin Pope then presented experimental findings regarding the “Effects of Eliminating Exchange Rate Uncertainty.” In his presentation “Relatives Vs. Neighbors: An Experiment Studying Spontaneous Social Exchange,” Georg von Wangenheim discussed results that examine how kinship and reputation help establish cooperation. Also, Ylva Søvik suggested a framework to study “Entrepreneurial Thinking” in the laboratory. After that, Tilman Börgers discussed the (non-)existence of incentive compatible mechanisms yielding “efficient compromising” allocations. The last talk of the workshop, “Saving Prof. Newcomb”, was given by Menachem Yaari, who proposed an approach to obtain correlated-strategies equilibria in the analysis of games.

Reinhard Selten

Simon Gächter

Steffen Huck’s laudatio for Professor Werner Güth on the occasion of the presentation of the book “Advances in Understanding Strategic Behaviour” (edited by Steffen Huck)

The burden of being someone’s student, well, actually, I’d much rather tell you about the pleasures. But, first of all, let me explain the other reason for why we have gathered here tonight. It’s actually a birthday we celebrate tonight. As many of you know (and those who don’t are better surprised now) Werner turned 60 this year.

Now, it’s in the nature of birthdays that you can rather easily anticipate them; and when I did a few years ago, I realized that this would be great opportunity to say “thank you” to my teacher. We met the first time almost exactly 15 years ago in Frankfurt when I was in my third year and took his Advanced Micro class. As students in Frankfurt at this time we were not quite used to passionate teaching. So this class came as a surprise. It was stimulating and indeed quite intoxicating from the very first lecture. Now here was somebody who obviously took interest in what he was doing. Somebody with the capability to inspire and to let economics look like fun.

And then came the second surprise. Now, if you weren’t a student at a big German university in the late eighties, you need to know that we were rather treated like cattle in these days. And that was fine, we all got used to it. We all knew our student ID numbers. Sometimes we were afraid that one day we would forget an important date which would screw up our entire careers but otherwise it was fine.
So I was not really prepared to what happened when I asked Professor Güth one dreary Winter day in Frankfurt 15 years ago about a particular technical problem I had to resolve if I wanted to teach a tutorial for his Introductory Micro class the following year. He said, “Oh, why don’t you come upstairs and we talk this through. I’m sure we can find a solution.” So we went upstairs, we talked it through and he did find a solution — and all that in just fifteen minutes. I can tell you: this was a great moment. There aren’t many better things in life than encountering completely unexpected kindness. And for me, it turned out, it was also a rather decisive moment. In retrospect, I think this was the moment when I became a “Güth student”. Teaching tutorials, taking part in seminars, writing my diploma thesis, becoming a doctoral student … this was just one continuous journey — always exciting and always pleasant.

Here is an anecdote from the Frankfurt years I have never forgotten. I think it was in the late Summer of 1993 when Werner organized an international workshop with money from the Humboldt foundation. I had to give my first talk in English and I remember the pure horror I felt the days before. Among the international guests was Elizabeth Hoffman and at the big workshop dinner, an occasion actually not too dissimilar from the one tonight, she started chatting with me and I told her that I was Werner’s student. A few minutes later she turned to Werner who sat a couple of seats further to her left and mentioned that she had just learned that he was my advisor. I still have very vivid memories of his reply. He said: “What do you mean advisor? I’m his father.”

Today, eleven years later, if I look at myself, my interests, my attitude, and, I would hope, my way of dealing with my own students, I feel that this pretty much summarized the truth. And just as you think as a child sometimes about what would have happened had your parents never met I have sometimes nightmares about what would have become of me had Werner not been in Frankfurt at that time. Honestly, I can’t tell you how horrible this thought is. And, indeed, how grateful I am that I was adopted this dreary Winter day in Frankfurt some 15 years ago.

So, as you can see, my being Werner’s student was always very pleasurable. We never had the fights he once predicted we would have and this despite my smoking. But, of course, the fights may still lie ahead.

By now you will probably wonder where are the burdens? After all, Werner promised you I would speak of burdens. Well, a few years ago I decided that it would be great to have an actual present for Werner’s 60th birthday. And here it is. It’s a book with 16 chapters on topics Werner has been working on through his entire career—including one chapter actually by himself.

And, yes, of course, I was sometimes frightened that doing this could become very burdensome. But here’s the truth. It didn’t. In fact, the whole operation was as smooth as it comes. And this despite quite a few people being involved in the operation. Here’s a list of the authors:


If you look at this list you might think that it spells disaster. Too many people, too famous people, too busy people. No chance of getting this done in time. But the magic was that everybody not only contributed great work but also respected all the deadlines. And it was quite clear why this magic could happen. It had nothing to do with me. It was the authors’ great respect for Werner and his work that made them so generous with their contributions and so obedient with all the deadlines.

And talking about finishing in time, this is probably the moment where I should stop, and raise my glass and say “Happy birthday!”.
### Ringberg Workshop

February 20 - 26, 2005

From February 20 to 26, 2005 the Strategic Interaction Group organized its second workshop in the Ringberg castle.

Topics were Network Economics, Behavioral Finance and Labour Markets.


### Experimental Day 2005

September 28, 2005

This year’s Experimental Day was organized in Jena on September 28 by the Strategic Interaction Group the MPI of Economics, in cooperation with the Faculty of Economics, Law and Social Sciences from the University of Erfurt. Lecturers were Matthias Sutter (“Multiple agents, relational contracts, and collective agreements”), Sven Fischer (“Inequality Aversion in Ultimatum Games with Asymmetric Conflict Payoffs”), Anthony Ziegelmeyer (“Cooperative Networks: Theory and Experimental Evidence”) from MPI Jena and Gabi Ruchala (“Trust, Reputation and Competition”) and Manfred Königstein (Performance Incentives and the Dynamics of Voluntary Cooperation) from Erfurt University.

### 3.4 Seminars and Lectures

#### University Seminars

**Summer Term 2004**

Luis Gonzáles: *Information Economics*

**Winter Term 2004/2005 and Summer Term 2005**

Andreas Nicklisch and Torsten Weiland: *Experimental Economics*

#### Guest Lectures

**January 2004**

**Ralf Wilke, Mannheim (Germany)**

*Verweildauern in Arbeitslosigkeit und Frühverrentung: nicht parametrische Evidenz anhand deutscher Regis**

**Frank Daumann, Jena (Germany)**

*Doping im Hochleistungssport – Ursachen und Interventionsinstrumente aus ökonomischer Sicht*

**Ralph Bayer, Adelaide (Australia)**

*Game consoles for free? An experimental investigation into dynamic pricing in markets with network-externalities*
Uri Gneezy, Chicago (USA)
The W effect of incentives

Johannes Siegrist, Düsseldorf (Germany)
‘Homo reciprocans’: Bedeutung des Konzepts für die Soziologie der Gesundheit

March 2004

Martin Beckenkamp, Bonn (Germany)
The use of aspiration levels in heuristics

Jeannette Brosig, Magdeburg (Germany)
Group decision making and communication

April 2004

Dinko Dimitrov, Tilburg (The Netherlands)
Simple Priorities and Core Stability in Hedonic Games

Martin Kocher, Innsbruck (Austria)
Conditional Cooperation in Public Goods Experiments and Its Behavioral Foundations

May 2004

Pavlo Blavatsky, Prague (Czech Republic)
The Heuristic of Relative Probability Comparisons

Stephan Kroll, Sacramento (USA)
The Impact of Endowment Origin and Heterogeneity on Contributions in Public Good Games

June 2004

Yoav Ganzach, Tel Aviv (Israel)
Judging Risk and Uncertainty of Financial Assets

July 2004

Michael Kosfeld, Zürich (Switzerland)
Distrust – The Hidden Cost of Control

Hermann Brandstätter, Linz (Austria)
The Personality roots of saving uncovered from German and Dutch Surveys

Joseph Clark, Queensland (Australia)
Choice and Competition under complexity: An Experimental study with an application to Pension-Fund choice

Sabine Strauß, Innsbruck (Austria)
Individuals and Groups in License Auctions

David V. Budescu, Champaign (USA)
Dominance Analysis

Joseph Clark, Queensland (Australia)
Red Queen vs. Red King: When does the slowest runner win the race?

August 2004

Frank Heinemann, Munich (Germany)
Measuring strategic uncertainty in coordination games

September 2004

Robert Goodin, Canberra (Australia)
The Veil of Vagueness: A Model of Institutional Design

Elias L. Khalil, Vienna (Austria)
Is Shame a Price?

October 2004

Elias L. Khalil, Vienna (Austria)
The Impossibility of an Embarrassed Homo Economicus
Andrés Perea, Maastricht (The Netherlands)
Minimal belief Revision leads to Backward Induction
November 2004

Nathalie Picard / André de Palma, Cergy-Pontoise (France)
Risk Aversion and Choice Behavior

Andrea Morone, Bari (Italy)
A Laboratory Experiment of Knowledge Diffusion Dynamics

Jakub Steiner, Prague (Czech Republic)
A Trace of Anger is enough: On the Enforcement of Social Norms

Simon Gächter, St. Gallen (Switzerland)
Conditional cooperation revisited

December 2004

Raphaël Giraud, Paris (France)
Framing under Risk: Endogenizing the Reference Point and Separating Cognition and Decision

January 2005

Burkhard Hehenkamp, Dortmund (Germany)
Who Should Receive Weaker Incentives? Peer Pressure in Teams

Ralph Bayer, Adelaide (Australia)
The Double Dividend of Relative Auditing – Cooperate Tax Evasion in Oligopoly Markets

June 2005

Max Albert, Saarbrücken (Germany)
Product Quality in Scientific Competition

Uwe Dulleck, Vienna (Austria)
Experts vs. Discounters: Competition And Market Unraveling When Consumers Do Not Know What They Need

July 2005

Paul W. Thurner, Mannheim (Germany)
Strategic Signalling During International Negotiations

August 2005

Stephan Kroll, Innsbruck (Austria)
Reciprocity Spillover in Laboratory Markets

October 2005

Felix Höfler, Bonn (Germany)
Experts vs. Discounters: Competition And Market Unraveling When Consumers Do Not Know What They Need

November 2005

Philipp Reiss, Magdeburg (Germany)
Another Explanation for Overbidding and Another Bias for Underbidding in First-Price Auctions

December 2005

Rosemarie Nagel, Barcelona (Spain)
Actions, Beliefs and Feelings: An Experimental Study on Psychological Game Theory
Visiting Scholars

2004

Bayer, Ralph (January 13 – 15, 2004)
Assistant Professor at the School of Economics, University of Adelaide, Australia.
Research Interests: Behavioral Economics, Experimental Economics, Public Finance and Game Theory.

Beckenkamp, Martin (March 17 – 18, 2004)
Assistant Professor, Max Planck Institute for Research on Collective Goods, Bonn, Germany.
Research Interests: Social Dilemmas, CPR-Problems and Decision Making.

Bernoinghaus, Siegfried (October 4 – 6, 2004)
Professor at the University of Karlsruhe, Germany.
Research Interests: Game Theory, Experimental Economics

Blavatskyy, Pavlo (May 24 – 26, 2004)
PhD student at CERGE-EI, Prague, Czech Republic.
Research Interests: Decision Theory, Game Theory and Experimental Economics.

Bleich, Sabrina (October 4 – 6, 2004)
PhD Student at the University of Karlsruhe, Germany.
Research Interests: Heterogeneous Labor Markets

Boun My, Kene (March 31 – April 12, 2004)
Engineer at BETA, Strasbourg, France.
Research Interests: Experimental Economics and Networks.

Bourgeois-Giraud, Sacha (December 6 – 7, 2004)
Researcher at the Institute NICOD, Paris, France.
Research Interests: Analytic Philosophy

Brandstätter, Hermann (July 5 – 12, 2004)
Professor emeritus at the Johannes Kepler University of Linz, Austria.
Research Interests: Economic Psychology, Experimental Economics.

Brosig, Jeannette (March 22 – 24, 2004)
Researcher at the Faculty of Economics and Management, University of Magdeburg, Germany.
Research Interests: Experimental Economics, Microeconomics and Game Theory.

Budescu, David V. (July 15 – 23, 2004)
Professor at the Department of Psychology at the University of Illinois, Champaign, USA.
Research Interests: Individual decision making, probability judgment and communication.

Burkhardt, Hans-Dieter (October 4, 2004)
Professor at the Humboldt University of Berlin, Germany.
Research Interests: Künstliche Intelligenz, Robotik

Clark, Joseph (July 5 – 31, 2004)
PhD candidate at the University of Queensland, Australia.
Research Interests: Choice under complexity, Behavioral Game Theory, Industrial Organisation

Daumann, Frank (January 14, 2004)
Professor at the Institute of Sports Science at the University of Jena, Germany.

Dimitrov, Dinko (March 31 – April 1, 2004)
Marie Curie Research Fellow at the CentER and Department of Econometrics, Tilburg University, The Netherlands.
Research Interests: Social Choice and Game Theory.
Dudey, Thomas (January 13 – 14, 2004)  
PhD student at the Centre for Adaptive Behavior and Cognition (ABC), Max Planck Institute for Human Development, Berlin, Germany.  
Research Interests: Experimental Economics and Decision Making.

Fellner, Gerlinde (September 24 – 30, 2004)  
Research Associate (PhD) at the University of Bonn, Germany.  

Gächter, Simon (November 29 – December 5, 2004)  
Professor at the University of St. Gallen, Switzerland.  
Research Interests: Behavioral and Experimental Economics.

Ganzach, Yoav (June 7 – 24, 2004)  
Professor at the Faculty of Management at the University of Tel Aviv, Israel.  
Research Interests: Behavioral Economics, Behavioral Decision Making.

Gatarek, Lukasz (December 13 – 14, 2004)  
Student at the University of Mainz, Germany.  
Research Interests: Time Series, Microeconometrics.

Geisbüsch, Simon (September 14 – 15, 2004)  
Student at the University of Bonn, Germany.  
Research Interests: Modelling expectations in a population considering heterogeneous knowledge.

Giraud, Raphaël (December 6 - 7, 2004)  
Researcher at the Université Paris I, EUREQuA/TEAM, Paris, France.  
Research Interests: Individual Decision Making.

Gneezy, Uri (January 26 – 28, 2004)  
Professor at the Department of Economics, University of Chicago, USA.  
Research Interests: Experimental Economics.

González-Farias, Graciela (January 26 – February 4, 2004)  
Professor at CIMAT, Mexico.  
Research Interests: Time Series and Econometrics.

Professor at the Australian National University, Canberra, Australia.  
Research Interests: Democratic Theory, Political Theory and Public Policy.

Grebe, Tim (March 16, 2004)  
PhD student and research assistant at the Institute of Economic Theory III, Humboldt-University Berlin, Germany.  
Research Interests: Microeconomics, Auctions and Game Theory.

Greiner, Ben (August 23 – 26, 2004)  
Research Associate / PhD student at the University of Cologne, Germany.  
Research Interests: Experimental Economics.

Heinemann, Frank (August 9 – 13, 2004)  
Assistant Professor at the University of Munich, Germany.  
Research Interests: Monetary Macroeconomics, Financial Crises, Experimental Economics.

Khalil, Elias (March 8 – 10, and September 20 – October 27, 2004)  
Research Fellow at the Konrad Lorenz Institute, Vienna, Austria.  
Research Interests: Behavioral Economics, Theory of Rational Belief Formation.

Kocher, Martin (April 18 – 21, 2004)  
PhD at the Department of Economics at the University of Innsbruck, Austria  
Research Interests: Experimental Economics and Public Finance.
Kohlmann, Andreas (December 15, 2004)
Student at the University of Mannheim, Germany.
Research Interests: Game Theory

Kosfeld, Michael (July 6 – 7, 2004)
PhD at the Institute for Empirical Research in Economics at the University of Zurich, Switzerland.
Research Interests: Behavioral Economics, Game Theory.

Krawczyk, Michal (December 13 – 14, 2004)
PhD Student at the Warsaw University, Poland.
Research Interests: Game Theory, Experimental Economics

Kroll, Stephan (May 26 – 27, 2004)
Assistant Professor at the Department of Economics at the California State University of Sacramento, USA.

Kunin, Michael (August 4 – 6, 2004)
PhD at CERGE-EI, Prague, Czech Republic.
Research Interests: Microeconomics and Game Theory, Industrial Organization, Economics of Transition.

Morone, Andrea (November 15 – 19, 2004)
PhD at the University of Bari, Italy.
Research Interests: Behavioral economics, Experimental economics, Networks formation

PhD Student at the Tilburg University, The Netherlands.
Research Interests: Microeconomics, Game Theory, Dynamic Games

Nenadić, Oleg (May 31 – June 2, 2004)
Research Assistant at the Institute for Statistics and Econometrics at the University of Göttingen, Germany.
Research Interests: Computational Statistics.

de Palma, André (November 1 - 2, 2004)
Professor at the University of Cergy-Pontoise, THEMA, France.
Research Interests: Transport Economics, Microeconomics of Uncertainty

Perea, Andrés (October 25 – 28, 2004)
Professor at the Maastricht University, The Netherlands.
Research Interests: Game Theory, Rational Choice, Belief Revision

Pevnitskaya, Svetlana (December 14 – 16, 2004)
Visiting Assistant Professor at the Department of Economics, University of Southern California, Los Angeles, USA.
Research Interests: Applied Microeconomic Theory, Experimental Economics

Picard, Nathalie (November 1 - 2, 2004)
Assistant Professor at the University of Cergy-Pontoise, THEMA, France.
Research Interests: Household Behaviour, Microeconomics of Uncertainty

Ploner, Matteo (October 18 – December 17, 2004)
PhD Student, School of Advanced Studies, Pisa, Italy.
Research Interests: Experimental Economics, Behavioral Game Theory

Ramser, Hans-Jürgen (October 5 – 6, 2004)
Professor at the University of Konstanz, Germany.
Research Interests: Industriebekonomik, Konjunktur- und Wachstumstheorie

Rey Biel, Pedro (November 24 – 26, 2004)
PhD Student at the University College London, United Kingdom.
Research Interests: Behavioral Contract Theory, Experimental Economics, Industrial Organization

Sausgruber, Rupert (March 8 – 10, 2004)
Research assistant and lecturer at the Department of Public Economics, University of Innsbruck, Austria.
Research Interests: Behavioral Public Finance.

Siegrist, Johannes (January 27 – 28, 2004)
Professor and Director of the Institute of Medical Sociology at the University of Düsseldorf, Germany.
Research Interests: Links Economic, Sociological Theory, Social Reciprocity and Implications for Health.

Steiner, Jakub (November 29 – December 3, 2004)
PhD Student at the University of Prague (CERGE-EI).
Research Interests: Public Goods, Law and Economics, Economic of Discrimination, Global Games

Strassmaier, Christina (February 16 – 19, 2004)
PhD student at the Institute of Finance, University of Innsbruck, Austria.
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4 Evolutionary Economics Group
(Director: Ulrich Witt)

4.1 Research Outline (Overview)

Research conducted in the Evolutionary Economics Group continues to focus on the processes of change at the institutional, technological, and spatial level of the economy. These interactive processes are put in perspective with the historical record of the longer-term transformations of the economy to identify regular patterns of change and to systematically explore them on the basis of more generally valid hypotheses. In view of, on the one side, the complexity of the transformations at all levels of the economy and, on the other side, the limited resources of the research group, only a selected number of transformation phenomena and problems can be investigated. The choice of the „portfolio” of problems to be explored in an exemplary, comparative fashion is, of course, a key strategic decision that in our case is guided by a few basic conjectures and theoretical expectations.

One of the very basic (ontological) claims is the hypothesis of an evolutionary continuity in reality (Witt 2003). This is to say that the process of economic change is conceived of as yet another set of phenomena governed by self-organization and evolution. The implications of such a monistic interpretation of reality for our approach are multi-faceted. They range from taking a naturalistic perspective on the economy and economic behavior to a more complex view of the dynamics of change as an interaction of self-regulating and self-augmenting processes. One of the consequences of this re-interpretation is that some of the abstraction strategies developed for analyzing equilibrium states of the economy need to be rethought, adapted, or even replaced. In order to be able to achieve this, a thorough understanding of the empirics of the historical changes in institutions, in production, in consumption, and in the spatial agglomeration patterns of the economy is necessary.

The portfolio of problems that have been investigated by the group in the period 2004-2005 in line with this approach cover five distinct research areas. They are characterized in more detail in section 4.2 by the researchers’ projects partly pursued under the guidance of the two principal investigators Ulrich Witt and Thomas Brenner. It is also visible in the workshops we have organized and, of course, our publications.

The first research area, to which several members of the group have made contributions, are the conceptual and methodological options and problems of the evolutionary approach (section 4.2.1).

The second research area is the explanation of long-term economic change from a naturalistic perspective (principal investigator: Ulrich Witt). Andreas Chai (dissertation) and Alexander Frenzel (dissertation) investigate changes in consumption, Ulrich Witt discusses the utilitarian foundations. Christian Cordes and Franz Schaper (dissertation) explore the role of knowledge and labor for the long-term development of the production technology. Uta-Maria Niederle, Georg von Wangenheim and Ulrich Witt look into how long-term change at the level of economic institutions can be explained (section 4.2.2).

The third research area are the normative implications of economic evolution (principal investigator: Ulrich Witt). Christian Schubert and Martin Binder (dissertation) approach this problem by again taking recourse to a naturalistic perspective. The wider intention here is to explore the possibilities of an evolutionary version of „welfare economics“ (section 4.2.3).

The fourth research area (principal investigator: Ulrich Witt) is the development of firms and industries within a somewhat shorter historical time scale. Silke Scheer (dissertation) and Ulrich Witt focus on the role of entrepreneurship within firm organizations coordinated at the cognitive level on coherent conceptions of their business so that they are enabled to grow. Hagen Worch (dissertation) reviews the empirical evidence for the role entrepreneurial coordination behavior plays for the development of firms. Christian Cordes (in a joint project with Peter Richerson from the UC-Davis) looks into the creation and transmission of an entrepreneurial business culture from a behavioral point of view. Guido Buenstorf, Christina Guenther, and Ulrich Witt try to connect the theoretical look on the entrepreneurial firm with an industry perspective. More specifically, Guido Buenstorf inquires into the firm founding activities at the beginning of an industry life cycle, their knowledge base, and their conse-
sequences for the further development of the population of firms in an industry. Christina Guenther (dissertation) explores how research on the entrepreneurial activity at the firm level can be integrated with the analysis of the industry life cycle, e.g. in explaining spin-off activities and differential firm growth at different phases of the industry life cycle. Ulrich Witt and Christian Zellner analyze the commercialization of knowledge and its organizational implications as a framework for knowledge-based entrepreneurship. Christian Zellner inquires into the role the migration of scientists plays for the knowledge transfer in national systems of innovation (section 4.2.4).

The fifth research area (principal investigator: Thomas Brenner) is the spatial dimension of economic evolution. Thomas Brenner investigates the various interdependencies between local innovativeness and the industrial agglomeration dynamics both theoretically and empirically. Tom Broekel (dissertation) analyses the factors that foster innovativeness at the local level and those that seem to have impeding effects. Dirk Fornahl addresses the problem of firm founding activities from a regional point of view. He focuses, in particular, on the influence of local entrepreneurial performance and entrepreneurial role models on the regional distribution of firm founding rates and the policy options/restrictions implied by such influences (section 4.2.5).

4.2 Research Activities

4.2.1. Economic Evolution: Conceptual and Methodological Works

In this research area several members of the evolutionary economics group have made a contribution relating to, or informed by, the problems and conditions they face in their respective specific research fields.

The Role of Darwinian Concepts for an Evolutionary Approach to Economics

Ulrich Witt (completed project)

The aim of this project (Witt 2004, Witt and Cordes 2005) was to clarify at a conceptual level the relationships between the Darwinian theory of evolution on the one hand and an evolutionary approach to economics on the other hand. By defining the relationships an answer is implicitly also given to a deeper, trans-disciplinary question: in the sciences a Darwinian world view is now firmly established. What role does that world view play for economics or – to put it the other way round – what is the place of economics in such a world view? Several approaches can be taken.

A first one – which has widely been adopted in evolutionary economics – tries to make use of Darwinian concepts by more or less loose analogies mostly on the basis of the notion of natural selection (Nelson and Winter 1982, Vromen 2001). A reduction of economic evolution to a Darwinian world view is not attempted. (It is sometimes even explicitly rejected). A second approach is that of “Universal Darwinism” (Dawkins 1983, Hodgson 2002). It is based on an abstract reduction of the Darwinian theory in evolutionary biology to three principles: variation, selection, and retention or replication. Even though the principles represent a domain-specific abstraction, all forms of evolution – in whatever context they occur – are claimed to follow these principles. This amounts to suggesting an analogy between an abstract model of evolutionary biology and abstract models of evolution elsewhere, e.g. in the domain of economics.

The two approaches relying on analogies have their strengths and weaknesses. Their core assumption – that selection is a shaping force – raises the question of whether there is sufficient inertia in the selection basis so that selection processes have time to unfold systematic effects. For modern economies the answer is not evident – not least because humans, by their cognitive capacity, are able to anticipate selection effects and have strong incentives to avoid them. The abstract variation-selection-retention-based analogies more-
over face the related problem that crisis-induced human inventiveness undermines both the idea of "blind" variation and the strict distinction of variation and selection characteristic of the Darwinian theory. Furthermore, in the economic domain there often is no replicating unit in an evolving process, e.g. in an individual's learning from experience. The analogy to the abstract principles of the biological model does not work then.

A third approach tries to apply the neo-Darwinian theory of natural selection directly to human economic behavior (cf., e.g., Rubin 1982, Robson 2001, Galor and Moav 2002). This interpretation implies an ontological monism: human economic behavior is explained as a product of natural selection in the same way as in evolutionary biology in general and sociobiology in particular. Strictly speaking such an explanation applies only to genetically determined forms of behavior. Moreover, it presumes that selection pressure on humans is still tight enough to wipe out all deviations from the behavior with the highest fitness (in terms of reproductive success). However, in modern times, the most significant part of adaptations in economic behavior occur within one generation, i.e. at a pace much more rapid than that of inter-generational, genetic adaptation. The intra-generational adaptations result from learning and insight which can be associated with cultural, rather than natural, evolution.

To avoid the mentioned problems a fourth approach is suggested (Witt 2003, Chap. 1). Its presumption is that the "hardwired" genetic endowment of humans (which is a result of natural selection) only sets the stage for yet other forms of behavior adaption. They reflect the influence of human insight and knowledge accumulation and are the basis for man-made forms of evolution, e.g. economic evolution. They emerge within the freedom left by the constraints of natural evolution – and, hence, without invalidating the Darwinian world view. Following the fourth approach, the challenge for evolutionary economics is to develop theories that are capable of spanning an enormous historical range: from the "take off" phase (where genetically determined economic behavior dominated) to the multiple, multi-level process of change in modern economies dominated by acquired capabilities and aims.

References


Modeling Learning and the Cooperation in Prisoner’s Dilemma Game

Thomas Brenner (ongoing project)

Two questions are central to this project. The first is how to develop a learning model that describes cognitive learning adequately (for first developments, see Brenner 1999). In recent years, cognitive learning processes have aroused increasing interest within economics. However, there is still an insufficient understanding of how these processes (usually called belief learning in economics) can be adequately modelled. Second, the question of why people cooperate in the Prisoner’s Dilemma has attracted much research in economics for almost two decades. Currently, fairness seems to be the most promising explanation. However, studies of the cognitive processes show that people rarely make fairness considerations while playing the Prisoner’s Dilemma Game. Therefore, alternative explanations are studied here.

Generally, cognitive processes are difficult to study in an experimental setting. We observe the decisions of people, but usually not their thoughts. In addition, it is difficult to motivate people to state the reasons for their decisions properly. Therefore, we run experiments in groups, in which groups of three people have to make their decisions together (see Brenner and Hennig-Schmidt 2004). We record their discussions. We believe that since they want to convince their partners, they put forward the arguments on which their own decision is based. As a consequence, we are able to study the changes of arguments and beliefs and thus the processes of cognitive learning.

A model of belief learning is developed on the basis of these experimental results and the psychological literature. This model is tested with data from a different experimental study in which the participants had to make their decision individually. The model's fit to the experimental data is compared to the fit of other learning models common in the economic literature. It is shown that the developed model of stochastic belief learning does quite well compared to other models. The model is then used to study the behavior in the Prisoner’s Dilemma. It is able to explain the fact that some pairs of players manage to establish cooperation while others do not, although they are in exactly the same situation. Fairness considerations play no role in this explanation. Whether cooperation is established, depends very much on the initial beliefs of the two interacting individuals and on the confirmation or contradiction of these beliefs by the behavior of the other individual.

References


Developing an Operational Approach to Knowledge and its Economic Characteristics

Thomas Brenner, Tom Broekel, Ulrich Witt (ongoing project)

In this project, notions of knowledge in the literature are related to a newly developed operational interpretation of knowledge (Witt, Broekel and Brenner 2005) – an interpretation that can also fruitfully applied to exploring how knowledge growth and knowledge technology interact (Witt and Zellner 2005). It is generally agreed that knowledge plays a crucial role both in the short run as a constraint of economic activities and in the long run as a driver of technological change (Mokyr 1992). However, knowledge is a multi-faceted phenomenon that has given rise to a wide variety of conceptualizations (cf. Machlup 1980). A widely adopted concept going back to Polanyi (1958, cf. also Cowan, David and Foray 2000) refers
to the form of knowledge and contrasts tacit with codified knowledge. A related, but content oriented distinction discussed in Witt and Zellner (2005) is that between procedural and propositional knowledge. The different classifications reflect different characteristics of knowledge. The significance of the characteristics depends on the context.

A case in point is the long-standing debate on the public good character of knowledge. Some authors claim that, once knowledge exists, it has properties of a public good (Nelson 1959; Arrow 1962) or at least of a local public good. Others consider knowledge a private good (e.g., Callon and Bowker 1994). If we take non-rivalry in use and lack of exclusion from use as the criteria for a pure public good, then it turns out on closer inspection that these opposing assessments are based on very different assumptions about how knowledge is stored and made accessible, and how it can be communicated. This suggests an operational approach to knowledge that accounts for the underlying knowledge technology. Knowledge accumulated over time is stored in the individual agents’ memory and diverse technical media, or it is embodied in artefacts. However, stored knowledge as such does not produce any effect. To make use of it, it must be “expressed”, i.e. transformed into thought and action. To carry out that transformation a sufficient “absorptive capacity” (Cohen and Levinthal 1989) is, of course, needed.

A significant feature of knowledge is that the transformation from stored knowledge into thought and action does not erase or destroy the stored content – it can be re-used over and again. This feature explains why there is little or no physical rivalry in (re-) using knowledge, once it is stored outside the human brain (which presupposed that it is codified). But this fact alone is not sufficient to satisfy the public good criterion. There frequently are cases in which the value of knowledge declines with its repeated expression by different users, e.g. if the repeated expression leads to the imitation of a technical innovation. Wherever this is true, the fact that knowledge stored in technical media can be accessed with low or no physical rivalry would even boost rivalry in use.

From the perspective of the operational interpretation a similarly mixed result also obtains with respect to the exclusion criterion. However, the critical features of the knowledge technology now relate to the communication aspect. In the communication of knowledge, failure or inability to exclude recipients results in a loss of the private appropriability of the gains form that knowledge. This can happen if knowledge can be inferred by others from observing someone’s actions or by using an artefact produced by somebody else. (In many cases, selling artefacts or service actions in which knowledge is embodied is the only way in which knowledge can be commercially exploited.) If there are no technical devices precluding unauthorized observations of actions or use of artefacts, only enforced legal protection of, e.g., intellectual property rights (or an insufficient absorptive capacity of unauthorized observers/users) can prevent privately expressed knowledge from becoming a public good.

It can be shown that the extent to which exclusion can be practiced depends on the type of knowledge (Witt, Broekel and Brenner 2005). Because of its very nature, tacit knowledge cannot be a pure public good. It differs in this respect from non-codified, but codifiable, knowledge and the latter from codified knowledge. However, unlike sometimes presumed in the literature (e.g. Saviotti 1998), it is not the encoding of knowledge that is critical in their cases. Codification is but the prerequisite for storing knowledge outside human memory. What is decisive for the private vs. public good properties of that knowledge is how the external storage can be made use of, and whether the derived knowledge flows can be protected from unintended communication (if it is not even intended as in the case of published scientific knowledge which is of course a public good).

References


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**Inquiries into the Nature of Novelty and its Role for Evolution**

Ulrich Witt *(ongoing project)*

The essence of discoveries, inventions, innovations is novelty – knowledge not previously known. The expansion of human knowledge and the extension of the set of feasible economic activities that it implies is the basis of economic development and progress (cf. Weitzman 1998). Nonetheless, novelty and its emergence are neglected research topics. If at all, research usually focuses on the diffusion of novelty (a phase logically succeeding the – unexplained – emergence in which the meaning of disseminating “novelty” is already known to the scientific observer). It can be claimed, however, that the emergence of novelty is a constitutive feature of evolution and that, for this reason, the epistemological and methodological complications which novelty implies are at the core of evolutionary theorizing (Witt 1987, Chap. 1; 1993, 2003; for a discussion of my position cf. Hodgson 1995).

Following up this position, an attempt is made in this project to go as far as possible in theorizing about the emergence of novelty and to explain in this way the epistemological status of novelty. Man-made novelty occurs in many forms and guises, but the source from which it ultimately springs is always human cognitive activity. Many insights relating to how novelty emerges may therefore be expected from the vast literature on human creativity (cf., e.g., Sternberg 1999) and the formation of cognitive concepts (cf. Hofstadter e.a. 1995, Fauconnier and Turner 2002). There is also a long tradition of historical research into how inventive thought has revolutionized science and technology and still does so (Usher 1954, Vincenti 1990, Mokyr 2002). However, all these different strands of thought have not directly focused on, and did not result in, a systematic account of novelty and its abstract properties.

The explanation of how novelty emerges hinges critically on what happens in our mind when we think, experience, or do something new. Despite considerable progress in the past, these mental processes are still not well understood: the act by which new meaning, or semantic content, is created or the neural processes underlying that act (cf. Knight 1996), not to speak of the prediction of its outcome. All that seems currently feasible is to identify at a semantic level some structural features of the way in which our mind produces novelty. (At the semantic level we can take advantage of our capacity to spontaneously grasp newly emerging meaning and to identify its properties.) Using a semantic representation of novelty, i.e. new cognitive concepts, a procedural approach to the creation of novelty is pursued in this project (Witt 2005a, 2005b). Two operations are identified on this basis, a generative and an interpretative one. They are shown to be logically distinct and have profoundly different epistemological implications. At its present stage, the project aims at revealing these implications and at deriving a theory of degrees of novelty that can be fruitfully contrasted with the theory of degrees of likelihood.
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The Usefulness of Biological Concepts in Economics

Christian Cordes (completed project)

Conceptual and methodological problems relating to a theory of economic evolution also have been prominent in this year’s work. The paper “Selection, Learning, and Schumpeterian Dynamics – A Conceptual Debate”, written together with Ulrich Witt, explores further the role of biological concepts in economics. To do this, this paper takes a closer look at some conceptual questions that are related to a debate that has been prominent in the history of economic thought: Schumpeter opposed analogies and metaphors in economics that draw on Darwinian thought. Instead, he emphasized human agency and the emergence and diffusion of innovations as principles. The neo-Schumpeterians, in contrast, embrace Darwinian notions, particularly the selection metaphor. Universal Darwinism even claims the same principles for natural and economic evolution. This paper argues to the contrary that causation and principles differ. Economic evolution is driven by innovations and their diffusion, with human creativity and social-cognitive learning playing the key role. The cognitive underpinnings of Schumpeterian dynamics are briefly outlined and connected to entrepreneurship, industry dynamics, and the role of novelty (see Witt and Cordes, 2006).

Another paper connecting methodological and conceptual issues with the history of economic thought is titled “The Role of Biology in Economics: Veblen and the Selection Metaphor”. This paper discusses several explanatory approaches to economic phenomena – the concept of routines, Universal Darwinism, and the continuity hypothesis – that rely on concepts borrowed from biology. In order to emphasize the differences between these avenues,
special attention is given to their dealing with the units and processes of selection in biological and economic evolution. Moreover, the relation of these approaches to Veblen’s own notions and demands as regards the conversion of economics into an evolutionary science is highlighted.

The shorter paper “What Orientation for Interpreting Veblen? A Rejoinder to Baldwin Ranson” also belongs to this field of research. In this article, I have claimed that the research strategy of Universal Darwinism based on an abstract reduction of the Darwinian principles would neither do justice to Veblen’s intentions nor is it likely to inspire progress in economic theory. Instead, I have suggested to adopt a perspective relying on concepts that are based on the continuity hypothesis. This perspective can much better be aligned with Veblen’s evolutionary thought: natural evolution has shaped the ground and still defines the constraints for man-made, or cultural, evolution (see Cordes, 2005).

References

An Evolutionary Outlook Towards the Problems of Economic Development and Development Policies

Saradindu Bhaduri (ongoing project)

For quite some time, the process of economic development was made synonymous with the privatisation and economic liberalisation and the direct transfer of institutions from well functioning market economies to developing market economies, a characteristic shared by all developing countries, has become a rule of the game. Very often, the thrust of such a policy framework has been to promote economic efficiency through incentives and external shocks. Only recently, however, the attention is being paid to understand why uniform policies have delivered diverse responses in various countries. The paradigm of evolutionary economics allows us to examine such circumstances by providing better insights into the agents’ behaviour with respect to the process of creation and diffusion of novelty (behaviour as well as artefacts) into a system, particularly given that such a process involves dealing with uncertainties that are not, often, predictable a-priori. Various factors, largely indigenous to a system, play more important roles under uncertainty than simple incentives and external shocks. To this end, the following topics are investigated:

- In “Vicarious learning and socio-economic transformation of Indian trans-Himalaya” the main purpose is to examine how social-cognitive learning can influence the speed and the nature of socio-economic transformation. As Hirschman (1958) stressed that the problem of development is essentially a problem of “where all difficulties of human action begin and belong: the mind”, an analysis of human mind and a conceptualisation of how it changes, therefore, becomes crucial for a proper understanding of the process of economic development and framing of policies. Viewing economic development as socio-economic transformation, à la Stiglitz (1998), subscribes to this view and requires a comprehensive understanding of learning and behavioural change by economic agents. Incorporation of appropriate learning mechanism has, however, only been inadequately done in the theories of economic development. This paper argues that social-cognitive vicarious learning can be a useful methodological tool in this regard by elaborating on the socio-economic transformation of the trans-Himalayan traditional societies. The paper emphasises that a deeper understanding of social-cognitive factors and associative learning can shed important light on the speed of socio-economic transformation and thereby helps developing effective policy framework. The paper also highlights the importance of identifying appropriate “role-mod-
els" (as in Bandura 1986) to foster economic transformation and development in a desired direction.

- The industrial entrepreneurship has been identified as one important source of generation and diffusion of novelties in economies since the days of Joseph Schumpeter and Frank Knight. However, attempts to carefully understand the cognitive dimension of entrepreneurship is a recent phenomenon (Witt 1998, 2000). Together with Hagen Worch the project on "Education, Experience, and the Cognitive Capacity of Entrepreneurs: Some Econometric Evidence from the Indian Pharmaceutical Industry" seeks to examine how cognitive frames of entrepreneurs are shaped by their past experiences and education. We argue that in the presence of bounded rationality the attitude towards the three most highlighted dimensions of entrepreneurship, namely, responsiveness to emerging uncertainty, discovering and exploiting new opportunities, and decision-making on how to coordinate and direct a firm, are influenced by the nature of their educational background and past experience. The existing literature on the relationship between education, past experience and entrepreneurship largely takes a resource based view, where it is emphasised that explorations of new entrepreneurial opportunities depend on the resources (human capital) accumulated through education and past experiences. Witt (2000) however, predicts that such factors would prove to be important for shaping their cognitive capacities as well by influencing the development of cognitive frames of individuals. Using data of manager-owned small scale enterprises in the Indian pharmaceutical industry, we find concrete econometric evidence that the background and experience not only influence the discovering and exploiting of new opportunities but also how an entrepreneur deals with the issues of uncertainty and coordination of existing firms. We argue that the primary reason for such impact lies in the way education and past experiences shape the cognitive capacity of an entrepreneur.

- In a joint project with Georg von Wangenheim we intend to examine how the interdependence between technology and related institutions influences their pattern of evolution. In other words, the core of our positive model is the interdependent evolution of institutions and technology. With respect to institutions, we start by a simplifying restriction to formal institutions, i.e. legal rules promulgated by legislators and courts and enforced by courts and the executive branch of government (police, administrative agencies). Within these institutions it will be helpful to separate institutions which may give positive incentives to innovate – the intellectual property rights (IPR) regime – and other rules which constrain innovations by imposing costs on their realization or outright prohibiting them – mainly private and regulatory law. For simplicity of expression, we refer to the former as IPR-law and to the latter as regulatory law. When we talk about technological evolution, we refer to both process and product innovation. The project also aims at understanding how (or whether) the abovementioned (co-) evolution in a common law framework differs from the same in a civil law framework.

References


Papers on Economics and Evolution

# 0518: K. Chandrasekhar and S. Bhaduri

*Vicarious Learning and Socio-Economic Transformation in Indian Trans-Himalaya: An evolutionary tale of economic development and policy making*

Recently, it has been suggested that the process of economic development should ideally be viewed as a socioeconomic transformation. Such a view requires a comprehensive understanding of how agents learn and change their behaviour. However, these aspects have only been inadequately addressed in development theory. This paper argues that social-cognitive vicarious learning theories can become a useful methodological tool by incorporating a triadic interaction between personal factors (beliefs, values), behaviour and environment. Our analysis is based on a survey of the Indian trans-Himalayan regions. The development trajectory of these regions suggests that a proper understanding of the vicarious learning mechanism provides crucial insight into the speed of socioeconomic transformations. It also helps to identify appropriate change agents within a society and, in turn, underscores the need for a comprehensive, yet flexible, development policy framework.

# 0410: C. Werker and T. Brenner

*Empirical Calibration of Simulation Models*

This paper discusses how the results of simulation models can be made more reliable and the method of simulating therefore more widely applicable. We suggested to calibrate simulation models empirically and developed a methodology based on Critical Realism in order to so. We suggested combining the procedures of two strands of literature: the empirical underpinning of the assumptions (like in microsimulations) and the empirical check of the implications (like in Bayesian inference). Both these strands of literature are mainly concerned with predicting future developments. We, instead, aim to infer statements about causal relations and characteristics of a set of systems or dynamics, such as, e.g., the development of an industry, that have a general validity for this set of systems or dynamics. In other words, instead of deriving probabilistic predictions of the future and statements of the current situation and dynamics of one single system we developed a methodology to gain general statements about the features of systems and dynamics.

# 0416: T. Brenner

*Agent Learning Representation - Advice in Modelling Economic Learning*

This paper presents an overview on the existing learning models in the economic literature. Furthermore, it discusses which of these models should be used under what circumstances and how adequate learning models can be chosen in simulation approaches. It gives advice for getting along with the many models existing and picking the right one for the own application.


# 0401: C. Cordes

*Veblen’s “Instinct of Workmanship,” its Cognitive Foundations, and Some Implications for Economic Theory*

This paper delivers some findings from the present-day cognitive sciences on man’s cognitive dispositions that support aspects of Veblen’s “nstitute of workmanship,” which is an essential starting point of his evolutionary theory of institutional change. These cognitive dispositions partly govern which information will be subject to profound contemplation and be
easy to disseminate within a population. Furthermore, they may give rise to a bias in human creativity. As a result, some cognitive foundations of the “instinct of workmanship” may induce a general direction in long-term economic development by influencing the continuous accretion of knowledge during cultural evolution.


# 0415: C. Cordes

*Darwinism in Economics: From Analogy to Continuity*

Currently there is an ongoing discussion about how Darwinian concepts should be harnessed to further develop economic theory. Two approaches to this question, Universal Darwinism and the continuity hypothesis, are presented in this paper. It is shown whether abstract principles can be derived from Darwin’s explanatory model of biological evolution that can be applied to cultural evolution. Furthermore, the relation of the ontological basis of biological and cultural evolution is clarified. Some examples illustrate the respective potential of the two approaches to serve as a starting-point for theory development.

*Forthcoming in: Journal of Evolutionary Economics*

# 0405: U. Witt

*On Novelty and Heterogeneity*

Novelty and heterogeneity are two closely related issues. Heterogeneity is not only a result of the emergence of novelty which creates variety in any evolving system. Heterogeneous elements are also required as inputs for the recombination processes underlying the generation of novelty. However, while heterogeneity figures prominently in computational and agent-based economics and in complex adaptive systems analysis, novelty and its emergence are neglected topics. In order to make progress with the latter the paper starts with a discussion of how novelty is being generated both in the case of genetic novelty and that of mental novelty. For the case of mental novelty it is then shown that the bottleneck in our understanding of novelty is not the generation procedure proper, but rather the procedure by which our mind evaluates or interprets the outcome. On the basis of this distinction it is briefly sketched how, for different forms of novelty, the degree of novelty may be rank-ordered and how the limits to predictability in the context of novelty vary with that degree.


# 0524: Ulrich Witt

*Reasoning About Novelty*

Novelty is ubiquitous in science, technology, and economic life. It drives the growth of human knowledge. However, an analysis of novelty and its emergence faces deep epistemological and methodological problems. Despite its great significance, novelty is therefore a neglected topic in scientific discourse. To make headway, this paper distinguishes principles of generating and interpreting novelty. Insoluble problems are shown to reside in the interpretation part. At an abstract level, they can be circumvented and the nature and some effects of novelty be discussed. A notion of degrees of novelty can thus be derived and compared to degrees of (un-)certainty.
The proper role of biological concepts in theory development has been a contentious issue in evolutionary economics from its historical beginnings. To further this debate and embed it in a multidisciplinary context, the workshop “Evolutionary Concepts in Economics and Biology” brought together some of the most eminent proponents of evolutionary approaches from various academic fields, ranging from biology and the history of science to anthropology, economic history and evolutionary economics. In all their diversity, the participants share a profound interest in evolutionary processes, how they differ between domains, and where to locate the common ground in evolutionary approaches in the respective academic fields.

A first set of contributions discussed the explanatory structure of Darwinist evolutionary biology and the extent to which it can provide a template for evolutionary theories outside the biological realm.

Historians of biology Georg Levit, Uwe Hossfeld, and Olaf Breidbach (Ernst Haeckel Haus, Jena) explored the reception of Darwin’s theory of evolution and the emergence of alternative explanatory concepts in evolutionary biology during the early 20th century. They presented a range of historical alternative theories of evolution that were developed due to doubts about the adaptive character of evolution, the gradualness of evolutionary changes, the role of environmental influences on evolution, and the random character of variability. They also showed that Darwin’s own theoretical position strongly differed from that position that was later accepted as “Darwinism”. Werner Callebaut (Konrad Lorenz Institute, Vienna) focused on a more recent theoretical development in biology. He presented some fundamental concepts from evolutionary developmental biology or “Evo-Devo”, such as epigenetic mechanisms, developmental constraints, and evolvability, that can contribute to a better understanding of evolutionary developments. In this context, an important role is played by modular units that constrain evolutionary transformation. Callebaut suggested that, in the economic as well as the natural realm, adaptation and evolution can only work effectively if variations are not too disruptive.

Geoffrey Hodgson and Thorbjørn Knudsen (University of Hertfordshire and University of South Denmark), in their programmatic paper “Why We Need a Generalized Darwinism: And Why a Generalized Darwinism is Not Enough”, endorsed the recent approach of Universal Darwinism. The proponents of this position argue that to explain the evolution of complex systems, there is no alternative to the – sufficiently generalized – Darwinist principles of variation, selection, and inheritance. Specifically, Hodgson and Knudsen suggested that self-organization is an insufficient alternative to Universal Darwinism, and that neither human intentionality nor the heritability of acquired traits rule out the application of a Darwinist approach. Richard Nelson (Columbia University, New York) presented a more skeptical view on the Universal Darwinist program. Although he endorsed the basic approach, he argued that the details of cultural evolution differ sharply from the details of biological evolution and that Universal Darwinists have tended to stay too close to biology. Moreover, what has been discussed by Universal Darwinists under the aggregate label “culture” consists of a variety of highly diverse areas. Nelson consequently called for careful empirical investigations to develop broad and flexible concepts of evolutionary change.

How can evolutionary concepts from biology be turned into useful tools for economic analysis? Stan Metcalfe’s (University of Manchester) paper “Accounting for Evolution: An Assessment of the Population Method” suggested a number of accounting concepts from biology that can help in describing and understanding evolutionary processes in the eco-
nomic realm. These accounting concepts are based on population thinking, i.e. they take as their unit of analysis a set of entities that, albeit differing in their specific characteristics, are subject to the same evolutionary forces. Specifically, Metcalfe investigated how suitable logistic processes, competition dynamics, and the Price theorem were to account for variation and selection processes in the economy. In their second contribution to the workshop, and based on their earlier endorsement of Universal Darwinism, Geoffrey Hodgson and Thorbjørn Knudsen applied generalized principles from evolutionary biology to the social domain. Their paper on “The Nature and Units of Social Selection” identified habits as the fundamental building blocks of routines and other higher-order cultural replicators. Moreover, routines determine the expected number of successors of a social organization (the interactor) within a given environment. Changes in habits and routines are interpreted as instances of Darwinian selection. Jack Vromen (Erasmus University of Rotterdam), in his paper titled “Routines, Genes and Program-based Behavior”, presented a conceptual critique of the “routines as genes” analogy. He reported recent findings from biology suggesting that the impact of genes on behavior is more complex than the basic Darwinist framework implies, and that genes are insufficient to predict behavior because behavior is mediated by different mental modules as information-processing devices. Similarly, identifying firm routines is insufficient for predicting firm behavior, as the smooth execution of routines depends on the behavior of individual firm members.

According to economic historian Joel Mokyr (Northwestern University, Evanston), evolutionary frameworks are a natural way to approach the history of complex phenomena. In his paper on “Useful Knowledge as an Evolving System”, he proposed an analogy between production techniques as phenotypes and the underlying propositional knowledge as genotypes. Actual techniques widely differ in the breadth of their “epistemic base”. Based on this conceptual framework, Mokyr suggested that the drastic technological changes that have occurred in the Western World after 1750 can be explained as a phase transition in useful knowledge enabled by a positive feedback process between technology and theoretical knowledge. Guido Bünstorf’s (Max Planck Institute, Jena) contribution aimed at evaluating the usefulness of such generalized biological concepts for empirical research into industry evolution. Based on recent findings of diversifying firms and spinoffs, he argued that there is strong evidence that useful economic knowledge can be transferred between markets and firms. At the same time, Bünstorf criticized existing approaches that analyze this knowledge transfer in a Darwinist framework for being too simplistic. As an alternative, the development of “descent” theories was proposed that focus on explaining how the interplay of background, experience and learning shapes the competitive performance of firms.

The second major focus of the workshop was on human nature as shaped by phylogenetic adaptation, and on the implications of human evolutionary endowment on cultural and economic evolution. Anthropologist Peter Richerson (University of California at Davis) held that the project of understanding evolution has much the same form in biology as in human affairs, even though the human cultural repertoire poses intriguing problems for evolutionary analysis. In the paper “The Balance of Evolutionary Forces Affecting Contemporary Cultures” (co-authored by Robert Boyd), the application of microevolutionary models based on concepts formalized in evolutionary biology is considered a promising approach in the evolutionary study of culture. In addition, Richerson reported on recent social learning experiments that complement the theoretical approach. Economic historian Alexander Field (Santa Clara University) took up the issue of group selection. He suggested that an account of biological group selection (which is controversial among biologists) is useful to enrich a behavioral model of economic agents. According to Field, mechanisms of group selection have selected for primary and secondary sociality algorithms that explain humans’ unselfish or group beneficial behaviors. These aspects of human behavior are inadequately accounted for in the standard rational choice model.
Two contributions from the Max Planck Institute explored the role of human phylogenetic endowment in the emergence and change of institutions. Ulrich Witt’s paper “Animal Instincts and Human Sentiments – On the Origin and Evolution of Economic Institutions”, reconstructed the evolutionary origin of institutions by exploring innate dispositions that have been shaped by natural selection and that gave rise to informal institutions coordinating individual behavior in group settings. Witt argues that human sentiments and considerate choice behavior have added variety to the further institutional evolution. Moreover, informal institutions are claimed to be the source of coercive power that is the basis of formal institutions. Christian Cordes and Christian Schubert proposed a naturalistic foundation of social contract theory. In contrast to mainstream social contract theory, which is based on a (hypothetical) original position model defined in an aprioristic way, they proposed to endogenize the key elements of the theory, i.e. develop them out of the individuals’ moral common sense. To this end, the biological and social bases of moral intuitions and empathy were explored.

A slightly different starting point for a naturalistic foundation of the social sciences was proposed by Carsten Herrmann-Pillath (University of Witten-Herdecke). He suggested “power” as a substitute for “utility” as a core analytical concept for understanding behavior. According to Herrmann-Pillath, power can be considered a “bridging concept” as it appears homologically in different domains and thus allows for a non-reductionist synthesis of evolutionary approaches. In empirical terms, “power” is interpreted as rank, domination, coercion, unequal exchange and so on.

Janet Landa (York University, Toronto) presented comparative empirical evidence on ethnically homogeneous middlemen groups from various continents and historical epochs. Landa showed that these groups shared a number of characteristics, such as being organized in closely-knit groups to facilitate trust and developing codes of ethics that effectively constrain anti-social behavior. The empirical evidence thus supports multi-level selection theories in biology – the homogeneous middlemen groups can be interpreted as “adaptive groups” (D.S. Wilson). In the companion paper “Informal Trading Networks, Imitation, Habits, and Social Evolution” co-authored by Landa and Bengt-Arne Wickström (Humboldt University of Berlin), it was shown that the discriminatory choice of trading partners that characterizes homogeneous middlemen groups is evolutionary stable. The groups can thus function as cultural transmission units.

An experimental paper on “Relatives versus Neighbors” by Werner Güth, Vittoria Levati and Georg von Wangenheim (all at the Max Planck Institute) used complex payoff structures to simulate the differences in cooperative behavior between agents with and without family bonds. The experiments indicate that cooperation rates vary strongly with the time horizon of the interaction, which is consistent with an explanation of cooperation in terms of reciprocity in repeated interaction. On the other hand, even though stronger interdependence of payoffs (the proxy for kinship relations) did not significantly increase cooperation, the players consistently shared more of their payoff with the “related” partners.

Finally, a “naturalistic approach” to economics not only has to account for the phylogenetic impact on human thought and behavior, but also on the physiological needs humans have and the environment’s ongoing capacity to satisfy these needs. Thus, human “ecology” enters the picture. In his paper “Bioeconomics as a Subversive Science” Peter Corning
(Institute for Study of Complex Systems, Palo Alto) proposed a bio-economic approach to these issues, i.e. the study of how living organisms acquire and utilize various resources to meet their biological needs. His further analysis concentrated on a methodology for operationalizing this paradigm through a framework of “survival indicators” that are designed to monitor the satisfaction of “basic needs”. A comparative study of four human populations illustrated the possible application of the proposal. In a similar vein, John Gowdy’s (Rensselaer Polytechnical Institute, Troy) paper on “Evolutionary Theory and Economic Policy with Reference to Sustainability” started from empirical findings on human wellbeing established in behavioral economics to derive policy implications, particularly with regard to basic needs, tax schemes and the potentially perverse effect of monetary incentives. He then explored the implications of sunk cost effects within groups for achieving environmental sustainability. The contribution of Bernd Siebenhüner (University of Oldenburg) on “Learning Actors in Evolving Environments” explored the learning behavior of collective agents, based on analytical tools from evolutionary economics, management theory and political science. Siebenhüner developed a conceptual framework that distinguished between adaptation and reflection; and emphasized the relationship between factors internal or external to the collective agent. The framework was then applied to empirical investigations, in the context of global environmental problems, of three different types of collective agents: business firms, intergovernmental organizations, and scientific assessment bodies.

Selected papers of the workshop will appear as special issues of the Journal of Evolutionary Economics and the Journal of Bioeconomics.

### 4.2.2 Long-term Economic Change in Consumption, Production, and Institutions

This research area covers the classical topics of economics – consumption, production, and institutions – for which we try to develop a specific evolutionary approach. The focus is on long term changes in economic behavior (consumption) and its constraints (production, institutions). The expectation is that the influence of genetic endowments and social learning processes – both are shaping agents of economic evolution – should best be identifiable in a longer term perspective. Much of the work is still at a conceptual level where suitable analytical tools have to be found. However, some explorative, empirical/historical projects have also been launched.

**Sensory Utilitarianism**

Ulrich Witt (*ongoing project*)

This project aims at reconstructing the position of a sensory utilitarianism from the point of view of the modern, scientific approach to human behavior (Witt 2005). In the original, Benthamite version, utilitarianism was based on a naturalistic, hedonic theory of behavior (Bentham 1948). Utility was conceived of as a sensory experience of pleasures and avoidance of pains and, thus, as an “objective”, measurable notion. Triggered by Jevons’ reinterpretation into a theory of the “mechanics of utility and self-interest”, the utilitarian approach underwent a dramatic metamorphosis (Warke 2000). After a successive “purging out of objectionable ... utilitarian, ethical, and welfare connotations of the Bentham, Sidgwick, Edgeworth variety” (Samuelson 1947, p. 90) it eventually mutated into present day axiomatic preference theory.

However, the development was accompanied by a massive reduction in the explanatory scope of the theory. What motivates economic behavior or why people order their preference the way it can be observed in revealed preference experiments is no question the theory is supposed to address. More specifically, the explanation of demand behavior was reduced to analyzing how a given amount of money is allocated among goods in relation to their prices. What it is that people demand and wish to consume – and why – is an anath-
It has been observed that earlier consumption experiences affect demand at later stages (Houthakker and Taylor 1966), but a theory explaining the reasons has not been developed. Similarly, it is almost held a truism that variations in prices and income affect the demand for and consumption of, different goods and services quite differently. But it is left open why this is so. Sophisticated measuring techniques have been developed (Deaton and Muellbauer 1980), but no explanation has been given for what determines the measured values, e.g. the income elasticities of goods and services.

The significance of these unexplained phenomena for the economic process cannot reasonably be doubted. The lack of theorizing on them is a serious handicap in understanding what happens on the demand side when the economy is growing; in grasping why the composition of demand changes over time and with varying income; in coming to grips with the role of satiation for income and price effects; in explaining why some new goods and services find markets while others do not – not to speak of the deficit in assessing utility and preferences in general and the unresolved empirical questions relating to consumption and demand in particular.

References


Product innovation and the evolution of consumer preferences -
Empirical studies of shoe consumption

Alexander Frenzel-Baudisch (ongoing project)

Technological progress is essential to economic progress. Technological progress is studied focusing on the dynamics of industrial production. Necessarily, assumptions are made about the demand for the produced goods and, necessarily, these assumptions are limiting the scope of investigations. Only very few studies have investigated into the nature of assumptions about the demand side and on the limitations they impose onto the research about the dynamics of industrial change and economic growth. Driving into this void, my
dissertation project is to explore into the demand dynamics in the face of product innovation. My objective is to explain the evolution of consumer preferences towards new products in order to clarify demand effects on the technological life cycle of consumer goods.

Pasinetti (1993: 57) claims that because economic growth implies a long-term satiation of demand for a given set of goods, “[t]echnical progress [...] must always be channeled into new directions, which must themselves, bit by bit, be discovered and invented, as the old ones continuously become saturated.” Under the assumption that production takes place at constant returns to scale, that productivity in each industrial sector is always increasing, and that demand for the good of any sector will ultimately reach satiation according to Engel’s Law, it is obvious that the number of industrial sectors has to increase to keep employment at a given level. Structural change due to the supply of innovative consumer goods and the evolving preferences of consumers for new products together are the basis for a sustainable growth of consumption and, thereby, for the growth of the economy as a whole.

In models of industrial organization (e.g. Klepper, 1996), technological innovations change the industrial structure. Appropriate demand dynamics to accommodate the new products are just assumed, but not explained. Most recently, Windrum and Frenken (Windrum, 2005; Windrum and Frenken, 2003) provided case studies of structural change of mature industries that stressed the importance of consumer heterogeneity and design complementarities of consumer products in driving new innovation cycles and economic growth. Evidence from these market studies challenges purely supply-driven explanations of industrial change, e.g. the stylized fact of the stabilization of market shares of experienced firms in a mature market (Klepper, 1996). The correlation between product innovation and consumption growth (e.g. Bils and Klenow, 2001) urges for explanations that go beyond the mere focus on supply dynamics.

Previous attempts to explains the evolution of consumption have suffered from drawbacks. Within a framework of consumer rationality Lancaster (1971) explained the demand for efficiency-enhancing innovations of consumer products. The occurrence of product innovation and changes of preferences is out of the explanatory scope of a neo-classical framework. Most recently, Earl and Potts (2004) pick up these criticisms and provide an evolutionary approach to consumer behavior and demand dynamics. Although their account of consumer behavior is genuinely evolutionary, their theorizing about consumer learning and preference change is founded on assumptions, but not on experimental evidence from psychology. Experimental psychology has much to offer for the foundation of the evolution of consumer behavior, because it identified learning mechanisms and behavioral dispositions that constitute the basis for human behavior and its evolution.

Kahneman et al. (1997) experimentally showed that the concept of decision utility in economic thought misses much of what people really experience as utility. Witt (2001) proposed a motivational theory of consumption growth based on his proposition that consumers are “learning to consume”. Taking this as a starting point, my dissertation elaborates theoretical propositions on the development of consumption that are based on different cognitive learning processes. The focus lies on how consumers learn the use of new prod-
products and, thereby, adapt to changes in product markets and to growing product variety at an individual and social level. Differences between the individual learning (Anderson, 1983) and the social learning from observing others (Bandura, 1986) are worked out. The evolution of preferences is influenced by these learning processes. Differences in the evolutionary paths of consumption expansions are traced back to the differences in the knowledge structures that result from the different learning mechanisms.

To illustrate my theoretical propositions empirically, I analyze changes of consumer behavior that express themselves in the demand for new consumer goods. Then, I explore how and under what conditions the evolution of demand is paralleled by evolutionary change on the supply side. For both empirical studies I chose the consumption of shoes because shoes are one of the oldest consumption goods as anthropologists and archeologists tell us. Shoes are directly linked to physiological needs to protect one’s feet from rough grounds and the climate. Shoes make a good counting unit to explore into the technological development of products and the related specialization of consumer behavior. Consumers in industrialized countries have long had enough income to specialize their consumption.

a) Longitudinal consumer panel analysis on shoe consumption

Focusing on low-tech innovations in footwear consumption, the theory about evolving consumer behavior will be empirically underfed by a longitudinal analysis of the largest consumer panel (n > 15,000) in Germany between 1980 and 1999. Detailed data on consumer behavior and their socio-economic characteristic will yield interesting findings on the evolution of consumption at an individual level.

b) A case study of demand dynamics and organizational change in the footwear industry

A historical case study animates the paper’s theoretical propositions about the dependences between consumer learning, product innovation, and industry structure. Investigating along Windrum’s argumentation, I have conducted a case study about the U.S. footwear industry between 1885 and 2002. Around 1980, the shoe became an income-superior good for the average American having been an income-inferior good before. Interestingly, although the market expanded the U.S. footwear industry declined. The unexplained change in income elasticity in this market makes it a very interesting case for consumer theory.

An integrated investigation on consumer and firm learning should provide a clearer vision of the interaction between product supply and demand in the evolution of markets. In order to inform policy makers, a deeper understanding of the evolution of consumer preferences is the basis for the consumer protection policies in rapidly changing product markets.

References


Satiation, consumption specialization, and the German organized tourism industry, 1975-1985.

Andreas Chai (ongoing project)

Why does per capita consumption expenditure grow with rising income and economic development? Beyond simply assuming consumption to be insatiable, a real answer to this question may be attained by analyzing the changing functional nature of consumption and how agents learn to satisfy their particular wants (Witt 2001). From this perspective, one can identify many ways in which markets interact with consumer learning processes to produce increases in consumption expenditure. For example, consumers may gain a higher willingness to pay for goods and services through specializing in certain consumption activities (e.g. opera), a process through which their tastes become refined and they accumulate specific knowledge related to that activity. On the other hand, expenditure growth may also be achieved by offering goods and services which simplify consumption techniques. Goods like frozen, precooked meals that save time and effort are valuable to consumers who have strong time constraints, lack the expertise in self-production, or are simply slack. Thus whether consumers have little or much knowledge does not inhibit the potential for expenditure growth, but it does matter in terms of understanding how consumption expenditure has risen.

This year’s research has focused on empirically investigating how these submarkets for “novice” and “expert” consumers have grown and changed in the course of the German postwar organized tourism industry. In this regard, an interesting question is whether these two types of markets are indeed dynamically interconnected in that novice consumers may, with experience, become specialized and thus graduate from one market to the next. Examining data from the Reiseanalyse, an annual survey of around 5000 German tourists (see figure below), research shows that novice consumers tend to favor more convenient package tours. These were historically responsible for a large wave of novice consumers entering the tourism market in the early 1970s, thanks to the introduction of package tours which utilized jet aircraft. This technology enabled a new generation of package holidays to the Mediterranean region to emerge, which had previously been too expensive or too time-consuming for most potential consumers. Consequently, not only did many existing consumers begin to utilize these packages, but they also enticed a new generation of consumers to travel for the first time. Over time, as consumers gained experience, preliminary empirical findings also reveal that the more times the average consumer has traveled in the last three years, the more are they indeed likely to substitute away from fully organized travel to self-organized travel. Furthermore, this relationship seems to have become significantly stronger in the later period between 1975 and 1985.

Whilst this tendency for experienced consumers to cease using fully packaged tours is potentially troubling for relevant suppliers, it should not be problematic as long as there are new novices entering the market that replace exiting ones. Nevertheless, here our data suggests that the total population’s propensity to travel has indeed reached a satiation level by the mid 1980s. A depleting number of fresh entrants suggests that suppliers would increasingly need to innovate their services in order to cater for more specialized consumers, triggering inter-market competition with suppliers for the growing expert submarket. This may explain the emergence of new trends such as “adventure” and “eco” tourism that are
types of organized tourism services that have emerged in the 90s and have a greater ability to cater to individual tastes.

More generally, this work implies that structural change in economic systems may not only occur when new innovations such as jet-powered package tours are introduced into markets, but that it can also happen when the satiation level in the adoption rate has been reached. Once this occurs, the heterogeneity of demand which stems from individual learning processes begins to become an important consideration for suppliers relative to that heterogeneity of demand which stems from changes in the overall population of consumers. As a result, suppliers interested in realizing increasing returns in the face of increasingly specialized consumers may need to reorganize their productive capabilities in order to enable consumers a greater say in the attributes of the final good or service. This calls for increasing returns to be realized by imbedding knowledge in organizations and institutions rather than in the technologies which produce the goods and services (Langlois 2001).

With the recent addition of new data, we look to continue to empirically examine in more detail how satiation levels are related to consumer exit rates and industrial change in the organized tourism market. We also look to examine whether indeed the exit rate of novices can be empirically linked to the intensity of competition within novice markets (intra-market competition). That is, consumer learning processes may be accelerated precisely because of market competition, which would be harmful in the long run to the suppliers for novice markets, yet helpful to suppliers for expert markets. In that sense, this suggests that competition occurs not only between different suppliers servicing the same market, but also between different markets which look to increase consumption expenditure in different ways.

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Capital-labor-substitution and long-term change in embodied knowledge

Christian Cordes (completed project)

During a six-month stay as a guest researcher at the Centre for Research on Innovation and Competition (CRIC) at the University of Manchester, a pilot project titled „Capital-Labor-Substitution and Long-term Change in Incorporated Knowledge“ was started that lays out some of my future research activities. At the core of this project is the observation that the continuous generation and accretion of production knowledge in the course of economic development ultimately depends on human cognitive capabilities. In a knowledge-based society, where mental labor inputs are the crucial contribution of humans to productive activity, these cognitive capabilities explain much of the characteristics of today’s employment structures. The project shows how the knowledge-content of human labor inputs changed in relation to capital inputs and technological advancement. Labor qualities and their cognitive foundations connected to the handling of knowledge, such as the acquisition, storage, utilization, communication, expression as well as the generation of knowledge, played a changing role in the course of technological progress: some functions were completely or partly transferred to machines influencing productivity development (for example, the storing and communicating of knowledge). Their shifting structure caused processes of upskilling of the workforce, and their composition determined the prices of commodities and explained the structure of wages in an economy.

A growing stock of societal knowledge entails an increasing importance of mental work belonging to, for example, the categories “acquisition of knowledge”, “expression of knowledge”, and “generation of knowledge”. Mental labor of the latter class, for instance, is employed to creatively solve problems resulting from technological progress whose solutions again cause subsequent problems necessitating even more creative labor inputs (see also Cordes, 2005a). Moreover, some of the human cognitive capacities mentioned above have been or will be constraints on an ongoing knowledge growth process (see also Cordes, 2005b). This observation has directed and will continue to direct innovative endeavors in the past and will therefore continue to affect future economic development. The project addresses these questions theoretically, empirically, and derives political implications.

A first result of this larger project is the paper on the accumulation of production knowledge and human labor inputs (Brenner and Cordes 2004) that delivers an analysis of qualitative change in labor in mutual dependence with the advancement of the epistemic base of technical knowledge. The role of various types of human capabilities in long-term economic development is depicted. Historically, a recurrent pattern is identified: humans learned to successively transfer qualities of labor to machines, potentially combined with non-human energy sources. The release of parts of the workforce from performing certain sorts of labor enabled humankind to spend this spare time in the search for further technical innovations, i.e., the generation and application of ever-more knowledge.

A model examines the relationship between the production of commodities and knowledge. The driving forces of these processes and the mechanisms that limit them are analyzed.

References


Knowledge as a Process of Effective Communication: Implications for an Analysis of Production

Franz Schaper (ongoing project)

Based on their greater explanatory value for a deeper understanding of the processes that underwrite economic growth and production, Witt (2003, 2004) argues for a replacement of the traditional production factors capital, labor (including human capital), and land by material, free energy, and knowledge. Taking Buenstorf (2004) as a point of departure, who provided a detailed account of the role of energy in production, the focus of the present project is on knowledge.

Economic development is strongly knowledge-driven (Nelson 1996). Various contributions from an evolutionary perspective discuss how technological, institutional, historical, and other constraints influence why and how firms, industries, and whole economies grow, stagnate, decline, or even vanish (Murmann 2003, Metcalfe 2002). Here the focus is on production processes themselves. In abstract terms, production may be seen as the spatiotemporally matching of specific inputs to obtain desired outputs (Witt 2005; Ayres and Warr 2005). Targeted matching implies control over these transformations and control implicates a knowing agent. Just as the range of transitions to be affected on and by materials and energy are limited by physico-chemical properties, there are constraints and capabilities with respect to man’s knowledge, in both individual and social dimensions.

However, whereas the data, information, and knowledge age(s) are claimed to have replaced the energy age and unlike concepts such as energy or information, for which solid foundations can be invoked from other scientific fields, “knowledge” concepts remain by and large derived from common sense and vernacular use or are introduced ad hoc and with thinly disguised ‘teleological’ drive. Based on these difficulties, a first aim of this project was to develop a coherent heuristics. Clearly demarcating the often confused concepts of data, information, and knowledge (Boisot and Canals 2004), borrowing the notion of knowledge-as-a-process from modern epistemology (Williamson 2000), and differentiating system-externally accumulated experience as a “self-transforming” production input (Witt 2005: 135) from its situation-specific use allowed the formulation of a model that treats knowledge as effective communication (Figure 1). Furthermore, the knowledge process essentially superimposes onto the production process it enables.

The model can be extended to highlight various important aspects of the knowledge-production nexus. First, knowledge and the anthropogenic evolution of knowledge are fractal, that is, self-similar. Differences in the specifics not withstanding (such as the mix in terms of physical and informational properties of inputs and outputs, the environment-data filters at both ends of the knowledge process), the same overall knowledge process can be identified at various analytic levels, from individual human beings and firms to national economies and the economic system as a whole. This not only binds together the micro, meso, and macro levels (Dopfer, Foster, and Potts 2004), but may also serve as a pointer to the complexly dynamic co-dependency of production (narrowly conceived) with other areas of human activity.

Second, in terms of the increasing embodiment of knowledge (Baetjer 2000) as a central driver of the rapid economic growth since the industrial revolution, the model suggests a differentiation between generic and operant levels (Dopfer 2005: 29), between a stock of experience and its actualization in knowledge. Third, Polanyi’s (1962) tacit element of knowledge comes into play as it points to the necessary investment in ‘experience-making’ for
any system that may not rely on a pre-selected and fixed choice set and response repertoire. But this acquisition and accumulation of new experiences is not only dependent on intergenerational transfer, the institutional “preparedness” on the various levels is also of fundamental import as it opens the possibility for the emergence of dedicated organizational arrangements such as professional organizations, publications, teaching and research institutions, and so on. This reinforces the common ideas regarding the coordination of the various knowledge “processors” within and between hierarchical levels as well as the decomposability of knowledge (Buenstorf 2005) and the linearization of experience in qualitatively expanding production.

The second and ongoing part of the project is to apply the KEC model in a specific case study in order to explore the complex dynamics of epistemological, institutional, organizational, and technological change. Technical change with respect to specific diagnostic or treatment procedures has been analyzed previously (recently, e.g., Metcalfe, James, and Mina 2005) with a general focus on the distributedness of the underlying innovation processes. Here we expand on these analyses and discuss the provision of health services in general and the emergence of the modern diagnostic laboratory in particular (Roche Corporate Communications 2004). This is to provide some answers to the question if and in how far the character and evolution of the modern the ‘knowledge-and-production’ nexus, the technological regime (Breschi, Malerba, and Orsenigo 2000), differs from those of earlier centuries.

The production of diagnostic services deserves particular attention not least because the desired output of the material- and energy-transforming processes is purely data. Furthermore, diagnostics utilizes essentially the same knowledge outputs from the biochemical sciences as the, in production terms, more traditional pharmaceutical industry as it sits at the intersection between science and the “art” of medicine. The KEC model will be used to identify bottlenecks and incommensurabilities at the various stages of the knowledge/production process by precisely identifying a specific level of analysis via its characteristic input-output relationship. For instance, either the spatio-temporal misalignment of the system under consideration may cause its inability to access required input data or communicate the results of the production process or, alternatively, insufficient experience may cause a break down of the knowledge sequence at either one of the reception, decoding, contextualisation, interpretation, or the enactment stages. The necessary contextual indexing is provided by subsequently expanding or contracting the system’s boundaries – i.e., the analytical space.

By following the historic technological trajectory from the earliest written evidence of diagnostic procedures of Ancient Egypt and Greece, one can isolate two major discontinuities. The years around 1840 saw the dawning of the “scientific” era in medicine. The first real alternatives to the millennia-old humoral concepts of disease were formulated, disease and health became ontologically unified, and “animal” chemistry became “organic” – the art of medicine became support from science. Interestingly, earlier inventions or considerable import, such as that of the printing press – and the possibility it conferred to the sharing and diffusion of new ideas –, had no discernable influence on the innovative spirit within the medical field. Rather, inter-individual sharing of experiences via codified data came into its own only in the mid-19th century: The first major works in clinical pathology appeared just as the first journals on the subject. Other novel institutional arrangements included the formation of teaching centers and the introduction of medical insurances. Early attempts, such as by Virchow and Frerich at Berlin’s Charité hospital, at installing units dedicated to diagnostics were few and often only temporary. This exemplifies how embedded knowledge systems are required to interact to overcome constraints in establishing and coordinating production systems. In order to widen the perspective beyond historic recounts of technological developments along the names of individual Schumpeterian entrepreneurs, technological lock-ins, the selection of dominant designs, and the like, differences and commonalities in the national institutional arrangements between Germany, Great Britain, and France will be considered. This emphasizes the social-cultural and socio-political embeddedness of the co-evolution of knowledge and production (Malerba 2002).

The second discontinuity occurred more than a century later. After the scientific approach was firmly established as a complement to medicine, the science-industry complex started to emerge form around 1960 onwards: The first automated machine for clinical chemistry –
Skeggs’ Continuous Flow AutoAnalyzer – was introduced. Although it remained the standard for about a decade, these years saw also an explosion in new test parameters and other new technologies: the capitalization of production increased dramatically and production sequences expanded due to continuing specialization. This increasingly freed both medical and technical personnel to concentrate on their primary task of providing fast and reliable support to the treating physicians. By way of example, we will consider the knowledge dynamics that facilitated the embodiment of the task of pipetting – the transfer of small volumes (microliters) of liquid. This is to show how the decomposition and linearization of anthropogenic knowledge is required for increasing investments in individual experience repertoires via education and learning on the one hand and substituting and augmenting human sensorymotoric abilities on the other. Broadening again the perspective, differences in the technological trajectories within clinical chemistry between former East and West Germany (e.g., Jaroß and Bochmann 2001) are to highlight how path-dependencies influence “[...] deeply our interpretation of the historical record and our understanding of the channels through which policy initiatives shape economic growth” (Metcalfe 1997: 32).

References


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Explaining the Genesis of Institutions

Ulrich Witt (ongoing project)

The notion of “institutions” belongs to the most diversely interpreted concepts in the social sciences. Moreover, many institutions seem to change from one historical epoch to the next, and the circumstances under which this happens also seem to change. From the point of view of an evolutionary theory of institutions three core questions therefore arise: (i) Are there any generic features by which institutions can be characterized in more general, abstract terms? (ii) Are there any recurrent patterns in the emergence and supersession of these institutions? (iii) Is the historical sequence in which they occur – the genesis of institutions – explicable by more general principles?

With respect to question (i), institutions have been interpreted as persistent forms of coordinated behavior in social interactions. In game theoretic terms, the generic features of institutions can then be identified with the characteristics of games that reflect the particular interaction context (Schotter 1981, North 1990, Binmore 1998, Young 1998, Aoki 2001). These characteristics are: first, the rules of the game (number and kind of players involved, interaction mode and sequence, and the pay off or incentive structure); second, its possibly multiple equilibrium points. On such a basis, different categories of institutions can be formed and their implications be investigated by a game-theoretic analysis.

Such an abstract, game-theoretic perspective has also been useful in exploring question (ii), i.e. the emergence and supersession of institutions. However, because of analytical problems, most of the contributions have concentrated on the case of spontaneously emerging, self-enforcing institutions. Examples are the customs and conventions (associated with the equilibrium points in many-person coordination games, Schlicht 1998, Young 1998). Another example are institutions reflecting dominance and subordination relationships associated with equilibrium points in “inequality-preserving games” (Ullman-Margalit 1978) such as the chicken game. The emergence of these institutions is usually modeled as propagation process in which the relative frequency of a particular strategy converges to a stable population share — an “attractor” in the corresponding phase space (Witt 1989). Similarly, institutional change can be modeled by introducing new strategies which result in a reduction or even collapse of the previously existing basis of attraction. The population dynamics are then drawn to a new attractor that represents a different institution – in the former case only after the critical frequency of strategy adopters is exceeded (perhaps as a result of cumulative random fluctuations, cf. Kandori, Mailath, and Rob 1993).

Question (iii) – the explanation of the historical sequence or genesis of institutions – is put center stage in this project. To come to terms with the cumulative nature of institutional change, a long term perspective is adopted that spans the time from the origin of human institutions to their modern forms (not unlike the institutionalist approach in Veblen 1899). By means of the abstract game-theoretic tools developed for analyzing questions (ii) and (iii) an attempt is then made to identify the essential steps in institutional evolution. They are represented by transition between different types of games on the one hand and a successive progress in strategic behavior from genetic dispositions to culturally conditioned, boundedly rational choices (cf. Witt 2005).
References

Preferences and Property Rights Towards a Social-cognitive Theory of Institutional Emergence and Change

Uta-Maria Niederle (ongoing project)

Many would agree that elaborate Property rights are most important to the modern economy characterized by a high division of labor and specialization. But property rights are fundamental not only to modern civil society: Rules of ownership exist in some way or other in every human society, and are included implicitly in their institutional framework. Some form of rules of ownership rules, or rather property relations, is vital to every economy, since they lie at the heart of exchange as a form of co-operation. Some kind of “rights of disposal” forms the basis of every transaction between actors. In this way property rights contribute to society’s socio-economic organization and performance.

Recently, property rights, and especially their meaning, emergence and change have gained more and more attention in economics (Demsetz 1967, Demsetz 2002, Merrill 2002). Therefore, besides estimating their impact on society, as is to some extent done by contemporary institutional theory, property rights must be examined in view of their cultural emergence and cognitive mechanisms of change, as well as their technological foundations. The impact of institutions on preferences has also been recognized (Bowles 1998, Bowles 2004), but the opposite influence – the influence of innate dispositions or behavioral tendencies on institutional rules – has not yet been scrutinized closely.

From an economist’s perspective, this postdoctoral project takes a cognitive approach to study the long-term evolutionary change of institutions and property relations as a concrete and economically most basic example. This approach requires a cognition-based model of man rather than the axiomatic model of rational choice used for problems of economic optimization. The project is part of an attempt to provide insights from the natural sciences and social theory other than economics as a basis for explaining economic behavior, i.e. to make economics and social theory “consilient” with the natural sciences (Wilson 1998). To this purpose insights from anthropology, social psychology, socio-biology, and institutional economics have to be synthesized. Such a synthesis allows to account for cognitive and dispositional biases in human nature that determine the nature of property relations and direct change.
There are several questions to be answered with this project:

1. Are there universal patterns in property rights structures across different societies and over time?
2. Can property relations or rules of ownership be related to some universal source of human behavior and human cognition?
3. What is property in contrast to mere possession and what makes property out of possession – what are the conditions?
4. What are the driving forces of changing property rights: What impact do learning processes and social instincts as part of the human makeup have?

The different parts of the analysis try to answer these four questions.

Universals and uniqueness in ownership structures. Here anthropological and historical accounts of property rights structures supply the empirical basis for the theoretical analysis of the relationship between property rights and preferences. Universal (or at least pan-cultural) features over all existing economies or societies, respectively, can give a hint at some fundamental features in human nature. Hence, a notion of rules of ownership has to be developed first that allows to integrate diverse dimensions and priorities in different contexts and over time. With such a definition at hand it seems that there are universals in institutional rules and property relations in different societies and over time (Anderson/Swimmer 1997, Morgan 2000, Brown 1991). In this perspective, the question is whether the formation of certain property rights during the stages of history is biased. This bias comes via certain human dispositions that shape “preferences” in specific contexts of rule formation. One such feature in human nature that connects property relations with human social relations is possessive behavior. Other social instincts featuring prominently in guiding social interaction are reciprocity, conformity, commitment and loyalty, status and prestige, impulses to help (like giving and sharing) and others. Other features concern human cognitive nature, like a certain “rule preference” (Schlicht 1998); and they direct attention towards the kind of rules of ownership that are followed. Therefore, the second step examines the substantive bases of preferences as context- and situation-specific phenomena.

Dispositions and cognitive conditions for property rights. Evolutionary and Cognitive Psychology explain the impact of social instincts on rules governing ownership relations in society. They also provide for the existence of certain rule preferences in humans. These are the unchanging substance that underlie the preferences for rules (Niederle 2006). The other - changing - element are attitudes (Fishbein/Ajzen 1975) as an expression of preference. The social-psychological concept of attitudes comprises a factual element of belief formation and an evaluational element of (emotive) reaction. It allows one to integrate change of knowledge and experience both via cognitive learning of probabilistic calculus and via reinforcement learning of evaluation.

From Possession to Property. From these points of departure property relations can be traced back to their origins in human and animal behavioural as well as cognitive dispositions. One such innate disposition, that has been mentioned before, is possessive behaviour towards objects and other humans that are vital for survival and reproduction (Kummer 1991, Ellis 1985). Two conditions for property relations developing out of mere possessory relations are elaborated, as there are cognitive symbolic representation (see figure 1) and some kind of voluntary rule following (Niederle 2005).

Co-evolution of Preferences and Property Rights. The last part of the project refers to the interrelation of institutions, technological change and preferences on the individual and societal level. In this perspective one direction of influence is from technology to preferences and property rights. It integrates theoretical mechanisms of co-evolution between technology, preferences and property rights underlying the processes of change. How human dispositions shape institutional history and how attitudes change in the course of technological progress is also addressed.
Evolutionary Economics Group

References


Evolution of Designed Institutions

Georg von Wangenheim (completed project)

This project was partly built on earlier work by von Wangenheim (2004) and concentrated on the emergence and the stability of organizations enforcing designed institutions. The model used here is based on a Prisoners' Dilemma situations embedded in an enforcement game. It has been applied as a starting point for research in two opposite directions.

Figure 1: left: standard enforcement game, middle: enforcement game with increasing opportunity costs, right: enforcement game with decreasing opportunity costs. \( p_i \) is the probability with which the single enforcee \( i \) complies with the rule to be enforced, \( q_j \) is the probability with which the single enforcer \( j \) enforces the rule to be enforced.
On the one hand, the study of the dynamics in enforcement games (figure 1) with increasing or decreasing opportunity costs (Wangenheim 2002) had been extended into continuous actions spaces: the individual enforcer may choose any probability of enforcement and the enforee may choose any probability of compliance. The results derived from the game with a finite division of actions spaces (for both players) carry over to the game with continuous action spaces. The finite division of action spaces required somewhat artificial divisions and had to be based on specific assumptions on individual adaptation of behavior. In contrast, introducing continuous action spaces made it possible to derive the corresponding stability and instability results by only making assumptions on population dynamics: These are standard in evolutionary game theory and they induce the ambiguity of stability of the unique Nash equilibrium of the standard enforcement game, which is in mixed strategies. Figure 2 shows the dynamics of the average enforcement probability over all individuals for the replicator dynamics. For both increasing and decreasing opportunity costs, the local qualitative features of the replicator dynamics carry over to all gradual, regular and payoff monotonic dynamics.

On the other hand, the emergence of cooperation in simple societies had also been experimentally studied in collaboration with Werner Güth and Vittoria Levati of the Strategic Interaction Group (Güth, Levati and Wangenheim, 2004). The goal of the experiment was to find out whether reciprocity in long term interactions or profit sharing with only some participants has a stronger influence on cooperation. The experiment was set up as a repeated social exchange game of four players (equal distribution of all players’ initial endowment yielded the highest possible payoff for all players) combined with pairwise profit sharing (profits from the partner’s use of a player’s own endowment partly flowed back to the player’s pocket). The design of the experiment in four different treatments (45 per cent or 5 per cent profit sharing combined with 16 or only 4 repetitions of the stage game in order to induce high or low reciprocity) aimed at distinguishing the two competing explanations for cooperation: profit sharing or reciprocity. It turned out that reciprocity had a dramatically higher explanatory power than profit sharing, which seems to have only a second order effect on the degree to which reciprocity induces cooperation.

References


Evolutionary Law and Economics

Georg von Wangenheim (completed project)

In close collaboration with Francesco Parisi (George Mason University), this project studied the evolution of social norms under the influence of legal norms. Deviating from usual approaches, a social norm was not simply taken as one socially enforced behavioral regularity where (nearly) all individuals behave in the same way. Instead it was taken as the distribution of what individuals think, and express by imposing social sanctions, what behavior should and should not be permissible in society. This ‘statistical’ concept of social norms allowed the researchers to study social norms which refer to fields of a multitude of behavioral alternatives. By restricting the analysis to cases in which these alternatives may be ordered along one dimension in a sensible way, it was possible to describe the evolution of social norms, i.e. of people’s opinions on where the borderline between permissible and punishable actions should be, by reference to earlier work of the evolutionary economics group (Flieth and Wangenheim 1996, Flieth and Foster 2002).

The model of opinion formation in large opinion spaces developed in this earlier work was based on the idea that individuals sometimes revise their opinions as a consequence of communication with others. When reference to a third individual’s opinion becomes relevant in this process, the rate of change of the opinion distribution depends on the current distribution in a super-linear way which allows for multiple equilibria. The model had been adapted in a way which allowed it to deal with the specific problems of social norm formation. Here interaction is not merely based on communication but also on observed behavior and even on observed private sanctioning. In addition, legal norms may serve not only as a focal point in the emergence of social norms (McAdams 2000) but may also destabilize social norms and induce their change. While similar interference of legal norms with social norms has been described for only two alternative actions (Cooter 1998, also cf. Kuran 1989), the extension to many possible actions allows for more and unexpected effects of newly introduced legal norms which deviate from the current social norms.

In a paper published in the volume related to the Workshop on “The Evolution of Designed Institutions” (see page 173-176), Parisi and Wangenheim (2006) aim to explain countervailing effects of social norms as they may sometimes be observed in the real world: legal norms have no effect on social norms or may even drive social norms away from the norm expressed in the law.

One way to explain these effects is based on localized communication. Communication is “localized” when it and reference to third individuals’ opinions becomes less likely if the opinions of the communicating individuals differ more. Then the direct effect of legal norms on most individuals’ opinion formation may be minute and the indirect effect via other people’s changing opinions on norms too small to draw the opinion distribution out of the old equilibrium’s region of attraction. As a consequence, social norms don’t change unless the legal norm is close enough to existing social norms. When communication is not only localized, but very distant opinions (including those opinions expressed by the legal norm itself) trigger renitence, then legal norms which are too extremely differing from social norms may indeed increase the gap between social and newly imposed legal norms.

An alternative approach to model the same effects is to examine the increased observability of activities which become illegal after the stipulation of a new law. The idea behind this approach is that communication in both norm formation and reformation refers not only to other people’s opinions but also to their actions. While legal sanctions make the illegal actions less frequent and should thus drive social norms toward the legal norm, illegal actions may at the same time become more prominent and thus a stronger argument in discussion on legal norms. While it was easy to find numeric examples for this effect leading to the diminution of legal norms’ influence on social norms, only extreme assumptions on the marginal observability effect for more distant opinions were able to explain how legal norms can repel social norms. It thus turned out that the observability effect of criminalization may usually not serve as an explanation. Further research will show whether this result changes when illegal behavior is deliberately used as an expression of opposition.

Additional analyses of legal rules guided by efficiency aspects most prominent in standard law and economics may set the grounds for further studies in evolutionary perspective. A
study of the complexity of nuisance law (Gomez and Wangenheim 2004) showed that rules with several layers of switches between property and liability rules in favor of injurer and victim as we observe them in both continental and Anglo-American jurisdictions are preferable on efficiency grounds. From an evolutionary perspective, this will lead to the question of how evolutionary forces driving legal change produce complexity and whether they do so independently of the efficiency of such complexity. Another study on the control of expert decisions in the administration by non-expert courts (Wangenheim 2005) raised the question how control of legal decisions evolves over time and what are the driving forces behind the depth and width of judicial control in appeals courts.

References


Papers on Economics and Evolution

# 0403: F. Parisi and G. v. Wangenheim

Legislation and Countervailing Effects from Social Norms

Human behavior is influenced both by internal norms or values ("what people think to be just behavior") and exogenous restrictions including legal sanctions. In the paper we study the interaction between these legal and extralegal forces and highlight the possibility of a countervailing effect of norms and individual in the face of changes in the legal environment. Building on the stylized fact that people’s individual values are partly static and partly subject to change overtime, we consider these social and legal forces as two main factors that contribute to the change in individual values. Legal innovation that departs from current values may lead to private enforcement norms or civil disobedience. Through private enforcement of expressive laws and through civil disobedience, individuals reveal their approbation or disapproval of laws to other individuals. This may lead to a hysteresis effect on individual values that may have a reinforcing or countervailing effect on the legal innovation. Our model of countervailing norms complements the existing literature on expressive law by showing conditions under which the equilibrium behavior may move in the opposite direction from that intended by the law. Our model studies the dynamics of such problem and unveils several important predictions and practical implications for the design of law.

# 0406: U.-M. Niederle

*From Possession to Property: Preferences and the Role of Culture*

The paper investigates the interplay between the institutions of law and property and innate propensities towards possession. The questions to be answered are: How do property relations emerge in historical-anthropological terms in contrast to the well-known constitutional perspective and what role do preferences - as human cognitive and behavioural dispositions - play in this process? The paper conjectures that possessiveness towards specific objects together with a primary attitude toward first rules of law, that is some rule preference and commitment, shape patterns and outcomes of property relations. More complex structures of property relations have developed together with technological advances. The differences in property relations across different societies result partly from diverse ecological conditions and partly from culturally transmitted traditions.


# 0411: C. Schubert

*Hayek and the Evolution of Designed Institutions: a Critical Assessment*

While Evolutionary Economics has devoted much attention to the attempt to explain the evolution of institutions that emerge spontaneously, the genesis, diffusion and evaluation of consciously designed institutions has largely been neglected. This paper tries to show (i) how an evolutionary approach to this problem could look like and (ii) in what way Friedrich A. v. Hayek’s work can contribute to it. Three aspects are identified as playing a key role in this respect: first, Hayek’s positive theory of both the legislative and the judicial law-making process; second, his normative theory, centered on the instrumental value of individual freedom for maintaining the epistemic superiority of spontaneous social orders; and third, his concept of democracy, based on a dynamic deliberation (instead of a static aggregation) view on individual preferences. While there are more or less wide gaps in all three original accounts, there are ways to fill them in an arguably “Hayekian” way and to combine the different threads to a conceptual basis for a Hayekian political economy.


# 0412: T. Brenner and C. Cordes

*The autocatalytic character of the growth of production knowledge: What role does human labor play?*

This paper analyzes how the qualitative change in human labor occurs in mutual dependence with the advancement of the epistemic base of technology. Historically, a recurrent pattern can be identified: humans learned to successively transfer labor qualities to machines. The subsequent release of parts of the workforce from performing this labor enabled them to spend this spare time in the search for further technical innovations, i.e., the generation and application of ever-more knowledge. A model examines the autocatalytic relationship between the production of commodities and knowledge. The driving forces of these processes and the mechanisms that limit them are analyzed.

# 0507: U. Witt

*From Sensory to Positivist Utilitarianism and Back — The Rehabilitation of Naturalistic Conjectures in the Theory of Demand*

Demand theory grew out of the revision of utilitarianism. The original, Benthamite program – based on a naturalistic, hedonic interpretation of behavior – was replaced by an abstract, subjectivist approach, a motivational mechanics. The implications – expressed exclusively in observable quantities, prices, and incomes – were developed in demand theory. The paper discusses major steps and consequences of the revision together with more recent partial revocations and attempts at reintroducing a naturalistic interpretation. The latter can be enhanced, it is argued, by integrating the (non-utilitarian) theory of wants, a long-standing, but currently much neglected, source of empirical reflections on the motivations of economic behavior.
A characteristic feature of economic development is the ever changing structure of consumption patterns. Reducing the explanation of this phenomenon to changing prices, finally caused by changes in the availability of goods (or characteristics), would neglect a major force driving this change, i.e. the variation of consumer wants and consumer knowledge. The present paper aims at sketching an evolutionary framework for the analysis of consumer behaviour that takes account of these features. For this purpose, Carl Menger’s theory of goods is taken as a starting point. Whereas economists after the “marginalistic revolution” were almost exclusively concerned with the determinants of exchange value and developing price theory, Menger puts as much emphasis on the user value as on the exchange value. Regarding the way of how user value changes a connection between Menger’s 19th century theory of goods and 20th century learning theories is established. The problem of how to get from individual learning processes to aggregate consumption patterns is approached by recollecting the genetic underpinnings of human learning and its contingency on certain physical and social conditions. Taking into account that these conditions are dynamic, the presented approach allows interpreting collective learning processes as historical events and makes them fruitful for the analysis of economic change.

Conferences and Workshops

Workshop “The Evolution of Designed Institutions”

The evolution of informal institutions has traditionally been the object of extensive theoretical study by evolutionary economists. However, formal institutions, their evolution, and in particular their dynamic interplay with informal institutions continue to be largely under-investigated. This workshop aimed to close this gap to some degree and provide some theoretical stimulus at the intersection of economics, psychology, and legal studies. Underlying the workshop’s concept was the definition of formal institutions as those “rules of the market game” that are defined and enforced by a small group of specialized agents.

Elinor Ostrom (Bloomington) classified the vast amount of rules that guide behavior in the commons dilemma into the following categories: Rules on participation, on allocating positions among participants, rules on allowable actions, payoff rules, and a last category comprising such diverse rules as rules on information, on the scope of exploitation of the resource, and on requirements to harvest in teams. In each of these categories she discussed a number of possible rules. Hence, the rules governing a common pool resource (and any other social interaction) are usually too complex to be optimized by one-step design. According to Ostrom, designing institutions is therefore always done by experimentally tinkering with a small subset of all relevant rules. A perfect prediction of results is impossible. This problem is aggravated by the ever-changing character of societies’ natural, social and economic environment. Complexity not only affects outside observers of rule systems but also the in-group authorities designing rules. Emergence of rules, spontaneous or designed, is thus an evolutionary process the understanding of which requires knowledge of the system’s environment, its adaptation mechanisms, and a measure of performance which feeds back into these mechanisms.

Bruno S. Frey (Zürich) used insights from economic psychology to study environments with changing institutions. He discussed the effects of newly installed and of vanishing dictatorships as well as the effects of introducing markets into a hitherto planned...
(part of the) economy. Following well established insights in psychology, he argued that individuals either align their preferences with the current environment to reduce cognitive dissonances or strengthen opposing preferences when state activities are perceived as ‘controlling’. For the case of dictatorships this means that the people will glorify the past after decay of the dictatorship, and respectively will revolt against a dictatorship once its suppressive power falls under a rather high threshold. When markets are introduced, again both reactions are possible: opposition to markets may prevail or an extreme pro-market creed may instead appear.

Richard Langlois (University of Connecticut) tried to apply the abstract concept of modularity to the questions of institutional structure and evolution. Modularity is a very general set of principles for managing complexity. One can eliminate what would otherwise be an unmanageable tangle of systemic interconnections by breaking up a complex system into discrete modules - which can then communicate with one another only through standardized interfaces within a standardized architecture. At least implicitly, these principles of modularity have long been discussed in the work of, among others, Adam Smith and Friedrich Hayek. Both argue that a complex modern society might be made more productive through a modular design of social and economic institutions. For instance, in separating mine from thine, property rights modularize social interactions, which are then mediated through the interface of voluntary exchange, all under the governance of the system’s common law framework.

Tom Tyler (New York University) opposed what he calls “instrumental motivations” (incentive schemes in economic terms) to “social motivations” (preferences for general or specific rule following; economists should not be mislead by the psychologist’s use of the word “social”). He compared these two different types of motivations in four respects: (1) legitimacy of rule makers or enforcers is an important determinant of efficacy of rules; (2) closely linked to, and underlying legitimacy is fairness in the procedures of making or enforcing rules. Procedural fairness seems to be more important than outcome oriented distributive justice or similar concepts; (3) trust in officials enforcing (or making) rules promotes acceptance of these rules far more if such trust refers to the motives of the officials rather than to the predictability of their actions; (4) identification with the group supports following those rules which are to the benefit of the group. He showed that “social motivations” outperform incentive and sanction based models in inducing cooperation necessary to overcome social dilemmas.

Ulrich Witt (Jena) explored the co-evolution between, on the one hand, technological opportunities, and, on the other hand, economic institutions. He tried to identify recurrent patterns in this developmental process. According to Witt, when reconstructed from its beginnings in the times of early human beings, (informal) institutional change can be traced back to a unique, innate capacity for cumulative, social learning. However, with the transition from genetically defined bands to culturally defined groups (ethnic, religious, or national) institutional evolution has increasingly developed into a contest between interests trying to defend established privileges and interests trying to appropriate the benefits from new technological opportunities.

Uta-Maria Niederle (Jena) discussed how preferences change in the course of time as a consequence of technological progress, learning and habituation. Given that preference changes are not restricted to preferences for consumption goods but extend to institutions that deal with the effects of new technological products, an understanding of how these formal institutions change first requires knowledge of how preferences, or rather attitudes towards these institutions evolve over time. She concluded that only if one understands the latter, is it possible to study how
newly designed and formal institutions receive the necessary support they need for their implementation and their enforcement.

Jan Schnellenbach (Marburg) argued that the evolution of consciously designed formal institutions is likely to be constrained by informal institutions, i.e., reliable modes of cooperation, that are in turn assumed to be stable in the short term. On this basis, he conceptualized formal institutional change as *syncretic* change, i.e., as the voluntary path-dependent integration of new rules into a given institutional structure. Formal institutions are not made from scratch. Due to various factors, e.g., cognitive limitations and attempts to cope with uncertainty we can normally only expect gradual changes to take place in the realm of institutions. Hence, the new institutional structure is always likely to be a blend of old structure and some new rules. Finally, Schnellenbach compared the necessarily cautious, defensive institutional ‘entrepreneurship’ with the much more offensive form of Schumpeterian economic entrepreneurship *strictu sensu*.

Two papers dealt with the specific case of the evolution of legal institutions. Christoph Engel (Bonn) discussed the puzzle that legal rules are more or less widely followed, although almost no one (except professional lawyers and judges) knows the wording of the law or knows how to handle legal texts properly. Moreover, hardly any lay person remembers ever having learnt any law. How is it that, nonetheless, one and the same set of legal rules can effectively govern the entire population?

Engel argued that the law is learnt, and that this learning is done in an indirect way. Most of it (called “primary learning of the law” by Engel) takes place during childhood and adolescence. What the child learns is a general ability to handle normative expectations, what may be called “normative proficiency”. This ability is then filled with the concrete normative expectations that can be derived from the law, but they are not conveyed in a technical legal form. Engel discussed alternative neurobiological and psychological learning theories which try to model this learning behavior, where children figure out what is expected of them by observation and inference.

Francesco Parisi (George Mason University) and Georg von Wangenheim (Jena) presented a model which shows how social norms form through interactions of individuals complying with, and violating, what other individuals think to be the social norm in a particular field of behavior. They argued that the co-existence of alternative social norms in one field of behavior, for example, consumption of various drugs, e.g., cigarettes, alcohol, heroin, and “crack” creates the problem of interference of legal norms with the social norms’ formation process. Through such countervailing effects of legal norms on social norms, the latter may evolve in the opposite direction of what was intended by a new law enacted to bridge the gap between both. To overcome these effects, Parisi and Wangenheim proposed introducing legislation in a piecemeal fashion over time. Here the law only slightly deviates from the social norms of most people in the early stages, but may eventually become more extensive over time. This method would influence social norms in the desired direction by ensuring that new legislation always remains close enough to the current state of social norms.

Turning to the normative aspect of the workshop topic, Christian Schubert (Jena) examined the potential of a normative branch within Evolutionary Economics, i.e., he tried to lay the groundwork for a normative theory that would provide criteria for the evaluation of institutions from the perspective of Evolutionary Economics. After discussing the pitfalls of orthodox welfare theory, he proposed the contractarian approach within Constitutional Economics as a basic blueprint for this normative branch. Contractarian theories are compatible with an evolutionary “world-view” if they can pass both David Hume’s general anti-contractarian critique and Friedrich Hayek’s epistemological skepticism against “constructivist rationalism”. Schubert argued that John Rawls’ contractarian approach, if interpreted in a conventionalist way (i.e., with a focus on the idea of a “reflective equilibrium”), can indeed
overcome these hurdles and, thus, serve as a building block of a normative branch within Evolutionary Economics.

Viktor Vanberg (Freiburg) discussed two methodological issues that have been repeatedly raised in the Evolutionary Economics camp. First, he examined the relationship between biological and cultural evolution. What are their commonalities and their differences? According to Vanberg, the fact that human intentionality and deliberate institutional design play a key role in cultural evolution does not necessarily contradict a “Universal Darwinism” approach in economics. He argued that the Darwinian concepts of variation, selection and retention are compatible with the recognition of particulars in the sphere of cultural processes. Second, Vanberg explored a proposal made by Witt according to which the fact that cultural evolution is, at least partly, man-made suggests that man should also be able to evaluate the results of cultural evolution. Vanberg agreed and proposed to use a contractarian approach to guide the human attempt to deliberately impose constitutional constraints on socio-economic evolution.

Finally, Gerhard Wegner (Erfurt) examined the question of how institutional safeguards can be devised that make sure that legal norms which regulate market activities remain largely consistent with individual preferences. He considered legal competition as a potential remedy. Although the mere idea of replacing the legislative monopoly of the state by a ‘market-like’ competition among legal rules suggests a radical redefinition of the idea of a state, Wegner showed that the concept is not purely fictitious. It has rather emerged, if in an unintended way, as a practical result of the EU treaty and its interpretation by the European Court. Hence, legal competition is a key factor in the evolution of designed (regulatory) institutions in the European Union. By choosing different goods consumers can choose different regulatory rules without ever having to leave their country. Wegner critically discussed objections (made by, for example, Sinn) against the workability of legal competition and concludes that its welfare implications are largely positive.


### 4.2.3 Evaluating Economic Change: The Normative Side

A key conjecture that can be derived from an evolutionary perspective on utilitarian theory is that the utility people derive from their actions is subject to learning, habituation, and sensory refinement. In this research area, the implications of this conjecture for the assessment of welfare and other normative criteria for rating economic outcomes are investigated. The notion of welfare improvements crucially hinges on evaluating economic states at successive points in time on the basis of time-invariable individual preferences. However, in an evolutionary perspective this is a counter-factual assumption about preferences. Ways have to be found to assess the outcome of economic change in the presence of a co-evolving evaluative basis – a task important also for the underpinnings of economics policy making.

### Evolutionary Economics and Normativity

Christian Schubert *(ongoing project)*

Evolutionary Economics still lacks a well-developed normative branch, i.e., a conceptual framework that allows one to critically discuss the quality of alternative policy goals and criteria to evaluate policy interventions (Witt 1996, Vanberg 2006). This project aims at developing such a framework (for first results, see Schubert 2006 and the subsequent project description).
What does the evolutionary perspective on economic behavior entail? First, individual preferences are subject to endogenous change. This causes well-known problems of inconsistency in any orthodox welfare theory that is based on the idea of deriving social welfare judgments by aggregating given preference orderings. Moreover, it cannot be safely assumed that individual preferences are consistent or that they are formed on the basis of perfect, unbiased information. Second, knowledge of policy problems and problem solutions is incomplete and fallible. Thus, the epistemic base of collective decisions cannot be taken to be given a priori. Rather, from an evolutionary viewpoint policy-making is rather concerned with the challenge of how best to generate new (positive and normative) knowledge on policy problems and problem solutions (Witt 2003). Third, to assume continuingly changing open social systems excludes the option to postulate the existence of any ‘social goal’ in an aprioristic way. Rather, social values and policy goals are themselves the product of ongoing processes of cultural evolution (Sartorius 2002). In other words, while cultural evolution has, of course, no ‘telos’ per se, real-world individuals do ascribe historically and culturally contingent aims and purposes to it. To illustrate, they arguably do not wish to be negatively affected by technological novelty in a systematic or discriminatory way. From the viewpoint of Normative Individualism, it is essential to identify these preferences (i.e., their origin, content and the way they change over time) in order to develop convincing hypothetical imperatives. Presumably, these would not only focus on the promotion of economic novelty, but also on the ‘fair’ distribution of the costs and benefits involved.

The present project aims at exploring two, arguably complementary, ways towards a normative theory that takes these conceptual challenges into account. First, from a contractarian perspective, it is suggested that a naturalistic approach to the key elements of the social contract model could be a fruitful way to root normative reasoning within both the universal elements of human preferences and the non-universal (informal) institutional structure of a given society (see Cordes/Schubert 2005, arguing against the related approach of Binmore 2005). Put differently, the ‘original position’ concept, a key component of the contractarian framework, is endogenized by basing it on positive insights on human empathy and the functions of empathetic preferences in both coordinating interactive behavior and in evaluating its results (see Cordes 2004 on the anthropologist and psychological background). Moreover, social norms are identified as shaping individual value judgments and preferences concerning the ‘fairness’ of economic processes and (temporary) states. Incorporating them in the contractarian methodology makes it possible to overcome the radically subjectivist orientation that still prevents, e.g., Constitutional Economics from delivering substantive and convincing advice on policy issues. Note that this approach also implies a further reorientation in the analysis of collective decision-making procedures: They are not conceptualized as mechanisms to aggregate given preferences, but rather as tools to organize social learning processes. Hence, variable preferences are not regarded as preventing the derivation of (a perfect end-state of) consistent social goals, but as a potential source of new normative knowledge.

The second methodological tool that might be used in our task is utilitarianism. While in its modern version (that underlies the new welfare economics), the utilitarian calculus is (i) exclusively geared toward the comparative evaluation of end-states, and is (ii) based on the assumption of fixed and given preferences, these key elements (being, of course, incompatible with an evolutionary world-view) may be overcome and reformulated by a reconstruction of classical utilitarian insights into the material determinants of human well-being (Witt 2005; see also Ng 2003). Since the essential normative conclusions of orthodox welfare theory assume the absence of (for instance) distributional and procedural preferences on the part of the individuals concerned, these will presumably have to be revised in light of such a psychologically informed ‘evolutionary welfare economics’. When individual preferences are no longer treated as a ‘black box’, however, the basic principle of welfare economics, viz. Normative Individualism, has to be redefined. When the traditional assumption of constant preferences gives way to an open set of preference paths, the basis for an individualistic concept of ‘progress’ can be reconstructed in two ways. Either the set of normatively relevant preference paths is restricted to those that reflect adaptive change and represent utility ‘improvements’ (v.Weizsäcker 2005), or welfare economics is refocused toward the maximization of individual ‘opportunities’ instead of preference satisfaction (Sugden 2004). From a naturalistic perspective both approaches, while insufficient on their own, may be integrated in an overarching concept of ‘developmental individualism’ (Schubert 2005).
References


Assessing Welfare When Preferences Change

Martin Binder (ongoing project)

In common understanding, the utility an individual derives from the consumption of a bundle of goods is constrained by the individual’s income which only allows for the consumption of a certain amount of goods. The individual is assumed to maximize utility subject to the income constraint. What goods are actually consumed depends on the preferences of the individual which are usually assumed to be (exogenously) given and stable over time (preferences are inferred from observed behavior in the theory of revealed preference).

Expanding this method from microeconomic theory to welfare economics leads to what A. Sen has called "black-hole"-welfare economics (Sen 1987). By assessing the goodness of economic states (or policies) by comparing them with other economic states (policies) assuming self-interested behavior and constant and given preferences, welfare economics is partly based on counter-factual foundations. Moreover, as so-called first-best solutions, the few fundamental theorems of welfare economics that can be derived on the abstract basis have very little practical impact.

Furthermore, no ethical considerations are allowed in welfare economics (though in everyday life, they play a vital role). Within an evolutionary approach, the assessment of the desirability of certain economic developments (the normative counterpart to static welfare assessments) cannot be based on the assumption of exogenously given, unchanging individual preferences. A positive theory of preferences and the way they can change is needed and has to be taken as the basis for ethical reflections that may broaden the normative foundations. To maintain the hedonic, utilitarian frame, an attempt can be made to align the
desired evolutionary theory of preferences with a „sensory utilitarianism“ as suggested by Witt (2000, 2005). (This would also be in accordance with the „consilience“-argument for the unity of sciences, cf. Wilson 1998).

In this project an attempt is made to extend such an approach to the normative assessment of economic developments. Learning theories will be employed to explain how individual changes come about and how future preferences could be like.

Currently explored research questions include the following: How does such an approach relate to Sen's welfare economics? Could a (neo-)pragmatist justification for a normative theory of evolutionary welfare economics be given? How are insights from happiness research to be fruitfully used in evolutionary welfare economics?

Reference


Papers on Economics and Evolution

# 0501: C. Cordes and C. Schubert
Toward a Naturalistic Foundation of the Social Contract

This paper delivers a step toward a naturalistic foundation of the social contract. While mainstream social contract theory is based on an original position model that is defined in an aprioristic way, we endogenize its key elements, i.e., develop them out of the individuals’ moral common sense. To this end, the biological and social basis of moral intuitions and empathy are explored. In this context, a key adaptation during evolution was the one that enabled humans to understand conspecifics as intentional agents. Since these aspects of behavior are considered to be an exaptation, they are not amenable to direct genetic explanations or to rationality-based approaches.

# 0517: C. Schubert
A Note on the Principle of ‘Normative Individualism’

According to the principle of Normative Individualism, the evaluation of economic states and processes should be guided exclusively by the wishes of the individuals who are seen as the only bearer of values. Despite its intuitive appeal and its almost universal acceptance in normative economics (i.e., Welfare Economics as well as Constitutional Economics), the principle itself has received only scarce, mostly skeptical attention in the literature. It has even less been discussed from an explicitly evolutionary perspective on human preference formation processes. It is argued that the principle may be made compatible with such a perspective if it is transformed into a concept of „developmental individualism“ that encompasses three sets of criteria, viz. preference-based, opportunity-based and distributive justice criteria.

# 0522: C. Schubert

Fairness in Urban Land Use: An evolutionary contribution to Law & Economics

Markets for complex, multi-faceted goods normally require a complex institutional framework to function properly, i.e., to lead to patterns of outcomes (in terms of static or dynamic efficiency, say) that are deemed acceptable by the individuals involved. This paper exam-
ines the institutional underpinnings of the market for urban land use rights, taking German public and private land use law as a case in point. Urban land use rights are a particularly complex object of exchange in that they generate multi-dimensional utility and imply multi-lateral external effects. Apart from efficiency considerations that have been discussed in the literature (nonconvex production sets, the Tragedy of the Anticommons, etc.), the individuals' attitudes regarding the fairness of (i) the contents of urban land use rights and (ii) the distribution of costs and benefits induced by innovative land uses have been largely neglected. It is argued that investigating the impact of these attitudes (and the underlying informal fairness norms) on the legal treatment of land use rights provides a key opportunity to construct an alternative Law & Economics approach that is not only compatible with an evolutionary perspective on economic land use decisions, but that also takes into account the institutional rules that motivate individual behavior. Many legal rules and procedures cannot be properly understood without recourse to the informal institutional framework of a given society. The paper also explores some normative implications of this insight.

4.2.4 The Development of Firms and Industries

A core area of evolutionary economics is industrial dynamics in the presence of innovative change. Innovations give rise to the emergence of new firms and industries and shape their development. In this research area we connect to the ongoing debate on these topics in evolutionary economics. Some of the empirical projects try to add to the understanding of founding activities and industry life cycles. Other projects try to extend the perspective by drawing attention to the entrepreneurial processes inside the firms that can be expected to interact with the dynamics of the industry. This requires not least to understand how different entrepreneurial governance regimes influence the growth potential of firms and, conversely, how organizational growth challenges the governance regimes that have made it possible.

The Changing Entrepreneurial Role in Firm Organizations — A Cognitive Approach

Ulrich Witt *(completed project)*

The choice between firms and market has been discussed extensively in the literature. It has rarely been framed as an entrepreneurial choice, however (cf. Casson 2000, Foss and Klein 2005). In this project, the role of entrepreneurship in firm organizations has been analyzed with special attention to the often neglected cognitive dimension of the problem. New business opportunities have to be thought up by an entrepreneurial mind and to be developed into a workable business conception. Moreover, to better coordinate the resources in the realization of a business conception, the entrepreneur can try to communicate the business conception to the employees. In the daily face-to-face interactions an attempt can be made to induce them to adopt the business conception as cognitive frame for their own firm-related activities. If, in addition, a supportive model of employee behavior can be established in the firm organization at the level of informal communication, a governance regime can be established that leaves the employees room for own initiative and creative problem solving and fosters their intrinsic motivation.

If successfully implemented, such a governance regime (called „cognitive leadership“, Witt 1998) tends to induce a higher level of work effort on the part of the employees despite the fact that their performance is not tightly monitored. Under the organizational form of ordinary market contracts this is different. All involved parties are engaged in own businesses on the basis of their (separate) business conceptions. Entrepreneurs who pursue their own business conception cannot be made adopt someone else’s conception as a cognitive frame. The motivation to perform and deliver is therefore basically an extrinsic one, contingent on material rewards from trade. If the choice of the organizational form of the firm is combined with the implementation of a cognitive leadership regime, this can thus entail unique ben-
fits to the entrepreneur which are not available under the alternative organizational form of ordinary market contracts.

Whether or not an entrepreneur is indeed able to implement a cognitive leadership regime so that the unique benefits materialize is, of course, a different question. For this question, factors like the entrepreneur’s capabilities and personal characteristics can be expected to be important. Special attention has been given in this project to charismatic leadership factors (cf. e.g., Podsakoff, MacKenzie and Bommer 1996). If a regime of cognitive leadership is successfully established in a firm, organizational coherence and work motivation affect profitability positively and often allow such firms to grow. However, a continued expansion of the firm organization reduces the rate of face-to-face interactions, and thus the influence, of the entrepreneur. At some point, the development overstrains the capacity to keep up cognitive leadership even of the most skilled entrepreneur. At that point, the further development of the organization can enter very different paths with dramatically differing implications for the entrepreneurial role in the organization and the firm’s profitability.

Some of the transitions that occur can be subsumed to a limited number of ideal type developments (Hannan, Burton and Baron 1996; Witt 2005): a phase of degrading organizational coherence and declining profitability often making the firm an object of acquisitions or mergers; a transition to a bureaucratic governance regime with hierarchical controls; an intra-organizational subdivision of entrepreneurship by creating sub-divisions in the corporate organization and by entrusting these divisions to entrepreneurially minded employees as separate spheres of influence and responsibility (offering the possibility of decentralizing a cognitive leadership governance regime). Organizations developing in a way that comes close to these ideal types have frequently been described in business history (cf., e.g., Chandler 1990, McCraw 1999, Murmann 2003). To focus on the changing entrepreneurial role in firm organizations may therefore be considered a fruitful way of approaching organizational change.

References


Cognitive Leadership in Growing Firms

Silke Scheer (ongoing project)

This project investigates the changing characteristics of leadership in growing enterprises from the perspective of organizational and social psychology. Also, insights from cognitive psychology are integrated. Following the underlying theory of cognitive leadership (cf. Witt 1998, 2000, 2003) it is argued that the internal organization of a firm systematically develops in terms of cognitive or entrepreneurial regimes. Founding a firm is a genuinely entrepreneurial act. However, the entrepreneurial input is also crucial to understanding the organizational changes a firm goes through when it is growing.

When an entrepreneur is founding a firm, she does so on the basis of a business conception. This business conception comprises of her business idea as well as the way she wants to realize it. From the business conception, concrete aims can be derived that guide the entrepreneur’s behaviour and decisions as well as her method of leading the employees. The theory of cognitive leadership presumes that the founder of a firm shares her business conception by communicating it in formal as well as informal interactions with her employees. Also, the employees pick it up by observing the behaviour of their colleagues and supervisors (Bandura 1986). Thus, common social norms evolve within the firm (Allison 1992). The entrepreneur aims at putting the business conception, along with the concrete aims derived from it, on the cognitive agenda of her employees. In doing so, the intention is to complement or replace the employees’ cognitive agenda with the aims of the firm. Thus, two problems are solved at the same time: the coordination and the motivation of the employees. Since the employees share the same aims and can use these aims as reference points, it is much easier for them to decide on strategic as well as on operational issues. Also, they are much more likely to opt for the same alternative. At the same time, the employees’ source of motivation tends to shift from being extrinsic to being intrinsic. Whereas extrinsically motivated employees work for external rewards like money etc alone, for intrinsically motivated employees it is decisive that they find their work rewarding in itself. Compared to extrinsic motivation, this kind of motivation is much more useful to the organisation, particularly a creative one, as well as the individual (cf. Bénabou & Tirole 2003).

If the start-up firm manages to be successful the entrepreneur has to recruit new employees in order to deal with the growing workload. The theory of cognitive leadership hypothesizes that from a certain number of employees onwards, the leader is not able to be in regular contact with all of them. Consequently, she cannot make sure that her business conception is shared by the entire workforce. A remedy to this problem is to install a second managerial layer. The task of the members of this second layer is to spread out the business conception among their subordinates, which they themselves have adopted from the entrepreneur. Thus, the coordinating and motivating effect of cognitive leadership can be maintained even in larger firms.

The phenomena described above are researched by the study “Cognitive Leadership in Growing Firms”. In this study, the theory of cognitive leadership is to be tested on the basis of a questionnaire (104 individual questionnaires filled in by the managerial staff and founders of 47 firms, see Figure 1). The lines of business the firms come from are quite diverse ranging from “medical, measurement, control and regulatory technology; optics” to “culture, sports and entertainment” (see Figure 2 and 3). So far, only descriptive analyses have been undertaken with the data. The thorough analysis of the data with a range of other statistical methods is what is aimed for now.
**EVOLUTIONARY ECONOMICS GROUP**

*Research Activities*

**The Development of Firms and Industries**

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**Figures 2 and 3**

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**References**


Organizational Change in Growing Firms: A Developmental Perspective

Hagen Woroch (ongoing project)

The primary objective of this research project is to understand the dynamics of firm organization. A great part of evolutionary economics has been inspired by analogies to the Darwinian theory of natural selection. Evolutionary theories in a broader sense do not necessarily imply selection but also encompass development (understood as a sequence of irreversible and non-repetitive changes). Developmental processes have largely been neglected, although they are crucially important for the growth of, and innovation within, firms. Our research on the theory of the firm pursues a developmental approach to contribute to a broader understanding of economic evolution.

Founding and running a firm as an ongoing concern is genuinely an entrepreneurial act (Witt 1998). Therefore, the analysis of the entrepreneurial input is crucial to a developmental theory of the firm. The firm is an organization, in which an entrepreneurial business conception finds its expression. A business conception is defined as the imagination of an entrepreneur of what to achieve and how to do it (Witt 1998, 162). The imaginative act is a cognitive process in which an entrepreneur builds an understanding of the products or services to be offered, and of how to coordinate their making. At the same time, the employees establish their own understandings of how to perceive and interpret the entrepreneur’s business conception, i.e. the firm’s intention, goals, rules, and procedures. As a result, making sense of what the business conception means and implies may vary among the firm members. The entrepreneur and the employees may have different cognitive frames about the firm’s business conception. Hence, coordinating the workforce within a company is not solely an issue of incentives but also involves establishing and enhancing the firm member’s understanding about the business conception.

Entrepreneurs may convey the company’s business conception to the employees through extensive communication. In fact, they can use such organizational practices as intensive training, apprenticeships and various kinds of socialization to instill a commonly shared understanding of the company’s business conception among the firm’s employees (Caldwell, Chatman and O’Reilly 1990; Chatman 1991; Kim, Cable and Kim 2005). As the firm members make sense of the business conception in the same way, the entrepreneur can coordinate the organization by relying on intrinsic motivation rather than on instructions, incentives and monitoring mechanisms. From a theoretical perspective, the question arises whether firms regularly pass through specific developmental processes – comprising organizational change and structural transformation – that are caused internally by systematic changes in the mode of coordinating employees. A crucial variable in this context is the size of the firm. As the organization grows, the increasing number of employees can hamper the communication process between firm members (Witt 2000; Aldrich 1999). In turn, this then affects the coordination mechanisms. Consequently, it becomes problematic to maintain close levels of communication between the employees and entrepreneurs on such issues as goals, rules, and organizational procedures, i.e. the business conception. The coherence of the organization’s behavior may decline rapidly, thereby generating pressure for organizational change.

This working hypothesis allows one to analyze some patterns of change that seem to regularly appear during a firm’s life span. In this research project, we present detailed case studies of individual firms and related historical material which support several hypotheses of the developmental approach. In particular, it is expected that growing firms reach growth
thresholds. At those points, companies tend to get increasingly involved in the problem of coordinating their daily operations. Reorganizing the coordination structure turns out to be one possible developmental pattern in order to preserve the firm’s competitiveness. The attempt to keep the received structure and to muddle through with coordination deficits is another - most likely less successful - pattern.

Assessing the regularities of organizational change on those thresholds is the purpose of this research project. It aims to identify the characteristics that determine the direction of change. The economic consequences of the different development paths are considered. The impact on profitability and subsequent growth potentials is examined. Furthermore, theoretical and empirical contributions of the organizational ecology approach and its explanatory power are also analyzed. Although organizational ecology started out with the assumption of Darwinian selection operating on a population of unchanging firms, it now increasingly pays attention to change within individual firms. This body of literature is discussed and compared with those implications that are derived from a developmental perspective.

References


A Naturalistic Approach to the Theory of the Firm

Christian Cordes (ongoing project)

In October 2005 a new project has been started that is dedicated to a naturalistic analysis of the evolution of business cultures and that is intended to result in a behavioral enrichment of the theory of the firm. During a one-year stay as a visiting scholar at the University of California at Davis, Department of Environmental Science and Policy, this work will be carried through in collaboration with Peter J. Richerson and members of his group. In joint work with Peter Richerson, a paper titled “A Naturalistic Approach to the Theory of the Firm” has been written in which a first step toward such a behaviorally enriched theory of the firm has been taken. The paper argues that firms exist because they are suitable organizations within which a cooperative regime based on social instincts can be established. In addition, it is shown how an entrepreneur – given these instincts – can shape human behavior within a firm. To illustrate these processes, a model is developed that depicts how the biased transmission of cultural contents via social learning processes within the firm influence employees’ behavior and the performance of the firm. These biases can be traced back to evolved social instincts. We also relate our conclusions to empirical evidence on the performance of different kinds of organizations.

Another paper that belongs to this research project is titled “The Role of ‘Instincts’ in the Development of Corporate Cultures”. Since their emergence during the second half of the nineteenth century, Darwin-inspired, instinct-based theories of human agency have delivered the psychological foundations of American Institutionalism. Therefore, the paper intends to revive the debate on the role of instincts in economics in general and in the analy-
sis of corporate cultures in particular by drawing on insights from contemporary research into the coevolutionary interaction of humans’ cognitive dispositions and their cultural environment. As a result, some social instincts are identified that influence human behavior in an organizational context.

Organizational Problems of Growing Firms and their Repercussions on the Industry Life Cycle

Guido Buenstorf, Christina Guenther and Ulrich Witt (ongoing project)

The life cycle pattern of industries has been characterized by the following stylized facts (Klepper 1997): both entry and exit of firms peak early after an industry’s beginnings. A pronounced shakeout in the number of firms occurs while the market still expands. The importance of process innovations relative to product innovations increases over time. Early entrants tend to perform better than later ones, indicating the presence of a first-mover advantage. In addition, the entrants’ pre-entry experience is crucial for their survival and performance. On average, diversifying entrants with a background in related industries and those that are founded as spinoffs by former employees of industry incumbents do significantly better than other entrants (cf. Klepper and Simons 2000, Agarwal et al. 2004; some industries, in which sub-markets are served by different diversified suppliers and new sub-markets allow for sustained entry into the industry, at least temporarily deviate from these stylized facts).

As an explanation for the stylized facts, particularly the shakeout phenomenon, increasing returns to process innovations have been suggested (Klepper 1996). Larger firms can spread development costs over a larger output base. In the industry’s growth process they can therefore always operate more efficiently than the smaller ones and thus maintain, and possibly expand the initial size differential. In this light, first-mover advantages for early entrants and the shift from product to process innovations follow naturally. However, the growth of a firm always also challenges its organizational capabilities of coordination and learning, and it is not evident that all firms perform equally well in coping with these challenges independent of the size they have already attained.

Differences in their capacity to solve organizational growth problems can also be conjectured to be behind the fact that some of them diversify at a certain stage of their development into another industry, often then even doing better in these industries than the average of the firms. Similarly, the formation of spinoffs in an industry may not only be the effect of asymmetric information between employer and employee (giving rise to opportunistic behavior, cf. Klepper 2001), or of an incumbent firm’s deliberate decision not to preclude all profitable entry opportunities for spinoffs (Klepper and Sleeper 2005). Spinoff activities may also be related to organizational transformations occurring inside incumbent firms when they grow. Organizational growth problems may prevent them from exploit all business opportunities. Entry by spinoffs then becomes a profitable option for certain employees in the incumbent firms, and even their motivation to capture it may be systematically affected by rigidities associated with the incumbent’s organizational growth.

Following these conjectures, this project focuses on the intra-organizational processes of change and their relevance for explaining the stylized facts of industry evolution. Partly drawing on earlier work on organizational development (Witt 2000, Rathe and Witt 2001) it will be explored theoretically and empirically whether the growth of, and changes inside, firms trigger both the formation of new entrants through spinoff formation and diversification strategies of incumbents (cf. Buenstorf 2005, Buenstorf and Witt 2005).

References


Research Activities

Knowledge Transfer through Entrepreneurship and the Evolution of Industries

Guido Buenstorf (ongoing project)

A number of recent studies on industry evolution find systematic effects of pre-entry experience on firm performance. Both diversifying firms from related industries (Klepper and Simons, 2000; Thompson, 2005) and spinoffs organized out of industry incumbents (Klepper, 2002; Klepper and Sleeper, 2005) tend to outperform other entrants, even though the performance effects of specific kinds of pre-entry experience vary widely across industries. These findings suggest that entrants to an industry differ in their capabilities. They thus present a challenge to established economic theories of organizations, industrial organization and geography.

This project adopts a population approach based on collecting rich data for all entrants over the entire lifecycle of select industries, their founders, characteristics and their performance in the industry. In addition, the comparative study of industries with similar characteristics allows for testing the generality of earlier findings, isolation of potential explanatory factors and a better understanding of the capabilities that underlie the differential performance of diversifiers and spinoffs. In 2005 research in this project focused on two issues.

First, data collection for the database on all German laser makers (1973-2003) was finalized. Analysis of the data (Buenstorf, 2005) indicates a number of parallels to earlier findings on the U.S. laser industry (Klepper, 2002; Klepper and Sleeper, 2005). In particular, the laser industries in both countries depart from the widespread “industry life cycle” pattern (Klepper, 1997) in that neither experienced a shakeout in the number of firms, but entry rates remained high and the number of active firms kept increasing over the entire time period under investigation. Furthermore, spinoffs started by ex-employees of incumbent laser firms are prominent among new entrants into the industry in Germany as well as in the U.S.. These firms were distinctively successful, in particular they systematically outperformed firms organized out of universities and public research institutions. A more detailed analysis of the spinoff process shows that, in addition to triggering events such as parent firm acquisitions, the rate of spinoffs out of a given firm is strongly affected by the performance of this firm – better incumbents tend to have more spinoffs than unsuccessful ones. Finally, in the German industry, entrants developing out of distribution firms for imported lasers performed equally well as the spinoffs, which suggests that the superior performance of experienced
entrants was primarily caused by better knowledge of potential markets and customers rather than manufacturing capabilities.

The second line of research, conducted jointly with Steven Klepper of Carnegie Mellon University, focuses on the evolution of the U.S. tire industry (1900-1980). We collected detailed information on the 126 firms entering in the state of Ohio, the historical center of the U.S. tire industry, as well as the backgrounds of their founders. Initially, this information was used to probe how endogenous processes of entry and firm formation, in particular diversification from the rubber industry and the organization of spinoffs out of incumbent firms, contributed to the emergence and evolution of the tire industry cluster in and around Akron, Ohio. Findings on the location choice of tire firms suggest that the Akron cluster developed because more and better firms originated and entered here, not because agglomeration economies attracted founders from other regions. Performance effects of being located in Akron were limited to the spinoffs of leading industry incumbents, whereas other types of new firms did not perform significantly better in Akron than elsewhere (Buenstorf and Klepper, 2005). In addition to their effects on geography, the endogenous processes leading to new entry into an existing industry also condition industry evolution in terms of competition and market concentration more broadly. Ongoing research therefore investigates the role of diversification and spinoff entry in the shakeout dynamics of the industry.

The empirical findings in both lasers and tires indicate that spinoffs are among the most distinctive entrants into an industry. In many industries, they play crucial roles in shaping competition and technological change. (Firestone is the most prominent case in the tire industry, but more recent examples such as Intel or SAP show that spinoffs are of widespread and continuing importance.) Little is known, however, about the factors shaping the spinoff process. In addition to the empirical efforts to identify the role of employee learning in the formation of spinoffs, a companion project – conducted jointly with Christina Guenther and Ulrich Witt – explores the implications of organizational development for the spinoff process.

References


Interdependencies of individual firm development and industry evolution

Christina Guenther (ongoing project)

The question of what conditions determine the success of business enterprises can be attacked in different ways. Two important lines of research which this project tries to consider simultaneously are the theory of the firm and the industry life cycle perspective. The
former deals with the conditions under which an individual firm acts successfully given its characteristic production function (as in the neoclassical theory), its transaction costs (as in the Coaseian approach), or its resources (according to the resource based view).

In contrast to such an individual firm focus, the second branch of literature directs attention to the conditions residing at the industry level. The main aim is to investigate the forces underlying the evolution of an industry and the characteristic features of the individual stages of that evolution (Klepper, 1997).

In an evolutionary perspective, the two levels of analysis are not independent of each other. Rather, a co-evolution of firms and their industries is likely to create significant interaction effects at both levels. Therefore, my research aims at providing first insights into how the findings of the two approaches can be aligned to gain a deeper understanding of this co-evolutionary process.

Within this context three lines of research will be followed: Firstly, the phenomenon of spin-offs (e.g. the foundation of an independent company by employees of an existing company) (Klepper and Sleeper, 2002) at different stages of the industry life cycle and their success will be investigated. The research will focus on structural differences of spin-off formation within the evolution of the industry. A framework will be developed in order to shed light on the interplay of entrepreneurial ambitions and capabilities by individuals, intrafirm developments and the changing market conditions. Especially the incidence of mergers and acquisitions as a triggering event for spin-off formation will be analyzed in detail.

Secondly, based on the theoretical considerations by Penrose (1959), individual firm growth will be inspected with reference to industry growth.

Thirdly, specialization and diversification by individual firms within and beyond certain customer and technology segments will be looked at with respect to the evolution and emergence of new (niche) markets within one industry.

In addition to the construction of a theoretical framework concerning the interdependency of firm development and industry evolution, an empirical investigation will be undertaken. The German machine tool building industry will serve as the basis.

The comprehensive dataset will be constructed by the compilation of several sources, namely the Directory of Machine tool suppliers (‘Red Book’) issued every four years by the Fachgemeinschaft für Werkzeugmaschinen (VDW) and several technical journals like ‘Werkstatttechnik’, ‘VDI-Zeitschrift’, and ‘Werkstatt und Betrieb’.

References

Knowledge Commercialization as Entrepreneurial Process and its Organizational Implications

Ulrich Witt and Christian Zellner (completed project)

New production technologies and products drive the process of economic growth. Both in economic research and in politics one question has therefore attracted increasing interest (cf. Nelson 1993, Salter and Martin 2001): how does new knowledge from scientific research find its way into the commercial part of the innovation system? The working hypothesis in this project is that the transfer is based on several entrepreneurial services (cf. Witt and Zellner 2004). The transfer does not happen unless someone conceives of business opportunities in new scientific knowledge. Then these (often only vague) imaginings have to be transformed into conceptions of how to run an innovative business venture. On that basis, resources – foremost the necessary knowledge resources – have to be attracted and coordinated. Where business organizations already exist, the new knowledge resources must, furthermore, be integrated with the organization’s expertise and capabilities to yield a coherent business conception. It can be argued that each of these services is a core element of knowledge-based entrepreneurship.

Like all forms of entrepreneurship, knowledge-based entrepreneurship is confronted with certain constraints. However, some of are specific in the sense that they result from the peculiarities of scientific knowledge and its mode of transfer (cf. Henrekson and Rosenberg 2001). These specific constraints – which only become apparent once the simplistic reduction of academic science to a knowledge output in encoded form is abandoned (cf. Zellner 2003) – can be conjectured to shape the way in which the commercialization of new technologies is organized. The procedural nature of the knowledge that typically underlies new scientific insights implies that it can only be acquired by being actively engaged in scientific research. Such tacit knowledge is hard, or even impossible, to encode and therefore needs to be carried in embodied form. However, in a rapidly progressing research environment, state-of-the-art tacit knowledge is changing constantly. Without the automatic up-date on the job in a continued involvement in scientific research, privately held tacit knowledge is therefore subject to a relatively rapid debasement effect.

To achieve the knowledge transfer into the commercial sphere, the services of scientifically trained personnel are required. This very special resource requirement implies substantial overhead costs for the venture, unless the entrepreneur is able to provide that service in person, e.g., as a former researcher in an own start-up firm. (This fact may explain why the transfer and commercial exploitation of technological knowledge indeed tends to be a matter of either small entrepreneurial start-up firms or large, incumbent firms, cf. Cohen, Nelson and Walsh 2002). Accordingly, two ways of organizing the transfer are scrutinized in more detail: start-up firms run by former scientists as entrepreneurs and large, incumbent firm organizations with specialized R&D staff. Both compete for the same human resources.

From the point of view of the scientists and engineers who are about to migrate from academic research into the commercial sector that competition results in an entrepreneurial self-sorting process (Witt 1998). These former scientists can realize the commercial value of the technological knowledge they have acquired in academic research either by setting up an own entrepreneurial start-up firm or by becoming employees in the large, incumbent firms. The constraints implied by the tacit, embodied form of knowledge seem to force both organizational solutions to adopt particular knowledge transfer strategies. Start-up firms have to find measures to cope with the decay of the founder’s knowledge as time elapses. The large, incumbent firms have to find ways to make migrating scientists decide in favor of becoming employees and to stabilize this initial outcome of the sorting process in order to prevent spin offs and fissoning at later stages.

References

Knowledge-based entrepreneurship and the commercialisation of new technologies

Christian Zellner (completed project)

The core requirement for successful knowledge-based entrepreneurship is the capability to spot new technological opportunities and pursue these until successful market products or services eventuate. This capability is presumably highly complex, and is itself composed of more basic capabilities whose interactions in the entrepreneurial process are not yet very well understood. Successful entrepreneurship implies coordination in at least two fundamental respects:

1. The technological and the commercial aspects of the venture must be integrated in the entrepreneurial function.
2. New technological opportunities must be integrated with the existing structure of technological knowledge in the firm organization.

Relating to these two fundamental coordination problems, the present project explored how large incumbent firms operate in fluid, uncertain environments that are characterised by rapid technological change. Knowledge-based entrepreneurship can, in principle, exploit technological opportunities regardless of the size of the firm organization. However, the specific way in which this is done may differ with the size of the firm in question. The often asserted difficulties which incumbent firms encounter in the commercialisation process can at least partly be traced to their greater organizational complexity and the extent to which technical functions are separated in the organization from business functions, e.g., financial operations, personnel, etc. (A greater separation of different entrepreneurial functions can ultimately be viewed as a response to the problems that accompany successful firm growth, cf. Witt 2000).

Here, the more general question that arises is how the entrepreneurial coordination task is achieved within a team or peer group of specialists rather than by a single heroic Schumpeterian entrepreneur alone. The need to explore this question is underscored by the fact that large firms try to confer business competencies to R&D staff in addition to their technological expertise. This may indicate that organizational coordination across functions like R&D, production, marketing, financial operations, etc. seems to generate more frictions than the original motif for dividing these functions would have suggested. The approach taken illustrated how the internal coherence of the firm co-determines its success in commercialising technologies that may originate in other parts of the innovation system, including its non-commercial institutions.

One of the main hypotheses explored was that the success of the dispersed coordination efforts in the organisation ("corporate entrepreneurship") is contingent on the career trajectories of the employees involved. This referred in particular to the extent to which employees have had previous exposure to the firm's functional units. It was maintained that this expo-
sure is particularly important for the evaluation of the commercial viability of the proposed ventures. Consequently, it has a strong bearing for both of the coordination problems identified above. Drawing on earlier work on the careers of scientists who migrated from basic research organisations to industry (Zellner 2003), a conceptual framework was developed that enabled one to assess the structure of career trajectories on innovative success more systematically. An interesting area of application of this argument is the – entrepreneurial – mobilisation of resources on the internal capital market of the firm, with the sources of finance incidentally being an aspect of entrepreneurship where large established firms clearly differ from start up firms.

References

Papers on Economics and Evolution
# 0407: G. Buenstorf and S. Klepper

The Origin and Location of Entrants in the Evolution of the U.S. Tire Industry

During its early and formative years, the U.S. tire industry was heavily concentrated around Akron, Ohio. We test the extent to which entrants in Ohio were attracted to the Akron area by agglomeration benefits, contributing to a self-reinforcing process envisioned in many modern theories of geography. We trace the geographic and intellectual heritage of the Ohio entrants and analyze the factors underlying their creation and location at the county level. Our findings suggest it was the creation of entrants, largely spurred by the supply of entrepreneurs, and not the attraction of entrants to the Akron area that fueled the agglomeration of the industry there.

# 0502: G. Buenstorf

How Useful Is Universal Darwinism as a Framework to Study Competition and Industrial Evolution?

The adequate role of Darwinist concepts in evolutionary economics has long been a contentious issue. The controversy has recently been rekindled and modified by the position of “Universal Darwinism”, most prominently favored by Geoffrey Hodgson and Thorbjørn Knudsen. They argue that the ontology of all evolutionary systems accords to the basic Darwinist scheme of variation, selection and inheritance. This paper focuses on the emerging application of the Universal Darwinist framework to the analysis of market competition and industrial evolution and gauges its usefulness for organizing an evolutionary approach to industrial economics. Drawing on both a theoretical discussion and recent empirical findings, it argues that selection and inheritance concepts narrowly construed after the biological example are of limited help in studying markets and industries. As an alternative to the ‘top-down’ approach of Universal Darwinism, ‘bottom-up’ causal theories are suggested that explain how the interplay of descent, experience and learning shapes the competitive performance of firms in the evolution of industries.

# 0504: U. Witt and C. Zellner

Knowledge-based Entrepreneurship: The Organizational Side of Technology Commercialization

New knowledge with commercial potential is continually created in academic institutions. How is it turned into economically valuable businesses? This paper argues that the transfer
is an entrepreneurial process. To understand this, the actions and the constraints characteristic for the entrepreneurial reshaping of the division of labor must be recognized. In the case of knowledge-based entrepreneurship, specific constraints result from the peculiarities of scientific knowledge – epitomized by contrasting tacit and encoded knowledge. Scientifically trained labor is required for transferring both forms of knowledge. However, the mode of transfer differs crucially and shapes the organizational form of commercializing new scientific knowledge.

forthcoming in: S. Brusoni, F. Malerba (eds), Perspectives on the Economics of Innovation, Cambridge: Cambridge University Press.

# 0508: G. Buenstorf and S. Klepper

Heritage and Agglomeration: The Akron Tire Cluster Revisited

We use new data on the location and background of entrants into the U.S. tire industry to analyze the factors that caused the industry to be so regionally concentrated around Akron, Ohio, a small city with no particular advantages for tire production. We analyze the states where firms entered and for the Ohio entrants the counties where they originated and entered, and we conduct various analyses of how proximity to other tire firms and to demanders affected the longevity of tire producers. We also examine how the heritage of the Ohio entrants influenced their longevity. Our findings suggest that the Akron tire cluster grew primarily through a process of organizational reproduction and heredity rather than through agglomeration economies, as has been commonly posited by scholars of the industry.

# 0510: U. Witt

Firms as Realizations of Entrepreneurial Visions

In the debate on why firms exist, the question of who chooses between firms and markets and on what basis is rarely addressed. This paper argues that the choice is a core element of the entrepreneurial pursuit of visions or conceptions of business opportunities. To successfully organize resources into the envisioned businesses – be it via firms or markets – resource owners must be coordinated on the entrepreneur’s conception of the business and be motivated to perform properly. To solve the dual problem, the organizational form of the firm offers the entrepreneur unique advantages not feasible under the organizational form of markets.

# 0520: G. Buenstorf

Evolution on the Shoulders of Giants: Entrepreneurship and Firm Survival in the German Laser Industry

This paper studies 40 years of evolution in the German laser industry to test the generality of evolutionary patterns observed in the U.S. laser industry. Key characteristics found in the U.S. industry are also present in Germany. There is sustained entry into the industry, and neither a shakeout nor first-mover advantages of early entrants are observed. A survival analysis finds that similar to the U.S. industry, laser firm spin-offs were systematically more successful than academic startups. Differences in survival and determinants of the spin-off process are traced for alternative kinds of spin-offs, including firms started by serial entrepreneurs.
4.2.5 Local Industrial Dynamics

In this research area we inquire into the interdependencies between local entrepreneurial founding activities, innovativeness, and the spatial distribution of industrial activities. This is a topic that has attracted considerable interest among both academic economists and policy makers. After extensive theoretical work on the topic in the past years, conducted particularly by Thomas Brenner, the bulk of the projects is now devoted to empirical tests and applications of earlier developed hypotheses and their ramifications. First implications for regional industrial and developmental policies can also already be derived.

Intra- and Interindustrial Co-Location, Local Resources and Innovation

Thomas Brenner (ongoing project)

The geographic concentration of industries has attracted enormous interest from economists, geographers, and policymakers in recent years. This project contributes to this research in five ways. First, we develop a stochastic model of the industrial dynamics in space. Second, Germany's distribution of local industry-specific economic activity is examined. Third, the impact of various factors, such as different local resources and the local activity in other industries, on this distribution is studied. Fourth, a meta study of case studies in the context of local clusters is conducted to compare the above results with findings in the literature. Fifth, we empirically investigate how various circumstances influence firm innovativeness.

We focus on the spatial distribution of firms of an industry. This distribution changes if firms enter or exit or if firms move from one location to another (which is interpreted in the theoretical model as a combination of exit and entry). We model these processes explicitly and assume that the likelihood of exits and entries depends on local factors, such as the available human capital, the population density, and the existence of public research. In addition, the existence of other industries in the region (because of spillovers and buyer-supplier relations) and of the industry itself matter (see Brenner 2004 for an extensive discussion). The resulting model can be analytically solved, and predictions for the spatial distribution of industries can be made.

Because of the intra-industrial interdependence of location decisions, the firms of one industry are often located in one or a few regions. Given some additional characteristics, these agglomerations are called local clusters. In the literature, it has been shown that a uniform distribution in space can be statistically rejected for many industries. The existence of industry-specific agglomerations, which can in most cases not be explained by the location of natural resources, is examined in this project for Germany. To this end, the number of employees is studied for 222 different industries in Germany. We then classify the regions according to the number of workers in the region who are employed in the industry under
consideration: The results are depicted in Figures 1 and 2. These show that for a number of industries the resulting distribution is bimodal. To prove this fact, two different methods are applied. First, the fit of a unimodal distribution is statistically compared to the fit of a bimodal distribution (see Brenner 2006). Second, the kernel of the distribution is calculated, and it is checked whether this kernel is bimodal. Both methods show that more than 50% of the manufacturing industries are characterized by such a bimodal distribution.

The results of the above analysis can be used to identify all local industrial clusters in the 222 studied industries in Germany (see Brenner 2004 and 2006). We then analyze the characteristics of the regions in which these clusters are located. The numbers of local clusters identified in the metal, textile, and glass industry are sufficiently large to compare the characteristics of the respective regions with the characteristics of regions that do not contain such a cluster. It turns out that the regions containing local clusters are not necessarily economically more successful. Naturally, the results differ between the various indicators tested. All things considered, however, the clusters that have existed for several decades seem to have had little impact on the economic situation in a region. This implies that the positive economic effects of local clusters on their region wear off with time.

In order to better understand which other factors influence this concentration of industries in space, the theoretical model of the spatial industrial dynamics is used. This model allows to include, besides the intra-industrial dependencies, all local factors that might have an impact. We consider the number of graduates in different disciplines, the number of inhabitants, the population density, and the amount of applied and basic public research. Furthermore, for each industry all other industries that are significant customers or suppliers, or have a technological relationship are considered. The model is fitted to the empirical data, which allows to check which local factors have an impact and what the spatial distribution looks like. First results show that there are strong differences between industries. Some are more influenced by technologically related other industries while others tend to be located near to their suppliers. Furthermore, different kinds of graduates play an important role for different industries. A detailed analysis of all industries is currently under way.

To be able to compare these results with the findings on local clusters in the literature, a meta study is conducted. According to the cluster theory developed earlier (see Brenner 2004), there are three fundamental types of prerequisites for the emergence of local clusters: a sufficient quality and quantity of supportive local circumstances, some actors and actions to use these circumstances, and the existence of local self-augmenting processes. All factors and mechanisms that are usually discussed can be classified into one of these three types. The theory (Brenner 2004) predicts that only one factor or mechanism of each type is necessary for the emergence of local clusters. In order to test the theoretical predictions and structure the findings in case studies, a meta study including 159 cases of local clusters is conducted to examine the relevance of the different factors and mechanisms. It is found that no factor or mechanism explains all case studies and that their relevance differs between industries, countries, and points in time. Human capital is mentioned most often as
being important, which is in line with our finding that graduates of different subjects play an important role for the location of industries in Germany. However, many other factors also play a role.

Finally, the data on the spatial distribution of industry-specific economic activities in Germany is also used to analyze whether firms in local clusters or agglomerations are more innovative than firms outside such industry-specific agglomerations (see Brökel and Brenner 2005 and Brenner and Greif 2006). Many other local factors are also included in the analysis. The results differ among the industries studied. The common assumption that local clusters enhance the innovativeness of firms is confirmed only for some of these industries: It does not seem to be a general feature.

References


Knowledge Flows and Ambient Condition as Influences on Regional Firms’ Innovativeness

Tom Broekel (ongoing project)

Recently, much attention has been given to regional systems and innovative milieus. Both concepts are based on the argument that innovation has a spatial component. This raises the question why some regions are more innovative than others. Some argue that spillovers make the firms in these regions more innovative, see e.g. Brenner (2004). In this context, the region’s infrastructure and endowment with crucial factors should be the focus of research, since they promote knowledge transfer, facilitate problem-solving, and reduce the risks and cost of innovation (Feldman, 1994).

Essentially, this means that the innovation process is partly based on resources that are location-specific, such as the region’s endowment of scientists, firms of a certain size, human capital, or financial resources, but also cultural, historical and social aspects.

Additionally, many studies have shown that knowledge plays a crucial role in the process of innovation creation, see e.g. Malerba and Orsenigo (1993), Breschi and Lissoni, (2001). Because of the existence of uncodifiable knowledge, which is embodied in the people, it can become sticky, if people are spatially immobile (von Hippel, 1994).

The aim of this project is to combine both aspects: on the one hand, taking the regional factor endowment into account and, on the other hand, analyzing the crucial role of knowledge. Seeing knowledge as the main regional resource for the innovation process, not only the regions’ endowment with knowledge sources is crucial but, more importantly, the use of these sources by the firms. Thus, not the regions’ knowledge infrastructure is the focus of our investigation, but rather the intensity of its actual use, i.e., the factors influencing the knowledge transfers between elements of regional innovation systems.

In order to investigate the mechanisms of knowledge transfers in a regional context, the common knowledge taxonomy of “tacit” (Polanyi, 1958) and codified knowledge is dropped and the differentiation between codified, uncodified but codifiable, contingent uncodifiable, and inherent uncodifiable knowledge used instead. By this distinction, the impact of codifi-
cation on the spatial dimension of knowledge transfers and the relevance of face-to-face communication within regional innovation systems can be evaluated more clearly. Additionally, the “knowing who” (Lundvall, 1992), the search for knowledge (Nelson, 1982), as well as the knowledge transfer via migration of scientists (Zellner and Fornahl, 2002) become important research foci. As Brenner and Greif (2006), Malerba, Orsenigo and Breschi (2000), find variances in the innovativeness of different industries, the potential influence of the independent variables is tested separately for five industries: in-organic chemicals, organic chemicals, automobile/ship/aircraft building, electronics and a mixed branch of optics, medical devices, computer engineering and measurement engineering. The industries are selected because they are fairly innovative and they can be clearly associated with the available patent data. Accordingly, this project focuses on the innovation creation by firms using available regional knowledge sources as additional inputs. Due to the complementarities between internal and external resources, the performance of the firms’ internal innovation process can then be expected to hint at the intensity of their use of external resources. Such an approach has a number of advantages. First, it enables us to identify in a large sample the really outstanding innovative regions, i.e., those that host firms showing a high probability of creating innovations. Second, by investigating these outstanding innovative regions from an evolutionary perspective, socio-economic events, structures and the impact of crucial factors, especially R&D employees’ inter- and intraregional mobility, are subjects of in-depth and long-term analyses. This should generate a deeper understanding of the long-term process that leads to the rise of such efficient regional innovation systems. First results give an insight into the coherence between the endowment of a region with a crucial set of factors and the innovativeness of local firms. Especially variables approximating knowledge sources and human capital have been found to be especially crucial. Further studies will use panel data and efficiency measurement analysis to identify those special regions whose development over time will then be investigated in more detail. A special focus will be on the mobility of highly qualified R&D employees as carriers of an important knowledge transfer.

References

Changes in Regional Firm Founding Activities – A Theoretical Explanation and Empirical Evidence

Dirk Fornahl (completed project)

Recently, a growing share of economic research has been dedicated to the analysis of entrepreneurial and especially start-up activities. The interest in understanding both new business formations in general and specifically what factors influence their geographical distribution and changes in particular is theoretical and practical in nature. This reflects an increasing recognition that these activities have a strong positive impact on national and regional variables, such as the competitiveness & innovativeness of firms as well as the rate of unemployment and, thus, on economic development in general (Audretsch and Fritsch 2003, Audretsch and Keilbach 2004). Moreover, empirical studies show that the regional distribution of entrepreneurial activities is uneven (e.g., Sterner 2000, Bade and Nerlinger 2000, Reynolds et al. 1994), and thus not all regions are able to profit from the positive effects of start-ups.

Besides the static comparison of start-up activities between regions, it can be observed that the national start-up activities change over time. Questions of whether regional start-up activities also change over time, how these take place and which explanations exist for such changes, have not been answered in the literature until now. Since these questions have political as well as theoretical relevance, the present study seeks to contribute to the literature by focusing on “if” and “how” changes in regional industry-specific start-up rates can be identified and explained.

Three main areas of concern have been addressed as follows first, empirical methods for the identification, classification and characterisation of changes in regional founding activities are suggested, second, a conceptual framework for the analysis of reasons for changes in regional start-up activities has been developed, and, third, the conceptual framework is to be supplemented by a detailed analysis of one specific event that influences the founding dynamics: the start-up of a small, successful firm, which has a positive role model effect on other potential founders. This effect as well as the conceptual framework was tested by using empirical research. These three main contributions will be discussed below. Final comments and outlook conclude.
1. Identification, classification and characterisation of changes in regional founding activities

To analyse the reasons for changes in the regional start-up activities, it is necessary to identify those regions in which such a region-specific change in firm founding activities has occurred. For this identification a sample of 15 industries and 49 regions covering the period 1990 to 2001 was selected. The data on the number of start-ups was provided by the Centre for European Economic Research; its data was found to be the most suitable for the analysis. A first step in the identification of short- to medium-term region-specific changes and the reasons for their emergence is a method by which the regional start-up development is normalised. This method abstracts from the general start-up development in an industry as well as the long-term differences between regions in different industries. The core question of the analysis is whether the regional development in start-up activities over the whole period under investigation in an industry is proportional to the general average development in this industry over all regions. If this is not the case, the method leads to the identification of a region in which a change in the founding activities has occurred. Take the case where the level of start-up activities in the region has changed relative to the aggregate development. In a first step of this identification procedure, which is based on the observed start-up rates in the single regions and in the aggregate of all regions, the respective likelihoods with which this number of start-ups is realised for a two-sided 1% confidence interval are calculated. The next step is a calculation of the factor interval by which the development of the regional likelihoods can be transferred to the aggregated ones of the industry at all points in time. If the factor intervals for all points in time under investigation overlap for a particular region and industry, the regional development is proportional to the aggregated one and, thus, no region-specific change occurred. On the other hand, the time series for which the factor intervals do not overlap are those in which a change in the relative start-up activity level took place.

In 22 per cent of the analysed time series such a region-specific change was identified. An examination of the industrial and regional levels showed that many of these changes took place in specific industries (e.g., “Computer and related activities”) and regions (e.g., Düsseldorf, Dresden). In 68 per cent of the cases the regional start-up activities only developed in one direction in comparison to the aggregated development in the industry, i.e., the level of regional founding activities increases or decreases in the industry compared to the general industry development. Regional factors play an important role in these changes and developments. The start-up activities in some regions develop predominantly positively, in other regions they develop negatively, and this simultaneously in different industries. Since, by contrast, the positive and negative developments in the single industries are evenly distributed, this indicates that regional factors lead to positive or negative regional developments over several industries.

In order to further analyse the time series in which a change of the relative position of start-up activities took place, classes of development were built which correspond to stylised developments derived from the conceptual framework. For this purpose, the factor intervals of a time series were assigned to certain levels of firm founding activities. These levels are constructed as follows: the first two levels are assigned to those factor intervals which are the minimum (level 1) and the maximum (level 2) of the development of the time series. If some of the other factor intervals do not overlap with these two levels, one or two new levels are added. Here are the main classes of development:

<table>
<thead>
<tr>
<th>Main classes</th>
<th>Number</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bump / short-term change</td>
<td>37</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>Fast level change</td>
<td>30</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Slow level change</td>
<td>29</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Linear development</td>
<td>22</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 1: Classes of development in regional start-up activities
in between are constructed. These new levels are based on the maximum and minimum of those factor intervals which do not overlap with level 1 or 2. Thus, level 2 becomes level 3 or 4, depending on the number of new levels that are built. This method is applied until all factor intervals are assigned to a certain level of development. The result of this method is a development across 5 levels at most, making it possible to further aggregate the developments in certain classes. To conduct this classification, a content analysis method was used by which changes in the development across the levels were assigned to specific classes by using a classification schema. The results for the classes that were identified most often are presented in table 1. Some developmental patterns are identified frequently (e.g., the short-term changes), in addition to the fact that in most cases the relative level of start-up activities decreases.

2. Conceptual framework for the explanation of changes

In the literature it is analysed how certain levels of regional factors (e.g., population density or human capital) affect start-up activities in a region at a certain point in time. In the present study, an approach was chosen which is complementary to the existing literature. On the one hand, the extension is based on the explicit examination of certain events which lead to changes in regional factors and, on the other hand, process-like information diffusion and over-shootings are considered (Figure 1).

The selection of the analysed events, factors and relationships was based on their relevance as discussed in the existing literature on firm foundings (e.g., the regional factors considered in the study are those cited forward in the literature) or in other economic contexts (e.g., information diffusion and delayed effects). Two factors especially have to be discussed: first, not all events affect all regional factors, and not all dynamic effects are relevant for all events and regional factors. The relevant relationships and processes that are applicable in specific contexts are discussed in the study. Second, the selection of events, factors, etc. is only a first step in endowing the conceptual framework with the most relevant elements. In future research, detailed analyses will be necessary. This has been done exemplarily for the effect of small firms in this study.

In order to link the observed developments (section 1) with the theoretically expected developments discussed in this section (2), expert interviews with representatives of the regional Chambers of Commerce and Industry were conducted in which the region-specific reasons...
for the start-up dynamics were identified. The result was that some events occurred which led to the expected developments. Although it was not possible to exclusively link changes to specific events, some events can be excluded as reasons for some of the developments.

3. Specific event: the start-up of a small, successful firm and its impact as regional role model

To analyse the general and abstract conceptual framework in more depth, one specific event, namely the founding of a small, successful firm, was selected and its impact on regional start-up dynamics examined in detail. This selected event is one example taken from the whole set of events. The other events can and should be examined in future research.

The behaviour of agents is influenced by their mental models and by the information received by the environment. The mental models change over time because of social-cognitive learning processes which result in a change of agents' behaviour. Of specific importance for such changes of mental models is learning based on the observation of other agents' behaviour. These agents serve as behavioural examples or so-called role models. There are two factors that moderate the effect of role models: the diffusion of information about the role model and her behaviour as well as the role model's actual acceptance. This is more likely if the observer and the potential role model are comparable with regard to some individual characteristics.

Since in the present study the focus of analysis was on local start-ups, it was examined whether role models have a specific regional impact Geographical proximity has an effect on the information diffusion about role models and, furthermore, leads to a greater likelihood that social networks emerge and persist over time. These networks in turn result in the social proximity with similar social norms, values and characteristics of network members. This social proximity increases the probability of acceptance of role models. Geographical and social proximity thus positively influence the likelihood that agents learn about the existence and the behaviour of regional role models and that they really accept the latter as such.

The effect of regional role models, in this case successful entrepreneurs, on economic activities discussed in the literature refers to singular case studies describing a general impact without analysing the specific effect on the single agent or potential entrepreneur. In this study, the impact of role models was examined in detail for different stages of the firm founding processes. The most important results are the following: 1) Regional role models of successful founders have a positive effect on the regional population’s attitude towards firm foundings: the willingness to found a firm increases. 2) The sectoral specialisation of the region increases because role models also have an impact on the technological and market orientation of the newly founded firms. 3) The evaluation of the agents’ own individual capabilities and the evaluation of the situation on the market targeted is influenced by the behaviour and decisions of the role models. The overall result of the role model impact are region-specific start-up dynamics which emerge from the interaction of observers and role models and are self-reinforcing in character.

The theoretical analysis was supplemented by an empirical case study of the city of Jena. This case study gathered information in two ways: 93 firms were interviewed by using a detailed questionnaire, and qualitative interviews with 24 experts were conducted. A result of the firm interviews was that 36% of the interviewed founders said that they were positively influenced by other founders from the region. On the one hand, this positive influence was generated by the provision of role models; on the other hand, the potential founders received information relevant for the start-up processes, or the previous founders had a positive effect on the regional factors which in turn were relevant for start-ups. With the present data, it was difficult to identify a statistically significant relationship between regional entrepreneurial role models and regional start-up activities. The role models did not have a significant impact on the number of start-ups in the corresponding years.

The outcome of the qualitative interviews supports the general effect of entrepreneurial role models. Two persons, in particular, were named as relevant for the development of start-ups by the experts: Lothar Späth (the former CEO of Jenoptik) und Stephan Schambach (the founder of Intershop). Again, it was found that different founders / managers can have a different impact on potential entrepreneurs. Lothar Späth influenced the general develop-
ment of the city of Jena and of the regional environmental conditions decisive for start-ups, whereas Stephan Schambach served as a direct regional role model for potential entrepreneurs in Jena. This role model effect was considered by the experts as the most important reason for the increasing start-up dynamics in Jena.

Final comments and outlook

The study shows that region-specific changes in start-up rates do exist. There are regional events or factors which lead to initial changes in the start-up activities relative to the average development in the industry of a region. A method for the identification of these changes was developed which abstracts from industry trends as well as from long-term differences in the level of regional start-up rates. Furthermore, the observed changes were grouped according to certain classes, making them accessible to a comprehensive analysis of their characteristics.

For the explanation of regional start-up dynamics a conceptual framework was designed based on the impact of certain events on regional factors. These factors in turn influence the regional start-up activities. The analysis focused on dynamic relationships between events, factors and start-ups like time lags and over-shooting effects. In addition to the abstract conceptual framework which examines the various events, regional factors and dynamics, a specific event, namely the founding of a new, successful firm, was analysed in detail. The analysis of this event was used as one example to illustrate the processes and suggests a possible way of how to examine the relationships mentioned above. The study found that local positive examples and role models in the person of successful founders do have an impact on regional start-up dynamics.

The study discussed the political implications that can be deduced from the analysis as well as the implications for the emergence of localised industrial cluster (Brenner 2004). Corresponding to the analysis of the role model effect of small firms on regional founding dynamics, it is necessary to examine in detail the impact of other events on the dynamics in order to extend the conceptual framework and test it empirically. In future research, the method used to identify the changes in regional foundings could be applied to other data. An additional examination of firm failures would enhance the quality of the evaluation of changes in regional economic activities. Furthermore, the impact of regional role models could be applied to other entrepreneurial areas, such as the analysis of role models and their impact on innovative activities.

References


Papers on Economics and Evolution

# 0509: T. Broekel and T. Brenner

Local Factors and Innovativeness – An Empirical Analysis of German Patents for Five Industries

A growing body of work emphasizes the role that the spatial component plays in the innovation process. These perspectives brought the region’s infrastructure and its endowment with crucial factors into the focus of research. Given that these factors do significantly influence the innovativeness of local firms, it is important to identify precisely which regional characteristics matter. The aim of this paper is to identify a number of key influences out of a multitude of structural factors that are thought to influence the firm’s innovation activity. We examine more than eighty variables that approximate the financial, geographical and social-economic factor endowment of a region. The variables are tested with a linear and log-linear model. The two staged procedure examines the variable’s bivariate correlation with patent data of five industries. Based on these outcomes multivariate regression models are applied in the second stage. The results for the different models are compared and their advantages and disadvantages are discussed. We find a strong impact of economic agglomeration, extramural science institutions and human capital. In the case of human capital, especially the graduates at the technical colleges are collocated with high regional innovativeness. Furthermore, significant differences are observed for the five industries and for using the two models.

# 0516: T. Brenner

The Regional Industry-size Distribution — An Analysis of all Types of Industries in Germany

This paper studies the distribution of the number of firms and employees in regions and industries. Various predictions for this distribution are deduced from theoretical considerations. Then, the empirical distributions of 198 industries in Germany are analysed. It is found that different kinds of industries show quite different distributions.

Conferences and Workshops

Workshop “Regional Innovativeness - Mechanisms of Knowledge Flows and Accumulation”

Recently, much attention has been drawn to different aspects of regional innovation systems. Concepts like ‘innovative milieus’ and ‘industrial cluster’ try to identify regional key factors and actors enhancing the innovation performance of firms. While some single elements, like the role of universities, have been extensively studied, dynamic processes and interactions between the different actors and players inside a regional innovation system are still little understood. Especially the role of knowledge, its sources, flows, and accumulation seem to be crucial in influencing the regional firms’ innovativeness. Therefore, the workshop aimed at exploring the prominent role knowledge is playing in regional innovation systems with a special focus on knowledge flows and social networks.

Thomas Brenner (Jena) used a stochastic model to simulate the evolution of the spatial firm population for four industries: pharmaceuticals, watches & clocks, TV & radio production, and data processing. Further, local availability of certain resources, such as employees in extramural public research institutes, average wage in the manufacturing section, venture capital firms, etc., and the existence of other industries in a region are included in the model.

By using the data on the spatial distribution of firm sites in Germany, the parameters of the model were estimated and results for the four industries obtained. In the case of pharmaceuticals, local resources, which are most likely to be found in rural and sparsely populated regions, had the strongest impact. Co-location with other industries did not play a role.
Similar results were found for data processing. In this case related industries, such as software development, are not co-located. Opposite results were obtained for TV & radio production and watches & clocks industries. They are concentrated in regions where the movie industry and the medical instruments industry are co-located, respectively.

Victor Slavtechev (Freiberg) investigated the contribution of different inputs, particularly different knowledge sources, to regional patenting output in the framework of a knowledge production function. The sources included, e.g., R & D employment, the size of public research institutions by field of research, and the amount of university external research funds from private firms and public departments. Further, the analysis on the level of German districts took into account characteristics of adjacent regions. As a main result, he found that the quality of university research, a variable approximated by the size of the external funds attracted, contributes to regional innovativeness, while the mere size of universities is unimportant. Accounting for industrial concentration, the analysis also revealed that an optimal level of diversity exists. Thus, Marshall - Arrow - Romer as well as Jacobs - externalities may play some/a certain role.

Ina Dreyer (Aalborg) explored the relation between absorptive capacity and the propensity to collaborate across geographic distances in relation to product innovation. She used qualitative data from two neighboring Danish regions, specifying the location of the most important collaboration partner in relation to product innovation activities. The analysis included latent class estimation to identify different patterns of absorptive capacity and multinomial logistic regression in order to explain the firm's propensity to cross geographic distances toward their most important collaboration partners. The results obtained confirmed that absorptive capacity, measured in terms of employee qualification as well as formal R & D activities, is important for building up a capacity to interact closely with geographically distant partners - but only when local knowledge sources appear to be lacking.

Tom Broekel (Jena) classified technological knowledge into codified, uncodified, but codifiable, and uncodifiable knowledge, instead of the often used concepts of tacit and encoded knowledge. Applying this classification of different knowledge types to a knowledge transfer framework, he examined the crucial roles of spatial distance, information and transaction costs. His theoretical analysis revealed the widely ignored importance of uncodified but codifiable knowledge influencing the pattern and costs of knowledge transfer across geographic distances. Additionally, two transfer mechanisms for this knowledge type, face-to-face communication and codification combined with information transfer via information and communication technology, were compared. Broekel derived a model by which he calculated the critical distance at which the two transfer mechanisms account for the same transfer costs. Using empirical data for Germany, he estimated this distance for the case of knowledge as being equal to one hour of learning, finding it to be less than 100 kilometers. Taking this up, he drew economic conclusions/ found economic implications for the value of knowing-who and the location decision of firms in relation to important knowledge sources.

Erika Uberti (Milan) addressed the multifaceted nature of interregional knowledge transfer through the analysis of four distinct but complementary phenomena: internet hyperlinks, European research networks, EPO co-patent applications, and Erasmus students mobility. By means of/In light of these phenomena, she characterized knowledge as an intrinsic relational structure that connects people and regions. Applying correlation, regression, and network analysis for 308 universities, 110 regions, and 170,900 patent applications, she showed that there exists a positive correlation between knowledge exchange flows, and that these flows are influenced by different types of distance: the geographic, the functional,
and the sectoral one. By using a gravitational model, it was further demonstrated that far from the claim of the "death of distance," geographic distance is still relevant for determining the structure of interregional knowledge flows. Functional and sectoral distances also play a crucial role. This suggests that knowledge flows easily between regions which are similar in terms of their scientific, technological, and sectoral characteristics.

Olav Sorenson (London) investigated whether the observed knowledge diffusion associated with science-based innovation is genuinely an outcome of the norm of openness and incentives for publication, or whether it is simply an artifact of the scientists having at their disposal/ being part of more dispersed social networks that facilitate quicker and wider dissemination of knowledge. His study made use of collaboration information for patents registered with the U.S. Patent Office. A longitudinal database of interpersonal relations among all inventors recorded by the Patent Office since 1975 can be derived from that information. Using this, Sorenson analyzed a sample of 17,264 patents and their citations and references by using a weighted exogenous sampling maximum likelihood estimator, finding science-based patents have a greater probability of being cited. Further, the results showed that innovations that are also (have) associated with/ that are also reflected in/ accompanied by scientific publications appear to diffuse far more rapidly than the ones that do not. Thus, science is identified as another medium that helps overcome the extent to which knowledge is tacit in any given setting and hence depends on direct interpersonal networks of transmission.

Charlie Karlsson (Jönköping) explored the question of whether the variation between regions in knowledge accessibility in a given period explains the variation in the growth performance of Swedish regions in the following period. As a base, he assumes that the potential for human interaction at various spatial scales transforms into potential knowledge flows. Employing an endogenous growth framework, he shows how the potential for knowledge flows at different spatial scales can be modeled using an accessibility approach which allows to apply an ordinary least square estimation. Different regional characteristics, such as change in value added per employee, knowledge intensity of the workforce, patent applications, etc., function as approximation for the accessibility of knowledge sources. Karlsson’s results indicate that the intra-municipal and intra-regional knowledge accessibility are significant and capable of explaining a significant share of the variation in growth of value added per employee. In contrast, interregional knowledge accessibility turned out to be insignificant, indicating that knowledge flows are bounded in space.

Finally, Ron Boschma (Utrecht) presented a case study of the Barletta footwear district in the South of Italy. Based on social network analysis, he demonstrated that the local knowledge network is quite weak and unevenly distributed among the district’s firms. In addition, firm-specific features like absorptive capacity and size were found to have/...size have an impact on the local firm’s innovativeness. They were collected at the firm level through conducting structured interviews with 38 out of the 58 firms involved in the local footwear production. To measure (of) the knowledge relationships between firms, Boschma used the rooster-recall method. The analysis revealed that according to the district’s entrepreneurs, networking is one of the less important sources of knowledge. Further, interfirm learning hardly takes place, because there are no trust-based relationships on which local firms can build. The case study confirms that it is essential to disentangle analytically the influence which the existing firms, their networks, and their location have on the performance of firms in the district in order to find out whether and, if so, in which way geography matters.

A conference volume, edited by Thomas Brenner and Tom Broekel, will be published.
Jena Workshop for Industrial and Regional Development

During recent years the regional economic or innovation system of the City of Jena (Federal State of Thuringia, Germany) has been the unit of analysis for many research projects. The idea behind this workshop was to bring together researchers from many diverse scientific disciplines and academic institutions in order to gain insights from all these complementary viewpoints. This offered the possibility to open up new perspectives for one’s own discipline and to lay the ground for future joint research. The presentations covered a wide range of topics and included theoretical as well as empirical perspectives.

The first presentation was held by Alexander Grimm (Friedrich-Schiller-University, Department of Economic Geography and Regional Development), who dealt with the interactive relationship between innovative activities and cluster formation / development which both positively influence the competitive advantage of regions and nations. A common factor that influences both innovation and clusters is knowledge, its generation and diffusion. Innovation processes are uncertain and complex, and thus, an interactive exchange of knowledge between the involved agents is necessary. This exchange is facilitated if agents are in close geographical and cultural proximity to each other. Cluster formation is the result of high rates of exchanged knowledge by innovative agents. Grimm illustrated his theoretical considerations with a case study of the development of the musical industry in Hamburg.

Kerstin Munsel (Friedrich-Schiller-University, Department of Economic Geography and Regional Development) shed some light on the effect of technology and start-up centres as a political instrument to support regional economic development. Munsel presented the results of an empirical investigation for Thuringia. She compared two groups of firms: those which were located in technology and start-up centres sometime during their existence (lifetime) and those that were not. Her results showed that these centres only have a minor effect on the motivation to start a firm, that the firms inside a centre have external advisers and use external organisations, and that firms that started in such a centre have a small advantage concerning their starting conditions. Furthermore, the firms which where never located in a centre have more employees, a higher turnover, and hold on average more patents. From these findings it can be concluded that such centres do not have a significant impact on regional development and are therefore not a successful instrument to support regional growth.

Dirk Fornahl (Max Planck Institute of Economics, Evolutionary Economics Group) addressed the question of how positive entrepreneurial examples, in this case successful founders of firms, can influence regional entrepreneurial activities by providing role models for other agents. As a starting point, the social and cognitive processes influencing learning processes and, thus, the behaviour of regional agents were analysed. A strong impact on these learning processes is made by regional behavioural role models because geographical and social proximity effects increase the information diffusion and the likelihood of acceptance. With regard to start-up activities, we can conclude that regional positive entrepreneurial examples influence other potential entrepreneurs in different ways during the start-up processes. Based on these effects, a region-specific start-up dynamic emerges which can lead to a specific regional attitude towards firm foundings in the long run. The presentation also contained an empirical part consisting of a case study on the City of Jena. This study could support the general impact of entrepreneurial behavioural examples on other agents’ behaviour.

Elke Schröder (Friedrich-Schiller-University, Department of Developmental Psychology) presented a training programme which aimed to sensitise pupils to their own entrepreneurial capabilities. The idea behind this programme was to provide an environment by designing specific training modules in which pupils could discover their own entrepreneurial characteristics (e.g., motivation, attitude towards risk, creativity, or problem-solving capabilities). Schröder described the structure of the training programme (which took place in
Thuringian schools) as well as the results of the related evaluation study. It was observed that pupils who participated in the programme gained new insights about themselves and learned something about entrepreneurship. Pupils with a high potential to become an entrepreneur in the future increased their interest in entrepreneurship, while pupils with a low potential came to the conclusion that starting a firm was not a good alternative for their own future plans.

Gabriele Beibst (University of Applied Sciences, Department of Marketing) drew attention to the role higher education institutions play in promoting entrepreneurship. Especially German institutions have not served this function very well in the past. The entrepreneurial education and resulting start-ups should be supported by the GET UP initiative, which was one of projects financed by the EXIST programme of the Federal Ministry of Education and Research from 1998 onwards. At the moment, eight higher education institutions in Thuringia and the project coordinator are working together to improve the entrepreneurial climate at the institutions by organising several activities (e.g., networking, coaching, international contacts, or education). An evaluation shows that 445 start-up projects were supervised of which 185 are currently operating. Over 1,000 workplaces were generated, and around 7.7 million euros were used.

Two presentations built upon a survey that was conducted in Jena and in which professors from the Friedrich-Schiller-University and from the University of Applied Sciences, both in Jena, were asked how they source and transfer their knowledge. Some results of this survey in which 174 professors participated were presented by Andrea Gerlach, Thomas Sauer, and Matthias-Wolfgang Stoetzer (University of Applied Sciences, Department of Economics). The first presentation discussed different transfer channels by which knowledge is transmitted from the universities to other organisations and individual agents (e.g., publications, consultancy, or the possibility to use university infrastructure). A closer look at the transfer channels reveals that some of them are evaluated as more important than others and that this evaluation differs between the professors from the Friedrich-Schiller-University and those from the University of Applied Sciences. The supervision of master theses is an important transfer channel for the University of Applied Sciences, while joint research and publication projects are the most relevant channels at universities generally. Most of the transfer channels can be grouped into main categories. These are related to research, teaching, training, and firm founding. The second presentation extended these insights by elaborating on the transfer partners, the regional dimension and the origin of transfer relationships. The most important transfer partners for the Friedrich-Schiller-University come from inside the university sector while partners for the University of Applied Sciences are located outside the public research organisations. A regional analysis shows that the geographical range of transfer channels differs. The promotion of start-ups or own entrepreneurial activities are very strongly locally bounded. Joint research, on the other hand, is mostly conducted with partners from Germany or even on an international basis. The transfer contacts are mostly based on the professor’s own initiative or the inquiry by an organisation which directly contacts a specific professor.

Holger Graf (Friedrich-Schiller-University, Department of Microeconomic Theory) focused his presentation on the patenting activities of organisations from Jena in comparison to such activities in other regional systems. Jena shows the highest patent intensity of East German regions. Here, the number of patents doubled between 1995 and 2001 as did patent intensity. The share of patents with more than
one inventor amounts to around 88%. Of these patents about 15% are held by inventors living in the City of Jena. By comparison, the rate of such internal patents is below 5% for West German regions. An examination of the linkages between different patenting organisations by the use of social network analysis shows that the structure of the co-patenting networks differs significantly between East German regions concerning density and centrality of the networks.

Dietmar Bastian (Friedrich-Schiller-University, Department of Comparative Government) continued with a study on networks and cooperation. He examined the networks and recruiting dynamics of biotechnology firms in several regions in the U.S., Europe, and Germany. A first finding is that most of the cooperation takes place within or between the U.S. East Coast, Europe, and Germany. For German regions around 60% of the cooperation is with other German regions. For most other European regions this percentage is much lower (around 40%). For U.S. regions, on the other hand, this share of national cooperation is higher at around 70-80%. The recruiting patterns show that in the U.S. only around 20% of the employees from universities are recruited locally. For the EU regions this share is around double. For some EU regions the share even reaches more than 80%. A different picture emerges for employees from firms. Here, around 74% of the employees recruited by U.S. firms originate from the same firm or from the region, while in EU regions this share lies at around 58%.

In the final discussion, Guido Bünstorf (Max Planck Institute of Economics, Evolutionary Economics Group) suggested a joint project which could make research on the Jena system of innovation easier. A great deal of research has been done on the Jena system of innovation in the past decade. Researchers from a variety of fields and disciplines have studied different aspects of this system, adopting a wide range of methodologies. In the course of these research activities, substantial knowledge has been accumulated. The objective of the suggested project (called 'STAPEL Stadt Jena') is to integrate and organise this knowledge into a joint database, and to make it available to the community of researchers working on the Jena system of innovation. Both the broad basis of past research as a starting point and the existing network of contacts between researchers working on the Jena system of innovation offer an opportunity to develop an exemplary longitudinal database on how a regional system of innovation develops over time.

This suggestion of a joint project was discussed by the attending researchers, and as a result all agreed to start the project off by implementing an internet platform on which information on past and ongoing research can be accessed.

4.3 Activities in Undergraduate Education

University of Jena - Lectures

Winter Term 2003/2004
Uta-Maria Niederle, Christian Schubert, Georg von Wangenheim, Ulrich Witt:
Theory of change of economic institutions

Summer Term 2004
Thomas Brenner: Applied, computer-based statistics
Thomas Brenner: Systems of Innovation – theoretical and political aspects
Christian Schubert, Ulrich Witt: Law and economics

Winter Term 2004/2005
Guido Buenstorf, Ulrich Witt: Entrepreneurship and market dynamics
Christian Schubert, Ulrich Witt: Evolutionary economics – conception and methodology
**Summer Term 2005**
Thomas Brenner: *Systems of Innovation - theoretical and political aspects*

**Winter Term 2005/2006**
Christian Schubert, Ulrich Witt: *Normative Economics*
Thomas Brenner: *Computer-based, applied statistics*

**University of Jena - Seminars**

**Winter Term 2003/2004**
Thomas Brenner: *Political possibilities in systems of innovation*

**Summer Term 2004**
Georg von Wangenheim: *Public choice*

**Winter Term 2004/2005**
Thomas Brenner: *Political possibilities in systems of innovation*

**Summer Term 2005**
Guido Buenstorf, Dirk Fornahl, Ulrich Witt: *Entrepreneurship - Forms, Determinants and Effects on Industry Evolution*

**Winter Term 2005/2006**
Thomas Brenner: *Political possibilities in systems of innovation*

**Other Universities**

**Winter Term 2004/2005**
Lectures Thomas Brenner:
University of Aalborg: *Analysis and Simulation of Complex Systems*
University of Graz: *Methods of Operation Research*

Seminars Thomas Brenner:
University of Graz: *Methods of Operation Research*

**Summer Term 2005**
Lectures Thomas Brenner:
University of Stuttgart-Hohenheim: *Innovation Economics*

Seminars Thomas Brenner:
University of Stuttgart-Hohenheim: *Studies of Industrial Clustering*
University of Aalborg: *Policy measures in innovation systems*
4.4 Seminar Presentations

**March 31, 2004**
Guido Bünstorf
*Why (evolutionary) Economics should worry less about selection and more about descendance and heredity: Conceptual arguments and evidence from industrial evolution*

Silke Scheer
*Foundations of the cognitive leadership theory: Drawing on cognitive psychology, the psychology of learning, and the concepts of social norms*

Hagen Worch
*Growth thresholds as a recurring pattern of organizational development*

**April 21, 2004**
Andreas Chai
*From moral sentiments to consumer sentiments: A Smithian approach to the coevolution of novelty demand and market standards*

Alexander Frenzel Baudisch
*Consumer choice in an evolving cognitive architecture*

**June 29, 2004**
Alexander Frenzel Baudisch
*Towards an empirical analysis of changing consumer behavior*

Christian Zellner
*Culture and emerging consumption patterns in low-income countries*

**July 28, 2004**
Christian Cordes
*Long-term development in human labor and their political implications*

Franz M. Schaper
*Knowledge and the production process: Some first thoughts*

Hagen Worch
*The growth of the firm and its developmental stages*

**November 03, 2004**
Franz M Schaper
*Knowledge and the production process: A view from epistemology*

**February 09, 2005**
Silke Scheer
*Changing characteristics of leadership in growing firms: Analysis of the data*

Hagen Worch
*Three case studies: Southwest Airlines, Arthur Andersen & Co., and Siemens & Halske*

Ulrich Witt
*Knowledge-based entrepreneurship: The organizational side of technology commercialization*
March 09, 2005
Franz M Schaper
Understanding knowledge: New growth, production and the knowledge factor

June 08, 2005
Andreas Chai
Savin’ oop twelve bloody months for t’sake a going away for a week

Alexander Frenzel
Evolving heterogeneity of consumer behavior
Panel analysis of preference formation in the German footwear market 1980-91

August 03, 2005
Tom Brökel
Framing elements of innovation creation

Thomas Brenner
Distribution of Industries ? The German Case?

August 17, 2005
Claudia Werker
Regional Dynamics and Learning Innovation Policy

Hagen Worch
A Cognitive Theory of Firm Development

Saradindu Bhaduri
Education, Experience, and the Cognitive Capacity of Entrepreneurs: Some Econometric Evidence from the Indian Pharmaceutical Industry

September 06, 2005
Martin Binder
Welfare economics when preferences change

Franz M. Schaper
The producer’s Linearization problem
Human cognition and the role of knowledge in production

September 21, 2005
Andreas Chai
Learning to consume organized tourism

September 27, 2005
Guido Bünstorf
Firm development as a driver of industry evolution
Some predictions derived from theoretical work

Christina Günther
Blunt diversification as the key to success?
A first step towards an integrative framework of industry life cycles and the theory of the firm
4.5 Lectures

February 2004

**Friedrich Schneider, Linz (Austria)**
Analyse von Finanzströmen islamischer Terror-Organisationen

**Frank Beckenbach, Kassel (Germany)**
On the Microeconomics of Invention and Innovation

**Wilhelm Ruprecht, Berlin (Germany)**
Fortschritt und Sicherheit in der alternden Gesellschaft

March 2004

**Thomas Lux, Leipzig (Germany)**
Genetic Learning as an Explanation of the Stylized Facts of Foreign Exchange Markets

**Michael Peneder, Vienna (Austria)**
A sectoral taxonomy of educational intensity. A statistical cluster analysis

**Eva Ebenhöh, Osnabrück (Germany)**
Agent based models of ultimatum games using experimental data and theory

**Nathalie Lazaric, Nizza (France)**
How to operationalize the routines concept ?: A theoretical and methodological discussion and a presentation of a case study.

**Steve Pejovich, College Station (USA)**
The uneven results of institutional changes in Central and Eastern Europe: The role of culture

April 2004

**Tobias Roetheli, Erfurt (Germany)**
Estimation of an Evolutionary Model of Competitive Concentration

**Paul Windrum, Manchester (UK)**
Unlocking Lock-ins and New Cycles of Innovation: Late Entrants and Changing Geographies of Global Production in the Camera and Computer Industries

May 2004

**Michael Neugart, Chemnitz, (Germany)**
Labor Market Policy Evaluation with ACE

**Harold Demsetz, Los Angeles (USA)**
Transaction Cost Confusions:Firms and Externalities

**Pierre Garello, Aix-en-Provence (France)**
Organizations and Orders: Two Types of Norms for Two Types of Rules

**William Wadman, Wilmington (USA)**
Income and Substitution Effects

June 2004

**Guido Bünstorf, Jena, (Germany)**
Industry Evolution in a Giant's Shadow - Lasers in Germany

**Rainer Voßkamp, Berlin (Germany)**
Schumpeterian Competition, Product Variety and Growth

**Taisei Kaizoji, Tokyo (Japan)**
Booms and Bursts of Asset Markets Empirical Results and a Stochastic Model

July 2004

**Christian Schubert, Jena (Germany)**
Towards a Substantive Utilitarian Concept of Socio-Economic 'Progress'
Ulrich Witt, Jena (Germany)
What Do Evolutionary Economists Deem Important?

Maik Schneider, Heidelberg (Germany)
Wissen und Technologischer Wandel

August 2004

Gerhard Scherhorn, Wuppertal (Germany)
Sustainability Reinvented: Lessons from an inquiry into the limits to consumer sovereignty

Andreas Chai, Jena (Germany)
National Systems of Imagination: Economic development's influence on the evolving British demand for the holiday resort and the systematic production of 'imagined goods'

Eric J. Johnson, New York (USA)
Loss Aversion: Aspects, Donations and Individual Differences

September 2004

Guido Bünstorf, Jena (Germany)
Heritage and Agglomeration: The Akron Tire Cluster Revisited

Ulrich Witt, Jena (Germany)
A Few Propositions About Novelty

Frederic L. Pryor, Swarthmore (USA)
What Does It Mean to Be Human? A Comparison of Primate Economies

October 2004

Frederic L. Pryor, Swarthmore (USA)
Economic Systems of Industrialized Nations: Their Impact and their Evolution

Marco Lehmann-Waffenschmidt, Dresden (Germany)
Mentality Matters - T. Veblens 'Regime of Status' und Max Webers 'Protestantische Ethik' aus der Sicht des (radikalen) Konstruktivismus. Eine Anwendung auf die ökonomischen Probleme des deutschen Wiedervereinigungsprozesses

Erik Stam, Utrecht (Netherlands)
The Growth and Spatial Organization of Young Firms: Evolutionary Perspectives

Jürgen Mimkes, Paderborn (Germany)
On entropy, novelty and heterogeneity

November 2004

Malte Faber, Heidelberg (Germany)
Die Geschichte der Soda-Chlorchemie. Wirtschaftsphilosophische Überlegungen

Jan Nill, Berlin (Germany)
Nischen, Zeitfenster und techno-ökonomische Wegweiser. Elemente eines evolutorischen Phasenmodells techno-ökonomischen Wandels jenseits der Lebenszyklusmetapher

Pavel Pelikan, Stockholm (Sweden)
Organizing and self-organizing in economics and in biology: the least familiar function of genes that can teach economists more than Darwinism

Georg Holtz, Osnabrück (Germany)
A model based approach to technological succession

December 2004

Ping Chen, Beijing (China)
Needham's Question, Adam Smith Dilemma, and Roots of Creative Destruction: An Alternative View from Market-Share Competition in Division of Labor

Alexander Field, Santa Clara (USA)
Group selection and economic theory
Ping Chen, Beijing (China)  
Nonlinear Trends, Persistent Cycles, and Random Shocks in Live Market: Frisch Fantasy, Lucas Fallacy, and Equilibrium Illusion in Macro Dynamics

Reinoud Joosten, Enschede (Netherlands)  
Bathroom Games

January 2005

Chrysostomos Mantzavinos, Witten-Herdecke (Germany)  
Learning, institutions, and economic performance

Saradindu Bhaduri, Jena (Germany)  
How sustainable is the agricultural transformation in trans-himalayan cold desert of spiti? A co-evolutionary perspective

February 2005

Rögnvaldur Sæmundsson, Reykjavik (Iceland)  
Conceptualizing the growth process in young technology-based firms

Michael Dahl, Aalborg (Denmark)  
Are you experienced?

Alexander Gerybadze, Hohenheim (Germany)  
Global innovation: multinational corporations vs. regional competence clusters

Peter Kenning, Münster (Germany)  
Economic decision making – some insights from neuroeconomics

March 2005

Harald Wiese, Leipzig (Germany)  
What price a left glove

Robert A. Lowe, Pittsburgh (USA)  
Overoptimism and the Performance of Entrepreneurial Firms

April 2005

Peter Leeson, Fairfax (USA)  
Trading with bandits

Wilfred Dolfsma, Rotterdam (The Netherlands)  
How to be better prepared for a paradigm shift in economic theory, and write better articles in the meantime

May 2005

Klaus Nathusius, Kassel (Germany)  
Das START Netzwerk für Intra+Entrepreneurship im EXIST-Programm - Theoretische Fundierung, Umsetzungsstatus und Erkenntnisse zur Einführung des Entrepreneurship-Themas an deutschen Hochschulen

Rüdiger Soltwedel, Kiel (Germany)  
Räumliche Implikationen der Internetökonomie - räumliche Implikationen für Innovationen?"

June 2005

Roger Koppl, Madison (USA)  
Market processes and entrepreneurial studies

Christoph Lütge, München (Germany)  
Naturalistische Normativität

Alain Marciano, Reims (France)  
Economists on Darwin’s theory of social evolution and human behavior
July 2005

**Philip McCann, Reading (UK)**
Innovation, clustering and agglomeration: Evidence from the UK and Finland

August 2005

**Nils Goldschmidt, Freiburg (Germany)**
Anthropology as the basic science of economic theory. Towards a cultural theory of economics

**Christian Cordes, Jena (Germany)**
A potential limit of competition: The Human Stain

October 2005

**Tobias Thomas and Markus Göbel, Hamburg (Germany)**
Evolution, institutions and the ‘Weaknesses’ of human behavior

**Brian Loasby, Stirling (Scotland)**
A cognitive perspective on entrepreneurship and the firm

**Franco Malerba, Milan (Italy)**
Innovation and industrial dynamics: progress and challenges

**Franco Malerba, Milan (Italy)**
The dynamics of vertical integration and specialization in industry evolution: a history friendly model

**Kerstin Wolter, Duisburg (Germany)**
A life cycle for clusters? The dynamics of agglomeration, change and adaptation

November 2005

**Christian Schubert, Jena (Germany)**
A note on the principle of ‘Normative Individualism’

**Anne Otto, Saarbrücken and Antje Weyh, Chemnitz (Germany)**
Die Betriebsdatei der Beschäftigtenstatistik als Gründungsdatenquelle und empirische Anwendungen

**Christopher Lloyd, Armidale (Australia)**
Evolutionary realism and economic history

December 2005

**Elke Kurz-Milcke, Ludwigsburg Germany**
Erfahrungsbericht aus der kognitiv-historischen Ethnographie: Wie geht das mit neuem Wissen in einer Laborwissenschaft?

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**Lectiones Jenenses**

April 21, 2004, Alan Kirman, Marseille, (France)
*The Economy as a Complex System*
4.6 Visiting Scholars

In 2004/2005 the following guest scholars stayed at our institute for a lot of interesting exchange and mutual research (guests are listed in alphabetical order):

**Ambrosino, Angela (January 15 – April 17, 2005)**
PhD Candidate, Department of Economics, University of Torino, Italy
Research Interests: Institutional Economics, Law and Economics, and Cognitive Economics

**Belussi, Fiorenza (December 13 – 22, 2004 and January 5 – 26, 2005)**
Professor at the Economics Department of the University of Padova, Italy
Research Interests: Industrial Dynamics, Regional Economics, and Industrial Districts.

**Chen, Ping (November 17 – December 15, 2004)**
Professor of Economics at the Ilya Prigogine Center, University of Texas at Austin, and the China Center for Economic Research at Beijing University.
Research Interests: Chaos Theory & Nonlinear Stochastic Dynamics of Business Cycles, Evolutionary Dynamics of Division of Labor, Cultural Economics and Anthropology.

**Dahl, Michael (February 17 – 20, 2005)**
Assistant Professor, Department of Business Studies, Aalborg University, Denmark
Research Interests: Knowledge Diffusion, Clusters, Spinoffs, and Entrepreneurship

**Demsetz, Harold (May 5 – 12, 2004)**
Arthur Andersen UCLA Alumni Emeritus Professor of Business Economics, University of California, Los Angeles, USA.
Research Interests: Industrial Organization; Law and Economics, Issues of Monopoly and Competition; Economics of the Firm; Public Policy Toward Business.

**Dolfsma, Wilfred (April 5 – 8, 2005)**
Assistant Professor of Innovation Management, RSM Erasmus University, Rotterdam, The Netherlands
Research Interests: Knowledge, Innovation, Consumption, and Institutions

**Dopfer, Kurt (October 11 – 16, 2004)**
Professor of Economics at the University of St. Gallen, Switzerland.
Research Interests: Evolutionary Economics, Institutional Economics, History of Thought, Paradigmatic and Methodological Problems.

**Field, Alexander (November 30 – December 10, 2004)**
Michel and Mary Orradre Professor of Economics, Department of Economics, Santa Clara University, CA, USA.
Research Interests: Behavioral Sciences, Evolutionary Theory, and Macroeconomic History.

**Gerybadze, Alexander (February 21 – 23, 2005)**
Professor, Center for International Management & Innovation, Hohenheim University, Stuttgart, Germany
Research Interests: Innovation Management Economics, Globalization of R&D, and Knowledge Management

**Joosten, Reinoud (December 6 – 17, 2004)**
Assistant Professor, School of Business, Public Administration and Technology, University of Twente, Enschede NL.
Research Interests: Game Theory, Microeconomics, Learning, and Dynamic Systems.

**Kaizoji, Taisei (July 1 – August 31, 2004)**
Associate Professor Division of Social Sciences, International Christian University, Tokyo.
Research Interests: Agent-based Computational Economics, Econophysics, Evolutionary Economics.
Khalil, Elias (March 8 – 10 and September 20 – October 27, 2004)  
Research Fellow at the Konrad Lorenz Institute, Vienna, Austria.  

Klepper, Steven (June 12 – 23, 2004 and July 1 – 11, 2005)  
Professor of Economics, Carnegie Mellon University, Pittsburgh, USA.  
Research Interests: Evolution of Industries, Developing Statistical Diagnostics (involving proxy variables)

Koppl, Roger (May 15 – July 9, 2005)  
Professor of Economics and Finance, Department of Economics, Fairleigh Dickinson University of Madison, NJ, USA  
Research Interests: Forensic Science Administration, Austrian Economics, and Evolutionary Economics

Leeson, Peter (April 3 – 17, 2005)  
Assistant Professor, Department of Economics, West Virginia University, Morgantown, USA.  
Research Interests: New Institutional Economics, Development Economics, and Austrian Economics

Loasby, Brain (October 13 – 22, 2005)  
Professor Emeritus of Economics, University of Stirling, United Kingdom  
Research Interests: Evolutionary Economics, History of Economic Thought, Institutional Economics, Theory of the Firm, Cognitive Economics

Lowe, Robert (March 13 – 16, 2005)  
Assistant Professor of Strategy, Tepper School of Business, Carnegie Mellon University, Pittsburgh, USA  
Research Interests: Entrepreneurship and University Technology Transfer

Malerba, Franco (October 16 – 21, 2005)  
Professor of Industrial Economics, Bocconi University, Milan, Italy  
Research Interests: Innovation, Industrial Dynamics, Technology Policy, Theory of the Firm, Systems of Innovation

Pejovich, Steve (March 29 – 31, 2004)  
Professor Emeritus, Texas A&M University, College Station, Texas.  

Pelikan, Pavel (November 14 – 18, 2004)  
Professor of Economics, Ratio Institute Stockholm, Sweden.  

Peneder, Michael (March 15 – April 3, 2004)  
Economist at the Austrian Institute of Economic Research (WIFO), Vienna, Austria.  
Research Interests: Industrial Economics & Innovation Research; Competitive Performance, Structural Change.

Pryor, Frederic (September 26 – October 12, 2004)  
Professor of Economics, Swarthmore College, Swarthmore, Pennsylvania, USA.  
Research Interests: Comparative Economic Systems

Pyka, Andreas (October 11 – 16, 2004)  
Lecturer at the Economics Department, University of Augsburg, Germany.  

Ruprecht, Wilhelm (February 22 - 26, 2004)  
Senior Economist, German Insurance Association, Berlin, Germany.
Research Interests: Evolutionary and Institutional Economics, Insurance Economics, Consumption Theory.

Sæmundsson, Rögnvaldur (February 14 – 19, 2005)
Assistant Professor, School of Business, Reykjavik University, Reykjavik, Iceland
Research Interests: Technology-based entrepreneurship, the growth process in young technology firms, technology management.

Sartorius, Christian (March 1 – September 9, 2004)
Research Associate, ISI Fraunhofer Institute for Systems and Innovation Research, Karlsruhe, Germany.
Research Interests: The physical, economic, and social conditions of sustainability. Time strategies in environmental innovation policy.

Spada, Anna (January 15 – March 24, 2005)
PhD Candidate, Department of Economics, University of Torino, Torino, Italy
Research Interests: Evolutionary Economics, Cognitive Economics.

Stam, Erik (October 5 – 11, 2004)
Assistant Professor of Economic Geography, Faculty of Geosciences, Utrecht University, NL.
Research Interests: Entrepreneurship, New Firm Growth, Firm Location, Entrepreneurial Networks, Inter-organizational Networks, Regional Clusters, Firm Exit, Evolutionary Economics.

Associate Professor of Economics, Univ of North Carolina, Wilmington, USA
Research Interests: Consumption Theory.

Werker, Claudia (August 16 – 24, 2005)
Post-Doc; PhD 1998 (Technical University of Freiberg)
Research Interests: Economics of Innovation and Technological Change, Industry Evolution, Regional, Economics, Innovation and Technology Policy, Evolutionary Economics, Research Methodology.
The year 2004 marked the 65th birthday of Manfred E. Streit, founding director of the Max Planck Institute and director emeritus of the Institutional Economics Group. To celebrate this event and honor its long-time managing director, on March 27, 2004 the Max Planck Institute hosted a symposium titled "Institutional Economics and Economic Policy - Where Will the Research Go?" Many of Streit’s long-term companions and students followed the invitation to join in the symposium.

Managing director Ulrich Witt opened the symposium by highlighting Streit’s achievements. Coming to Jena from the Hayek chair at the University of Freiburg, Streit made important contributions to institutional economics and the theory of economic policy, as well as being actively involved in policy advice. Under enormous personal efforts and sacrifices, he not only set up the new institute in Jena, but also initiated and supervised the construction of its present facilities.

In the first topical presentation, Uwe Mummert (University of Applied Sciences Nürnberg) opened the debate with a rather critical outlook on the field. His contribution "Institutional Theory and Policy - Institutions Do Matter, So What?" argued that the limits to institutional policy directly follow from institutional theory. The insight that outcomes of institutional change are hardly predictable and even less controllable - which always was at the core of Manfred E. Streit’s writing and teaching - is a key tenet of institutional theory. Accordingly, a call for modesty in institutional reform is the best institutional theory has to offer to institutional policy. Likewise, its practical contributions to transformation and development policy are largely restricted to recommendations on adjustments to the institutional framework for market processes. According to Mummert, the odds of implementation are low for the policy recommendations of institutional theorists. Institutional theory itself predicts that policy makers have little incentive to adhere to the kind of recommendation it is able to give. This dilemma, however, is shared by economic policy more generally.

Gerhard Wegner (University of Erfurt) discussed the present state of economic liberalism. Wegner contrasted the policy pessimism of great liberal thinkers like Hayek or Buchanan, who wrote against the backdrop of the post-Second World War welfare economies, to more recent actual reforms in Western democracies. These reforms were found to be surprisingly consistent with fundamental liberal principles, and they materialized without the constitutional changes that the liberal classics had expected to be required. At the same time, Wegner noted a striking discrepancy in present-day policy-making between widespread anti-liberal rhetoric and practical rapprochement to liberal positions (best visible in the reduction of inflation rates during the past decades). He argued that economic liberalism itself is to blame for a good share of this discrepancy, as it failed...
to build an attractive social vision around liberal economic policy. As a potential starting point for such a vision, Wegner proposed to consider Humboldt’s Enlightenment concept. Michael Wohlgemuth (Walter Eucken Institute, Freiburg) concluded the symposium by taking up an issue that Manfred E. Streit and Stefan Voigt had tackled in their 1995 paper “Toward Ever Closer Union or Ever Larger? Or Both?” Wohlgemuth stressed that ten years ago, Streit and Voigt predicted the current problems of the European Union caused by admitting more and more member states. While this “widening” of the union would be expected to enforce a “flattening” or a rollback, the present situation is characterized by an ambitious European constitution as well as new entry. According to Wohlgemuth, this amounts to moving two directions at the same time, and recent proposals on the future Europe under rubrics such as “core Europe”, “variable geometry”, or “multi-speed Europe” indicate awareness of the problems this development poses.

Eventually, the interdependence costs of finding a closer, larger and more democratic Europe must become prohibitive high. Wohlgemuth therefore suggested a core-acquis communautaire limited to a small number of key responsibilities. This suggestion, which traces back to the European Constitutional Group, would help to lower social costs, discourage blackmailing by veto states, and alleviate the trade-offs between efficiency, legitimacy and enlargement. Actual developments, however, seem to go into the opposite direction and increase the degree of collectivism and constructivism. As Wohlgemuth pointed out, harmonization schemes, political cartels and harmonized sclerosis can already be observed in the enlarged Union.

6 International Research Cooperation

Agreements with other Universities and International Nongovernmental Organizations

EGP is proud to announce five new cooperation agreements in 2005. In addition to our ongoing agreement with the University of Erfurt, our five new agreements with the Friedrich Schiller University of Jena, the Indian Institute of Management, Bangalore, University of Augsburg, George Mason University and the Kauffman Foundation will enhance our research resources and provide important exchange programs with these research institutions.

Friedrich Schiller University of Jena

EGP has developed a broad spectrum of cooperative projects and partnerships with the Friedrich Schiller University of Jena (FSU). In 2005, EGP offered its first course, The Economics of Entrepreneurship, at the University. Additional courses for the future have already
been planned and scheduled for the forthcoming semesters. In addition, EGP has been involved in supervising the theses required for Diplomarbeit. An agreement has been reached so that David Audretsch can expect to become an Honorary Professor in the near future, enabling EGP researchers to earn a doctoral degree and Habilitation at FSU. EGP and FSU also served as co-sponsors of the Gründungsforschung-Forum 2005, which was the ninth annual conference for interdisciplinary research on entrepreneurship and took place at the University of Jena in November, 2005. There were over 300 participants at this conference, and almost every EGP researcher made a presentation, including the keynote presentation by David Audretsch on, “Warum Deutschland Entrepreneurship braucht.” (“Why Germany Needs Entrepreneurship”). EGP has been strongly involved in developing proposals to create a Jena Graduate School on Economic Change, and to create a Jena Cluster of Cutting Edge Research on Innovation.

The First Indo-German Workshop On Entrepreneurship, Innovation And Economic Growth

The Max Planck Society has awarded a generous grant to the ‘The Entrepreneurship, Growth and Public Policy Group’ to conduct a joint workshop with the NS Raghavan Centre for Entrepreneurship Learning (NSRCEL; Indian Institute of Management, Bangalore) on Entrepreneurship, Innovation and Economic Growth. The Workshop will be held in the last week of March 2006 in Bangalore. NSRCEL has been a member of the Global Entrepreneurship Monitor Consortium (this consortium comprises 34 countries that publish annual reports on the national state of entrepreneurship. The website is www.gemconsortium.org. See Reynolds et al., 2003; Wennekers et al., 2005) formed by the Babson College and the London Business School and it published reports on India’s Entrepreneurial climate in 2001 and 2002 (see Manimala 2002, and Manimala 2003).

Background: With most research studies indicating that entrepreneurial climates are more successful in sustaining rapid economic progress, the necessity of shifting from a managed economy to entrepreneurial economy is the focal point of not just academic discourse but also policy debate. India and China, which account for a third of global population, are making giant economic strides by adopting policies that support entrepreneurship. These economies have become some of the fastest growing in the world through adoption of progressive entrepreneurial policies. As developing countries transform into developed nations and as the developed countries create more economic prosperity driven by innovation, knowledge spillovers and entrepreneurship, there are many lessons that could be learned by both. While the developed economies like Germany can explain the techniques to achieve higher levels of economic development, the developing economies, like India, can demonstrate how fostering entrepreneurship helps them realize high economic growth.

Aim of the Workshop: The aim of the joint workshop is to analyze commonalities and differences in the entrepreneurial situation between both countries, to assess and compare its impact on economic evolution and to derive policy implications. Academic research on developed countries has scientifically evaluated the role of entrepreneurship on economic growth, market expansion, commercializing innovation, and reducing unemployment. When considering the state of entrepreneurship in both countries, Germany and India, it is meaningful to distinguish between the high-tech “innovative entrepreneurship,” concerning start-ups in high-tech and innovative industries as opposed to “general entrepreneurship,” which concerns startups in less innovative industries, such as retail and hospitality industries. These general entrepreneurship start-ups account for more than 50 percent of all start-ups and far outweigh start-ups in innovative industries. Moreover, it is meaningful to evaluate the entrepreneur’s motivation in order to distinguish between “necessity-based entrepreneurship,” which concerns startup activities to respond to personal needs of the entrepreneur versus “opportunity-based entrepreneurship” to realize a business opportunity.

The aim of the workshop is to assess these differences, to analyze the impact on regional and national economic development and to derive corresponding options for public policy. In detail, the workshop will address the following topics:

- Assessment of differences and similarities between Germany and India in the industrial structure of entrepreneurship including an assessment of the regional structure;
- Assessment of the differences in the motivational structure of entrepreneurship in both countries, including an assessment of the regional structure;
- Analysis of the impact of different types of entrepreneurship in Germany and India on regional and national economic performance;
- Analysis of the spatial distribution and local clustering of entrepreneurship;
- Policy implications from the findings of the previous points.

To address these topics, one day of workshop will be dedicated to theoretical issues and existing surveys on Europe and India to set the framework. The second day will be devoted to empirical studies of the structure and impact of Entrepreneurship in Europe and India. The third day will involve merging these topics and drawing conclusions.

Since the difference between both countries is so marked, the workshop will provide a powerful tool to analyze the impact of industrial structure, entrepreneurial motivation and local clustering of startups on regional and national economic development. Corresponding policy implications will be appropriate for both countries involved. Therefore, we consider this workshop as a kick-off event for a longer collaboration between both institutions, the MPI of Economics in Jena and the NSRCEL in Bangalore. The final session of the workshop will be devoted to developing a common research agenda.

The workshop will be an engine for intense academic exchange that will help researchers and policy makers from both countries understand the economic transformation driven by entrepreneurship and innovation.

**Literature**


**Description of Agreement with the Erfurt School of Public Policy**

The agreement with Erfurt involves a formal cooperative agreement to promote the exchange and interaction of faculty and graduate students as well as to undertake joint research and policy projects. To date this cooperation has produced a series of visits to EGP by faculty of the Erfurt School of Public Policy, visits and lectures by EGP staff, two joint graduate student workshops (see below), and several important research projects of both a scholarly and applied policy nature. One of the joint projects resulted in the publication of a book in 2004, *Local Heroes in the Global Community*, edited by a team of scholars from EGP and the Erfurt School of Public Policy and published by Springer in 2004.

Below is a description of the different agreements with Erfurt this year:

**The Enable Report**

EGP and the Erfurt School of Public Policy Cooperation (Dr. Heike Grimm), was commissioned by the Thüringen Landesentwicklung Gemeinschaft (Thüringen LEG; the Thüringen State Development Society) to undertake a Research Project of the role of Thüringen entrepreneurship policy in fostering entrepreneurship under the European Commission’s Enabling European Entrepreneurship (ENABLE) Program. This research cooperation with both the state of Thüringen and the Erfurt University resulted in a profiled publication which is
highlighted by the state of Thüringen. The Enable Program (ENABLE) in the European Entrepreneurship Policy Context. This research resulting from the co-operation between EGP and Erfurt University was presented by Dr. Audretsch at a high-profile conference organized by the Government of Thüringen which took place in Brussels in May 2005 and involved a large number of policy makers from Thüringen, elsewhere in Germany and Brussels. EGP has two doctoral students, Stefan Schuetze and Iris Beckmann who are working with colleagues at the Erfurt University to extend and continue the ENABLE project.

The EGP-Erfurt School of Public Policy Student Workshops

"Where is Europe Going and What Does America Have to Do with it?". The Workshops consisted of three-day graduate student workshops (June 2004 and June 2005). These workshops brought together 40 graduate students from Indiana University, Southern Methodist University, Erfurt University and EGP where students, faculty from Erfurt University, and policy makers in Erfurt and Thüringen made presentations. These two events highlighted presentations by and interactions with Professor Dr. Dagmar Schipinski, the former Minister of Thüringen and candidate for president of the country, and Dr. Jürgen Aretz, State Secretary, Thüringen Ministry of Economics, Technology and Labor.

Partnership with University of Augsburg

The agreement is a result of the former Associate Director of EGP, Prof. Dr. Erik Lehmann, accepting an appointment to the University of Augsburg as Full Professor. The University of Augsburg will allow EGP doctoral students to enroll in the Ph.D. economics programs and include EGP Professors in their doctoral committee. Doctoral students may continue to conduct their research in Jena while working with their doctoral advisor in Augsburg. In addition, several important research projects have been developed, as well as a series of research seminars and interactions among faculty and doctoral students that will alternate between Jena and Augsburg.

Partnership with George Mason University

A new agreement with the School of Public Policy at the George Mason University outside of Washington D.C. in the United States has resulted in several new joint research projects involving both faculty and doctoral students at both institutions. In addition, the partnership enables extended research visits and intensive interactions by researchers in both Washington, D.C. and Jena, as well as a series of joint conferences.

Partnership with Kauffman Foundation

The Ewing Marion Kauffman Foundation in the United States and EGP have entered into a strategic partnership that has resulted in The Annual Kauffman-Max Planck Conference on Entrepreneurship Research. The Conference will take place each year on alternate sides of the Atlantic and bring together the leading scholars in the world on entrepreneurship research to analyze state-of-the art theory and empirical analysis. The inaugural conference is scheduled for May 2006 in Schloss Ringberg in Munich with the theme of Entrepreneurship and Economic Growth.

Friedrich Schiller University of Jena

EGP has developed a broad spectrum of cooperative projects and partnerships with the Friedrich Schiller University of Jena (FSU). In 2005, EGP offered its first course, The Economics of Entrepreneurship, at the University. Additional courses for the future have already been planned and scheduled for the forthcoming semesters. In addition, EGP has been involved in supervising the theses required for Diplomarbeiten. An agreement has been reached so that David Audretsch can expect to become an Honorary Professor in the near future, enabling EGP researchers to earn a doctoral degree and Habilitation at FSU. EGP and FSU also served as co-sponsors of the Gründungsforschung-Forum 2005, which was the
ninth annual conference for interdisciplinary research on entrepreneurship and took place at the University of Jena in November, 2005.

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Partly financed by the European Union, the ENABLE programme “ENABling European Entrepreneurship” was initiated in 2004 and will run until December 2006, with a total budget of 5,770,500 Euro. Its concept focuses on the improvement of environmental conditions for start-ups and small and medium enterprises (SMEs) on a regional level. The programme also promotes the stimulation of entrepreneurship in the participating regions. This approach is extremely important, since most of the widespread disappointment with the Lisbon Agenda can be attributed to the limited influence the EU has on the national implementations of the Lisbon goals. Consequently, the Union’s political focus now moves to the regional level, as “regional policy represents a high-return investment which helps to remove structural barriers to development, [and] mobilizes endogenous growth potential” (Danuta Hübner, responsible for regional policy of the EU Commission, in her speech at the conference of “Cohesion and the Lisbon Agenda” in March 2005.)

The analysis conducted at the Max Planck Institute of Economics / Entrepreneurship, Growth and Public Policy Group reveals the extraordinary consistence of ENABLE as a potential key programme in the arsenal of policy instruments to deliver on the Lisbon mandate by creating an Entrepreneurial Europe. The tripartite focus of the Enable Program on technology transfer, SME networks and facilitating the startup of new firms mirrors the policy priorities set out by the European Commission. It can therefore be concluded that the implementation of the ENABLE programme in the context of both the economic development policies of Thüringen as well as the European entrepreneurship and growth policies is not only compatible but also mutually reinforcing - even more so, since the approach of the Lisbon mandate to reinvigorate European growth by creating an Entrepreneurial Europe must involve local implementation. The ENABLE program is one such program linking the local and European levels.

This research resulting from the cooperation between EGP and Erfurt University was presented by Dr. Audretsch at a high-profile conference organized by the Government of Thüringen which took place in Brussels in May and involved a large number of policy makers from Thüringen, elsewhere in Germany and Brussels. EGP has a doctoral student, Stephan Schuetze, who is continuing to work on this topic:

Translating European Entrepreneurship Policy in the Regional Context

Stephan Schuetze’s dissertation will be based around the question how European policies can be translated into regional contexts. More specific, the study aims at analyzing the function of ENABLE as a trigger for policy changes in the region. By doing so, Schuetze will
closely cooperate with the organizations involved in managing ENABLE, mainly the “Landesentwicklungsgesellschaft Thüringen”, and also deepen the cooperation with the Erfurt School of Public Policy at the University of Erfurt. He will study how regional public development strategies are influenced and perhaps changed by the implementation of a program with a regional focus that specifically meets the goals of the Lisbon strategy. Schuetze’s focus will lie on the influences the ENABLE program has on four European regions, namely Carinthia (Austria), Kaunas County (Lithuania), Thueringen (Germany) and the sub-regions Sogn og Fjordane and Hordaland (Western Norway). These four regions share similar disadvantages for economic development, as they are all peripheral from the economic centers of their countries and need to develop alternative strategies to compete in a global environment.

Schuetze’s dissertation supplements the work of Iris Beckmann, who is studying the emergence of different policy regimes in regard of public funding of business development. Schuetze’s work will attempt to deliver evidence that programmes like ENABLE – in addition to their initial goals - can have added advantages in changing the pre-dominant policy regimes in these regions.

Cooperation Max Planck Institute with Erasmus University and EIM

The Max Planck Institute (MPI) maintains strong relations with the two leading entrepreneurship and small business research centers in the Netherlands, the Centre for Advanced Small Business Economics (CASBEC) at Erasmus University Rotterdam, and the research institute EIM Business and Policy Research located in Zoetermeer. Several advantages are obtained from this research cooperation. First, researchers from CASBEC/EIM frequently visit the MPI to present their work and to interact with the researchers at MPI. Second, several joint papers between researchers at MPI and CASBEC/EIM have been written in the last two years and new joint research initiatives will be pursued. Finally, each year a selection of talented undergraduate students, following entrepreneurship courses at Erasmus University, and researchers at EIM, in the early stages of their career, visit the Summer Institute organized by the Entrepreneurship, Growth and Public Policy Group in Jena. This allows them to gain insight in the latest developments in entrepreneurship research, and provides them with the opportunity to explore whether they want to pursue a career in entrepreneurship research. The cooperation between MPI and CASBEC/EIM is coordinated by Roy Thurik, who is a research professor at the Entrepreneurship, Growth and Public Policy Group.

“The European Initiative for Policy Research in Entrepreneurship and Growth (IPREG)” - A European Network of National Networks

The European Initiative for Policy Research in Entrepreneurship and Growth (IPREG) is in the process of creating a European network of national networks to initiate and disseminate policy and policy oriented research focusing on entrepreneurship and economic growth. The idea is to bridge the gap between policymakers and researchers to establish a scientific basis for more efficient growth policies. The focus of IPREG contributes to the revitalisation of the Lisbon strategy that was launched by the European Union in 2000. The idea originates from the Swedish Foundation for Small Business Research (FSF).

To realize this vision IPREG concentrates its activity in several fields. First, national IPREG networks will be established, bringing together all key actors from respective national scenes covering SMEs, policy making and research. The European IPREG Network will serve the national networks becoming an arena for interaction between national networks by arranging activities at the European level. A central focus is on conducting major pioneering policy oriented research projects to find better entrepreneurship and economic growth policies.

Furthermore, IPREG will initiate research projects that are of high interest to researchers and policymakers. At the first meeting it was decided that IPREG should focus on the Analysis of Entrepreneurship Policy in the first phase since this is a field where there are few other actors are involved. Plans for comparative studies of Entrepreneurship Policy in ten
European countries were presented. For the second phase a “task force” of researchers will be established to decide on a research project focusing on economic growth.

Another core goal of IPREG is to find interactive ways of disseminating research results and to act as an information resource for policy makers. A major field of activity will be to create a mechanism for effective knowledge transfer.

The first IPREG meeting was in Brussels on October 3-4, 2005, hosted by the Swedish Foundation for Small Business Research (FSF) with participants from eight European countries – Austria, Belgium, Germany, the Netherlands, Norway, Sweden, the United Kingdom - as well as the European Commission. The Entrepreneurship, Growth and Public Policy Group of the Max Planck Institute of Economics is a member of IPREG and will be responsible - together with the University of Reutlingen - to create Germany’s national IPREG network and coordinate national IPREG activities.

Researching Entrepreneurship Dynamics: The International Consortium for Dynamic Entrepreneurship Benchmarking

The International Consortium for Dynamic Entrepreneurship Benchmarking is headed by FORA, an independent division for research and analysis under the Danish Ministry for Economic and Business Affairs. The Entrepreneurship, Growth and Public Policy Group is representing Germany in the Consortium. The Consortium members have initiated various projects to research entrepreneurship dynamics. Our unit is taking part in the “Regional Entrepreneurship Infrastructure Study” looking at successful entrepreneurial regions in (among others) Denmark, the Netherlands, Portugal, Canada, Italy and Germany.

The goal of this consortium is to develop a comprehensive and dynamic benchmarking model that captures various measures relating to entrepreneurship, including measurements related to performance indicators and policy indicators. By participating, the Max Planck Institute will have an opportunity to benchmark German entrepreneurial performance against those of other participating countries on a year-to-year basis as the Entrepreneurship Index is developed. This Index will also make it possible for project participants to compare relevant national policy conditions across countries and across time. Countries involved in the consortium will be encouraged to adopt the results of the benchmarking analysis and to formulate nation-specific policy setting recommendations.

At this stage, we are providing data for the region of Jena (Thuringia) as a stand-out example for German economic development. A series of qualitative and quantitative interviews with Thuringian network providers and business representatives complements this effort.

Later project phases will include the actual benchmarking analysis, development of policy implications, and the institutionalization of the capability to conduct this research annually. This will involve constant refinement of the model and data acquisition tools as needed.

German experience with clusters and cluster-based policy: recommendations for Poland and selected Polish regions on December 6th – 8th 2004 in Erfurt and Jena

Workshop organized by the research unit Entrepreneurship, Growth and Public Policy Group of the Max Planck Institute of Economics together with Dr. Heike Grimm, University of Erfurt (Erfurt School of Public Policy), in cooperation with the Gdansk Institute of Market Economics (GIME) in Poland. The workshop was financially supported by the Haniel Foundation (11.000 Euros).

The main objectives of the workshop: exchange of views and experience on the methodology of cluster mapping; best practices in formulation and introduction of comprehensive cluster-based policy at the regional as well as national level; practical knowledge of cluster strategy formulation; cluster management or cluster governance.
Dr. Max Keilbach and Vera Troeger (both EGP) presented different methodological approaches to analyzing competitive potentials of regions, industry concentrations and clusters, and discussed them with the Polish group of representatives of GIME who stayed at the MPI from December 6-8, 2005. The workshop also included meetings with Thuringian institutions and experts working with and for local clusters such as Dr. Klaus Schindler, CEO of OptoNet e.V. in Erfurt, Dr. Dr. Dietmar Goergmaier, Thuringian State Chancellery, and Mark Moebius of the “Neudeli Gruenderwerkstatt” of the Bauhaus University Weimar.

OECD Entrepreneurship Indicators Project

The importance of entrepreneurs as drivers for employment, innovation and economic growth has been recognized by economists and policymakers for many years. However, the analysis of the links between entrepreneurship and various facets of economic growth has been limited. The interest in understanding how governmental policies and other national business environment factors influence entrepreneurship rates and types has increased recently. To close this gap the OECD Entrepreneurship Indicators Project was established in 2005, financially supported by the International Consortium for Dynamic Entrepreneurship Benchmarking headed by Denmark and the Kauffman Foundation of the United States. The Entrepreneurship, Growth and Public Policy Group of the Max Planck Institute of Economics is taking part in this project.

The OECD Entrepreneurship Indicators Project focuses exclusively on entrepreneurship and explores options to define and measure entrepreneurship, factors that influence entrepreneurship as well as the impacts and outcomes of entrepreneurship. Key goals of the Entrepreneurship Indicators Project are:

1. Building a Network, Support and Funding – Formation of a network of interested analysts and policymakers, and determination of levels of support and possible funding;
2. Determining Data Needs – Identification of policy-relevant and analytically interesting issues related to entrepreneurship for which international statistical information is needed;
3. Identifying Existing Data – Assessing existing international statistical information on entrepreneurship;
4. Developing Concepts and Definitions – Development of common concepts and definitions to facilitate convergence of existing data sets and to permit development of new comparable indicators of entrepreneurship and its underlying factors across nations;
5. Scoping Future Entrepreneurship Data Collection Activities – Development of possible models for collection of basic measures of entrepreneurship and related entrepreneurship indicators.

The first workshop was held in Paris on October 26-27, 2005, where it was agreed that OECD-led work on standard definitions and measurement concepts for entrepreneurship dynamics is essential. The Entrepreneurship, Growth and Public Policy Group at the Max Planck Institute of Economics is involved in this process of developing entrepreneurship indicators that is being coordinated by the OECD.

Endogenous Institutional Choice in Social Dilemma Situations

(2000 - 2004)

This research project has been funded by the Austrian National Bank (Jubiläumsfonds). It deals with endogenous institutional choice. The applied method is experimental economics. One doctoral student and two diploma students were employed in this project at the University of Innsbruck. Matthias Sutter is head of the project.

The main goal of this project is to understand how cultural differences affect strategic behaviour in a variety of strategic environments by focusing on experimental studies with the participation of East and West Germans, Israelis and Palestinians.


André de Palma (Université de Cergy Pontoise), Nathalie Picard (Université de Cergy-Pontoise and INED) and Anthony Ziegelmeyer (Max Planck Institute)

Many important economic decisions are taken within multi-adult households. The three authors plan to design economic experiments to test theories of household choice. Concretely, established couples will face individually and jointly decisions involving monetary payoffs.

Financial support from Institut National d’Etudes Démographiques (INED):
- 5000 Euros in 2004;
- 10000 Euros in 2005.


This research project has been funded by the Austrian Science Foundation (FWF). The aim of the project is to formalize the possible differences between individual and group decisions and to test for these differences in experimental studies.

The main location of the project is Innsbruck (Austria), where two project assistants (postdoc and doc) will be working. Matthias Sutter is head of the project.

Reciprocity and Fairness? Steps towards a theory of labor relations (2004 - 2008)

The special research unit (SFB 580) at the University of Jena studies social and economic consequences of the 1989 political change in Germany. This project is integrated in the labor market research group within the SFB and analyses the role of social preferences in labor relations in East and West Germany. Main coordination partners are Werner Güth and Sven Fischer.


How does strategic interaction of oligopolistic employers influence the flexibility in reacting to business cycle effects and structural changes? Participation in the DFG -Schwerpunktprogramm (sub-project in collaboration with Siegfried Berninghaus and Hans-Jürgen Ramser ).

KEINS

The Entrepreneurship, Growth and Public Policy Group and the Evolutionary Economics Group participate (beginning in September 2004) in a European Specific targeted research project (STREP): “Knowledge Based Entrepreneurship: Innovation, Networks and Systems”, which is funded by the EU within the Sixth Framework Program. The other partners in this project are from Italy, the United Kingdom, France, Sweden, Portugal and Poland. The task is to examine the relevance and features of knowledge-based entrepreneurship in Europe
by looking at three types of it: start-up entrepreneurship, corporate entrepreneurship and academic entrepreneurship. Different methodologies and approaches, ranging from formal theorizing to case studies and quantitative empirical work will be integrated. In 2005, two KEINS project meetings were held to discuss results from first-round projects and coordinate the ongoing research. The Max Planck Institute is in charge of the German contribution to the international KEINS data collection effort on new innovators. Moreover, to gain access to large datasets on startups in Germany, Austria and some of the new accession countries, an initiative towards a subcontract with the ZEW in Mannheim was started. This subcontract is expected to become effective in January 2006.

Coordinator: Bocconi University, Milan, Italy

**DIME**

DIME (Dynamics of Institutions and Markets in Europe) has been made a Network of Excellence under the Sixth Framework Program of the EU. It started operating in February 2005. The kick off meeting took place in November 2004. The Evolutionary Economics Group and the Entrepreneurship, Growth and Public Policy Group of the Max Planck Institute together with the University of Jena are one of the contractors of DIME. A total of 49 partners from many countries are involved in DIME. This network of excellence has two main objectives. On the scientific side it coordinates interdisciplinary empirical research on the co-evolution of technologies, corporate organizations and institutions as the fundamental driving process of economic change. Networks, institutions, knowledge flows and a regional perspective are at the core of this approach. On the structural side the network organizes dissemination workshops for practitioners and policy makers and establishes a Europe-wide teaching package in its research field. A common Ph.D and master program is planned as well as joint summer schools and Ph.D events. The Max Planck Institute plays an active role in all these activities.

Coordinator: University of Eindhoven, The Netherlands

**ETE**

Since 2002, the Evolutionary Economics Group has participated as a founding member in the cooperative European research network, ETE (Economic Transformation in Europe). Participating research groups are from the UK, France, Italy, Denmark, Norway, Sweden and Germany. ETE’s mission is to perform interdisciplinary conceptual and empirical research on processes and determinants of sustainable economic transformation. Topics include changing relationship between service and manufacturing activity in relation to innovation and the dynamics of growth; the role of wants and consumption behavior in the innovation process; the emergence of new institutional structures to guide the accumulation and application of innovative knowledge; and the scientific and technological capacity to implement sustainable development in Europe and on a global scale. The network meets on a regular basis and has initiated multiple joint submissions to EU programs and other sponsors.

Coordinator: University of Manchester and UMIST, UK

**KSI**

The Evolutionary Economics and the Entrepreneurship, Growth and Public Policy Groups also collaborate with the German-French Associated European Laboratory “Knowledge, Science and Innovation” (LEA-KSI) that was established in March 2004. Cooperation partners include the “Centre National de la Recherche Scientifique”, the Université Louis Pasteur, Strasbourg, and the “Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung”. Mutual workshops are held once a year with all research partners. This research network focuses on the theoretical and methodological challenges of the knowledge society, empirical studies on technology diffusion and knowledge generation, and regional systems of innovation.

Coordinator: Patrick Llerena
Differences in the level of entrepreneurial activity across countries are a puzzle for researchers. One of the various factors that have been identified as possible determinants of these differences is culture. The workshop on Entrepreneurship and Culture held February 7, 2005, investigated the degree to which different cultural values and institutions affect the level of entrepreneurship. A major focus was on attitudes towards risk and uncertainty, as well as on regulatory procedures, such as intellectual property rights regimes.

The workshop started by looking at the impact of cross-cultural differences on entrepreneurial performance from a psychology perspective. Michael Frese from the University of Giessen presented a paper on the effect of different psychological action strategies on entrepreneurial performance. The paper argued that different psychological action strategies inherent to the entrepreneur’s behavior lead to different levels of organisation in the start-up process reaching from comprehensive planning to reactive planning.

A new explanatory perspective was presented by Lorraine Uhlaner, who discussed how post-materialism can explain the differences in entrepreneurial activity across countries. The measure for post-materialism is based on Inglehart’s four-item post-materialism index. The model tests for nascent entrepreneurship, new business formation and the total entrepreneurial activity, as well as for the rate of established businesses, controlling for various economic, demographic and social factors. Lorraine Uhlaner used data for 27 countries, world-wide, and was able to confirm the significance of post-materialism in predicting new business formation rates.

Uwe Cantner and Anderas Freytag from the University of Jena investigated the effect of “Leitbilder” (informal institutions) in innovation systems as a possible explanatory variable for differences in entrepreneurship and innovative activity. The intense cooperation between universities and firms in Jena and the attitude towards the use of technology and technological change (“Zeissianertum”), as well as successful role models in the region determine the “Leitbild”. Looking at different innovation systems in Thüringen (Jena, Erfurt and Ilmenau) using network analysis, the authors concluded that a “Leitbild” has a long term influence on the way entrepreneurship and innovation are shaped in a region and that it governs the interaction between entrepreneurship and innovation. Determining to what degree in social capital and/or the “Leitbild” explain differences among systems of innovations has to be further investigated.

Rui Baptista, Professor at the Technical University of Lisbon and Research Fellow at the Max Planck Institute of Economics, looked at the relationship between cultural values, political institutions, and business entry regulation. Based on the idea that a society’s general attitude towards risk, uncertainty and power inequality is embedded in its institutions, Rui Baptista examined if such values have an impact on a society’s economic incentives, because they shape regulatory procedures for business entry. Using data for 53 countries from a variety of sources he found a positive relationship between the level of entry regulation and the way people in different countries deal with risk and uncertainty.

Sjoerd Beugelsdijk presented the results of an empirical study showing that differences in the regional entrepreneurial culture have an impact on the regional rates of innovation and regional economic growth. Analyzing a sample of 54 European regions Sjoerd
Beugelsdijk was able to confirm the hypothesis that regions with an entrepreneurial culture are more innovative and grow faster.

Geert Hofstede highlighted the finding that entrepreneurship differences across European countries are persistent and have a strong cultural component. Looking at the level of entrepreneurship by using data from a joint EIM and IRIC database Hofstede found that more entrepreneurs can be found in countries where people are in general less satisfied with their life and with the way democracy works. Hofstede emphasized, however, that within countries the effect can be inverted, meaning that entrepreneurs can be more satisfied with their lives than those who are not entrepreneurial. Consequently, it is important to analyse the level of entrepreneurship with regard to its cultural context.

Arjo Klamer’s presentation switched the focus from the impact of cultural factors on entrepreneurship towards entrepreneurship in the cultural field. Klamer elaborated on the specificities of cultural entrepreneurship and provided insights regarding the determinants of successful entrepreneurship in the arts.

One major aspect of cultural differences that might affect the level of entrepreneurship is the attitude towards uncertainty. Sander Wennekers examined the influence of this aspect on the level of business ownership across OECD countries. Looking at three specific years (1976, 1988, and 2000) results showed that the influence of uncertainty avoidance on business ownership rates has changed over time. Whereas this is positively correlated in 1976 and 1988, there is evidence for a compensating pull mechanism in countries with low uncertainty avoidance in the year 2000. Looking at two different cultural country clusters, there is a strong negative relationship between GDP per capita and the level of business ownership in the group of high-uncertainty avoidance countries. In a group of low uncertainty avoidance countries this longstanding negative influence of per capita income is no longer found.

Picking up Rui Baptista’s results on differences in regulatory procedures, Andrew Burke from the University of Warwick, focused on the effects of intellectual property rights regimes on the entrepreneurial economy, specifically the self-employment sector. The focus was on various elements of an IPR regime, such as the political system, laws, and institutions as well as a general familiarity with and respect for IPR related products. Burke showed that a well-developed IPR regime has a net positive effect on the self-employed sector.

Summer Institute
(Entrepreneurship, Growth and Public Policy Group)

EGP hosted over 60 researchers, scholars and policy makers from June 27th to July 1st, 2005. The week was designed to have morning presentations by scholars in the field and breakout sessions in the afternoon. The breakout session were divided into small groups that would discuss the presenter’s research and then report their questions and opinions to the entire summer institute at the end of each day.

Monday: Director Daivd Audretsch and Zoltan Acs, George Mason University

Professor Audretsch and Acs opened the second annual summer institute with a welcome address asking where Entrepreneurship research is and where they believe the research will go towards. The presented the paper „Entrepreneurship and Economic Growth“. A key find-
ing in their paper is that the conventional wisdom regarding the process of innovation technological change is generally inconsistent with the new understanding about the role of entrepreneurship in innovative activity. The empirical evidence strongly suggests that small entrepreneurial firms play a key role in generating innovations, at least in certain industries. While the conventional wisdom is derived from the Schumpeterian Hypothesis and assumption that scale economies exist in R&D effort, for which there is considerable empirical evidence, more recent evidence suggests that scale economies bestowed through the geographic proximity facilitated by spatial clusters seems to be more important than those for large enterprises in producing innovative output.

Tuesday: Prof. Stephen Klepper, Carnegie Mellon University
Professor Klepper submitted two papers called “The Geography of Organizational Knowledge” and “Entry by Spinoffs”. Klepper presented his work on “The Geography of Knowledge”.

Taken from Klepper’s abstract: The evolution of the geographic distribution of producers in the television receiver and automobile industries is analyzed. Both industries experienced sharp shakeouts and evolved to be oligopolies, suggestive of increasing returns. The television receiver industry was initially concentrated regionally but evolved to be more dispersed over time. In contrast, the automobile industry was dispersed initially but evolved to be heavily concentrated around one city, Detroit, Mich., that initially had no producers. Neither pattern conforms to theories that portray agglomerations as being beneficial to the firms that populate them. An alternative theory is developed and tested to explain the geographic evolution of the two industries. Firms are assumed to differ in terms of their initial competence at the time of entry, which shapes their long-term performance. They acquire their competence from firms in related industries and prior entrants into the new industry. The location and performance of entrants in both industries is analyzed, and it is shown how differential importance in the two sources of competence plays a critical role in explaining the contrasting evolution of the geographic structure of the two industries.

Wednesday: Prof. Howard E. Aldrich, University of North Carolina Chapel Hill
Prof. Howard Aldrich’s scholarly lecture on Entrepreneurship and Social Capital gave deep insights to participants into this area. He presented six papers that he co-authored with other scholars.

In “Against All Odds: The Impact of Financial, Human, and Cultural Capital on Becoming a Nascent Entrepreneur” which he co-authored with Phillip H. Kim and Lisa A. Keister, he examined the relative importance of three forms of resources in pursuing start-up ventures: financial, human, and cultural capital. His analysis of the Panel Study of Entrepreneurial Dynamics showed that neither financial nor cultural capital resources are necessary conditions for becoming a nascent entrepreneur. By contrast, potential nascents gain significant advantages if they possess high levels of human capital. Specifically, advanced education and managerial experience were significantly positively associated with becoming a nascent entrepreneur. Their findings suggest that attempts at entering entrepreneurship, at least in the short-term, may increase, as opportunities to acquire human capital become more widespread.

Thursday: Prof. Simon C. Parker, University of Durham
Prof. Simon Parker from the University of Durham captivated young minds by his lecture on the fourth day of the Summer Institute. He presented his paper, “The Economics of Entre-
entrepreneurship: What We Know and What We Don’t” and portrayed the current state of entrepreneurship research. In his introductory lecture he offered a reflective overview of what Economics adds to our understanding of entrepreneurship. He illustrated the kinds of questions that can be posed and answered using Economics. Then he presented and discussed a selective list of “canonical” theoretical and empirical models that form the intellectual bedrock of the Economics of Entrepreneurship. After that, he presented and discussed some well-established theoretical contributions and empirical findings generated by his approach.

Friday: Prof. Sharon Alvarez, Ohio State University

Prof. Sharon Alvarez, of the Fisher College of Business, Ohio State University, gave a presentation on the alternate theories of entrepreneurial action on the final day of the Summer Institute, based on extensive research and keen insight. She identified the subtle difference between the discovery and creation theories of entrepreneurship and presented her paper jointly written with Jay Barney “Discovery and Creation: Alternative Theories of Entrepreneurial Action”.

EGP Residence Week

EGP hosted its first ever Residence Week from July 4th to July 8th, 2005. The week was designed to have a selected group of young scholars in the field present research and to collaborate with Max Planck researchers to advance Entrepreneurship research.

Cacophony or harmony? Multivocal logics and technology licensing by the Stanford University Department of Music

Topic by Andrew J. Nelson (Stanford University)

This lecture was a case study of how Stanford University’s Center for Computer Research in Music and Acoustics (CCRMA) became the world leader in FM synthesis. Mr. Nelson investigated how this technology assisted the Yamaha Corporation to develop the world’s largest selling set of musical instruments through licensing. His technique consisted of conducting interviews with key individuals and evaluating the institutional context of Stanford University, concluding that the most critical factor was individual agency—in essence that there were a series fortunate coincidences that facilitated the development of the technology. In addition, there was a discussion about the importance of licensing technology and its benefits.

From Innovation to Firm Formation in the Windsurfing, Skateboarding, and Snowboarding Industries

Topic by Sonali Shah (University of Illinois at Urbana-Champaign)

This lecture evaluated how three different sports grew in popularity and how innovations from both users and firms fueled each sport’s growth and the growth of firms supporting the sports. The three sports were chosen because each is relatively young, having had most of its developments and innovations within the last 40 years, as well as having a supportive community participants and equipment sales around $100 million annually in the late 1990s. Consistently the first innovations in each sport (Skateboarding, Snowboarding, and Windsurfing), were from the original users and many of the following innovation were made by user-founded firms. The principle finding of the work is that much of the innovation, development, and selection activities were a direct result of a feedback loop from the participants to the manufacturers, who coincidently in the early stages were users in all of the sports.

Globalization, Employment, and Poverty Reduction

Topic Marco Vivarelli, University of Piacenza

Professor Vivarelli presented a discussion about globalization, employment, and poverty reduction which came to several conclusions. First, among the highlighted conclusions, was that due to absorptive capacity, productive growth
may exceed output growth to the detriment of job creation. Another interesting finding showed that short-term financial portfolio flows and domestic policy reforms seemed to play a more critical role in the level of income equality for developing countries.

**Knowledge Spillovers, Geographic Clusters and the Product Development Activities of New Ventures: An Empirical Examination**

Topic by Brett Gilbert, Georgia State University

Professor Gilbert presented this paper which examined the track records of geographic clusters, picking this focus because such clusters are known for producing innovative firms. Geographic cluster locations and the location of knowledge spillovers firms were examined to determine the influence that the explorative and exploitative innovation activities of new ventures have. The authors felt that a stronger relationship of industry clustering on exploitative innovations and a stronger relationship of knowledge spillovers on explorative innovations was possible.

**Localized Knowledge Spillovers and New Venture Creation**

Topic by Lawrence Plummer, University of Colorado

Professor Plummer evaluated new growth theory and highlights knowledge as a contributor to economic growth. Acs, Audretsch, Braunerjhelm, and Carlsson (2005) contended that incumbents and new ventures together are the mechanism by which the link between knowledge and growth is established, also suggesting that, in a given region, higher rates of innovation will lead to higher levels of entrepreneurial activity while a greater number of incumbents will diminish this relationship.
Summer Institute on “Bounded Rationality” 2005

From Aug 1st to Aug 14th, the Strategic Interaction Group hosted the 5th International Summer Institute on “Bounded Rationality in Economics and Psychology” at the Max Planck Institute of Economics in Jena. Since its debut in 2001, based on a joint initiative of the MPI for Human Development in Berlin (Center for Adaptive Behavior and Cognition) and the MPI of Economics in Jena, the summer institute has taken place every year and has been organized alternately in Berlin and Jena.

This year, 14 internationally acknowledged scholars and 31 graduate and postdoctoral students from around the world followed the invitation and spent two exciting and memorable weeks together. As one of its main objectives, the summer institute aims at introducing students from different disciplines to a novel perspective on human decision making by acquainting them to the concepts of bounded rationality. Essentially, this field of research is dedicated to the study of simple cognitive mechanisms or heuristics that allow us to make good inferences. At the same time, this theory imputes that our cognitive capacity and information-processing capability is limited or bounded.

In a wide range of lectures that were held by outstanding scholars in their fields, students were able to learn more about the main research areas in which bounded rationality has been studied. In these talks, senior researchers shared much of their experience, drew attention to the most promising areas of application of bounded rationality, and provided helpful tips for the students’ ongoing research projects. The participants were further introduced to a multitude of research methods such as experiments, observations, and simulations. Interested participants themselves had the opportunity to present their own research ideas and results and to discuss them with their fellow students and the faculty members.

The program included lectures by Nathan Berg (“What is Bounded Rationality?”), Konstantinos Katsikopoulos (“The use of recognition in group decision making”), Joerg Rieskamp (“How do people learn to select strategies: A learning model of bounded rationality”), and Lael Schooler (“Adaptive Benefits of Forgetting: How Forgetting Aids Heuristic Inference”), from Max Planck Institute for Human Development in Berlin. Also, Jean-Robert Tyran (“Democracy, Efficiency and Redistribution”) from the Institute of Economics, University of Copenhagen; Klaus Fiedler (“Decision making from varying degrees of psychological distance”), from the Institute for Psychology, University of Heidelberg; Yaakov Kareev (“Cognitive Overload and the Evaluation of Risky Alternatives”), from the Center for Rationality, Hebrew University of Jerusalem; Urs Fischbacher (“Fairness: Experimental evidence and theory”), from the Institute for Empirical Economic Research, University of Zurich; Luis Gonzalez (“Statistical Methods for Experimental Economists”), from the UN Statistics Division; Svetlana Pevnitskaya (“Experimental Methods”) from Department of Economics, University of Southern California; and Martin Sefton (“Voluntary Contribution Mechanism Experiments”), from the Centre for Decision Research and Experimental Economics, University of Nottingham.

In addition to the lectures and group discussions, the students were encouraged to prepare, conduct, and analyse an actual computerized experiment in the laboratory. For this, they formed several groups, determined their preferred research topic and elaborated research
questions which were then to be experimentally investigated. Our participants took up these projects with great enthusiasm and displayed some impressive dedication and perseverance in this task. With all this motivation, it was not surprising that each of the five groups was able to present some very interesting results and conclusions in their final presentation at the end of the summer institute.

But also apart from the scientific schedule, both the students and the faculty members had a very good time. Having such an international crowd and given the friendly atmosphere of the summer institute, it was a great socializing event, as well. One could easily get in touch with his fellow students and the more senior scholars from almost all around the world who share similar interests. Thus, in the course of the two weeks, many new contacts and friendships evolved, some of which resulted in ongoing research co-operations.

On several occasions, our participants had the chance to familiarize themselves with some of the cultural and natural attractions in Jena and its vicinity. Visiting Weimar, the Cultural Capital of Europe in 1999, opened the mind from science to literature and the fine arts. A hiking trip to the battlefields of Jena/Auerstadt where Napoleon defeated the Prussians, and a sightseeing tour through the city, showing the domains of Goethe, Novalis, Haeckel, Schott and Zeiss, underlined the historical impact of Jena and its university. Obviously, the culinary finesse of the Thuringian kitchen, as it was experienced in several restaurants, bars and, of course, at our institute, convinced the majority of the group.

Subsequent to the Summer School, a two day workshop with short seminar presentations of working papers in the field of Bounded Rationality complemented the lectures and group assignments of the Summer School.

In retrospect, the Summer Institute on Bounded Rationality has been an exciting possibility to update and broaden one’s knowledge within the field of cognitive mechanisms and heuristics in economics. The combination of research, lectures, and spare time activities induced lively group dynamics which drove all participants to unexpected benefits and sparked the desire in some to take part in the next summer institute, as well.
The second Sino-German Workshop on Evolutionary Economics took place at the Max-Planck-Institute of Economics from August 28 through 31. It was jointly organized by the Evolutionary Economics Group, the Chair of Evolutionary and Institutional Economics at the University of Witten-Herdecke, and the Department of Physics at Beijing Normal University, and financed by the Sino-German Center for Research Promotion of the Deutsche Forschungsgemeinschaft (DFG) and the National Natural Science Foundation of China (NSFC). Following a first, very successful meeting in Beijing in 2004, this workshop again gave 14 scientists from China, mainly from the universities of Beijing and Nanjing, the opportunity to discuss recent developments in evolutionary economics with 13 colleagues from Germany, Switzerland, Austria and the Netherlands.

The topics of the presentations were organized around some core issues, such as evolutionary economics, institutional change, spatial economics, economic growth and industrial organization.

In the opening session on “Conceptual Issues in Evolutionary Economics”, Carsten Herrmann-Pillath (Witten-Herdecke) discussed the problem of reflexivity in political economy from a methodological perspective, showing that reflexivity in the sense of endogenous policy-making gives rise to a number of paradoxes which in turn foster the generation of ever more complex economic theories. Kurt Dopfer (St. Gallen) pleaded for a unified “rule theory” in economics, that integrates ideas of self-organization and evolution. He argued that evolutionary economics still lacks a unifying core concept that could play the role the equilibrium concept plays in neoclassical economics and that would allow to view the aspects of co-ordination and change in their integral nature. Dopfer suggested to use “rules” as such a fundamental analytical concept in evolutionary economics. Yi-Cheng Zhang (Fribourg) examined analogies between informational and natural selection. He argued that the evolving economy, while sharing many similarities with biological systems, has many features like, e.g., intentionality and institutions that are unique for man-made processes. To account for the differences, Zhang proposed the concept of “informational selection” as a basis for Darwinian thinking in the analysis of economic processes.

The second session was devoted to the theory of institutional change. Chen Ronghu (Nanjing) gave a critical overview on the research methodology of approaches to model the evolution of institutions. Yang Ruilong (Renmin University) presented a model, jointly developed with Yang Qijing, of gradual institutional changes in China, with a particular focus on the role played by local governments and the interplay between central rulers, political entrepreneurs and economic agents. He Liping (Beijing Normal) investigated the interaction of state and market in the course of the evolution of China’s financial institutions after 1978.

In the third session, the spatial dimension of evolutionary economic processes was discussed. Based on a paper co-authored with Hardy Hanappi (Vienna), Wolfgang Radax (Vienna) discussed the problem of “global evolutionary economic dynamics”, investigating on the one hand the global trend to greater units (such as trade blocks and political unions instead of nation states) and, on the other hand, the increasing urbanization rate with problem-generating mega-cities as a case in point. He argued that these developments represent theoretical challenges that evolutionary economics is particularly able to tackle. Wang Zheng (Shanghai and Chinese Academy of Sciences) presented a paper written with Ma Cuifang, Weng Guilan, and Wang Yin that examines temporal and regional processes of knowledge spillovers. Based on two case studies he argued that it is inadequate to estimate spillover intensities only by focusing on knowledge gaps. Thomas Brenner (Max Planck Institute) presented a stochastic model of the evolution of the firm population in a region and an industry. The model describes the number of firms in a region by a stochastic process for which the marginal probability distributions can be derived. He also presented...
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some empirical evidence from Germany. Finally, Gan Guohui (Chinese Academy of Science) discussed the evolution and spatial dynamics of economic structures in China.

The fourth session on “Evolutionary Perspectives on Economic Growth” opened with a contribution by Fang Fukang (Beijing Normal) on the role of human capital in the economy’s growth process. Cai Zhonghua (Beijing Normal) presented an evolutionary model on technological innovation, Fisher’s principle and structural change. Marco Lehmann-Waffenschmidt (Dresden) presented a paper, co-authored with Edeltraud Guenther (Dresden), on “deceleration” based on a theory of revealed preference. He presented experimental evidence for the hypothesis that time pressure can decrease consumers’ happiness and is subjectively perceived as a personal burden.

Gao Jie (Nanjing) opened the fifth session on “Evolution in Industrial Organization” with a paper surveying evolutionary models of industrial dynamics and a special application to the Chinese power industry. Ulrich Schwalbe (Hohenheim) presented an evolutionary game theory approach on “Mergers, Tacit Collusion, and Competition Policy”. Guido Buenstorf (Max Planck Institute) discussed the evolution of Germany’s laser industry, testing for the generality of shakeout patterns and first-mover advantages observed in the US laser industry. He also presented a survival analysis of the performance of different types of entrants, finding that laser firm spinoffs were systematically more successful than academic startups, and examined the determinants of spinoff generation in German laser firms.

Chen Yu (Renmin University) presented a compositive three tier model, analyzing the effect of information processing in economic evolution. Frank Schweitzer (Zürich) gave an agent-based perspective on multiplicative models of company dynamics and wealth distributions. Ulrich Witt (Max Planck Institute) discussed the competition for scarce attention as a phenomenon that characterises the media industry. Witt outlined an individualistic approach to model the constraints and possible effects of mass media information dissemination, assuming that information is individually selectively processed and, hence, potentially biased, and that there may be social contingencies in the selection process, leading to contingent individual knowledge, beliefs and values.

Gerald Silverberg (MERIT Maastricht) opened the sixth session on “Innovations” with a talk that was based on two papers jointly written with Bart Verspagen (Eindhoven). He presented a complex systems model on the size distribution of innovations, using patent citations as an indicator of innovation significance, as well as self-assessed reports of patented innovation values. Putting special emphasis on the existence of “heavy tails” (i.e. the question of whether or not the probability of very large innovations declines more slowly than exponentially), he argued that the heaviness of these tails has some implications for technology policy and growth theory. Uwe Cantner (Jena) presented a paper jointly written with Holger Graf (Jena) that applied social network analysis to explain the evolution of the network of innovators in the city of Jena from 1995 to 2001. They found this evolution to be characterized by an increasing focus on core competencies of the network. By examining the network from R&D cooperations they also discovered that job mobility of scientists and the technological overlap of actors could best predict the resulting structures.

Session seven gathered papers that presented models of economic complexity. Ping Chen (Peking University) discussed the possibility of using transition economies as “natural experiments” in testing competing economic theories. He argued that the high costs of transition depressions caused by shock therapies indicate the gap between equilibrium economics and industrial economics, opening the way towards a new understanding of
supply-demand forces and the micro-meso-macro relationship from the evolutionary perspective and complexity science. Liu Hong (Nanjing) examined the question of whether there are regularities in the change of organizational forms when environmental complexity is growing. Finally, Li Huajun (Beijing) presented a paper, jointly written with Chen Ping, Tang Yinan, and Zeng Wei (all Beijing) that develops a general nonlinear stochastic approach which is capable of analyzing competing stochastic models in financial market and which is more general than the equilibrium-based Black Scholes option-pricing model. She argued that this model may provide a new understanding of dynamic complexity and market structure, pointing to limitation of the Brownian motion model and the efficient market hypotheses.

The concluding session was devoted to a plenary discussion on the future prospects of collaboration in the field of evolutionary economics. The social program during the workshop offered excursions to Weimar (including an Opera performance) and to the Leuchtenburg Castle south of Jena. They were meant to give the participants from China the opportunity to discover some features of German Culture and the beautiful surroundings of Jena.

VII. International Workshop for Young Scholars on Evolutionary Economics, Buchenbach

During October 4th to 8th 2005, our outreach program for young scholars took place for the first time in the format of an “International Workshop on Evolutionary Economics for PhD students and Post-Docs”. The place was again, as in the previous six occasions the scenic village of Buchenbach in the Black Forest. For the first time participants came from all over the world, some of them as far as from Turkey, China, and Japan. As in previous years our co-organizer was Professor Marco Lehmann-Waffenschmidt from the Technical University of Dresden. This year’s conference was a mixture of workshop and summer school, for which we got full funding by the German Thyssen-Foundation. The workshop consisted of a number of selected contributed papers by the PhD students and Post-Docs, followed by comments of other participants and a discussion. These sessions were complemented by a number of Keynote Lectures by internationally renowned evolutionary economists. The contributors were R. Day (USA), A. Field (USA), P. Llerena (F), S. Melcafe (GB), P. Murmann (USA), H. Siegenthaler (CH), Sidney Winter (USA), Ulrich Witt (D).

In his stimulating lecture on the ‘Micro Foundations for Evolutionary Theory’, Richard H. Day, undertook to provide the micro foundations for evolutionary theory grounded in sound behavioural assumptions about human rationality (which is always ‘local and adaptive’) and economizing behaviour. To adequately capture individual behaviour in a formal model, he introduced a recursive programming approach to deal with the complexities associated with human decision making.

In his lecture on “Evolutionary Theory, Experimental Economics, and the Role of Culture”, Alexander Field explained how experimental economics contradicts rational choice behaviour and how evolutionary theory can explain the emergence
of culture via group-level selection. Field's central argument was that it becomes very difficult to explain the persistence of such phenomena as altruism without higher level selection mechanisms.

Patrick Llerena questioned in his talk (“Science, Technology, Industry Links: Misinterpretation and Consequence”) whether the “European Paradox” (i.e. the conjecture that the EU countries play a leading role in scientific output, but lag behind in converting this output into industrial innovations) had substance. Llerena examined science-industry links in Europe and the US and sketched the case of the University of Strasbourg to develop concrete policy implications for research policy and innovation networks.

Stanley Metcalfe discussed the evolution of industrial dynamics in his lecture about “Recent Developments in Industrial Dynamics”. In his presentation, Metcalfe linked together productivity growth analysis, life cycle dynamics and population dynamics and related them to Marshall's evolutionary economics.

Peter Murmann outlined in his lecture on “Evolutionary Economics & History: Empirical Research as Detective Work” to what extent cliometricians are similar to Sherlock Holmes in that their work needs to driven by the careful and thorough analysis of the given data. He reported on his empirical work on different industries (paper, dye, etc.), inviting the audience to join him in an interactive analysis on firm entry and exit numbers to get a first glimpse on a newly assembled data set.

Hansjörg Siegenthaler linked economics to the natural sciences in his presentation on “Institutions and Biology in the Process of Communicative Learning”. He argued that the neurobiological foundations of behavioural regularities might be the adequate starting point for economics (“neuroeconomics”). Moreover, he highlighted the role of social-communicative learning as an important feature for the scientific discourse.

In his talk „Leveraging Operational Knowledge: How Cognition, Search and Replication are Linked“, Sidney Winter focused on the connecting features between cognition, search and replication in the context of operational knowledge of a firm. He showed how a fractal landscape model could give first insights into the mechanisms of problemistic search and the origins of routines.

Ulrich Witt gave a lecture on „Competition for Scarce Attention – Mass Media and the Evolution of Knowledge and Tastes“, where he developed hypotheses as to how constraints on human information processing are limiting factors in the development of knowledge and the evolution of tastes. The findings were then detailed and discussed in the form of a game-theoretic model about agenda-setting dynamics.

Participants of the contributed papers sessions presented a wide range of different topics from simulation models, to case studies, historical studies and theoretical investigations.

Besides the intellectual stimuli of the lectures and presentations, there was also the opportunity for the participants to get in touch with the lecturers and the other students of evolutionary economics during an excursion to the nearby villages of the Black Forest. For those not accustomed to German culture, a tasting of local wines and food such as onion tart (“Zwiebelkuchen”) in a “Straußwirt-
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schaft” (a typical rural tavern run by winegrowers) provided a flavour of the Black Forest region.

The papers presented by the students were:
- “Diversity, Competition, and Technological Progress” (Gisela Aigner)
- “An evolutionary model for the dynamics of vertical integration and modular production” (Leonardo Bargigli)
- “Changing Preferences and Welfare Economics” (Martin Binder)
- “Development of Institutions in the Early Modern Period” (Daniel Brunner, Stephan Hagenbusch)
- “Learning to Consume Organized Tourism” (Andreas Chai)
- “Trust and knowledge in the behavioural dynamics of innovation networks” (Maria Daskalakis)
- “Schumpeter and Georgescu-Roegen on the foundations of an evolutionary analysis: the problem of qualitative change, its methodological implications and analytical treatment” (Christoph Heinzel)
- “Market Take-off in Systemic Industries – The Early Industry Life Cycle Stage in the Mobile Payment Industry” (Raina König, Michael Stephan)
- “Demand, Technology and Growth of Services – A Growth Model with Evolutionary Micro-Founded Structural Change” (Andre Lorentz, Maria Savona)
- “Opportunism and the evolution of political competition” (Bilge Öztürk)
- “Creation and Creativity in the Evolutionary Theory of the Firm” (Geneviève Schlink)
- “An evolutionary model of firms’ institutional behaviour focusing on labour decisions” (Sandra Tavares Silva, Aurora Teixeira)
- “The Emergence and Erosion of Norms in a Common Property Resource System – Findings and Open Questions from the Fieldwork in Namaqualand, South Africa” (Bjørn Vollan)
- “Routines of individual and adoption of innovations – A reflexion in human evolution” (Zhao Wang)
- “Diffusion processes in network effect markets” (Volker Wiedemer).

In addition there was a poster session in which all other students presented their research.
Colloquium on Evolutionary Economics

In 2005, the Evolutionary Economics Group had its 10th anniversary. Ten years before, Ulrich Witt, then professor of economics at the University of Freiburg and director of the Institute for the Study of Economic Evolution was appointed scientific member of the Max Planck Society. On October 1, 2005 he started his position as the director of a second research group at the Max Planck Institute in Jena. Three of his Freiburg research assistants accompanied him to the New Länder: Silke Stahl, Thomas Brenner and Burkhard Flieth. In those weeks in the fall of 1995, there was not yet a place to do research. Everything had to be built up from scratch, and it would last for two years until the research group would find its final residence in the institute’s new building. But all that didn’t restrain the group from letting their research evolve …

On November 19, 2005 the Evolutionary Economics Group celebrated its 10th anniversary. All the people of the first hour were among the alumni who attended this event. The meeting was meant not only to celebrate, but also to (critically) look back and cast a look ahead. The main point of exchange was what impact the training in evolutionary economics has had on the alumni and what role evolutionary concepts are playing in current work environments.

A first talk was given by Dr. Silke Stahl. She is now Senior consultant and coordinator of the innovation research business unit at the VDI Technologiezentrum, Düsseldorf, the German Engineers’ Association. From the point of view of her current position she discussed the “(Costs and) Benefits of a Socialization in Evolutionary Economics”. Her observation is that this approach is increasingly represented in consulting — customers expect dynamic orientation (“fore-sight”), arguments and justification (“rhetoric”), theory and methods as background tools. Therefore, integrative and communication skills, understanding for other “academic languages”, the ability to “tell stories” are needed, i.e., “networkers” rather than “faithful rationalizers”. Further, she highlighted several evolutionary concepts that are used - or should be used - in Consulting. There is, for instance, the concept of path dependence, which is a good device for looking, which local strengths and competences can be reinforced in regional development. The concept of diversity and adaptive capability is reflected in organizational structures and management styles that allow for diversity and learning. Silke Stahl pleaded for niches for experiments and learning instead of streamlined organization, principles instead of rules, management of interests instead of incentive schemes and leadership instead of control. The evolutionary concepts of explicit and tacit knowledge, learning and competence were turned into the question of how public actors can contribute to the acceleration of innovation processes. Silke Stahl asked for a new understanding of the role of public actors – the state as initiator and moderator of processes. Concluding her talk, Silke called it a good idea to communicate the increasing demand for evolutionary concepts in the “real world” in teaching and PhD programs. Looking back, with a smile, she found the benefits of socialization in evolutionary economics to be definitively higher than the costs. Her thoughtful introduction stimulated the debate over the whole day.

A second talk was given by Dr. Burkhard Flieth. He is working for one of the largest German insurance companies and has, among other tasks, been responsible for a big IT-migration project over the past years. Talking about project planning and operation and control of projects he showed, for instance, the evolutionary concepts of decomposition of aggregates to be useful for identifying structures. He also demonstrated dynamic interdependencies in project plans or IT systems and suggested the co-existence of multiple attractors as a reason for why some project teams utterly fail while others succeed.
In the third talk, Dr. Wilhelm Ruprecht, now working for the German Insurance Federation, discussed a critical mass model for the transition between different retirement pension schemes. He argued that the understanding of the logic of the transition process is decisive for understanding what policy options currently exist in Germany in the policy makers' attempt to cure the crisis in the prevailing “pay-as-you-go” insurance scheme.

Thomas Brenner, now associate professor at the institute, continued the presentations with a review of the paper series on Economics and Evolution over the past 10 years. Being the specialist in modeling learning processes he not only analyzed the spectrum of topics of all past contributions. He also suggested some novel themes by just recombining elements of the present themes – the perfect operation for generating novelty!

Next speaker was Peter Murmann, who had been visiting professor in the group in 2002 and is currently Visiting Professor of Strategy & International Business at the Helsinki University of Technology. Being the editor of the ‘Evolutionary Economics’ Social Sciences website he is a staunch expert in evolutionary economics himself. In his lecture he gave an outlook entitled “Towards a Framework for Comparative Industry Studies”, which was followed by a vivid discussion of the historical methods he recommended.

Paolo Seri who spent the years 2000/2001 as a doctoral student in the Evolutionary Economics Group and who is now a university researcher at the University of Macerata in Italy continued with a talk on “The Rise and Fall of the “Italian Model”. He found on the performance of industrial districts in Italy, a complex, spontaneously developing form of local inter-firm relationships capable of creating economics of scope. For the problem of measuring the strength of inter-firm relationships Paolo Seri at the end suggested an ingenious solution: why not using wine consumption as a measure of informal sociability, a component of social capital.

Georg von Wangenheim, senior researcher in the group from 2002 to 2005, now professor of law and economics at the University of Kassel, Germany, gave the final talk on “Evolution of Order and Chaos”. His aim was to identify hints of co-evolution of chaos and order and their relation to creativity. He did not go into depth with regard to the experiments he was running over the past years but convinced the auditorium with several sophisticated models he constructed, demonstrating chaos theory, entropy, incentives, feedback loops in daily life – not least the life of economic researchers. He concluded with an outlook on further experiments to test his postulated hypotheses.

In his dinner speech, Ulrich Witt looked back at 10 years of building up and running the group’s research. Asking rhetorically “To What Extent can Economic Evolution Be Anticipated?” he argued that an entrepreneurial economy – as much as an entrepreneurially organized research into new ideas – is not predictable in its future outcomes. Extrapolations can work in the short run only, where qualitative change does not yet alter the basis for the trends estimated for the qualitative conditions of the past. The major reason for qualitative disruptions is the inventiveness of the people, Witt explained. In their non-cognitive activities people basically adapt to changing conditions. In their cognitive activities, however, they not only seek to make the best possible adjustments (“constrained optimizations”), but
actively search for, and think-up, how they can alter their constraints in a favorable way ("innovations"). Innovations usually imply qualitative change, and since by their very nature – they cannot be anticipated, qualitative change in the economy cannot be anticipated either.

These facts, unsurprising to everyone facing the task of explaining evolution in whatever context, leave little more than retrodiction as a methodic tool for enhancing and testing empirical content of evolutionary theories. Nonetheless, for more limited predictive endeavors, the chances even in an evolutionary perspective may not be so bad. Human economic behavior with little or no cognitive participation is much more inert and therefore to a certain extent anticipatable (as the behavior of animals is). However, such behavior prevails in only a few domains like consumption working attitudes, or attitudes towards institutions. Moreover, whenever cognitive reflection intervenes, the rather robust behavioral patterns may change in unpredictable ways. We need much more understanding, Witt concludes, of where and for what time scales economic behavior can be assumed to be following the learned or even inherited patterns without being significantly disrupted by the influence of non-anticipatable cognitive activity.

In his retrospective, Ulrich Witt came to the conclusion that it took three to four years until the research program of the Evolutionary Economics Group was fully laid out in this spirit. Its achievements in breaking new ground for economic theory so far can be attributed to the enthusiasm and excellent work of all group members – and will continue to depend on them in the future. There will be lots of challenges and hard work ahead to convince economists elsewhere of the fruitfulness of the naturalistic approach that characterizes the group’s research program. This is anticipatable, Witt claimed, because – despite the enormous cognitive efforts in doing their research – economists tend to be much less reflective in their attitudes towards what the right research should be. However, without daring there will be no break through. Thus, gratitude to those who took the risk of trying the group’s new ideas over the past 10 years should be a commitment for those continuing into the next decade.
8 Publications

8.1 New Books


Entrepreneurship and growth are central concerns of policy makers around the world. “Local Heroes in the Global Village” introduces public policies for the promotion of entrepreneurship on a comparative, primarily German-American level. The book contributes to the debate what role public policies play in stimulating national and regional economic growth. With a better understanding of the complexity and variety of existent entrepreneurship policies in the U.S. and Germany, the reader of this volume will be able to formulate best practice, hands-on strategies which aim to promote nations as well as regions in an “entrepreneurial economy”.

This volume brings together conference contributions of leading academics and policy advisors from the United States and Europe. While the transatlantic conference on entrepreneurship policies was held in Germany, the program benefited from the presence of the American academics familiar with German policy issues and well-known Congressional and National Academies staff familiar with policy making at the senior levels of the U.S. government.

The volume has the virtue of both providing solid empirical analysis and theoretical underpinning from leading economists (among others, Rolf Sternberg, David B. Audretsch and Paul Reynolds) and social scientists, as well as a fresh perspective on the myths and realities concerning the operation of the U.S. innovation system. James Turner, for example, from the House Committee on Science (U.S. Congress) provides a legislative practitioner’s view of the decisions surrounding the seminal Bayh-Dole legislation and a much better perspective of commercial-oriented behaviour among American universities. These multiple perspectives bring together a unique and policy-relevant view of U.S. and German entrepreneurship policies as well as both innovation systems grounded in economics and policy.


The purpose of The Role of Labour Mobility and Informal Networks for Knowledge Transfer is to analyze the microfoundations of knowledge spillovers. The microeconomic analysis of knowledge spillovers leads to the insight that the spillover and flow of knowledge is not at all automatic. Instead, this volume suggests that a filter exists between knowledge and its economic application. The focus of The Role of Labour Mobility is on several key mechanisms that serve to reduce this filter and facilitate the flow of knowledge. In particular, the volume draws on emerging literature identifying the role of knowledge spillovers to investigate the significance of labour mobility and informal networks as mechanisms facilitating the flow of knowledge.

No field in economics has dealt extensively with the microeconomics of knowledge spillovers. Thus, it is important to include the perspectives and insights of research approaches that span a broad spectrum of fields in economics. This work brings together scholars from labor economics, regional economics, the economics of innovation and technological change, and sociology to introduce new insights yielded from the microfoundations of knowledge spillovers.


This volume collects sixteen articles written in honour of Werner Güth. In their variety they reflect the entire spectrum of approaches that are currently employed at the frontiers of (behavioural) game theory. Each is inspiring on its own and together they illustrate the excitement of the agenda of understanding strategic behaviour.

The economics of energy has been a contested issue over the past century. Although it has not figured prominently in mainstream economics, numerous alternative proposals have called for energy to play a more central role in economic theory. In this highly original and enlightening volume, Guido Buenstorf develops a new conceptual approach to the economics of energy which originates from recent advances in evolutionary economics.

The book proposes a non-reductionist, evolutionary approach to the economics of energy and sets out by asking how energy use in production contributes to the use value of goods. Based on a sequential production framework, the author re-interprets the notion of factors of production, identifies long-term patterns of change in energy use, and highlights the role of technical interdependence in adopting new energy technologies. This approach is then applied to three historical cases of energy innovation: the transition from wood to coal, the introduction of the steam engine, and the electrification of industrial production.

Academics and researchers in the fields of evolutionary economics, ecological economics and innovation will welcome this fresh and illuminating interpretation of the economics of energy and its role in the process of production.


Local industrial clusters, such as Silicon Valley in the United States, have become an important subject of scholarly inquiry in recent years. This book offers a unifying view by capturing the general characteristics and prerequisites of local industrial clusters both on a theoretical as well as an empirical level.

The book establishes a mathematical model to analyse the dynamics of clustering and the conditions that are to be satisfied if a local industrial cluster is to evolve. This model allows predictions about the spatial distribution of firms to be deducted, which are empirically tested in the book. This thorough methodology allows the author to study the existence of local industrial clusters in Germany, their stability and the industrial characteristics that are responsible for their existence.

An impressive scholarly exercise, this book also contains important policy lessons. As such, *Local Industrial Clusters* will be a valuable read for policy-makers as well as academics.


Despite the increasing trend towards deregulation, the public regulation of private activities remains a common phenomenon in industrialized countries. However, it is frequently claimed that slow and costly regulatory licensing procedures impede economic growth. This book investigates the strategic and adaptive interaction between citizen-applicants and administrators in regulatory licensing bodies, and studies the effects of policies to accelerate and simplify these processes.

Based on a variation and extension of the enforcement game, the author demonstrates that amendments to procedural rules which aim to speed-up and improve licensing procedures may have the effect of reducing social welfare. He illustrates that the failure of a policy to increase the number of applications implies a failure to increase the number of licenses granted. This in turn causes a reduction of social welfare. Importantly, he shows that the reverse implications are not true and that despite an increase in the number of applications
or licenses granted, social welfare may still decline. Therefore, he argues that any evaluation of procedural reforms on purely theoretical grounds is impossible. Only the measurement of real improvements in social welfare will verify the success of a policy. To establish failure, however, it is simply necessary to observe a decrease in the number of applications or licenses granted.

This book is a rare combination of game theoretic modeling and microeconomic analysis on the effects of variations in the procedural rules of licensing. The conclusion drawn will interest and inform a wide variety of academics and researchers working in the fields of law and economics, regulation, administrative law and game theory.


Studies in Choice and Welfare is a book series dedicated to the ethical and positive aspects of welfare economics and choice theory. Topics comprise individual choice and preference theory, social choice and voting theory (normative, positive and strategic sides) as well as all aspects of welfare theory (Pareto optimality; welfare criteria; fairness, justice and equity; externalities; public goods; optimal taxation; incentives in public decision making; cost-benefit analysis, etc.).

Kuklys examines how Nobel Prize-winning economist Amartya Sen’s approach to welfare measurement can be put in practice for poverty and inequality measurement in affluent societies such as the UK. Sen argues that an individual’s welfare should not be measured in terms of her income, but in terms of what she can actually do or be, her capabilities. In Chapters 1 and 2, Kuklys describes the capability approach from a standard welfare economic point of view and provides a comprehensive literature review of the empirical applications in this area of research. In the remaining chapters, novel econometric techniques are employed to operationalise the concepts of functionings and capability to investigate inequality and poverty in terms of capability in the UK. Kuklys finds that capability measurement is always a useful complement to traditional monetary analysis, and particularly so in the case of capability-deprived disabled individuals.


The role of entrepreneurship in society has changed drastically over the last half-century. Just after World War II, the importance of small business seemed to be fading away. A generation of scholars systematically supported the thesis of Joseph A. Schumpeter that large-scale establishments were the most powerful engines of progress. However, that thinking has been reversed in recent years, as entrepreneurship has come to be perceived as the true engine of economic and social development. This book analyzes why entrepreneurship has emerged as an important economic force, and what the link is between entrepreneurship and economic growth. It also explains the emergence of new entrepreneurship policies. Audretsch, Keilbach, and Lehmann make connections between entrepreneurship and economic growth at the levels of individual firms and entire regions. The book concludes that the new millennium may not be so much about the process of Joseph Schumpeter’s creative destruction, where entrepreneurial startups displace and ultimately drive incumbent companies out of business, but rather is characterized by creative construction. Globalization and its concomitant outsourcing and off shoring is the source of the “destruction,” especially in terms of lower skilled jobs. By contrast, entrepreneurship in the 21st century global economy is constructive. It commercializes investments in knowledge and ideas that otherwise might never have been, but ultimately result in growth, global competitiveness, and employment. Thus, the emergence of entrepreneurship policy can be interpreted as the attempt to generate entrepreneurial based economic growth by creating an entrepreneurial economy.

The present book is an introduction to the non-cooperative game theory. It mainly addresses students who enjoy precise modeling.

Besides the basic notation of normal form and extensive form games, the book discusses topics of negotiation theory, the theory of repeated games as well as of evolutionary game theory, taking into consideration latest research results and the basics of experimental game theory. Many of the theoretical results are compared with well-known experimental findings. This specific symbiosis of theory and experiment is rather new for a game theory textbook. The new edition contains a new chapter of the theory of auctions to account for their growing importance. The book now also includes sections on “mechanism design” and the concept of “stable equilibria”.

8.2 Publications by MPI Researchers

**Articles in Journals**


Buenstorf, G., ‘Sequential Production, Modular Techniques and Technological Change’, *Structural Change and Economic Dynamics*, 16(2), 2005, 221-241.


Güth, W., ‘Early or Late Conflict Settlement in a Variety of Games – An Experimental Study’, *Journal of Economic Psychology*, 25, 2004, 177-194 (together with V. Anderhub, N. Marchand).


Sutter, M. ‘Individual versus group behavior and the role of the decision making procedure in gift-exchange experiments’, *Empirica*, forthcoming (together with M. Kocher).

Sutter, M. ‘Measuring productivity of research in economics. A cross-country study using DEA’, *Socio-Economic Planning Sciences*, forthcoming (together with M. Kocher, M. Luptacik).


### Chapters in Books


PUBLICATIONS


Schubert, C., 'Introduction: Institutional design, social norms and preferences in an evolving economy', in: Schubert, C., Wangenheim, G.v. (eds), The Evolution of


Books


Working Papers


8.3 Preprint Series

Papers on Entrepreneurship, Growth and Public Policy

# 01-2004: David B. Audretsch, Max Keilbach
Entrepreneurship Capital and Economic Performance

# 02-2004: David B. Audretsch, Erik E. Lehmann, Susanne Warning
University Spillovers and New Firm Location

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Post-Materialism: A Cultural Factor Influencing Total Entrepreneurial Activity Across Nations

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Explaining female and male entrepreneurship across 29 countries

# 09-2004: Joost van Acht, Joop Stam, Roy Thurik, Ingrid Verheul
Business Ownership and Unemployment in Japan

# 10-2004: Ingrid Verheul, Lorraine Uhlaner, Roy Thurik
Business Accomplishments, Gender and Entrepreneurial Self-Image

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The Role of Dissatisfaction and Per Capita Income in Explaining Self-Employment Across 15 European Countries

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A Model of the Entrepreneurial Economy

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Employment Growth and Entrepreneurial Activity in Cities

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New Firm Survival and Human Capital

# 15-2004: Zoltan J. Acs, Catherine Armington
The Impact of Geographic Differences in Human Capital on Service Firm Formation Rates

# 16-2004: Catherine Armington, Zoltan J. Acs
Job Creation and Persistence in Services and Manufacturing

# 17-2004: Richard Florida, Sam Youl Lee, Zoltan Acs
Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation

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Regional Innovation in the US over Space and Time

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Financing High-Tech Growth: The Role of Debt or Equity

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The Effects of Experience, Ownership, and Knowledge on IPO Survival: Empirical Evidence from Germany

# 21-2004: Erik E. Lehmann
Does Venture Capital Syndication Spur Employment Growth and Shareholder Value? Evidence from German IPO Data

# 22-2004: Erik Lehmann, Susanne Warning, Jürgen Weigand
Governance Structures, Efficiency, and Firm Profitability

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The Entrepreneurship-Philanthropy Nexus: Implication for Internationalization
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Can Institutional Change Impact High-Technology Firm Growth?: Evidence from Germany’s Neuer Markt

# 26-2004: Julie Ann Elston, Robert S. Chirinko
Finance, Control, and Profitability: The Influence of German Banks

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Dividend Policy and Institutional Ownership: Empirical Evidence using a Propensity Score Matching Estimator

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Business dynamics and employment growth: a cross-country analysis

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The link between firm births and job creation: Is there a Upas Tree effect?

# 34-2004: André van Stel, Martin Carree, Roy Thurik
The effect of entrepreneurship on national economic growth: an analysis using the GEM database

# 35-2004: André van Stel, Viktor Stunnenberg
Linking Business Ownership and Perceived Administrative Complexity: An Empirical Analysis of 18 OECD Countries

# 36-2004: Michael Fritsch, Pamela Mueller
The Effects of New Business Formation on Regional Development over Time
(published in Regional Studies, Routledge, Vol. 38 (8), 2004, 961–975.)

# 37-2004: Max Kelibach, David B. Audretsch
Entrepreneurship Capital: Determinants and Impact

# 38-2004: Lawrence A. Plummer, Zoltan J. Acs
Penetrating the “Knowledge Filter” in Regional Economies

# 39-2004: Rui Baptista
Culture, Institutions and Government Attitudes towards New Firm Entry

# 40-2004: Rui Baptista, Roy Thurik
The Relationship between Entrepreneurship and Unemployment: is Portugal an Outlier?

# 41-2004: Michael Fritsch
Entrepreneurship, Entry and Performance of New Businesses Compared in two Growth Regimes: East and West Germany

# 42-2004: Doga Kayalar Erdem, David B. Audretsch
Determinants of Scientist Entrepreneurship: An integrative research Agenda

# 43-2004: Henry R. Hertzfeld, Albert N. Link, Nicholas S. Vonortas
Intellectual Property Protection Mechanisms in Research Partnerships

# 44-2004: Paul Reynolds
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Entrepreneurship in the EU: to wish and not to be

# 02-2005: Michael Fritsch, Pamela Mueller
The Persistence of Regional New Business Formation-Activity over Time - Assessing the Potential of Policy Promotion Programs

# 03-2005: Mark Sanders
Market Size or Acceleration Effects; Comparing Hy potheses to Explain Skill Biased Technical Change

# 04-2005: André van Stel, Martin Carree, Roy Thurik
The effect of entrepreneurial activity on national economic growth

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Nascent entrepreneurship and the level of economic development

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Uncertainty Avoidance and the Rate of Business Ownership across 22 OECD Countries, 1976-2000

# 16-2005: Heike Grimm, David B. Audretsch
Das Enable-Programm im Kontext der Europäischen Politik für Unternehmerische Initiative

# 17-2005: Erik Stam, Veronique Schutjens
The Fragile Success of Team Start-ups

# 18-2005: Simon C Parker
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Firm Level Implications of Early Stage Venture Capital Investment - An Empirical Investigation

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Determinants of entrepreneurial engagement levels in Europe and the US

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Portfolio strategies of life science venture capital firms in the USA and Europe

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Public Choice by Referenda or Delegation. An Experimental Comparison of Direct and Indirect Democracy.

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Time is money – Time pressure, incentives, and the quality of decision-making. (forthcoming in: Journal of Economic Behavior and Organization.)

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Are four heads better than two? An experimental beauty-contest game with teams of different size.

Framing Effects, Selective Information and Market Behavior – An Experimental Analysis.
(published in: Journal of Behavioral Finance, 6 (2), 2005, 90-100.)

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(forthcoming in: Games and Economic Behavior.)

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The Effect of Monetary Feedback and Information Spillovers on Cognitive Errors: Evidence from Competitive Markets.

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Relatives versus Neighbors – An Experiment Studying Spontaneous Social Exchange.

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The rationality of rational fools – The role of commitments, persons and agents in rational choice modeling.

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Unilateral face-to-face communication in ultimatum bargaining – a video experiment.

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Express Yourself; The Price of Fairness in a Simple Distribution Game.

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Conventions – Some Conventional and Some Not So Conventional Wisdom.

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Approximate Truth in Economic Modelling.

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A Note on Quantal Response Equilibria in Bargaining.

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Trust between individuals and groups: Groups are less trusting than individuals but just as trustworthy.

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Loss aversion and learning to bid.

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Effective equity experiences from an ultimatum experiment.

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Logit estimation of conditional cooperation in a repeated public goods experiment.

#06-2005: W. Güth, M. V. Levati, M. Ploner
The Effect of Group Identity in an Investment Game.

#07-2005: A. Nicklisch, L. Zucchini
Dynamic Efficiency of Emission Trading Markets: An Experimental Study.

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Fair Wages and the Co-Employment of Hired and Rented Hands – An Experimental Study.

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Is playing alone in the darkness sufficient to prevent informational cascades?

#10-2005: R.E. Goodin, W. Güth, R. Sausgruber
Early versus Late Coalition Announcement in Experimental Democracies.

#11-2005: W. Güth, N. Nikiforakis, H.-T. Normann
Vertical Cross-Shareholding Theory and Experimental Evidence.

#12-2005: F. Koessler, Ch. Noussair, A. Ziegelmeyer
Individual Behavior and Beliefs in Experimental Parimutuel Betting Markets.

#13-2005: J. Huber, M. Kirchler, M. Sutter
Is more information always better? Experimental financial markets with asymmetric information.
(forthcoming in: Journal of Economic Behavior and Organization.)
#14-2005: **U. Cantner, A. Nicklisch, T. Weiland**  
Innovation races: An experimental study on strategic research activities.

#15-2005: **G. Fellner, M. Sutter**  
Causes, consequences, and cures of myopic loss aversion - an experimental investigation.

#16-2005: **J. B. Davies, M. G. Kocher, M. Sutter**  
Economics research in Canada: a long-run assessment of journal publications.

#17-2005: **M.V. Levati, M. Sutter, E. van der Heijden**  
Leading by example in a public goods experiment with heterogeneity and incomplete information.

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Let The Dummy Talk! Unilateral Communication and Discrimination in Three-Person Dictator Experiments.

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The impact of payoff interdependence on trust and trustworthiness.

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Comparison of Mean-Variance Theory and Expected-Utility Theory through a Laboratory Experiment.

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Conventions for Implementing Conventions - An Evolutionary and Experimental Analysis.

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Attitudes toward Private and Collective Risks in Individual and Strategic Choice Situations.

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An Experimental Investigation of Alternatives to Expected Utility Using Pricing Data.

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“One Man, One Dollar”? Examining the equalization argument in support of campaign contribution limits.

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Cooperative Networks: Theory and Experimental Evidence

#33-2005: **W. Güth, K.-D. Koschmieder, M.V. Levati and E. Martin**  
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#34-2005: **D. A. V. Dittrich and A. Ziegelmeyer**  
Laboratory Bilateral Gift Exchange: The Impact of Loss Aversion

Strategic Delay and Rational Imitation in the Laboratory
#36-2005: Sven Fischer
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#37-2005: K. Boun My, F. Cochard and A. Ziegelmeyer
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#40-2005: Andrea Morone and Ozlem Ozdemir
Measuring the Degree of Ambiguity about Probability: Experimental Evidence

#41-2005: S. Fischer, L.G. González and W. Güth
(Un)Reliable Concessions in Static and Dynamic Bargaining Experiments

Papers on Economics & Evolution

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# 0404: E. Ostrom
The Working Parts of Rules and How They May Evolve Over Time.

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On Novelty and Heterogeneity.

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From Possession to Property: Preferences and the Role of Culture.

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Empirical Calibration of Simulation Models.

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The Autocatalytic Character of the Growth of Production Knowledge: What Role does Human Labour Play?

# 0413: C. Sartorius
Second-order sustainability – conditions for the development of sustainable technologies in a dynamic environment.
# 0414: F. Pryor
Economic systems of OECD nations: impact and evolution.

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Why Multilevel Selection Matters.

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Routines, genes and program-based behaviour.

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Evolutionary Theories of Cultural Change: An Empirical Perspective.

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Useful Knowledge as an Evolving System: The View from Economic History.

# 0501: C. Cordes, C. Schubert
Toward a Naturalistic Foundation of the Social Contract.

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How Useful Is Universal Darwinism as a Framework to Study Competition and Industrial Evolution?

# 0503: L. Andreozzi
Hayek Reads the Literature on the Emergence of Norms.

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Knowledge-based Entrepreneurship: The Organizational Side of Technology Commercialization.

# 0505: E. Stam, E. Garnsey
New firms evolving in the knowledge economy; problems and solutions around turning points.

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A small fish war: an example with frequency-dependent stage payoffs.

# 0507: U. Witt
From Sensory to Positivist Utilitarianism and Back — The Rehabilitation of Naturalistic Conjectures in the Theory of Demand.

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Heritage and Agglomeration: The Akron Tire Cluster Revisited.

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Local Factors and Innovativeness – An Empirical Analysis of German Patents for Five Industries.

# 0510: U. Witt
Firms as Realizations of Entrepreneurial Visions.

# 0511: W. Ruprecht
From Carl Menger’s Theory of Goods to an Evolutionary Approach to Consumer Behaviour.

# 0512: O. Sorenson, J. Singh, L. Fleming
Science, social networks and spillovers.
# 0513: B. Loasby
Entrepreneurship, Evolution and the Human Mind.

# 0514: R. Day
Microeconomic Foundations for Macroeconomic Structure.

# 0515: C. Baden-Fuller, S. G. Winter
Replicating Organizational Knowledge: Principles or Templates?

# 0516: T. Brenner
The Regional Industry-size Distribution — An Analysis of all Types of Industries in Germany.

# 0517: C. Schubert
A Note on the Principle of ‘Normative Individualism’.

# 0518: K. Chandrasekhar and S. Bhaduri
Vicarious learning and socio-economic transformation in Indian trans-himalaya: an evolutionary tale of economic development and policy making.

# 0519: M. A. Maggioni and T. E. Uberti
International networks of knowledge flows: an econometric analysis

# 0520: G. Buenstorf

# 0521: A. Marciano
Economists on Darwin’s Theory of Social Evolution and Human Behavior.

# 0522: C. Schubert
Fairness in Urban Land Use: An evolutionary contribution to Law & Economics.

# 0523: T. Brenner
A Stochastic Theory of Geographic Concentration and the Empirical Evidence in Germany.

# 0524: U. Witt
Reasoning About Novelty.

Discussion Papers by Prof. Streit

No. 01-2004: Manfred E. Streit
Komplexität und Ordnung – Kognitionstheoretische Aspekte ökonomischer Phänomene.

No. 02-2004: Manfred E. Streit
Wissenschaftliche Politikerberatung zwischen Wissensmangel und Opportunismus.

No. 03-2004: Manfred E. Streit
Die "Verfassung für Europa" – Bemerkungen zu einem ordnungspolitischen Dauerproblem.

No. 01-2005: Manfred E. Streit
Die Soziale Marktwirtschaft – zur Erosion einer wirtschaftspolitischen Konzeption.
(published in: ORDO Bd. 56, Stuttgart: Lucius & Lucius, 2005, 113 - 121.)

No. 02-2005: Manfred E. Streit
Neoliberal – Zu einem Schmähwort in der Diskussion wirtschaftspolitischer Reformen.
(forthcoming in: WISU – Das Wirtschaftsstudium)

No. 03-2005: Manfred E. Streit
Die Verteilung und Umverteilung von Markteinkommen – Anmerkungen zu einem provozierenden Phänomen.
(forthcoming in: WiSt - Wirtschaftswissenschaftliches Studium)
9 Cooperation with Friedrich-Schiller-University

Since the last evaluation in 2004 the institute has preempted the graduate program, which will be jointly offered by our institute in the future, by organizing several lectures:

Spring 2005:  
- Advanced Game Theory  
- Network Economics  
- Experimental Economics 

Autumn 2005:  
- Game Theory  
- Econometrics 

From 2006 on the graduate education program is jointly offered by all three MPI groups. To establish a more formal program, organizing the graduate education, the institute together with the faculty of economics, partly also including the faculty of psychology, has launched three funding initiatives (see the materials in Volume II):

- Intern. MP-Research on “Adapting Behaviour to a Fundamentally Uncertain World” - Psychology, Economics and Law Joining Forces
- Graduate courses (microeconomics and game theory)
- Excellence initiative

10 Appointments and Honors

Appointment Mark Sanders

In September 2005, Mark Sanders, research scholar at the Entrepreneurship, Growth and Public Policy Group at the MPI, has been appointed as an assistant professor in macroeconomics at the University of Utrecht. Mark Sanders received his doctoral degree at the University of Maastricht in 2004. His PhD-dissertation on Skill Biased Technical Change was published in 2005 (Edward Elgar Publishers). Since September 2004 he joined the EPG as a research scholar. After visiting for 3 months at Brown University, Providence, Rhode Island, he embarked upon a project to merge the fields of entrepreneurship and economic growth at the theoretical level. His results will be published in several high ranked academic journals. He is working on both empirical and theoretical projects together with David B. Audretsch, head of the EPG and his colleagues Max Keilbach and André van Stel.

Appointment Christian Martin

Christian Martin, research fellow with the Entrepreneurship, Growth and Public Policy Group at MPI, has been appointed Assistant Professor (“Juniorprofessor”) at the Department of Social Sciences and at the Centre for Globalisation and Governance at University of Hamburg in December 2004. Before joining the MPI in March 2004, Martin held positions at the University of Konstanz. During his time with the EGP group he conducted research into spatial policy spillovers and location theory. Martin has published, among other journals, in Public Choice, Constitutional Political Economy, and the Social Science Computer Review.
Appointment **Vera Troeger**

Vera Troeger has been appointed as lecturer in Political Economy and Political Methodology at the Department of Politics, University of Exeter in October 2005. The principal research activities of Vera Troeger lies at the intersection of comparative and international political economy, formal theory, as well as applied and pure quantitative methods. From 2002 till 2004 Vera Troeger worked as Head of the Econometric Division of the FAST-Project/SwissPeace Foundation, Bern/Switzerland. In addition, she was Program Affiliate at the WCFIA, Harvard University, Cambridge, MA. In 2004 she accepted a position as Research Fellow at the Max Planck Institute of Economics in Jena, Germany. Most of the PhD (University of Konstanz) thesis was written at the MPI. Vera Troeger has published, among other journals, in the European Journal of Political Research, the British Journal of Political Science, Political Analysis, European Union Politics and the Swiss Journal of Political Science.

Appointment **André van Stehl**

André van Stehl was appointed Assistant Professor in the Department of Economics at University of Utrecht in May 2005. Van Stehl received his Doctorate from the Erasmus University in Rotterdam in economics. Before joining Max Planck, van Stehl was a researcher for EIM Business & Policy Research.

Appointment **Erik Lehmann**

In September 2005, Erik E. Lehmann, research scholar at the Entrepreneurship, Growth and Public Policy Group at the MPI, has been appointed as a full professor in management and organization at the University of Augsburg. Erik E. Lehmann received his doctoral degree at the University of Rostock in 1999 and finished habilitation at the University of Konstanz in May 2005. Since March 2004 he joined the EPG as a research scholar. During this time, his main research interest is focused on the role of academic spillover effects on high tech firms. His results on university spillover effects are published in several high ranked academic journals. Together with David B. Audretsch, head of the EPG and his colleague Max Keilbach, he published “Entrepreneurship and Growth” (Oxford University Press).

Research Award **Gerlinde Fellner**

Gerlinde Fellner has been awarded the Otto-Hahn medal for her PhD thesis “Experimental studies on investor behaviour”. The Otto-Hahn medal includes a monetary grant and is awarded every year by the Max Planck Society to young researchers for their outstanding scientific achievements. The laudatio of Fellner’s dissertation highlights the interdisciplinary approach to explore why actual investment behaviour considerably deviates from predictions of microeconomic theory. The use of psychological explanations such as competence and control illusion, norm conformity, and emotionality are considered as inventive and her research is characterised as reflective of high methodological competence. Special acknowledgment receives her efforts in advancing the integration of the two neighbouring disciplines economics and psychology.
Appointment **Georg von Wangenheim**

In spring 2005, Georg von Wangenheim, research associate at the Evolutionary Economics Group, has been appointed as a full professor in Philosophy of Law, Private Law and Law and Economics at the Department of Economics at the University of Kassel. Georg joined the EVO group in September 2002. After having completed his PhD in Economics at Freiburg University in 1994, he has worked as research fellow at the University of Hamburg, the UC Berkeley Law School and the University Pompeu Fabra in Barcelona. In 2002, he finished his second PhD thesis ("Habilitation") at Hamburg University.

Georg’s research interests focus on the ways Law and Economics mutually enrich each other. In particular, he applies Law and Economics analysis on the evolution of law, the bureaucracy and its reform, Public Choice problems, as well as on issues of land use and environmental regulation. In his PhD thesis, published by Mohr-Siebeck in 1995, he developed a model of the evolution of legal rules, stressing the phenomenon of frequency-dependencies. Results of his research were published in high-ranking academic journals. His second PhD thesis, published by Edward Elgar in 2004, discusses the behavior of public administrative bodies, using sophisticated game-theoretic tools.

**List of selected publications:**

Researchers at the Institute

Aldridge, Taylor
Research Fellow: Public funded venture capital, in particular commercialization of academic science research, commodification of nationalism and patriotism; examining how entrepreneurs have endogenized political means for profit ends and the resulting political externalities.

Beckmann, Iris
Research Fellow: Entrepreneurship Policy, research on the emergence of entrepreneurship policy: differences and changes in economic policy on a regional, state and national level, the political economy of entrepreneurship policy.

Bhaduri, Saradindu
Research Fellow in 2005 at MPI, Jena and Assistant Professor of Economics in the Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi (Ph.D in Economics 2001, from Jawaharlal Nehru University, New Delhi): Economic analysis of technological change, institutional change, entrepreneurship and firm behaviour, economic development and development policies.

Binder, Martin

Brenner, Thomas
Associate Professor (Dr. rer. nat., 1995, University of Stuttgart; Dr. rer. pol., 1998, Friedrich Schiller University, Jena; habil., 2003, Friedrich Schiller University, Jena): Localised Industrial Clusters, Industrial Spatial Distribution, Innovation Economics, Learning in Economics, Experimental Economics, Game Theory, Simulations, Computational Economics, Business Cycles, Labour Economics, Consumption Behavior.

Brökel, Tom

Büchner, Susanne
Research Fellow (MA, Sociology, Psychology and English, 2000, University of Leipzig): Fairness and Solidarity.

Bünstorf, Guido
Research Associate (Dr. rer. pol., Economics, 2002, Friedrich Schiller University, Jena): Industry Evolution, Entrepreneurship, Technology Transfer, Evolutionary Economics.

Chai, Andreas
Research Fellow (B.Econ. (Hons.), 2002 University of Queensland/Australia): Evolutionary Consumer Theory, Tourism Economics, Developmental Economics, History of Economic Thought.

Chlaß, Nadine

Conte, Andrea
Research Fellow: Economics of innovation, the determinants of innovation in industrialized countries through empirical analysis of the innovative input-output relationship at the firm level, the effects of innovation in the labor market, in particular testing whether the skill biased technological change hypothesis applies to developing countries.
**Cordes, Christian**  
Research Associate (Dr. rer. pol., Economics, 2003, Friedrich Schiller University Jena): The biological and psychological foundations of economic behavior; long-term economic change and its driving forces; an evolutionary perspective on economic policy making; methodological and conceptual problems of theories of evolution.

**Dittrich, Dennis Alexis Valin**  

**Fellner, Gerlinde**  

**Fischer, Sven**  

**Fornahl, Dirk**  
Research Associate (Dr. rer.pol. Economics, 2005, Friedrich Schiller University Jena): (Regional) Entrepreneurship; (Regional) Networks and cooperation; Knowledge flows; Industrial evolution; Academic organisations and their (regional) impact; Technological concentration and specialisation; International environmental policy.

**Frenzel Baudisch, Alexander**  

**González-Morales, Luis G.**  

**Günther, Christina**  

**Güth, Werner**  
Director (Dr. rer. pol., 1972, and habil., Economics, 1976, University of Münster; 1977–1986, University of Cologne, 1986–1994 University of Frankfurt (Main), 1994–2001 Humboldt University of Berlin; since 2001 Director of the Strategic Interaction Group of the Max Planck Institute and honorary professor of Economics of Friedrich Schiller University, Jena and a member of the Berlin-Brandenburg Academy of Sciences): Game Theory, Experimental and Micro-economics with strong leanings towards (Social) Psychology, Philosophy, (Evolutionary) Biology and the Political Sciences.

**Kuklys, Wiebke**  
The sad news of the death of our dear colleague and friend Wiebke Kuklys has filled us with deep grief. She died in June 2005 at the age of 33. Wiebke joined the Strategic Interaction Group of the Max Planck Institute in 2003. Until the very end she shared with us her extraordinary intelligence and enthusiasm for life. She obtained her Ph.D. degree at the University of Cambridge, and was looking forward to hold in her hands a copy of her published thesis, “Amartya Sen's Capability Approach: Theoretical Insights and Empirical Applications.” It appeared in Springer’s Studies in Choice and Welfare as one among Wiebke’s wonderful legacies to us. We will miss her.
Levati, Maria Vittoria

Martin, Ev
Research Fellow (Dipl., business administration, 2005, Friedrich Schiller University, Jena): Game Theory, Experimental and Behavioral Economics, Bounded Rationality, Motives for setting up Foundations.

Monsen, Erik
From January to June 2005 Research Fellow, and since June 2005 Senior Research Fellow: Corporate entrepreneurship, organizational development & change, organizational learning, identification, and social identity, integrating employees and teams into the design of entrepreneurship.

Morone, Andrea
Scholarship holder (July 1, 2005 – Feb 2, 2006), Lecturer in Economics at the University of Bari, Italy: Behavioral Economics, Experimental Economics, Behavioral Game Theory.

Müller, Pamela
Senior Research Fellow: Entrepreneurship and the process for new firm formations and their impact on economic development, regional economic development and regional development strategies.

Nicklisch, Andreas

Niederle, Uta-Maria
Research Associate (Dr. rer. pol., Economics, 2000, University of Rostock): Cognitive Models of human economic behavior; Possessive behavior and its relation to the formation of property rights; Concepts and models of evolutionary dynamics; general theory of institutions and institutional change; Economic history.

Oettl, Alexander
Research Fellow: Economics of innovation, management of technology, knowledge spillovers, economic geography.

Ortega-Argilés, Raquel
Senior Research Fellow: SMEs, innovation and ownership structure based on a panel data approach, firm demography, survival and growth rates, link between family, foreign and corporate governance structures and firm demographic process.

Ozdemir, Ozlem
Scholarship holder (Sept 1, 2005 – Feb 28, 2006), Research Associate (PhD in Economics, 2000, Texas Tech University, USA), Assistant Professor at the Department of Economics, Yeditepe University, Istanbul, Turkey: Experimental and Behavioral Economics, Decision Making under Risk and Uncertainty, Firm Behavior, Industry Competitiveness.

Pantz, Katinka
Research Fellow (Magister Artium in Philosophy, Politics, Economics, 2002, Dr. rer. pol., Economics, 2005, Humboldt University of Berlin: Political Economy of International Economic Policy Spillovers; Quantitative Methodology in the Comparative Political Economy.

Patzelt, Holger
Senior Research Fellow: Strategic alliances and inter-firm cooperations of entrepreneurial companies; venture capital financing, focused studies on high technology industries with a particular emphasis on the life science sector.
Ploner, Matteo
Scholarship holder (July 1 – Sept 15, 2005); PhD Student at the School of Advanced Studies, Pisa, Italy: Experimental Economics, Behavioral Game Theory.

Qiu, Jianying
Research Fellow (Master of Finance, 2005, Freiburg University): Behavioral finance, game theory, market microstructure and experimental economics.

Riedel, Andreas
Research Fellow, PhD-Student (Dipl., Economics, 2005, Friedrich Schiller University, Jena): Behavioral finance.

Sanders, Mark
Senior Research Fellow: Areas of endogenous growth, the product life cycle and public policy implications, trade-theory, labor economics and the economics of technical change.

Schaper, Franz

Scheer, Silke

Schmidt, Carsten

Schubert, Christian

Schütze, Stephan
Research Fellow: European Union entrepreneurship policies, focused studies on European Union entrepreneurship policies and their translation into regional contexts, gender and immigration issues with regard to entrepreneurship.

Solis, Daniel Liviano
Research Fellow: Industrial economics, economic geography, focused studies of the relationship between industrial dynamics and the geographic factors that shape the distribution of the economic activity across the territory, the application of quantitative methods such as spatial econometrics and nonparametric econometrics in the treatment of this topic.

Sutter, Matthias
Associate Professor (Dr. rer. soc. oec, 1999, habil., Economics, 2002, University of Innsbruck): Experimental Economics, Public Economics, Public Choice, Economics of Economics. Since October 2005 visiting W3 Professor at the University of Cologne.

Tamvada, Jagannadha Pawan
Research Fellow: Qualitative empirical issues in measuring entrepreneurship in a region, Determinants of survival and productivity of small firms in developing countries, Schumpeterian growth theory using a development economist’s perspective.
Uske, Tobias
Research Fellow (M.A., Economics, 2005, Friedrich Schiller University, Jena): Reputation and Trust Building, Knowledge Dissemination, Game Theory.

van Stel, André
EIM Business and Policy Research, The Netherlands; Senior Research Fellow at the Max Planck Institute of Economics; Assistant professor at the Centre for Advanced Small Business; Economics (CASBEC) at Erasmus University, Affiliated with the Max Planck Institute of Economics: determinants and consequences of entrepreneurship.

Vanberg, Christoph
Research Associate (PhD. Economics, 2005, Cornell University): Public Choice, Game Theory, Behavioral and Experimental Economics; Areas of interest include campaign finance policy, legislative organization, budget processes, and the development of behavioral / cognitive approaches to individual and group decision making.

Wangenheim, Georg v.
Research Associate until May 2005 (Dr. rer. pol., Economics, 1994, University of Freiburg; habil. in economics, 2002, University of Hamburg; 2001 visiting research professor (law and economics) Universitat Pompeu Fabra, Barcelona; 2002-2005 research associate at the Evolutionary Economics Group, Max Planck Institute; 2005 - present Professor for Foundations of Law, Private Law and Law and Economics, University of Kassel): Evolution of preferences; Game Theory; Institutional Economics; Law and Economics; Public Choice; Welfare Economics from an evolutionary perspective.

Weiland, Torsten
Research Fellow (Dipl., Business Administration, 2004, Friedrich Schiller University, Jena): Industrial Organization, Economics of Innovation, Microeconomics, Game Theory and Behavioral Economics.

Witt, Ulrich
Director (Dr. rer. pol., 1979, University of Göttingen; habilitation, 1985, University of Mannheim; 1986-87 Visiting professor University of Southern California, Los Angeles, 1988-95 Professor of economics at University of Freiburg; Director of the Evolutionary Economics Group, Max Planck Institute and honory professor of economics at the Friedrich Schiller University Jena 1995 - present): Economic behavior and its biological and psychological foundations; Long-term economic growth; Institutional Change; Consumption and Production Theory; Industry Dynamics and Firm Development; Methodological and conceptual problems of theories of evolution.

Worch, Hagen
Research Fellow (M.A., Economics, 2001, Friedrich Schiller University, Jena): Theory of the firm; Developmental patterns in firm organizations; Cognitive foundations of firm behaviour; Intrinsic motivation and incentives; Economics of knowledge and innovation; Evolutionary economics.

Zellner, Christian
Research Associate until Dec 2004 (Dr. rer. pol., Economics, 2003, Friedrich Schiller University, Jena): Knowledge-based entrepreneurship; Economics of innovation and technical change (esp. the contribution of basic research to national innovative capacity); Development economics (esp. in relation to evolutionary consumption theory).

Zhao, Zuoquan
Senior Research Fellow: Spatial distribution, economic growth, entrepreneurship, focused studies on unfolding aggregate growth models in a spatial context in which the spatial distribution (e.g. agglomeration) and mobility (e.g. knowledge spillovers) are endogenized, statistics of spatial distribution and the role of entrepreneurship in agglomeration.
Ziegelmeyer, Anthony  
Research Associate (Ph.D., Economics, 2001, University of Strasbourg): Social Learning and Behavioral Economics.

Zimmermann, Jörg  
Research Fellow: International entrepreneurship – finance and strategy, internationalisation strategy of international entrepreneurs as well as related firm characteristics like human capital, network, internationalisation path, limitations of internationalisation and market entry strategy, impact of finance on the internationalisation strategy and firm performance, venture capital.

Information about the Institute

Administration

The administration department, consisting of 8 staff members, relieves scientists of the necessary daily clerical work, among other things, within the range of personal administration, book keeping, completion of projects, guest room administration, institute cleaning etc.. This department keeps information for the scientists and while providing necessary consultation of diverse topics. In addition, the administration staff ensures a clean environment, security and order at the Institute as well as supporting the scientific staff to organize meetings.

The administration department has been using the accounting system SAP since 1997 and the SAP R/3 HR since 2003 for personnel administration.

Since 01.09.2005 a new administration clerk has been trained. Mrs. Magdalena Kose has been trained in bookkeeping, purchasing and personnel and will work in these areas as well. She will also receive an overview of secretarial duties including Electronic Data Processing plus other administration areas within the Institute.

The Institute takes on the responsibility to make it possible for young people to allow them a qualified entrance to working life and is pleased to be able to contribute a small part so that in economically weak times a future prospect is given to the new generation.

Computing Services

The IT department is committed to providing a stable and modern communication infrastructure. During the last reporting periods the infrastructure was upgraded and modernized to fit the needs of three scientific departments. In contrast the current reporting period has two main purposes, one being moderate renewal, the other being the implementation of new services and procedures at the institute to enhance scientific productivity.

In most areas the capacity of the infrastructure is still sufficient due to foresighted investment planning in 2003 – 2004 and thus there was only a moderate need for renewal of its components. The network’s infrastructure was expanded to its full capacity and a WLAN was introduced to provide guests a modern environment. A VPN connection was introduced to help traveling staff and home users.

One major challenge was the change of the institute’s name and, subsequently, all external network names, email addresses and websites. This was achieved without interruption of normal IT services.

The institute’s increasing number of workshops and guests resulted in setting up standardized procedures for a user and guest workflow and an increased provision of information for guests. A standardized plan for a workshop and summer school environment was introduced and tested during summer 2005. The IT department started an intranet project, where users and guests could find information to facilitate Internet connection.
The IT department assisted in projects for scientific and research programs. The computer laboratory was completely modernized, being expanded and equipped with new hardware. New functions were introduced at the institute's Video Laboratory thus enhancing the recording functionality and the type of experiments to be performed. To facilitate video sample analysis, a modern and powerful workstation environment was set up to digitize video tapes.

Scientific web services were enhanced and new types of online experiments are now possible. They allow for online surveys and Internet Experiments. A new website, http://journal.sbej.mpg.de, was set up which allows online literature searches of the small business economics journal.

Current challenges in network and computer security were dealt with by an automated procedure of computer installation and distribution of security patches. Security measures in our server room were improved.

The main purpose of all activities is to provide a modern, secure and stable IT infrastructure without which modern scientific research can no longer take place. The approach is to achieve a balance between scientific requirements, technical desires and financial constraints.

Library

Three employees work in the library team. The team is always anxious to provide the latest and best information for the scientific work. Since 1999 the library team is working with the library software “Aleph”. At present the library owns 26,000 books, 6000 bound journal volumes and approximately 180 current periodicals. In 1995 we were able to acquire the scientific library of Gottfried Haberler (ca. 3000 volumes) with rare books of the period 1930 – 1980.

The Library and Research Information is a special library that primarily provides services to the academics at the Institute. For this purpose it supplies printed and electronic media and information in the scientific fields of Evolutionary Economics, Experimental Economics and Economic Systems. In addition, the library acquires general reference books, dictionaries and literature in adjacent scientific areas.

The MPS Virtual Library is an information portal that offers access to a large number of heterogeneous scientific information resources using one common search interface. The Electronic Journal Library provides access to full-text articles in all relevant areas. In addition, the library provides many online information services, for example Web of Knowledge, WISO and OVID Online Database Server. Items not held at the Institute Library can be obtained through the Inter Library Loan Service.
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