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DYNREG

Dynamic Regions in a Knowledge –Driven Global Economy:
Lessons and Implications for the EU"

Instrument: Specific Targeted Research or Innovation Project

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1. PROJECT EXECUTION

1.1 PROJECT RESEARCH OBJECTIVES

The objective of this project was to identify factors underlying the growth performance of emerging dynamic regions and the role of these regions in a knowledge-driven world economy so as to draw lessons and policy implications for the EU. In particular, this project provides:

- a theoretical and methodological research framework on the role of knowledge and innovation in fostering growth, competitive advantages and competitiveness and the role of public policy in fostering innovation and growth;
- a comparative analysis of the factors underlying the growth performance of dynamic regions and the role of knowledge and innovation in fostering growth at firm, industry, region and country levels;
- assessing the role of shifting comparative advantages in new growth regions and the impact of current trends in dynamic regions on patterns of world growth, development, competitiveness, inequalities and convergence;
- an analysis of public policies in shaping the dynamic economic performance of firms, industries, regions and countries with the aim to draw lessons and policy implications for the EU.

1.2 PROJECT CO-ORDINATOR

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1.4 DESCRIPTION OF WORK PERFORMED AND RESEARCH RESULTS

COMPREHENSIVE THEORETICAL AND METHODOLOGICAL RESEARCH FRAMEWORK

This objective has been pursued in Work package 1 over the period 1 January - 30 June 2006. The research output in this work package consists of a literature survey and detailed theoretical and methodological frameworks for the subsequent three main parts of the project. This objective has been achieved through the delivery of the following research output:

- Literature survey on dynamic growth regions, innovation, and competitiveness in a knowledge-based world economy
- Theoretical and methodological study on dynamic growth regions and factors explaining their growth performance
- Theoretical and methodological study on comparative advantages in dynamic growth regions, convergence and inequalities patterns
- Theoretical and methodological study on the role of public policies in fostering innovation and growth

UNDERSTANDING THE GROWTH PERFORMANCE OF DYNAMIC REGIONS

This objective has been pursued in Work package 2 running from 1 July 2006 - 30 April 2007. Research in this part of the project has used advanced econometric methods to test a number of hypotheses about the forces behind dynamic growth and delivered a comparative analysis of the factors underlying the growth performance of dynamic regions with a special attention to the role of knowledge and innovation in fostering growth at firm, industry, region and country levels. This objective has been achieved through the following research output:

- Characteristics of dynamic regions in the world economy
- Factors underlying the growth performance of the dynamic regions at the global, national and sub-national levels
- Expert opinion surveys on sources and factors of dynamic growth

ASSESSMENT OF THE IMPACT OF GLOBALISATION ON ECONOMIC GROWTH AND COMPETITIVENESS

This objective has been pursued in Work package 3 over the period 1 May 2007- 28 February 2008. Research in this work package has analysed the main consequences of dynamic growth in emerging regions on prospects of growth, competitiveness, convergence and inequality in the EU, considered as a whole, at national and sub-national levels. This objective has been achieved through the following research output:

- Trends in comparative advantages of emerging regions and their determinants
- The impact of dynamic growth in emerging regions on trade, income and convergence patterns in the world economy
- Dynamic growth, inequalities and social cohesion

ANALYSIS OF PUBLIC POLICIES IN FOSTERING INNOVATION AND GROWTH

This objective has been pursued in Work package 4 running from 1 March -31 December 2008. Research in this work package has summarised the main findings of work packages 2 and 3 and assessed their policy implications for the European Union. In addition, the research team focused on uncovering the role of public policies in shaping the economic performance of firms, industries, regions, and countries, in particular, the role of public policy in guiding the processes of innovation and economic growth. This objective has been achieved through the following research output:

- Lessons and policy implications of emerging growth regions for the European Union' s competitiveness and growth prospects
- The role of public policies in fostering innovation and growth
- Economic growth, innovation and competitiveness in a knowledge-based world economy (edited book)

1.5 SCIENTIFIC APPROACH AND METHODOLOGY

This project contributes to the progress beyond the current state-of-the art by blending together a series of complex theoretical and methodological approaches aimed at understanding the factors behind the emergence of dynamic spaces in the world economy, in a context of greater global interaction. It entails a combination of subject and territorial approaches aimed at filling a current gap between theories mainly developed in economics (such as the neoclassical and endogenous growth theories or the new economic geography), with theories of a more 'institutional' nature and multi-disciplinary background, such as the theories on national and regional innovation systems, human resources and FDI-led growth and sociology. The innovation of this research effort consists in using an integrated framework of analysis where regional growth questions are put in an international framework and examined from a new perspective incorporating parallel and rarely interacting literatures. By blending these different research strands into one research project, in order to address the important knowledge gaps, and given the particular policy focus of the project, the main result of the analysis is a fuller understanding of which development strategies and policies work in order to generate sustainable economic growth.

1.6 KEY FINDINGS AND POLICY MESSAGES

This research provides novel insights into the process of economic growth with a special attention to the role of knowledge and innovation, human capital, foreign direct investment, entrepreneurial clusters and social capital in fostering growth at firm, industry, region and country levels. Further, we shed light on the impact of globalisation on economic growth and competitiveness. Finally, we analyse public policies aimed to foster economic performance and innovation at the firms, industry, region and country levels. Key findings and policy messages are summarised below.

1.6.1 FACTORS UNDERLYING GROWTH PERFORMANCE AT THE GLOBAL, NATIONAL AND SUB-NATIONAL LEVELS

According to experts, the areas with the greatest economic dynamism in the near future are China and India, followed by the EU new member states. The less developed areas of the world seem to be divided into two groups: one with high-growth potential and increased prospects for convergence with the developed world, and another with low-growth potential and a diverging fortune. This finding corroborates the existence of multiple growth regimes and nonlinearities (or even club-convergence) in economic growth and world convergence (all discussed in the recent growth literature). A number of important determinants of economic dynamism at the global scale have been identified. These determinants are consistent with the mainstream economic literature highlighting the need for increased human capital, innovation, openness, investment and infrastructure, but also with the less-conventional economic theories, pointing out the increasing importance of institutional, legal and political factors. The determinants of economic dynamism do not have the same influence in the advanced and the less advanced economies. For the former group, aspects related to human capital, innovation, knowledge and technology seems to be much more important, whereas for the latter, aspects that are deemed paramount are related to the socio-political framework, the institutional (legal) environment and the amount of FDI attracted. It is worth noting that a high degree of openness, a capacity for flexible adjustment and the quality of infrastructure are some fundamental preconditions for economic dynamism independent of the level of development an area exhibits. The prevailing mix of opposite characteristics that is considered to best promote economic dynamism indicates that a number of perceived determinants are effective only within a limited scope. This also raises a question for the validity of the conventionally linear models of growth, in which relations and impacts are either positive or negative. With regard to which conceptual frame is most capable in explaining economic growth, the theories of endogenous growth and New Economic Geography seems to prevail. Mainstream (neoclassical) theories find little support, raising questions with regard to their suitability in discussing contemporary economic growth issues. Overall, there is evident a tendency of experts to espouse theories which are modern and favour active policy interventions. With regard to the most appropriate methodology in exploring growth determinants, experts favoured the in-depth case studies. Yet, both econometric and historical analyses scored very high, highlighting the importance of combining methodologies (in a triangulation fashion) in order to acquire a better understanding of the process and sources of economic growth.

The findings outlined above have a number of policy implications. First, it becomes apparent that **the same policy-frame is not appropriate to both advanced and the less-advanced areas**. On these grounds, the EU should consider to differentiate between policies targeting the north European – developed – countries and those applied to the lagging EU South. While for the former group, policies should focus on improving the human capital and encourage innovation and technology advancements, in the latter group attention should also be paid at strengthening the socio-political framework and the institutional environment in general. In addition, it is important to highlight that policies aiming at improving the quality of infrastructure are essential to all economies (independent of the level of development exhibited).

Second, despite existing EU assistance, the southern European countries are deemed to be less capable in achieving sustainable economic growth and securing future dynamism. This necessitates additional support on the part of the EU, especially if the cohesion objective is to remain one of the top priorities. Finally, the mix of opposite characteristics that is perceived to promote economic dynamism indicates that a number of popular policies are effective only within a limited scope. In other words, there seems to be a need for a course of action that incorporates a fusion of (allegedly) opposite policies if growth is to be sustained, for example combine open-market principles with public intervention in specific areas, seek for competition but in cooperation with others, and so forth.

Economic growth and world convergence are non-linear. Our results indicate the formation of two groups at the world scale: a convergence one, including countries with a low to medium-high development levels, and a divergence one including countries with a medium-high to very high development levels. The formation of the two groups has serious implications for theory and policy. The existence of nonlinearities in economic performance and convergence is of particular interest to policymakers since it indicates the possibility of development traps requiring specific policy interventions. At the initial stages of development the neoclassical type of forces (such as constant returns to scale and diminishing productivity or low factor cost) seems to dominate leading to convergence. After a critical threshold, however, home-market and scale effects, heterogeneity and externalities start to take over, making advanced areas to grow faster than those of intermediate development. In this sense, the paper argues, both forces of convergence and divergence co-exist, but in different proportions and with different strength, depending on the level of development exhibited. Each particular level contains a different convergence/divergence mix, requiring different mix of policy interventions. For world convergence, attention should be placed on the phase where divergence dynamics dominate. This is because, although there exist positive spillovers spreading growth from the more to the less advanced economies, these are incapable of bringing the system into a state of balance, if market forces alone are left at work. In other words, economic policy has to come into play to correct those imbalances. If not, there is a danger that increases in income disparities might trigger off new waves of migration, putting pressure on leading countries for costly policies of safeguarding or sealing borders, and inducing uncertainty and instability to the rest of the group.

GDP per capita in Europe exhibits a non-linear pattern of regional growth and suggest that after some threshold level of development regional convergence trends vanish and regional divergence trends dominate. These findings provide support to the hypothesis that both convergence and divergence processes actually coexist in all levels of development and reveal the formation of two clubs at the European regional scale: a convergence club that includes regions with a low to medium-high level of development, and a divergence club that includes advanced and very advanced regions.

The main drivers of regional growth in Europe are agglomeration economies, geography, integration, economic structure and development. Agglomeration economies favor growth in large urban concentrations, while geography favors regions with high levels of accessibility and connectivity within the European market. The process of integration seems to favor the more advanced regions, hosting a higher share of large, experienced and internationalized firms and as a result, being in a better place to compete in the new open European market. The economic structure of regions is found to play an important role, as structural convergence at the EU level appears to be a precondition for regional convergence. Regions having higher levels of similarity with the dominant European economic structure tend to achieve higher rates of regional growth. Finally, the paper shows that more advanced regions tend to grow faster, to the extent that they are characterized by high levels of openness and also high levels of structural similarity with the dominant economic paradigm.

Regional economies change in their course of development, becoming larger and deeper, more diversified, with different structure and different levels of intra-regional and inter-regional integration. Neoclassical setting has a greater potential to explain growth performance in earlier levels of development, while the endogenous growth and the new economic geography settings have a greater potential to explain growth performance in more advanced levels. Neoclassical type of forces, such as constant returns to scale and diminishing productivity or low factor cost dominate up to a critical development threshold, leading to regional convergence. After that, home-market effects, scale effects, heterogeneity and externalities gradually dominate and allow advanced areas to grow faster than areas in intermediate levels of development. With the exception of national characteristics, that may include also nationally implemented cohesion policies that may affect regional balances, all other drivers of regional growth tend to favor (conditionally or unconditionally) the larger, central, more advanced and with a better structure regions. In contrast, peripheral, structurally diverging and lacking home-market and scale effects regions have weak prospects for growth. Many of these regions will experience a pressure in their productive base arising from the higher levels of integration and the higher levels of competition from the more advanced counterparts. Unavoidably, these findings turn the attention of the discussion to regional policy at the EU level. It becomes evident that the current balance of market processes and policy responses generates an outcome that favors more the competitiveness than the cohesion pillar of the European policy. To the extent that these trends continue in the foreseeable future, they will put a serious pressure by sizeable constituencies, for a reexamination of the EU policy agenda and especially the EU regional policy.

Experts overall believe that learning, agglomeration and interrelatedness are key to the development of the economy in general and to the economic development of specific places and regions more particularly, and can invoke positive or negative lock-in. This puts a large emphasis on the importance of research institutions and human capital and the ability of regions to retain skilled and educated labour. Limited cognitive abilities make individuals prefer local, exploitive search in the form of solutions close to already existing routines, and a concentration of their search in their spatial vicinity. Learning improves fact-finding, information processing and decision making. Learning, in this respect, can lead to both path creation and path dependence. Further insight into the exact processes of learning and their effect on economic agents, networks of agents in a firm, networks between clusters of firms, and networks between firms and (knowledge) institutions, we believe, can greatly benefit the discussion on dynamic growth and convergence patterns. Evolutionary economic geography has the ability to specify the drivers and constraints that channel actions of individuals in general and knowledge creation in particular. On a micro level, the object of study, then, is localized learning, represented in our study by factors as high quality of human capital; high technology, innovation and R&D; and specialization in knowledge and capital intensive sectors, and at the macro level it is institutions, in the form of political environment; good infrastructure; and secure formal institutions, that contribute even further. Cluster formation, then, in our study represented by high degree of openness, is the micro-representation of geographies of economic development that are formed through (coordinated) self-organization by means of interaction of processes of path creation and path dependence. Clusters, in our view, offer excellent case-study objects for further research into mechanisms such as selection and adaptive learning.

Human capital is an important factor driving the output growth in ICT industries. Specifically, on average, other things equal, in countries with an *ex-ante* high human capital stock and in countries with a high human capital accumulation, ICT industries grew relatively faster**.** Furthermore, human capital stock and human capital improvement had a positive and significant effect on physical capital investment. We find that human capital was an important driving factor for output growth in ICT-producing manufacturing and ICT-using services. These results suggest that education policy aimed at human capital improvement is likely to be complementary to policy supporting the diffusion of ICT.

The path of ICT diffusion varies across firms, industries and regions which is consistent with the theory of new technology diffusion. In appears that the speed of ICT diffusion is influenced by firm characteristics such as firm size, age, skill intensity, exposure to foreign markets and proximity to early adopters of ICT in the same industry and regions. Policy intervention could be made on the ground that the market may not provide a satisfactory distribution of the benefits of ICT across firms, industries, space, and time. The literature on public policy related to technology diffusion points to three sources of market failure which might justify policy intervention to speed up the diffusion of ICT: imperfect information, market structure and externalities to adoption. Our results suggest three important policy implications. First, there seems to be a lack of factors conducive to the adoption of ICT in particular in the case of the firms located outside the capital city region and which operate in non-ICT industries which might lead to a "digital divide". Second, the positive relationship between human capital and ICT adoption indicates that education policy is complementary to policy supporting ICT diffusion. Third, ICT adoption can be fostered by encouraging interactions with firms that are using ICT intensively.

The level of education of the inventors is key in shaping the geographical breadth of knowledge spillovers. Highly educated inventors rely more on geographically wide research networks than their less educated peers. This holds after controlling for the mobility of the inventors and for the scientific nature of the research performed. Differently, location matters only in the very rare regions in Europe that perform the bulk of the research in the specific discipline of the inventors. In Europe, a strong threshold effect exists, as knowledge spillovers develop locally in the top 1% of regions in the specific technological field of the invention. This suggests that, in order to be effective, regional policies would need large investments in the creation of a critical mass of firms, institutions, and people working in related activities. This adds to the fact that, in general, there is no consensus in the literature on the specific role of geographical proximity in fostering knowledge spillovers beyond the effect of the concentration of the pool of potential interacting people.

In the globalised knowledge economy well-educated people are a key driving force for regional development, growth and innovation. Understanding the precise character, spatiality, and temporality of this phenomenon is essential for explaining regional growth patterns and uneven development. With regard to science and academia the USA is the world's most attractive location. Europe must become attractive for students and scholars from emerging markets such as China, India or even Africa. In order to be competitive Europe has to make it possible that e.g. social security and pension claims can easily be transferred across EU-borders.

In today's science and research industry, successful careers strongly depend on international experience and integration within the particular community. Thus, e.g. integrated mobility programs (including return option and/or obligation) are needed in order to further stimulate brain circulation. Furthermore, special initiatives to increase mobility to non-U.S. destinations and within Europe are valuable.

There are considerable differences in terms of educational attainment and inequality in Europe. European regions differ from one another with regard to the average and inequality in human capital endowment. Regional variations in educational attainment and inequality are shaped by three factors: proximity and linkages, North-South divide, and urban-rural divide. Regions surrounded by highly-educated areas tend to have a higher educational stock, as well as regions surrounded by high within-region educational inequality have higher levels of inequality. This denotes that the geographical distribution of education is not uniform as it is characterised by significant positive global spatial autocorrelation and space-time correlation. Not only the evolution of education within a region is closely related to its evolution in neighbouring regions, but also the spatial evolution of education affects the dynamic evolution of human capital. Education is geographically autocorrelated due to knowledge and skill diffusion, as well as to the guidelines for education systems and structures which are, as a general rule, set nationally. Hence, because of the spatial interactions between regions, the interregional linkages, geographical location and proximity are important in accounting for the human capital performance of regions. However, these spatial effects perform differently according to two regimes: the urban-rural pattern and the European North-South divide. There are systematic differences between urban and rural European regions and between northern and southern European regions. This shows that there are spatial limits to the spread of externalities, and that the diffusion of skills and knowledge will always be easier within groups of closely related economies ('clubs'). Economies within a group (i.e. the group of northern European countries) interact more with one another than with those outside the group. Finally, educational patterns in the territory of the EU have not changed dramatically throughout the whole period of study, denoting persistence in patterns of educational attainment and inequality in specific regions.

Policy-makers should pay more attention to within-region educational inequalities than to between-region and between-country inequalities, because within-region inequalities are far more prominent than the other components. The analysis also showed that educational policies should account for the spillover effects with adjoining regions, as externalities spread out the barriers of regional economies. If, for instance, policies favour factor mobility, educational investments in one location can draw production away from other locations or provide access to adjacent locations that were not previously accessible. In other words, a policy which influences the distribution of education within a region is likely to change the competitive advantages of neighbouring regions. Nevertheless, there are urban and geographical limits to the spread of externalities. Policy-makers should also consider the role of the EU North-South divide in terms of educational inequality. Southern regions with a low endowment in human capital and high inequality surrounded by other low human capital regions with high inequality will probably remain in a low human capital trap. In contrast, regions in the North of Europe with low endowment of human capital and surrounded by highly-educated regions and low inequality have a greater probability of reaching a higher state of endowment. The clusters of the less-educated and highest inequality European regions in Southern Europe may create a great disadvantage for those regions. Finally, regional policies addressing inequalities may illustrate the systematic differences between agglomerations and rural peripheral regions, as inequalities are higher in rural areas. Overall, policy-makers should take into consideration that space matters for inequalities.

The absence of convergence in GDP per capita is not matched in terms of social welfare. Economic and social cohesion at a regional level is one of the main objectives of the European Union. However, while economic cohesion, proxied by GDP per capita, has attracted significant attention with most studies finding little regional convergence since 1985, social cohesion has been virtually ignored. We find that the absence of convergence in GDP per capita is not matched in terms of social welfare. Welfare levels have converged significantly across European regions and this convergence has been built on a series of structural and institutional factors, among which female participation in the labour force is the most relevant.

To create sustainable economic growth inequality levels should be addressed. In the first phase of economic development, a phase in which we place China in the model of Kuznets, economic growth can still go with inequality growth. However in a later stage, if China wants to become a developed country, the creation of equality is a condition sine qua non. One broader policy or societal evolution we saw in turning around the relation between economic growth and inequality growth, is the emergence and support of more collaboration between all stakeholders in a society. Collaboration and bargaining on a national, political, societal and industrial level. Only through structures that support this bargaining all interest groups can find common goals and serve common interests.

The increase in telecommunication infrastructure over the past three decades enhanced R&D investments but did not affect the accumulation of physical or human capital. The findings highlight the role of infrastructure investments in the transition to a knowledge-based economy which applies to most EU member countries. In addition, it emphasizes a complementarity between infrastructure investments and industrial policies that support R&D or higher education. Policymakers in relatively advanced knowledge-intensive regions can further improve the productivity of firms by means of (telecommunication) infrastructure investments. Moreover, the growth-effect of infrastructure investments depends on factors such as intellectual property rights, industrial and innovation policy, or the level of tertiary education in the country. That is, infrastructure investments are more effective if policymakers simultaneously implement innovation policies or tailor investments to R&D intensive regions. In contrast, complementary policies that rise incentives for private investments (e.g. tax breaks, subsidies) are found to be ineffective. The findings demonstrate that infrastructure investments provide a tool for public authorities to foster economic growth not only in labour abundant less developed economies but also in knowledge-intensive R&D driven advanced economies.

Infrastructure investment can induce tremendous growth effects in transition countries if they trigger the convergence of the economy to a higher balanced growth path. This scenario is more likely if complementary structural factors are growth-promoting, e.g. an adequate quality of schooling. On the other hand, the impact of infrastructure investments n growth can be negligible if they are not sufficiently large in slow-growing economies. Thus, policymakers in slow-growing developing countries can induce a shift from the low to the high equilibrium balanced growth path by means of public infrastructure investments. Moreover, structural change in complementary factors that influence the efficiency of technology adoptions, e.g. better schooling or the removal of external trade barriers, may trigger the convergence to a higher long-run balanced growth path in that they improve the incentives for private infrastructure investments.

Social capital may contribute significantly to economic growth. The concept of "social capital" and its implications for communities' well-being are gaining an increasing importance in the international public policy debate. In fact, many benefits have been ascribed to social capital, including better health performances, improved child welfare, lower crime rates, and improved governmental responsiveness and efficiency. Moreover, social capital has also been linked to productivity, income and other indicators of economic performance. International agencies such as the World Bank and the OECD are nowadays exploring the role played by social capital and are indicating social capital-related subjects as important investigation issues. We find empirical evidence suggesting that social capital may contribute significantly to economic growth. Consequently, local policies, especially in the area of education, family support, community services, sport and the arts, communications and essential services should be designed in order to take into account social capital as a key-factor for their success.

1.6.2 GLOBALISATION, ECONOMIC GROWTH AND COMPETITIVENESS

Further openness to trade with emerging economies as China, is on average positively related to the performance of European manufacturing firms. This result is an important argument against protectionist calls that periodically arise throughout the Member States. In general we can say that more international integration, even with emerging economies, means a faster rate of productivity growth in line with the aims of the Lisbon Strategy. We identify the vertical channel (the rising of imports from upstream industries able to supply intermediates to domestic firms) as the major contributor to firm-level performance gains with respect to the horizontal channel, provide evidence that future policy decisions should take into account that benefits from integration are important also for the supply side of the economy and not only for the welfare of consumers. The less clear result related to the horizontal channel (the increased import penetration in industries that collect competitors located abroad) shows that there is a need for policies that enhance competitiveness of firms. But the substitutability existing between the expenses in R&D and the technological content is incorporated in new products available on global markets constitutes an important caveat for policies aimed at the creation of incentives to innovation. Innovation through the adoption of imported intermediates allows some firms to be more competitive without turning to incentives provided by public authorities.

There is a strong relation between the increasing availability of foreign intermediates on global markets for European countries and the value added that can be exported by the same members of EU. This evidence suggests that it is necessary to consider the specialization patterns of European countries from a different point of view. The traditional incentives to foster specialization in high-tech products, especially if these latest are classified according to old criteria, contradict the fact that it is possible for countries to be specialized in sectors that, even if traditionally considered low-tech, can show an important part of value added produced domestically. This evidence can be explained by the fact that it is not important what countries produce but how they produce and what is the value created for international markets. Industrial sectors are heterogeneous across countries with respect of value incorporated into exported products. Traditional industrial policies adopted to force the transformation of specialization patterns of different economies (in this case European ones) following the same route towards the same industries can lead to the loss of comparative advantages in productions that are however advanced if we consider the value added content and not a misleading technology content.

FDI inflows into China have been complementary to FDI inflows into other recipient countries. If we consider FDI as part of international strategies adopted by multinational enterprises, it appears that FDI inflows into China have fostered synergies with all other recipient countries. However, it appears that these complementarities have declined over the analyzed period. Furthermore, the FDI inflows into China affect differently horizontal and vertical FDI. Our results suggest that countries which attract mainly horizontal FDI, because of their high market potential, adjust better to competitive pressures from China. As far as vertical FDI is concerned, competition with China arises in the presence of low cost advantages. As cost advantages increase, complementarities become more likely. FDI inflows into China complement FDI inflows into the EU, too. However, this positive relation is less intense in the case of horizontal FDI and more intense in the case of vertical FDI in comparison to other recipient countries.

FDI spillovers exist both within and across complementary manufacturing sectors. During the past decades many governments in both developing and transition countries have offered significant incentives in order to attract foreign direct investments (FDI), being motivated to do so by expectations of possible spillover benefits. Our findings show that FDI spillovers do exist both within and across complementary manufacturing sectors. The former arise when foreign firms operate in traditional labour intensive manufacturing sectors, while the latter occur when foreign firms operate in high tech manufacturing sectors. Moreover, we find that domestic firm size conditions the exploitation of FDI induced spillovers even after controlling for absorptive capacity. We also found a lot of heterogeneity across countries consistent with the technology gap hypothesis.

FDI promotion policies and incentives to foreign firms should be carefully planned in order to obtain the expected benefits for indigenous firms. FDI-induced spillovers are not automatic. We find that FDI induced spillovers on locally owned firms have been conditioned to specific factors, i.e. the technology intensity of foreign firms' products and the size of the indigenous firms. Generally speaking, they should be addressed to foreign firms coming from countries with a large technology gap with respect to the host countries, otherwise the costs of implementing such a policy might not be compensated by benefits for indigenous firms, as the case of Poland indicates. Secondly it is important to understand which indigenous firms – i.e. small vs. large indigenous firms – are the best partners for foreign firms in order to ensure the transmission of spillovers. Although both inter-sectoral and intra-sectoral spillovers exert a positive impact on indigenous firms' productivity, the latter are more important than the former since they imply the transmission of specific-knowledge; therefore incentives should be addressed particularly to the foreign firms operating in technology-intensive sectors.

FDI induced spillovers generated by MNEs located within a region may enhance aggregate regional total factor productivity. The sector of activity of MNEs does not seem to matter, since we found evidence of both intra and inter-sectoral spillovers. Quite surprisingly, MNEs located in other regions exert a negative but not always significant effect on regional productivity. Two clear policy messages emerge from this paper. First, FDI induced spillovers are driven by regional channels. This implies that FDI promotion policies should be implemented at regional rather than at national level. Secondly, these policies should be coordinated among regions in order to avoid or minimize possible negative effects on neighboring regions.

Immigration and trade are complements, but the degree of their complementarity is dependant upon both the size of the existing immigrant community and where these immigrants come from. A significant trend, at least in developed countries, is the increase in the proportion of the population that is made up by migrants. The issue of the impact of this migration on trade is often ignored in policy discussion. These tend to focus on job displacement and the movement of human capital/skills. Our results suggest that the USA has reached a saturation point with some immigrant communities where immigration and trade are effectively substitutes. For EU countries this point has not been reached yet, especially if one considers exports.

Institutions and skill endowment seem to be the main drivers of comparative advantages, with a growing weight in more recent years. Moreover, if we look at different country groups, we find that institutional comparative advantage is relevant for European countries, while it does not seem to affect BRIC countries' export flows. This seems to confirm the common wisdom that BRIC's exports are mainly constituted of simple and cheap goods. On the other side, EU can increase its competitiveness by capitalizing on its institutional comparative advantage. In other words, EU countries should aim at exporting goods that are institutionally intensive, because of their good endowment of institutional quality.

A view of firms and nations in terms of learning and value creation can help explain uneven development in favour of some developing countries, as learning can encourage the creation of institutions that facilitate the access and adoption of both ‘‘best’’ practice and socially responsible behaviour of firms. All of these are not to assert that convergence necessarily follows as learning increases, but it is likely to provide more degrees of freedom for developing countries to pursue strategies that facilitate convergence. For a variety of reasons, some developing countries will be successful in these strategies; some will not. However, those countries that are successful may well eventually be able to affect independent and favourable development trajectories.

Involvement in international markets substantially boosts the likelihood of becoming a successful innovator. Firm productivity and export decisions are closely related to innovation activity. Innovation may play a more important role in the decision to start exporting, and successful exporting may drive process innovation. This suggests that the causality between innovation and exporting may run in both directions. Specifically, we find that primarily medium-sized and large firms are more likely to become successful process innovators if they export compared with otherwise similar non-exporting firms. Equally as interesting, on the other hand, is the finding that exporting has no significant effect on the success of starting to product innovate. Also, surprisingly, being a successful innovator, other things equal, did not significantly improve the probability of becoming a first-time exporter. We therefore find evidence that the causal relationship between exporting and innovation runs from the former to the latter but not vice versa. This suggests that export promoting policies may exhibit certain complementarities with investment promotion policies. Given that we observe efficiency gains from exporting only for medium-sized and large firms, policy measures targeting micro and small exporters would be required. A general policy framework could therefore include both innovation promoting policies, such as R&D subsidies, tax credits for R&D expenditures, promotion of knowledge transfer between research institutions and business, support for established high-tech companies, and export promotion policies e.g. training schemes for new exporters, making general information on export markets available to perspective exporters, promotion of industry- and product-specific clusters etc.

1.6.3 The Role of Public Policies in Fostering Innovation and Growth

Public policies enhancing R&D investment and promoting innovation activities are key for a dynamic economic growth and restructuring. Our results showing that R&D subsidies in the past periods have enhanced the probability of firms to start innovating suggest that governments should continue in pursuing this type of innovation promoting policies. Herewith, a general policy framework for innovation promoting policies is sought, which may include measures such as R&D subsidies, tax credits for R&D expenditures, promotion of knowledge transfer between research institutions and business, support for start-up high-tech companies, etc.

The competitiveness of industries in the international arena must be sustained by the dynamic interaction between, national, regional and sectoral innovation systems. Besides sectoral innovative activity, it is inter-sectoral knowledge flows that are important factors to sustain the international competitiveness of industries. For a high level of growth especially business R&D expenditures and innovation expenditures on a firm level appear most effective. Also, the level of population with tertiary education seems to have a considerable effect on innovation performance, especially when the human capital factor employment is used as dependent variable. This supports the idea that the specialization profile matters for macroeconomic performance. As the service sectors produce the highest share of high-tech employment in Europe, human capital is an important push factor of economic growth, and, as a result, there should be a large focus on expenditures on education as a form of knowledge investment. But policies sustaining the human capital formation are not only crucial in the R&D intensive branches of the economy, in more traditional sectors of manufacturing they have the purpose to upgrade the absorptive capacity of less advanced industries and foster the process of inter-sectoral diffusion of new technologies. Further, there seems some form of correlation between R&D and human capital expenditures, which supports the idea that R&D activities undertaken by private firms greatly benefit from the existence of a well-functioning set of public organizations in the S&T domain, and that these institutions should therefore be actively supported by public policies. The components of a system of innovation do not only include private firms and their R&D activities, but also public organizations such as universities, public research institutes, science parks and so on. Policies should take into account the interactions existing between the different institutional levels and thus coordinate as much as possible sector-specific innovation and industrial policies with nation-level policies governing the macro-economic environment, the trade and financial regimes, and the education system, but regional policies also play a relevant role in the innovative process.

The location choice of R&D multinationals in the European Union countries is driven by the number of existing R&D firms, flexible labour markets, high skills, efficient financial markets and low technological development. Our results indicate that the probability to locate in an EU country increases with the number of existing R&D firms, flexible labour markets, high skills, efficient financial markets and low technological development. Taxation does not appear to have a significant effect on the location choice of R&D multinationals.

On average, the probability to locate in an EU region (NUTS 2) increases with the size of demand (market potential), agglomeration economies (positive spillover effects from existing foreign R&D firms), technological development (R&D intensity), flexibility of labour markets, proximity to research excellence centres (university in the top 200 list) and physical infrastructure. Regions with lower GDP per capita appear more attractive as location choices for R&D multinationals. The determinants of the location choice of R&D multinationals are different for regions in Western Europe (EU15) and Central and Eastern Europe. While in Western Europe, regions with higher GDP per capita are the preferred locations for R&D multinationals, in Central and Eastern Europe, regions with lower GDP per capita attract the bulk of R&D foreign investment. Unemployment rates appear negatively correlated with the probability of R&D multinationals while they do not have an effect on the location decision in CEECs.

The location choice of multinationals in the ICT sector increases with the size of demand (market potential), agglomeration economies (positive spillover effects from existing firms in the ICT sector), technological development (R&D expenditure), flexibility of labour markets, and information technology infrastructure. Regions with lower GDP per capita appear more attractive as location choices for ICT multinationals. The determinants of the location choice of ICT multinationals are different for regions in Western Europe (EU15) and Central and Eastern Europe. While in Western Europe, regions with higher GDP per capita are the preferred locations for both ICT multinationals in manufacturing and service sectors, in Central and Eastern Europe, regions with lower GDP per capita attract the bulk of ICT service multinationals. A negative competition effect from domestic ICT firms is found in Western Europe for the service sectors. Unemployment rates appear negatively correlated with the probability of location in the whole EU and Western Europe, while they increase attractiveness for regions in CEECs. Some determinants are also found having heterogeneous effects on multinationals from different countries. In particular, US multinationals are not sensitive to labour costs while EU multinationals respond to this factor negatively.

Foreign acquisitions have a positive and significant effect on labour productivity. Further there is little evidence for positive effects of foreign acquisitions on total factor productivity. The results are broadly similar for firms taken over by US and EU based firms. We find that the effects of foreign acquisitions vary across industries. It appears that while foreign ownership led to higher productivity in the office & electrical machinery industry, it had a negative effect on productivity in the renting of machinery & equipment industry. Firms acquired by foreign investors in computer services experience a higher productivity in the second year of the post-acquisition period.

Inflation and long-run productivity growth are negatively related. Inflation generates long-run real effects due to a link from the short-run interplay between nominal and financial frictions to a firm's qualitative investment portfolio. We find that inflation increases the costs of corporate insurance against productive but risky projects and hence a firm's choice of technology. It follows that economies that feature a higher level of inflation are predicted to exhibit lower TFP-growth in the long-run. That is, each level of inflation is associated with a different long-run balanced growth path as long as financial markets are incomplete. We find that (i) firms insure systematically against risky R&D investments by means of corporate liquidity holdings; (ii) periods of higher inflation restrain firm-level R&D investments by reducing corporate liquidity holdings. This result entails strong policy implications for emerging economies since changes in monetary policy regimes represent a relatively inexpensive way to catch up in terms of TFP and to encourage private sector development. Moreover, the complementarity between the effect of inflation and the degree of financial development on aggregate productivity growth implies that a higher level of inflation is more harmful in Eastern European than in Western European countries where financial markets are generally considered to be more developed.

Industrial and competition policies should be seen within the broader context of enhancing sustainable value creation. The road to sustainable value creation is not one-way. Countries should exploit the informational benefits from the existence of a plurality of institutional and organisational forms. Theory and history suggest there are no panaceas. Current EU policies are a step in the right direction, but need to pay more attention to the issue of sustainability, the link between corporate and public governance, and the impact of different power structures and hierarchies of agencies on industrial policies for sustainable value creation. The limitations of self-monitoring and diversity suggest the need for international governance that puts sustainability centre-stage. This may operate alongside enlightenment and mutual stewardship and monitoring to help sustain the value creation process.

If governments wish to avoid 'capital flight' they should strive for 'political stability' and a 'healthy economic environment', to include healthy demand conditions. Such policies may also be conducive to attracting inward investment.

Our results support the view that business cycle, and 'excess resources'-related factors can motivate outward investment. Political and social instability, monetary austerity and a low domestic profit share are also factors that may lead firms to undertake outward investment. All these are both in line with, and confirm, existing theory and conventional wisdom. They add empirical weight on an issue where evidence is rather scarce and shed empirical light on firm motives to go abroad.

Sustainability requires both internal and external controls, to include the market, but also hierarchy (firm and state), as well as institutional and global controls. Institutional diversity and pluralism can help effect mutual 'stewardship' and monitoring. For sustainable value creation, corporate governance needs to be aligned to national and global governance, in a way that thwarts the potentially negative impact of some agents' pursuit of value capture on sustainable value creation. Such include environmental, social and economic degradation. In our context corporate, social and environmental responsibility, but also requisite public policies are part and parcel of the need for sustainable value creation.

Small developing countries need to explicitly account for any liabilities of smallness when devising and implementing strategies for competitiveness and catching-up. Lessons can be derived from strategic management to include the issues of positioning, diagnosis and creation of competitive advantages and alignment between objectives and means to achieve selected strategies. FDI and clusters can serve a country's competitiveness, especially when they are combined and aligned with the country's competitive advantages and selected competitive stance/positioning. For numerous reasons, many already discussed in the literature, but some also overlooked, small countries have some distinct advantages in devising and implementing such strategies. If they address the crucial problem of the higher incentives and payoffs to corruption which they face, small countries could leverage their advantages to achieve competitiveness and catching-up. Small transition economies, which are not landlocked in distant locations, could devise strategies for FDI and/in relation to clusters that can be aligned to their created competitive advantages and competitive positioning to serve the purpose of superior competitiveness, and thus catching-up. At the same time the margins of opportunity may becoming narrower – not least because of the shifting landscape concerning globalization and global governance. It is arguable that successful catching-up by smaller developing countries could be made much easier, were the international community to appreciate that such catching-up is good for global economic sustainability.

The benefits and costs of innovation are essentially tied to the interests of both private and public parties within nations and internationally. We develop the concept of sustainable global value creation as an alternative and complementary criterion to the perspectives promoted under neoclassical industrial organization and the traditional "systems of innovation" views. The crucial insight offered under the global sustainable value creation view is that the benefits and costs of innovation are essentially tied to the interests of both private and public parties within nations and internationally; that these interests may change over time in complex ways; and that interest alignment is crucial in promoting global, as opposed to localized, interests. A focus on sustainable global value creation helps explain, predict and prescribe good managerial practice, public policy and global governance. A focus on sustainable global value creation has important implications for organizations, institutions, incentives, competition, innovation and global governance. A focus on global sustainable value creation raises new questions concerning the interaction between business policies and the interests of individuals, nations, regions, and other economic actors. Sustainability raises 'strategic contradictions' such as cooperation without collusion, the avoidance of restrictive practices, and the intersection of short-term efficiency and innovative efficiency. Better policy depends on deeper research into the complex implications of actors, actions and initiatives such as privatized prisons, quasi-public agencies, and strategic trade policies.

Innovation performance is different per culture, per level of development which in turn can be economic, political, institutional, etc., per sector and basically per country (especially if country size, for example, is not accounted for). There are also some overlaps visible, however, that may explain some of the differences in innovation performance in Europe. New member states, for example, seem to benefit from public R&D expenditures. For developing countries especially, then, the policy level seems to indeed constitute a major channel of interaction. As the outcomes of our analysis show that is important to distinguish between economically (and politically) developing countries and developed countries in Europe, as well as between cultures, in this case broadly the differences between southern, middle and northern Europe, the scope of regional policies should not only include competitiveness-enhancing interventions in advanced industrial 'clusters', but should also be complemented by cohesion policies aimed at actively fostering the technological capability and absorptive capacity of backward regions. In this way, the risk of less favored regions to fall behind can be minimized. The idea in evolutionary literature of competitiveness and cohesion as two complementary policy objectives therefore appears valid in the light of our results. In both cases, besides R&D expenditures, human capital expenditures are in this respect of key importance.

Size differentials are a major determinant for the choice on internal versus external innovation for value capture of different-sized firms, in the context of multi-level bargaining in hand. We derive implications for "closed" versus "open" innovation approaches, and we discuss managerial practice, limitations and possible extensions. Our answers are that there can exist a division of labour between large and small firms with the latter focusing on Research, and with large firms focusing on Development , that leverages their respective competencies. In the presence of multi-level bargaining the share of benefits is satisfactory to both sides, not least because of the possibility of litigation, but also the fact that overall value creation is higher than when each firm does both R and D. In this context, firms can use open or closed innovation (or both) depending on circumstances that allow them to benefit from such an arrangement.

Receiving human resources (HR) support boosts significantly the contribution of R&D investment on value added. In particular, our estimates suggest that a business that invests an extra sterling pound in R&D experiences on average a 0.35 per cent increase in value added when receives support in the area of staff training and development compared to the situation when it does not receive such support. Similarly, HR-support in the form of more training for the manager/entrepreneur and improved recruitment and retention increases the returns to an additional pound spent on product innovation and business development by 0.33 per cent and 0.08 per cent respectively. In terms of managerial practices, our results suggest that it pays for firms to invest in innovation and R&D when at the same time they invest in upgrading employees' and managerial skills through training and improving recruitment and retention practices.

Public policy should aim to enhance competition through innovation, by regulating anti-competitive and promoting new firm creation and growth and markets for technology and ideas. Nation states (especially developed ones) should avoid 'strategic trade policies' and/or the pursuit of sectoral interests of powerful groups, at the expense of the wider interest of economic sustainability. Pluralism and diversity, through the creation and growth of NGOs, consumer associations, public-private partnerships, clusters and overall 'social capital' creation should be encouraged, in order to ensure a degree of mutual stewardship and monitoring that aims to address the problem of ‘who monitors the monitor’, which in practical terms means the avoidance of ‘regulatory capture’ by powerful constituents in pursuit of rent-seeking.

The view that the best manager is someone that is a top expert and therefore foremost must delegate, control and correct will be less and less applicable in modern, more specialized environments is of key importance to innovation policies. The finding that some business viewed as best practices (e.g. Nokia) successfully implemented this business model can serve as a catalyst for many European organisations to follow. A new focus here, aside from the investment and attention to R&D, is the focus on organizational culture to stimulate innovation. Behind this theory lies the belief that innovation is not just a matter of individual activity, but can be the result of organizational or even broader educational, societal culture. To create conditions in which organizations become more innovative is the key for this. A culture of self-management, empowering and creating open spaces are one the features that can stimulate this innovational behavior of groups or individuals. In education the way we learn and work is formed. And also here some principles of intelligent organization or learning organizations can be useful to be more implemented.

2 DISSEMINATION AND USE: PUBLISHABLE RESULTS

2.1 FACTORS UNDERLYING GROWTH PERFORMANCE AT GLOBAL, NATIONAL AND SUB-NATIONAL LEVELS

Human Capital and Output Growth in ICT Industries: Empirical Evidence from OECD Countries

Gavin Murphy and Iulia Siedschlag

This paper provides novel empirical evidence showing that new technology and human capital are complementary. In particular, it examines whether human capital fosters output growth in ICT industries. We use data from a sample of twenty OECD countries over the period 1980-2002 and focus on within country between industry differences in output growth. The main finding of this paper is that in developed countries, human capital is an important factor driving the output growth in ICT industries. Specifically, on average, other things equal, in countries with an ex-ante high human capital stock and in countries with a high human capital accumulation, ICT industries grew relatively faster**.** Furthermore, human capital stock and human capital improvement had a positive and significant effect on physical capital investment. We find that human capital was an important driving factor for output growth in ICT-producing manufacturing and ICT-using services.

Determinants of ICT Adoption: Evidence from Firm-Level Data

Stefanie Haller and Iulia Siedschlag

We analyse factors driving inter-firm and intra-firm diffusion of ICT using data from Irish manufacturing firms over the period 2001-2004. We find that the path of ICT diffusion has been uneven across firms, industries and space which is consistent with the theory of new technology adoption. Our research results suggest that firms which are larger, younger, fast-growing, skills-intensive, export-intensive and firms located in the capital city region have been relatively more successful in adopting and using ICT. We find positive technology spillovers from firms that have adopted ICT located in the same industry and region. To a certain extent, patterns of ICT adoption are different for domestic and foreign-owned firms, in particular with respect to the effects of exposure to foreign markets and firm size.

On the Dynamics of Economic Performance: an Expert Survey

Paschalis Arvanitidis, George Petrakos and Sotiris Pavleas

Drawing on various theoretical and methodological approaches, many scholars have over the years investigated the factors underlying economic performance. Yet, findings are often contradictory and inconclusive. The paper sheds light on a number of unsettled questions concerning economic potential, using primary data from an international survey of expert opinion. Issues examined include the significance attached to explanatory factors in terms of their influence to economic performance, the combination of policies expected to advance economic potential and an evaluation of the ability of key theoretical and methodological approaches to explore growth performance. The results have serious implications for theory and policy.

Analysis of Educational Distribution in Europe: Educational Attainment and Inequality Within Regions

Andrés Rodríguez-Pose and Vassilis Tselios

The geography of education, especially at subnational level, is a huge black box. Basically nothing is known about the distribution of educational attainment and inequality across regions in Europe. This paper addresses this gap in the literature by mapping educational attainment and inequality in 102 regions in western Europe, using data extracted from the European Community Household Panel (ECHP) covering more than 100,000 individuals over the period 1995-2000. The results of this Exploratory Spatial Data Analysis (ESDA) reveal a strong correlation between levels of educational attainment and inequality across regions in Europe. Regions with similar educational conditions tend to cluster, often within national borders. In addition a North-South and an urban-rural dimension is evident. Northern regions and large European metropoli have not only the most educated labour force, but also the lowest levels of inequality. Educational inequality seems to be, in any case, a fundamentally within region phenomenon. 90 percent of the educational inequality in Europe takes place among individuals living in the same region.

Education and Income Inequality in the Regions of the European Union

Andrés Rodríguez-Pose and Vassilis Tselios

This paper provides an empirical study of the determinants of income inequality across regions of the EU. Using the European Community Household Panel dataset for 102 regions over the period 1995-2000, it analyses how microeconomic changes in human capital distribution affect income inequality for the population as a whole and for normally working people. The different static and dynamic panel data analyses conducted reveal that the relationship between income per capita and income inequality, as well as between a good human capital endowment and income inequality is positive. High levels of inequality in educational attainment are also associated with higher income inequality. The above results are robust to changes in the definition of income distribution and may be interpreted as a sign of the responsiveness of the EU labor market to differences in qualifications and skills. Other results indicate that population ageing, female participation in the labor force, urbanization, agriculture, and industry are negatively associated to income inequality, while unemployment and the presence of a strong financial sector positively affect inequality. Finally, income inequality is lower in social-democratic welfare states, in Protestant areas, and in regions with Nordic family structures

FDI spillovers in new EU member states: which firms creates them and which firms really benefit?

Marcella Nicolini and Laura Resmini

During the past decades many governments in both developing and transition countries have offered significant incentives in order to attract foreign direct investments (FDI), being motivated to do so by expectations of possible spillover benefits. Using an unbalanced panel of firm level data in Bulgaria, Poland and Romania over the 1998-2003 period, we examine the impact of foreign firms on domestic firms' productivity. In particular, we try to answer the following research questions: 1) Are there any spillover effects of FDI, and if so, are they positive or negative? 2) Are spillover effects more likely to occur within or across sectors? 3) Are the existence, the direction and the magnitude of spillovers conditioned by sector and firm-specific characteristics? Our findings show that FDI spillovers do exist both within and across complementary manufacturing sectors. The former arise when foreign firms operate in traditional labour intensive manufacturing sectors, while the latter occur when foreign firms operate in high tech manufacturing sectors. Moreover, we find that domestic firm size conditions the exploitation of FDI induced spillovers even after controlling for absorptive capacity. We also found a lot of heterogeneity across countries consistent with the technology gap hypothesis.

Productivity Spillovers, regional spillovers and the role played by Multinational Enterprises in the new EU member states

Marcella Nicolini, Laura Resmini

In this paper we analyse whether and to what extent Multinational enterprises (MNEs) can generate positive externalities for the host economies by allowing for spatial dependence patterns in Total Factor Productivity (TFP) growth rates at sectoral and regional level. To this respect, we use spatial econometric techniques, which allow us to identify not only the type of spatial dependence governing this phenomenon and to estimate it consistently, but also clusters and other "anomalies" in the patterns of productivity spillovers. There has been, at least in our knowledge, no spatial econometric study on the impact of MNEs on aggregate TFP; therefore, we aim at filling this gap. We found evidence of positive spillovers from MNEs operating in the region, and negative spillovers from MNEs outside the region. The latter are however limited to specific groups of regions, such as the capital regions and regions bordering with former EU-15 countries. Therefore, we can conclude that there seems to be a regional channel for FDI spillovers.

Inventors and the Geographical Breadth of Knowledge Spillovers

Paola Giuri and Myriam Mariani

This paper studies the geographical breadth of knowledge spillovers. Previous research suggests that knowledge spillovers benefit from geographical proximity in technologically active and rich regions more than elsewhere. An alternative view explains the geographical breadth of knowledge spillovers as a function of the characteristics and personal networks of the individuals. We test these two competing theories by using information provided directly by the inventors of 6,750 European patents (PatVal-EU survey). Our results confirm the importance of inventors' personal background. However, compared to previous research, we find that the level of education of the inventors is key in shaping the geographical breadth of knowledge spillovers. Highly educated inventors rely more on geographically wide research networks than their less educated peers. This holds after controlling for the mobility of the inventors and for the scientific nature of the research performed. Differently, location matters only in the very rare regions in Europe that perform the bulk of the research in the specific discipline of the inventors

Knowledge Spillover Agents and Regional Development

Michaela Trippl and Gunther Maier

In the last years, there has been a growing recognition that in the globalised knowledge economy well-educated people are a key driving force for regional development, growth and innovation. The key aim of this paper is to shed some light on the relation between the mobility of talent and knowledge flows. We refer to talented individuals who transfer knowledge from one place to another by means of their mobility as “knowledge spillover agents”. Although the paper deals with highly skilled mobility and migration in general, a particular attention will be paid to flows of (star) scientists. Understanding the precise character, spatiality, and temporality of this phenomenon is essential for explaining regional growth patterns and uneven development. Based on a review of different strands of literature and recent insights from regional economics, concepts about innovation and knowledge interactions, and migration studies we examine the role of highly skilled labour for regional development, the key factors for attracting and retaining talent as well as the rise of “brain gain” policies.

Star Scientists as Drivers of the Development of Regions

Michaela Trippl, Gunther Maier and Bernhard Kurka

It is widely recognised that in the emerging globalized knowledge economy well-educated people play a central role in spurring the growth of cities and regions. In this paper we focus on scientific talent as a distinctive group of the highly skilled class, trying to unravel their impact on the dynamics and performance of regions. Based on a world-wide survey of 720 so called “star scientists” we examine as to what extent these top researchers are involved in regional development activities and which factors determine their level of engagement.

Regional Growth and Convergence in Europe

George Petrakos, Dimitris Kallioras and Ageliki Anagnostou

This paper estimates a regional convergence model at the EU level, allowing for the possibility of a non-linear relationship between growth and development levels. The results suggest that after some threshold, convergence trends vanish and regional divergence dominates. These findings provide support to the hypothesis that both convergence and divergence processes actually coexist in all levels of development, with the former dominating in earlier stages and the later dominating in more advanced stages of development. The paper also estimates a regional growth model providing evidence that the main drivers of regional growth in Europe are agglomeration economies, geography, integration, structure and development. The results suggest that the regional dynamics in Europe are characterized by spatial selectivity and an overall unfavorable environment for lagging-behind regions. To the extent that these trends continue in the foreseeable future, they may require a reexamination of the EU policy agenda and especially the one related to regional policy.

Calling for innovations - infrastructure and sources of growth

Marc Schiffbauer

This paper analyzes the impact of infrastructure capital on different sources of economic growth. Starting with the contribution of Barro (1990), the literature on infrastructure and growth mainly focuses on the relation between private and public capital investments. In contrast, we demonstrate a link between (telecommunication) infrastructure capital and endogenous technological change in the context of an dynamic panel estimation applying aggregate country- as well as U.S. firm-level data. The main empirical finding is that the increase in telecommunication infrastructure during the last 30 years enhanced R&D investments but did not affect the accumulation of physical or human capital in our sample. Moreover, we provide an extended R&D growth model, which emphasizes a cost-reducing feature of infrastructure capital, to demonstrate a potential link between the level of infrastructure capital and technological change. The model reveals different policy implications than the previous literature which are based on neoclassical inference. The findings highlight the role of infrastructure investments in (the transition to) knowledge based economies which applies to most EU member countries. In addition, it emphasizes a complementarity between infrastructure investments and industrial policies that support R&D or higher education.

Catching up or falling behind? The effect of infrastructure capital on technology adoption in transition economies

Marc Schiffbauer

This paper analyzes the importance of infrastructure capital in determining the convergence path for transition economies. That is, we examine to what extend infrastructure services, e.g. telecommunication or transportation infrastructure, influence the probability that a transition economy catches up or falls behind the endogenous growth rate of the world technology leader. Therefore, we suggest a growth model which accounts for a link between infrastructure and the process of innovation either via R&D or the imitation of foreign technologies. The former is based on the assumption that infrastructure capital reduces the effective costs of specialization into more productive products while the latter feature follows the approaches of Howitt (2000) or Benhabid and Spiegel (2005) in assuming that imitation is more productive but also more costly if an economy is further away from world technology frontier. We show that the income level in transition economies may converge to or diverge from the income level in developed countries depending on the relative infrastructure capital stock and the quality of institutions. Finally, we apply country panel data to confirm the empirical link between infrastructure capital and the speed of income convergence.

Social capital and Growth in Brazilian Municipalities

Luca Corazzini, Matteo Grazzi and Marcella Nicolini

According to the modern theory of social capital (Coleman (1990), Putnam (1993), Fukuyama (1995)), widespread trust would influence the economic performance of a country through a) reduction of transaction costs and legal disputes; b) higher percentage of time devoted to innovation in new products or processes; c) higher reliability of formal institutions, which implies that people can adopt more appropriate horizons in making investment decisions and choose production technologies that are optimal over the long, rather than short, run; d) stronger social cohesion due to the sharing of ethical norms which induces cooperative behaviours and organisational innovations. On the basis of these theories a large number of empirical contributions which confirm the existence of a positive relation between growth, efficiency and the level of trust has been produced. Following the seminal work by Knack et al. (1997), we try to explain growth in Brazil over the period 2000-2003 using indicators of social capital. We develop our analysis at the most detailed geographical level, considering all 5507 municipalities. This choice is motivated by the great heterogeneity across Brazilian states in terms of growth rate. In facts, while we observe homogeneity within some State, such as Sergipe, in other States, such as Sao Paulo, huge differences are present. This forces us to consider the municipalities as unit of observation; otherwise the country level would force us to lose all the heterogeneity. In order to obtain good measures of social capital, we start from a set of objective measure, and then analyse them with factor component analysis. We find a robust evidence of the positive effect of social capital on growth rates of income per capita.

2.2 GLOBALISATION, COMPETITIVENESS, AND ECONOMIC GROWTH

Is FDI into China Crowding out the FDI in the European Union?

Laura Resmini and Iulia Siedschlag

We estimate an augmented gravity model to analyze the effects of FDI into China originating in OECD countries on FDI into European Union (EU) and other countries over the period 1990-2004. Our results suggest that on average, *ceteris paribus*, over the analyzed period, FDI inflows into China have been complementary to FDI inflows into other recipient countries. If we consider FDI as part of international strategies adopted by multinational enterprises, it appears that FDI inflows into China have fostered synergies with all other recipient countries. However, it appears that these complementarities have declined over the analyzed period. Furthermore, the FDI inflows into China affect differently horizontal and vertical FDI. Our results suggest that countries which attract mainly horizontal FDI, because of their high market potential, adjust better to competitive pressures from China. As far as vertical FDI is concerned, competition with China arises in the presence of low cost advantages. As cost advantages increase, complementarities become more likely. FDI inflows into China complement FDI inflows into the EU, too. However, this positive relation is less intense in the case of horizontal FDI and more intense in the case of vertical FDI in comparison to other recipient countries.

Import Penetration, Intermediate Inputs and Productivity

Carlo Altomonte, Alessandro Barattieri, and Armando Rungi

We test the impact of import penetration on the productivity of a sample of roughly 35,000 Italian manufacturing firms operating in the period 1996-2003, considering the impact on productivity of both import penetration in the same industry and import penetration in the up-stream industries. We find that import penetration has a positive effect on productivity, but the effects are three times as large for import penetration in up-stream industries. Trade-related variables do not account however for the bulk of variation in individual firms' Total Factor Productivity.

Changes in Comparative Advantages

Marcella Nicolini

This paper inspects how comparative advantages have changed in the last 30 years. Using trade data on 197 countries over the period 1976-2004, it provides evidence that comparative advantages are not static, but change over time. More interestingly, it shows the rise in relevance of insitutional comparative advantage. Finally, it shows that this results does not hold for some countries, i.e. BRIC countries, such as Brazil, Russia, India and China.

Changing Patterns of International Integration: European Union and Trade in Intermediates

Armando Rungi

This paper explores how European countries have integrated themselves in world vertical production chains in the period 1995-2006. The analysis focuses on bilateral trade of both EU-15 and New Members of the Union with world, Brazil, Cina, India and Russia and will be performed at very disaggregated sectoral level, in order to allow differences among the above mentioned countries to emerge. Measuring the verticalization of the EU-15 through an application of Hummels, Ishii and Yi (2001), I try to identify an aggregate production function to verify the importance of imported intermediates at national level. Data come essentially from the Eurostat-ComExt database.

The Sustainable Competitive Advantage and Catching-up of Nations: FDI, Clusters, and the Liability (Asset) of Smallness?

Christos Pitelis

We explore the role of foreign direct investment and (its relationship to) clusters for the competitiveness (and catching-up) of small(er) developing countries. We suggest that while size *per se* need not matter, small(er) developing countries need to explicitly account for any liabilities of smallness when devising and implementing strategies for competitiveness and catching-up. We claim that international strategic management scholarship can add insights on this important issue, by complementing extant literature and contributions by international trade and economic development scholarship.

Some further results on the impact of migrants on trade

Edgar Morgenroth and Martin O'Brien

This paper investigates the relationship between migration and trade. Specifically it adds to the existing literature by allowing for the endogeneity of migration, as predicted by theory, while also allowing for the relationship between trade and migration to be non-linear. In contrast to previous single country studies this paper utilises a large cross section dataset for 26 countries and their trading partners.

Immigrant links affect bilateral trade flows via two mechanisms. Firstly, immigrants bring with them a preference for home produced goods. If these goods are differentiated across countries then one would expect the level of imports of the host country from the home country to increase. Secondly, the immigrant stock is embodied with information about their home market and as such costs of trade can be diminished. The prevalence of either the preferences or information effect can be ascertained by examining whether imports or exports are influenced more by immigration, however both phenomena are likely to be at work.

An important implication of the network explanation of the link between trade and migration is that it predicts a non-monotonic relationship between the two since it is likely that as migrant stock increase further international networking opportunities are exhausted. Similarly, as migrant stocks increase they are likely to substitute locally produced goods that meet their preference for imported goods.

Migration is likely to be endogenous since trade liberalisation impacts on factor incomes and thus the incentive to migrate. Likewise, if one favours the network explanation for the link between trade and migration one would expect migration to be endogenous since trade is likely to induce the formation of networks and thus induce migration.

Edith Penrose and a Learning-Based Perspective on the MNE and OLI

Christos Pitelis

We apply insights from Edith Penrose's work to extant theory of the multinational enterprise (MNE) as enveloped by John Dunning's Ownership, Location, Internalization (*OLI*) Paradigm. We suggest that Penrose's knowledge/learning-based approach has important implications on the nature of, and the interactions between, *O*, *L* and *I*, and it helps endogenize and integrate the three elements of Dunning's triad in the context of a dynamic, and strategic perspective of the MNE. More importantly, a learning-based perspective adds a cognitive dimension to the MNE and *OLI*. This supports a forward looking, synchronic decision making view, that may lead to apparently sub-optional decisions, taken in view of anticipated changes, alongside strategic behaviour, aiming to effect such change, once decisions have been reached. A Penrosean-inspired knowledge/learning-based perspective helps render the *OLI* more dynamic, strategic and forward looking.

A Behavioral Resource-based View of the Firm - The Synergy of Cyert and March (1963) and Penrose (1959)

Christos Pitelis

Cyert and March's (1963) seminal behavioral theory is one of the two major economics-based theories of the firm that goes inside the "black box" (the firm)—the other being the contribution of Edith Penrose. The two theories have differences, but also similarities, and substantial scope for cross-fertilization that has gone unnoticed in the literature. In this paper, we try to integrate important ideas from both books, paying particular attention to the issue of "excess resources," slack, and (intrafirm) conflict. We then build on the integrated framework by delving into the nature of intrafirm conflict and its relationship to the degree of intrafirm rivalry, as they may impact the possible use of slack by firms. We derive propositions common to the two theories and new ones of importance to our understanding of organizational growth and change.

Twenty Years Resource-Based View (or is it 50?): Some (Old and) New Challenges and Need for Extensions

Christos Pitelis

We focus on Edith Penrose's resource-based theory of the firm, first appeared 50 years ago in 1955–1956. We discuss progress since, at the conceptual and empirical levels, and some criticisms and 'defences' of the modern Resource-Based View (RBV), and Edith Penrose's version in particular. We then point to existing and new challenges and ways ahead. Despite serious challenges, we suggest that the RBV holds significant promise for strategic management, economics and their interrelationship.

Stephen Hymer's Contribution to International Business Scholarship: An Assessment and Extension

Christos Pitelis and John Dunning

We assess Stephen Hymer's contribution to the theory of the multinational enterprise and to international business (IB) scholarship. We focus on Hymer's evolving analytical framework, and assess it in terms of its internal consistency and in the light of the shifting global landscape and scholarly thinking. We also extend Hymer's framework, revisit his predictions, and conclude by questioning his canonical status within the IB profession.

European Industrial and Competition Policy: Perspectives, trends and A New approach

Christos Pitelis

This article discusses alternative perspectives on competition and industrial policies (IP) in theory and in practice and critically assesses recent European IP in this context. It develops a new framework for IP that emphasises the sustainability of value creation at the firm, meso and national levels, and explores its implications for IP in general and European IP in particular. It views current EU policies as a step in the right direction, but argues that they need to pay more attention to the issue of sustainability, the link between corporate and public governance, and the impact of different power structures and hierarchies of agencies on industrial policies for sustainable value creation. The limitations of self-monitoring and diversity suggest the need for an international competition and regulatory policy organisation, along the lines of the WTO.

The Multinational Corporation and the Global Sourcing of Knowledge: Remodeling Absorptive Capacity

Christos Pitelis, C. Kottaridi, M. Papanastassiou, and D. D. Thomakos

We build on extant theory of the MNC, MNC subsidiaries, absorptive capacity and Penrose's concept of 'productive opportunity' to develop a framework on the MNC and absorptive capacity (AC) that allows us to explore the role of subsidiaries in the global sourcing of knowledge. We develop and test hypotheses using primary questionnaire-collected data. Our results support the idea that subsidiaries' *realized* AC can be improved by the *realized* and *potential* AC of the MNC group and the subsidiary and in turn may improve the performance of the subsidiaries and the group as a whole.

Factors Influencing the Internationalisation of Firms: Micro Foundations of Macro Determinants

Christos Pitelis and G. Argitis

We draw on insights from the theory of the multinational enterprise (MNE) to explain outward investment and (thus) internationalisation. We claim that micro insights from the work of Stephen Hymer, Edith Penrose and other extant theories of the MNE can serve as micro foundations of some macro determinants of internationalisation. The focus on macro determinants pursues and develops an earlier critique of the theory of the MNE by Penrose; that it fails to distinguish between intra-national and international expansion of firms. We propose demand-side national business cycle considerations as a Penrose-inspired answer to the Penrosean critique. Our evidence derives from USA and UK data, supports insights from Hymer, Vernon, Penrose and our response to the Penrosean challenge.

The Determinants of Competitiveness at the Firm, Industry and National Levels: A Framework and Evidence

Christos Pitelis and Vassilis Vasilaros

We aim to bridge four levels of strategy theory of value capture and sustainable value creation; micro (firm), meso (industry, region), macro (national) (and also global). We propose a framework for value creation by firms and explore firm strategies for value capture and their relationship to value creation. We construct requisite variables and test our framework for 17 OECD countries using panel data. We find support for our integrative framework. We also explore the issue of sustainability and its implications for managerial practise, corporate governance, public policy and global governance that promote sustainable global value creation.

Determinants of MNE Subsidiaries Decision to set up own R&D Laboratories-Theory and Evidence

Constantina Kottaridi, Marina Papanastassiou, Christos Pitelis

We explore the determinants of MNE subsidiaries decisions to set-up own R&D laboratories drawing on evidence from UK regions. In this context, we also test for the interaction between firm's internal and external environments. We also integrate extant IB and strategic management literatures and incorporate recent debates in New Economic Geography (NEG) in specifying the 'external environment'. We find support for the role of firm's 'productive opportunity' and predictions of the NEG on the basis of an analysis of primary data. We discuss implications for managerial practice and government regional policies.

Institutional Diversity, Agency and Governance for Sustainable Value

Christos Pitelis

Extant views of (shareholder) value, (corporate) governance, and competitiveness have a narrow view of 'agency', a poorly developed theory of value and pay little attention to sustainability. In this paper we develop a perspective on the determinants of value-wealth creation at the firm, meso-, and national levels, explore the limitations of extant theory of the firm, concerning governance and value in its context, and discuss some prerequisites of sustainability. We conclude that the pursuit of value is not antithetical to, but it derives from, the notion of sustainability, that sustainability requires both internal and external controls and that institutional diversity can help effect mutual 'stewardship' and monitoring. Moreover, for sustainable value creation, corporate governance needs to be aligned to national and global governance.

Critical Success Factors for a Knowledge-based Economy: An Empirical Study into Background Factors of Economic Dynamism

Patricia van Hemert and Peter Nijkamp

The past decade has shown a rising popularity of the notion of the knowledge-based economy. The relationship between knowledge and economic growth is often studied in a conceptual and empirical context by addressing correlations between these factors (on the basis of e.g. the new growth theory and endogenous growth theory). This paper, however, takes an evolutionary and more exploratory route. In our study, a sample of ‘knowledge experts’ is used to identify the relative importance attached by these experts to the various factors that shape the force field of a knowledge-based economy. The study is carried out for different types of regions/ countries in the world (the Netherlands, developed regions, developing regions, and semi-developed regions). Starting from the notions of mainstream theory, our analysis finds that Dutch experts are of the opinion that economic dynamism is explained by increasing returns to scale and network effect rather than by international free trade. In particular, competitiveness is related to the location of industries and economies of agglomeration (i.e. linkages), whereby also social, cultural and institutional factors in the spatial economy are taken into account. When further analysis using statistical regression methods and multivariate factor analysis shows that Dutch experts are supportive of the notion that especially the interplay between knowledge development and institutional dynamics shape the economic landscape of a particular region, we propose a more evolutionary view instead of the new trade theory and New Economic Geography.

Mapping Regional Personal Income Distribution in Western Europe: Income per Capita and Inequality

Andrés Rodríguez-Pose and Vassilis Tselios

Past studies of regional economic disparities in the EU are fundamentally based on the information provided by macroeconomic variables. This paper considers regional disparities using microeconomic data aggregated at the regional level, paying attention not only to the average but also to the inequality levels of individual incomes within regions. It maps regional personal income distribution in western Europe, using data from the European Community Household Panel (ECHP) data survey covering more than 100,000 individuals, for 102 regions, and over the period 1995-2000. The Exploratory Spatial Data Analysis on income per capita and inequality reveals a rich set of findings. (1) There is a strong U-shaped relationship between income per capita and inequality which is highly robust across inequality measurements. (2) 80 percent of the income inequality in Europe takes place among individuals living in the same region. (3) Regions with similar income conditions tend to cluster, not only within national borders, but also across nations. (4) There is a North-South and an urban-rural divide where northern regions and city-regions have the highest economic development, as well as the lowest levels of inequality.

Inequalities in Income and Education and Regional Economic Growth in Western Europe

Andrés Rodríguez-Pose and Vassilis Tselios

Does inequality matter for regional growth? This paper addresses this question, using aggregated microeconomic data for more than 100,000 individuals over a period of 6 years from the European Community Household Panel (ECHP) dataset, complemented with Eurostat's Regio data. The aim is to examine the relationship between income and educational distribution and regional economic growth in western Europe. Our results indicate that, given existing levels of inequality, an increase in a region's income and educational inequality has a significant positive association with subsequent economic growth. Educational achievement is positively correlated with economic growth, but the impact of initial income levels is unclear. Finally, the results suggest that inequalities in educational attainment levels matter more for economic performance than average educational attainment. The above findings are not only robust to the definition of income distribution, but also across inequality measurements.

From innovation to exporting or vice versa?

Jože P. Damijan, Črt Kostevc and Sašo Polanec

Firm productivity and export decisions are closely related to innovation activity. Innovation may play a more important role in the decision to start exporting, and successful exporting may drive process innovation. This suggests that the causality between innovation and exporting may run in both directions. Using detailed microdata from innovation surveys, industrial production surveys, and trade information for Slovenian firms in 1996-2002, we investigate the bidirectional causal relationship between firm innovation and export activity. We find no evidence for the hypothesis that either product or process innovations increase the probability of becoming a first-time exporter, but we do find evidence in both the innovation survey and the industrial production survey that exporting leads to productivity improvements. These, however, are likely to be related to process rather than product innovations, and are observed only in a sample of medium and large first-time exporters.

2.3 The Role of Public Policies in Fostering Innovation and Growth

What drives the location choice of R&D multinationals in the European Union?

Gavin Murphy, Iain Nash, Iulia Siedschlag

This paper analyses the determinants of the location of R&D multinational enterprises across European Union countries. Our sample includes 445 new R&D multinational enterprises incorporated in the European Union over the period 1999-2006. The data source is the Amadeus database. Our results indicate that the probability to locate in an EU country increases with the number of existing R&D firms, flexible labour markets, high skills, efficient financial markets and low technological development.

Taxation does not appear to have a significant effect on the location choice of R&D multinationals.

What determines the attractiveness of EU regions to location of R&D multinationals?

Iulia Siedschlag, Donal Smith, Camelia Turcu, Kevin Zhang

This paper examines the attractiveness of EU regions to the location of R&D multinationals. Our sample includes 446 location decisions of new R&D multinational enterprises incorporated in the European Union over the period 1999-2006. The data source is the Amadeus database. Our results suggest that on average, the probability to locate in an EU region (NUTS 2) increases with the size of demand (market potential), agglomeration economies (positive spillover effects from existing foreign R&D firms), technological development (R&D intensity), flexibility of labour markets, proximity to research excellence centres (university in the top 200 list) and physical infrastructure. Regions with lower GDP per capita appear more attractive as location choices for R&D multinationals. The determinants of the location choice of R&D multinationals are different for regions in Western Europe (EU15) and Central and Eastern Europe. While in Western Europe, regions with higher GDP per capita are the preferred locations for R&D multinationals, in Central and Eastern Europe, regions with lower GDP per capita attract the bulk of R&D foreign investment. Unemployment rates appear negatively correlated with the probability of R&D multinationals while they do not have an effect on the location decision in CEECs.

What determines the attractiveness of EU regions to the location of multinationals in the ICT sector?

Iulia Siedschlag, Kevin Zhang, Donal Smith

This paper examines the attractiveness of EU regions to location of multinationals in the Information and Communications (ICT) sector. Our sample includes 8,543 foreign affiliates of multinational enterprises (MNEs) in the ICT sector incorporated in twenty member states of the European Union over the period 1998-2008. The firm-level data source is the Amadeus database. Our results suggest that on average, the probability to locate in an EU region (NUTS 2) increases with the size of demand (market potential), agglomeration economies (positive spillover effects from existing firms in the ICT sector), technological development (R&D expenditure), flexibility of labour markets, and information technology infrastructure. Regions with lower GDP per capita appear more attractive as location choices for ICT multinationals. The determinants of the location choice of ICT multinationals are different for regions in Western Europe (EU15) and Central and Eastern Europe. While in Western Europe, regions with higher GDP per capita are the preferred locations for both ICT multinationals in manufacturing and service sectors, in Central and Eastern Europe, regions with lower GDP per capita attract the bulk of ICT service multinationals. A negative competition effect from domestic ICT firms is found in Western Europe for the service sectors. Unemployment rates appear negatively correlated with the probability of location in the whole EU and Western Europe, while they increase attractiveness for regions in CEECs. Some determinants are also found having heterogeneous effects on multinationals from different countries. In particular, US multinationals are not sensitive to labour costs while EU multinationals respond to this factor negatively.

Do foreign mergers & acquisitions boost firm productivity?

Frances Ruane, Marc Schiffbauer, Iulia Siedschlag

This paper examines the causal relationship between foreign acquisitions and firm productivity in the UK over the period 1999-2007. While we find little evidence for positive effects of foreign acquisitions on total factor productivity, our results uncover positive and increasing effects on labour productivity (a partial productivity measure) from the first until the fifth year of the post - acquisition period. The results are broadly similar for firms taken over by US and EU based firms. We find that the effects of foreign acquisitions vary across industries. It appears that while foreign ownership led to higher productivity in the office & electrical machinery industry, it had a negative effect on productivity in the renting of machinery & equipment industry. Firms acquired by foreign investors in computer services experience a higher productivity in the second year of the post-acquisition period.

How efficient are public R&D subsidies in promoting firm's innovation and growth? Evidence from Slovenia

Jože P. Damijan and Črt Kostevc

Efficiency of R&D subsidies for promoting firm innovation has been found controversial in the literature. In order to study this issue in Slovenia, we use comprehensive firm-level accounting information (1996-2002), which is combined with the CIS data for a large sample of Slovenian manufacturing enterprises (1996-2002). By estimating the probit model on the whole dataset, we find that both public R&D subsidies as well as R&D subsidies received from abroad (both measured as a share of firm's total R&D subsidies) help significantly Slovenian firms to increase their ability to innovate. R&D subsidies received from abroad are shown to be twice that efficient as the public subsidies in terms of the likelihood of new innovations. These results are confirmed in an alternative estimation procedure by using the matching based on "subsidy success" (subsidized versus non- subsidized irms) in order to compare their R&D efforts and matching based on the propensity to innovate (innovator versus non-innovator) in order to explore the impact of different R&D sources on productivity growth. Received R&D subsidies are shown to enhance the probability of firms to start innovating.

Inflation, financial development and long-run TFP-growth

Marc Schiffbauer

This paper demonstrates a negative relation between inflation and long-run productivity growth. Inflation generates long-run real effects due to a link from the short-run interplay between nominal and financial frictions to a firm's qualitative investment portfolio. First, we employ country panel data to investigate the robustness of a negative causal effect of inflation on long-run TFP-growth. Second, we develop an endogenous growth model whose key ingredients are (i) a nominal short-run portfolio choice for households, (ii) an agency problem which gives rise to financial market incompleteness, (iii) a firm level technology choice between a return-dominated but secure and a more productive but risky project. In this framework, inflation increases the costs of corporate insurance against productive but risky projects and hence a firm's choice of technology. It follows that economies (time periods) that feature a higher level of inflation are predicted to exhibit lower TFP-growth in the long-run. That is, each level of inflation is associated with a different long-run balanced growth path as long as financial markets are incomplete. Finally, we apply U.S. industry as well as firm level dynamic panel data to examine the relevance of our specific microeconomic mechanism. We find that (i) firms insure systematically against risky R&D investments by means of corporate liquidity holdings; (ii) periods of higher inflation restrain firm-level R&D investments by reducing corporate liquidity holdings.

The Interdependence of Private and Public Interests

Joseph Mahoney, Anita McGahan and Christos Pitelis

The predominant focus in research on organizations is either on private or public institutions without consistent consideration of their interdependencies. The emphasis in scholarship on private or public interests has strengthened as disciplinary and professional knowledge has deepened: management scholars, for example, tend to consider the corporation as the unit of analysis, while scholars of public policy often analyze governmental, multilateral, community and non-profit organizations. This article advocates a partial merging of these research agendas on the grounds that private and public interests cannot be fully understood if they are conceived independently. We review three major areas of activity today in which public and private interests interact in complex ways, and maintain that current theories of organization science can be deployed to understand better these interactions. We also suggest that theories of public-private interaction also require development and describe a concept called "global sustainable value creation," which may be used to identify organizational and institutional configurations and strategies conducive to worldwide, intertemporal efficiency and value creation. We conclude that scholarship on organizations would advance if private-public interactions were evaluated by the criterion of global sustainable value creation.

Public subsidies, business R&D and innovativeness. A qualitative meta-analysis

Patricia van Hemert and Peter Nijkamp

The relationship between innovation and competitiveness is an important topic in both academic research and economic policy and has been studied extensively over the past few decades. Investments in private and public R&D are nowadays believed to make up the heart of a modern knowledge economy. In the present paper, we will adopt an evolutionary economics perspective and investigate whether, in addition to private R&D activities, also institutional arrangements and policy interventions play a role in shaping innovation patterns and their impacts on the innovativeness and competitiveness of industries. We aim to find support for the evolutionary claim that the competitiveness of industries in the international arena must be sustained by the dynamic interaction between, national, regional and sectoral systems. Since, according to the evolutionary metaphor, the growth of an innovation system follows a complex dynamics that cannot simply be analysed within an equilibrium framework, we will here use an alternative approach based on qualitative pattern recognition analysis originating from artificial intelligence analysis. We will emply here in particular rough set analysis which has proven to be a promising tool in order to explore and identify broad underlying qualitative relations between variables used. Besides R&D expenditures, human capital expenditures are regarded as the major input in the knowledge creation process in our analytical framework. Focus of our investigation is on patterns in the competitiveness of the EU member states, using quantitative data from the European Innovation Scoreboard. In our analysis we find support for the hypothesis that there are indeed interactions between different institutional levels, and, as a result, for the importance of the broader systemic context within which the innovative process unfolds for the study of patterns and impacts of innovation for policy purposes.

Entrepreneurship, innovation and regional development: A Southern European perspective

George Petrakos, Pantoleon Skayannis, Apostolos Papadoulis and George Anastasiou

This paper explores the ability of peripheral European productive systems to adjust in the new knowledge-driven environment and benefit from the development policy agenda of the EU and the member states, which is dominated by the Lisbon Strategy. In this framework, the paper analyses the adjustment and prospects of the productive and innovative system of Greece, with special reference to the region of Thessaly. Part of the analysis is based on a business survey conducted in Thessaly, inquiring into the patterns and changes in the innovative activity of industrial firms. The analysis focuses on the role of the internal and external environment, specialisation, human resources and inter-firm relations. It also focuses on the ability of firms to innovate and compete in an increasingly open and demanding environment. Our findings reveal the difficulties of applying the Lisbon Strategy in peripheral economies and as such they have important implications for regional innovation policy.

Innovation Governance for Value Capture-The Problem and a Proposed Simple Model-based Solution.

Christos Pitelis and Andreas Panagopoulos

We aim to model the "optimal" choice on internal versus external innovation for value capture of different-sized firms, in the context of multi-level bargaining. We find that size differentials are a major determinant for the choice in hand. We derive implications for "closed" versus "open" innovation approaches, and we discuss managerial practice, limitations and possible extensions. Our aim is to respond to a number of "paradoxes" in the innovation literature. Firstly, the failure of some firms to capture value from their in-house innovations. Second, the fact that most radical innovations take place by small firms with large ones focusing on less risky ones. Third, the question why should firms be prepared to forfeit proprietary control of their innovations. Fourth, why should small firms continue to innovate, in the presence of possible infringement by large firms.

We find that there can exist a division of labour between large and small firms with the latter focusing on R, and with large firms focusing on D, that leverages their respective competencies. In the presence of multi-level bargaining the share of benefits is satisfactory to both sides, not least because of the possibility of litigation, but also the fact that overall value creation is higher than when each firm does both R and D. In this context, firms can use open or closed innovation (or both) depending on circumstances that allow them to benefit from such an arrangement.

Human resource Practices and Value Capture from Investment in Knowledge/Innovation: Evidence from a Quasi-Experiment

Christos Pitelis and A. Georgiadis

We analyse the link between human resource (HR) practices and the ability of firms to capture value from investments in knowledge-innovation and present evidence that supports a positive relationship between the two, employing an empirical design that utilises a unique data set that is based on a quasi-experiment. Our findings suggest that an additional pound invested in R&D, increases the rate of return of businesses that receive support in the form of employees and management/entrepreneur training, as well as improved workforce retention and recruitment, by significantly more than businesses that didn't receive such support. This has important implications for managerial practice and public policy. In this paper we presented an empirical study that offered evidence in an attempt to bridge this gap in the Strategic Human Resource Management literature. In particular, we exploited the unique research design provided by a policy initiated by the DTI and the BPF of the UK THL sector which aimed to assist SMEs in the sector to boost productivity and performance by also providing free HR-related support in the form of consultancy advice and training.

We found that receiving HR support boosts significantly the contribution of R&D investment on value added. In particular, our estimates suggest that a business that invests an extra pound in R&D experiences on average a 0.35% increase in value added when receives support in the area of staff training and development compared to the situation when it does not receive such support. Similarly, HR-support in the form of more training for the manager/entrepreneur and improved recruitment and retention increases the returns to an additional pound spent on product innovation and business development by 0.33% and 0.08% respectively.

In terms of managerial practices, our results suggest that it pays for firms to invest in innovation and R&D when at the same time they invest in upgrading employees' and managerial skills through training and improving recruitment and retention practices.

Value Capture from Organizational Advantages and Sustainable Value Creation

Christos Pitelis

The impact of firm value capture strategies on the sustainability of the value creation process as a whole has been little discussed in the literature. Despite contributions by leading scholars on issues pertaining to value capture and value creation, moreover, we still lack a systematic framework of their determinants. Our purpose in this paper is to propose a conceptual framework for value creation and value capture, explore their relationship, and discuss pre-requisites for sustainable system-wide value creation. We then derive propositions and explore implications of our analysis on business strategy and public policy.

The intelligent organisation, a HR solution for more innovation to cope with globalisation and the economic crisis?

Tom Vermeylen

The question this research addresses is the following: How can we stimulate innovation and creativity in an economy, in enterprises, schools, and organizations? Aside from investment in R&D we focus here on the way organizational development can help create innovation. Many theories of HR management are old, but for some of them the implementation only now becomes urgent. Following former head of HR with Nokia, Pentti Sydänmaanlakka, the missing link in innovation policies is an adapted form of leadership and management. Hence, the working environment is, as the global environment, changing rapidly and dramatically. He states that we should be moving from a old-fashioned industrial management paradigm towards an adapted post-industrialised paradigm. The argument is that in knowledge organisation the hierarchical management through command, control and correct is no longer the most effective strategy. As the manager is no longer capable of having expertise in all increasingly specialized discipline of its employees. The adaptation of new strategies is especially urgent is high-skilled, complex work disciplines and organisations. We propose the 'intelligent organization model' which emphasises non-hierarchical, supportive, empowering and self-management.

Is there regional convergence in social welfare?

Andrés Rodríguez-Pose and Vassilis Tselios

Economic and social cohesion at a regional level is one of the main objectives of the European Union. However, while economic cohesion, proxied by GDP per capita, has attracted significant attention with most studies finding little regional convergence since 1985, social cohesion has been virtually ignored. This paper tries to cover this gap by asking the question of whether regional convergence in social welfare, measured by Sen's index, has taken place across regions of the EU-15. Using panel data models with or without spatial interaction effects we find that the absence of convergence in GDP per capita is not matched in terms of social welfare. Welfare levels have converged significantly across European regions and this convergence has been built on a series of structural and institutional factors, among which female participation in the labour force is the most relevant.

APPENDIX

LIST OF WORKING PAPERS

Available to download from www.esri.ie/dynreg

No.	Title	Author(s)
WP 1	Dynamic Growth Regions, Innovation and Competitiveness in a Knowledge Based World Economy: A Survey of Theory and Empirical Literature	Iulia Siedschlag (ed.)
WP 2	Theoretical and Methodological Study on Dynamic Growth Regions and Factors Explaining their Growth Performance	Panagiotis Artelaris Paschalis Arvanitidis George Petrakos
WP 3	Theoretical and Methodological Study on Comparative Advantages in Dynamic Growth Regions, Convergence and Inequalities Pattern	Laura Resmini
WP 4	Theoretical and Methodological Study on the Role of Public Policies in Fostering Innovation and Growth	Marc Schiffbauer
WP 5	Explaining Knowledge-Based Economic Dynamism in a Global Scale	Panagiotis Artelaris Paschalis Arvanitidis George Petrakos
WP 6	Knowledge Transfer, Innovation and Growth	Jože P. Damijan Črt Kostevc
WP 7	The Effects of Human Capital on Output Growth in ICT Industries: Evidence from OECD Countries	Gavin Murphy Iulia Siedschlag
WP 8	Analysis of Educational Distribution in Europe: Educational Attainment and Inequality Within Regions	Andrés Rodríguez-Pose Vassilis Tselios
WP 9	Education and Income Inequality in the Regions of the European Union	Andrés Rodríguez-Pose Vassilis Tselios
WP 10	Productivity Spillovers and Multinational Enterprises: in Search of a Spatial Dimension	Laura Resmini Marcella Nicolini
WP 11	Productivity Spillovers from Foreign Investment: The Role of Neglected Conditionalities	Laura Resmini Marcella Nicolini
WP 12	A Generalized Model of Regional Economic Growth in the European Union	George Petrakos Dimitris Kallioras Ageliki Anagnostou
WP 13	A Conceptual Framework for Firm Cooperation and Clusters and Their Impact on Productivity and Competitiveness	Christos Pitelis
WP 14	Going for Growth: A Theoretical and Policy Framework	Peter Nijkamp Patricia P. van Hemert
WP 15	Social Capital and Growth in Brazilian Municipalities	Luca Corazzini Matteo Grazzi Marcella Nicolini
WP 16	Knowledge Spillover Agents and Regional Development	Michaela Trippl Gunther Maier
WP 17	Knowledge Spillover Agents and Regional Development: Spatial Distribution and Mobility of Star Scientists	Gunther Maier Bernhard Kurka Michaela Trippl
WP 18	Calling for Innovations - Infrastructure and Sources of Growth	Mark Schiffbauer
WP 19	Characteristics of Dynamic Regions in the World Economy: Defining Knowledge-Driven Economic Dynamism	Paschalis Arvanitidis George Petrakos
WP 20	Determinants of Economic Growth: The Experts' View	George Petrakos Paschalis Arvanitidis Sotiris Pavleas
WP 21	Changes in Comparative Advantages	Marcella Nicolini

No.	Title	Author(s)
WP 22	Causal link between exporting and innovation activity. Evidence from Slovenian firms	Jože Damijan Črt Kostevc
WP 23	Import penetration, intermediate inputs and productivity: evidence from Italian firms	Carlo Altomonte Alessandro Barattieri Armando Rungi
WP 24	Changing patterns of international integration: Germany and Italy in the countries of EU enlargement	Carlo Altomonte Armando Rungi
WP 25	Is FDI into China crowding out the FDI into the European Union?	Laura Resmini Iulia Siedschlag
WP 26	Some further results on the impact of migrants on trade	Edgar Morgenroth Martin O'Brien
WP 27	Catching Up or Falling Behind? The Effect of Infrastructure Capital on Technology Adoption in Transition Economies	Marc Schiffbauer
WP 28	Critical success factors for a knowledge-based economy: an empirical study into background factors of economic dynamism	Patricia Van Hemert Peter Nijkamp
WP 29	Determinants of ICT adoption: evidence from firm-level data	Stefanie Haller Iulia Siedschlag
WP 30	Understanding scientific mobility: characteristics, location decisions, and knowledge circulation. A case study of internationally mobile Austrian scientists and researchers	Bernhard Kurka Michaela Trippl Gunther Maier
WP 31	Inventors and the Geographical Breadth of Knowledge spillovers	Paola Giuri Myriam Mariani
WP 32	Convergence patterns in the world economy: exploring the non-linearity hypothesis	Panagiotis Artelaris Paschalis Arvanitidis George Petrakos
WP 33	Mapping regional personal income distribution in Western Europe: Income per capita and inequality	Andrés Rodríguez-Pose Vassilis Tselios
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WP 35	The Multinational Corporation and the Global Sourcing of Knowledge: Remodeling Absorptive Capacity	Constantina Kottaridi Marina Papanastassiou Christos Pitelis Dimitrios Thomakos
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