Regional Development as Self-Organized Converging Growth

PETER NIJKAMP
Free University
De Boelelaan 1105
1081 HV Amsterdam, The Netherlands
pnijkamp@feweb.vu.nl

Abstract

Spatial disparities reflect differences in regional growth and productivity, and call for a profound analysis of their driving forces. This paper offers a concise and selective overview of various elements of regional development theories. Starting from traditional regional growth theory, it introduces next findings from location and agglomeration theory, including infrastructure and network modelling, with a particular emphasis on spatial accessibility. Next, innovation, entrepreneurship and knowledge are addressed, and interpreted as critical success conditions for modern regional development. Elements from endogenous growth theory and the new economic geography are introduced as well.

We pay also attention to contributions from the social capital school, as they may be particularly relevant for enhancing regional productivity. Finally, attention is paid to the regional convergence debate, while the paper concludes with some prospective views on spatial disparity analysis.

1.   Force Field of Regional Development

Regional development is not only an efficiency issue in economic policy, it is also an equity issue due to the fact that economic development exhibits normally a significant degree of spatial variability. Over the past decades this empirical fact has prompted various strands of research literature, in particular the measurement of interregional disparity, the causal explanation for the emergence or persistent presence of spatial variability in economic development, and the impact assessment of policy measures aimed at coping with undesirable spatial inequity conditions. The study of socio-economic processes and inequalities at meso- and regional levels positions regions at the core places of policy action and hence warrants intensive conceptual and applied research efforts.

For decades already, the unequal distribution of welfare among regions and/or cities has been a source of concern of both policy-makers and researchers. Regional development is about the geography of welfare and its evolution. It has played a central role in such disciplines as economic geography, regional economics, regional science and economic growth theory. The concept is not static in nature, but refers to complex space-time dynamics of regions (or an interdependent set of regions). Changing regional welfare positions are often

hard to measure, and in practice we often use Gross Domestic Product (GDP) per capita (or growth therein) as a statistical approximation (cf. Stimson et al. 2006). Sometimes alternative or complementary measures are also used, such as per-capita consumption, poverty rates, unemployment rates, labour force participation rates or access to public services. These indicators are more social in nature and are often used in United Nations welfare comparisons. An example of a rather popular index in this framework is the Human Development Index which represents the welfare position of regions or nations on a 0-1 scale using quantifiable standardized social data (such as employment, life expectancy or adult literacy) (see e.g. Cameron 2005). In all cases however, spatial disparity indicators show much variability.

Clearly, the concept of a region is a problematic concept in empirical research, as the spatial scale of regions may exhibit much variation ranging, for example, from the larger US states to relatively small regions in Europe, even sometimes down to the municipality level. A key feature of any region – in contrast to a nation – is its relative openness (see e.g., Blanchard 1991). From a statistical viewpoint, regions are often administrative spatial units with a certain competence for socio-economic policy and planning. The relatively small scale of a region leads normally to a high degree of heterogeneity and interaction with each other, as a result of locational features such as local production factors, institutions, transport infrastructures and local market size (see also Armstrong and Taylor 2000).

Regional disparities may have significant negative socio-economic cost consequences, for instance, because of social welfare transfers, inefficient production systems (e.g., due to an inefficient allocation of resources), and undesirable social conditions (see Gilles 1998). Given a neoclassical framework of analysis, these disparities (e.g., in terms of per capita income) are assumed to vanish in the long run, because of the spatial mobility of production factors which causes at the end an equalization of factor productivity in all regions. Clearly, long-range factors such as education, R&D and technology play a critical structural role in this context. In the short run however, regional disparities may show rather persistent trends (see also Patuelli 2007).

Disparities can be measured in various relevant categories, such as (un)employment, income, investment, growth etc. Clearly, such indicators are not entirely independent, as is, for instance, illustrated in Okun's law, which assumes a relationship between economic output and unemployment (see Okun 1970, Paldam 1987). Convergence of regional disparities is clearly a complex phenomenon which refers to the mechanisms through which differences in welfare between regions may vanish (cf. Armstrong 1995). In the convergence debate, we observe increasingly more attention for the openness of spatial systems, reflected inter alia in trade, labour mobility, commuting etc. (see e.g., Magrini 2004). In a comparative static sense, convergence may have varying meanings in a discussion on a possible reduction in spatial disparities among regions, in particular (see also Barro and Sala-i-Martin 1992, Baumol 1986, Bernard and Durlauf 1996, Bodrin and Canova 2001):

- β-convergence: a negative relationship between per capita income growth and the level of per capita income in the initial period (e.g., poor regions grow faster than initially rich regions);
- σ-convergence: a decline in the dispersion of per capita income between regions over time.

The convergence hypothesis in neo-classical economics has been widely accepted in the literature, but is critically dependent on two hypotheses (cf. Cheshire and Carbonaro 1995, Dewhurst and Mutis-Gaitan 1995):

- diminishing returns to scale in capital, which means that output growth will be less than proportional with respect to capital;

- technological progress will generate benefits that also decrease with its accumulation (i.e., diminishing returns).

Many studies have been carried out to estimate the degree of β-convergence and σ-convergence (see e.g., Barro and Sala-i-Martin 1991, 1992). The general findings are that the rate of β-convergence is in the order of magnitude of 2% annually, while the degree of σ-convergence tends to decline over time, for both US states and European regions. Clearly, there is still an ongoing debate world-wide on the type of convergence, its speed, its multidimensional conceptualisation, and its causal significance in the context of regional policy measures (see e.g., Fagerberg and Verspagen 1996, Fingleton 1999, Galor 1996). Important research topics in the current literature appear to be: the role of knowledge and entrepreneurship, spatial heterogeneity in locational or socio-cultural conditions, and institutional and physical barriers. An important new topic in the field has become group convergence (or club convergence) (see e.g., Islam 2003, Fischer and Stirbock 2006, Baumont et al. 2003, Chatterji 1992, Chatterji and Dewhurst 1996, López-Bazo et al. 1993, Quah 1996, Rey and Montouri 1999, and Sala-i-Martin 1996). Thus we may conclude that the research field of spatial disparities is still developing and is prompting over the years fascinating policy issues. In the sequel of this paper we will now address more in particular prominent policy questions, as they have emerged over the years.

2.   Spatial Disparities: Productivity is the Key

Spatial disparities may manifest themselves at different geographical levels, ranging from nations to urban districts. The lower the geographical scale, the larger normally the geographical variation in the welfare variable(s) considered. This scale dependence of spatial disparities calls for great caution in comparing the performance of nations or regions. But in most cases, differences in spatial performance (e.g., income per capita, employment growth etc.) are directly or indirectly related to differences in productivity among regions. Clearly, such differences may be ascribed to physical geography, to inefficient use of human resources, to inadequate availability of physical or human capital, to lack of recourses and so forth, but overall we may conclude that deficiencies on the supply side of production factors – whatever the cause of these deficiencies may be – leads to a lower performance of the region concerned. And therefore, the measurement and evaluation of total factor productivity (TFP) is of great importance for understanding spatial welfare disparities.

The motives to measure regional development are manifold. But a prominent argument all over the years is that welfare positions of regions or nations may exhibit great disparities which are often rather persistent in nature (see Fingleton 2003). These in turn translate into large disparities in living standards. For example, in 1960, the world's richest country had a per capita income that was 39 times greater than that of the world's poorest country (after correcting for purchasing power), while by the year 2000, this gap had increased to 91 (Abreu 2005). Regions in our world do not only have significant differences in welfare positions, but it takes also sometimes decades or more to eliminate them. As an illustration we take here Tanzania (the world's poorest country in 2000), which experienced on average a modest growth rate of 0.6 percent per annum over the period 1960-2000. In order to reach the world's average per capita income of 8,820 US dollars per annum at its current rate of growth, it would need another 485 years. Even if the annual growth rate were to increase to 1.8 percent (i.e., the world's current average), it would need 161 years to close the gap. And if it were to grow at the rate of South Korea (the fastest grower over the period concerned), it could close the gap in just 49 years. Persistent regional welfare disparities are a source of frustration for both economists and policy-makers (cf. Lucas 1988).

Regional development is clearly a multidimensional concept with a great variety that is determined by a multiplicity of factors such as natural resource endowments, quality and

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quantity of labour, capital availability and access, productive and overhead investments, entrepreneurial culture and attitude, physical infrastructures, sectoral structure, technological infrastructure and progress, open mind, public support systems, and so forth (see Blakely 1994). By focussing the attention on regional welfare differences, we touch on a centre piece of the evolution of growth in and between regions.

In the past half a century we have witnessed an avalanche of studies in regional differences in welfare. The literature on regional development has usually centred around two dominant issues: how is regional welfare created and how can we cope with undesirable interregional welfare discrepancies? The first question is normally referred to as 'allocative efficiency' and addresses the economic issue of an optimal use of scarce resources (i.e., inputs such as capital, labour, physical resources, knowledge etc.) so as to generate a maximum value of output. The second question is more of a socio-political equity nature and addresses the mechanisms and conditions (economic, policy interventions) that may help to alleviate undesirable development disparities in the space-economy. Normally, efficiently operating regions tend to grow faster than regions with less favourable development conditions, so that there is an in-built tension between efficiency and equity among a system of regions, at least in the short run. It goes without saying that the efficiency-equity dilemma is one of the most intriguing issues in regional development policy (cf. Baldwin et al. 2003, Brakman et al. 2001, Fujita and Thisse 2003, and Puga 1999). But have we gained sufficient new insight in order to assist regional development policy?

The policy response to undesirable international welfare discrepancies has usually been to start a subsidy programme, either in the form of infrastructure provision (and other regional development factors) or as social welfare transfers. In many cases, the size of these transfers exceeds by far regional development expenditures, but it ought to be recognized that these transfers are only of a consumptive nature (e.g., short-term income subsidies) and do not have a productive meaning, so that their long-range impact on a reinforcement of regional economic structures is almost negligible.

There is another striking fact. The great many studies on the effect of regional policy measures on regional welfare are often not leading to conclusive findings that would warrant an intensification of regional development policy. Of course, there may be many reasons for this disappointing observation, such as: the long-term nature of regional development efforts in which a time span of one generation is not unusual, the lack of distinction between static allocation effects and long-range dynamic generative effects, the insufficient attention given to the difference between internal and external border areas, and the methodological flaws inherent in tracing the effects of individual projects or programmes on a total regional economy. In addition, the focal point of regional policy was not always clear, as it might differ according to spatial unit, sector or socio-economic target group.

From the above observations it is clear that regional development policy is fraught with many uncertainties. The present contribution aims to shed light on the complexity of regional development. It will start off from the heart of regional economics, viz. location and allocation theory, and include an exposition on neo-classical factor endowment and infrastructure theory (Section 3). Next, a more contemporaneous contribution will be offered on the modern drivers of regional development, viz. knowledge and entrepreneurship, while also paying attention to recent advances in endogenous growth and the new economic geography (Section 4). We will then pay attention to an important and often less tangible issue, viz. the effect of social capital (Section 5). In a subsequent section (Section 6) we will address more explicitly the so-called convergence debate and the role of governments in regional development policy. We will conclude with some retrospective and prospective remarks on the future of regional development policy and research.

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3.   Spatial Accessibility: A Prominent Competitive Factor

In the history of economic development we have observed that spatial accessibility offers many opportunities fore economic progress. River banks and coastal areas were often forerunners in acquiring welfare gains. Indeed, the history of mankind has exhibited a dynamic geographic pattern, where accessibility through proper infrastructure and favourable physical-geographical conditions (e.g., climate) were decisive factors for settlement of people and firms. These areas created the foundations for large agglomerations (such as New York, London, Cape Town, Tokyo or Venice). Regional development appeared to find favourable breeding places in accessibility and large economic attraction poles. It is evident that differences in geographic accessibility caused ultimately spatial disparities. Even nowadays, persistent discrepancies in regional welfare have historical roots in locational conditions of such high-potential areas. The present figures of our world are still striking: approx. 1 billion people live on less than a dollar per day, while more than 2 billion people have no access to adequate sanitation. And the gap between poor and rich is formidable and even increasing. For example, the top 20% of the world's population consumes about 85% of the world's income, while the bottom 20% lives on approx. 1.5% of the world's income. And things get worse: a generation ago, people in the top 20% were 30 times as rich as those in the bottom 20%; nowadays, they are more than 70 times as rich! (see Serageldin 2006). In general, the more prosperous places are those with a high degree of accessibility.

The dispersion of economic activity in our world shows clearly a great variation. And hence, location theory has played a central role in explaining not only the spatial distribution of economic activity, but also the dispersion of welfare among regions or cities. Consequently, regional development theory is deeply rooted in location theory (cf. Martin and Ottaviano 2001). Location theory has already a long history in regional economics and economic geography. Starting off from path-breaking ideas set forth by Von Thünen, Christaller, Lösch, Isard, Hoover and many others, modern location theory has moved into a strong analytical framework for regional economics and economic geography. Cost minimization and profit maximization principles are integrated in a solid economic setting, in which both partial and general spatial equilibrium studies on the space-economy can be found that highlight the geographical patterns of industrial and residential behaviour. Furthermore, the theory is also able to encapsulate the impact of public actors, for instance, through the provision of space-opening or accessibility-enhancing infrastructure (as can be observed in regional development policy). We may thus conclude that the fundamentals of classical location theory are made up of a blend of physical geography (determining the accessibility of a location and the availability of resources) and smart economic behaviour (through a clever combination of production factors and market potentials in space) (see for a review Capello 2006 and, Davis and Thisse 2002). Location and accessibility are essentially two sides of the same coin.

It should be noted however that location patterns are never static, but have an endogenous impact on newcomers (residents and firms), though various spatial externalities. Thus, incumbent firms may attract others through scale, localization and urbanization advantages (e.g., in the form of spatial-economic externalities in a Marshallian district; cf. Asheim 1996). Consequently, agglomerations tend to become self-reinforcing spatial magnets impacting on the entire space-economy. Such concentrations of economic activity create welfare spin-offs for a broader regional system and thus determine the geographic patterns of welfare and regional development. Seen from this perspective, a blend between location theory and urban economics (or urban geography) is plausible (see also the so-called new economic geography; Fujita et al. 1999, and Hanson 1996).

In the past decades, we have witnessed the emergence of the digital economy through which actors could be networked world-wide. As a consequence, the interaction between industrial networks and location as well as the access to networks has gained much interest (see Nijkamp 2003 for a review). Locations that offer the best available network services are the proper candidates for many firms in the ICT, high-tech and high-services sectors and are able to generate a high value added to regional development. Despite many statements on the 'death of distance', it ought to be noted here, that physical distance still matters. ICT may enhance spatial productivity of actors by expanding their action radius, but evident substitution mechanisms have so far not been found (with a few exceptions on a local scale).

The availability of and access to infrastructure is a related critical success factor for regional development (cf. Davis and Weinstein 1999). In addition to the presence of labour as capital on traditional factor inputs, we observe an increasing interest in measuring the impact of infrastructure on regional development. Especially in a world with shrinking distance, space-time accessibility of regions becomes a critical determinant of relative regional-economic positions. Transport economics and transport geography have offered an abundance of theoretical and empirical evidence on the importance of physical infrastructure for regional growth. An extensive review can be found in Nijkamp (2001). The uneven provision of infrastructure have also been identified as a key determinant of regional income disparities in less developed countries (World Bank 2006, pp.168-174). It should be added however, that it is not the pure supply of infrastructure, but rather its effective use that determines its productivity-enhancing potential.

4.   Entrepreneurship, Innovation and the Knowledge Economy

Spatial dynamics (including the emergence of spatial disparities) is the result of changing activity patterns of people and firms, including geographic mobility of these actors. Since the good old days of Marshall, Schumpeter and Kirzner we know that innovation and entrepreneurship are the driving factors behind economic growth. There is an avalanche of literature on the importance of entrepreneurship for enhancing the innovative capacity and growth potential of regions (see e.g., Acs et al. 1999 and Audretsch et al. 2002). Entrepreneurs are change agents with a high innovative potential.

In recent years, we have witnessed an increasing interest in entrepreneurship. Entrepreneurship is a complex and multi-faceted phenomenon that finds its roots in risk-taking behaviour of profit-seeking individuals in a competitive economy. But its determinants have also clear correlations with gender, age, education, financial support systems, administrative regulations, risk tolerance and market structures (cf. Kirchhoff 1994 and Storey 1994). Entrepreneurship lies at the heart of innovation as the art of doing creative things for the sake of achieving a competitive advantage in an open economy. The debate on entrepreneurship and innovation has – from a geographical perspective – prompted the emergence of new concepts such as innovative regions, innovative milieus, learning regions, or knowledge-based regions (see e.g., Malecki 2000, Florida 1995, Nijkamp and Stough 2004, and Simmie 2002). Innovation has become the critical survival factor in a competitive space-economy and determines the direction and pace of regional development. A key aspect of innovation in a modern space-economy is the use of and access to the information and communication technology (ICT) sector. Consequently, ICT infrastructure is increasingly seen as a necessary resource endowment for regional development with a high degree of productivity-enhancing power.

The ICT emergence has prompted speculative ideas on e-economics, e-societies, e-governments or e-firms. Indeed, it goes almost without saying that ICT is a necessary ingredient of a modern knowledge-based economy. And that also holds for regions and cities. Clearly, knowledge is a composite good with many facets, but from an economic perspective

knowledge serves to enhance productivity and to induce innovations. There is indeed an ongoing debate on the unidirectional or circular relationship between knowledge and development, and this forms one of the central issues in endogenous growth theory (see also Markusen, 1985, and Krugman 1991). Endogenous growth theory seeks to offer a micro-economic foundation for economic dynamics where traditional fixed factors are seen as a result of intrinsic economic forces.

It is noteworthy that endogenous growth theory has played a central role in the growth debate since the 1990's. The main idea of these new contributions is that technological progress is not exogenously given, but an endogenous response of economic actors in a competitive business environment. Consequently, in contrast to earlier macro-economic explanatory frameworks, the emphasis is much more on individual economic behaviour of firms (see e.g., Aghion and Howitt 1998 and Barro and Sala-i-Martin 1997). In this way, it can be demonstrated that regional growth is not the result of exogenous productivity-enhancing factors but is the result of deliberate choices of individual actors (firms and policy-makers). This also implies that governments are not agents 'above the actors', but 'among the actors' in a dynamic economy.

Furthermore, the importance of knowledge for innovation and entrepreneurship is increasingly recognized. The spatial distribution of knowledge and its spill-overs are considered as an important success factor for regional development in an open competitive economic system. Thus, the geographical patterns of knowledge diffusion as well as the barriers to access to knowledge are decisive for regional development in a modern global and open space-economy. Consequently, knowledge policy – often instigated by ICT advances – is a critical success factor for regional welfare creation (see e.g., Acs et al. 2002., Döring and Schnellenback 2006 and Keeble and Wilkinson 1999). With more economies depending on knowledge-intensive products, the importance of a dedicated knowledge policy is increasingly recognized.

Regional development policy appears to move increasingly towards knowledge and innovation policy (see Asheim and Gertler 2005 for a comparative study). This argument is reinforced in a recent study by Stimson et al. (2005), where the authors demonstrate that leadership and institutional qualities have a great impact on regional welfare, in particular, when the role of leadership is linked with innovation and knowledge-creation. To the same extent that innovative entrepreneurship is critical for long-term regional welfare growth, governance and leadership are essential for a balanced regional development (Martin 1999). Leadership presupposes proactive behaviour, visions for future development, awareness of institutional and behavioural processes, responses and bottlenecks, as well as acceptance by the population. The awareness of the importance of leadership and entrepreneurship lies in with the recognition of creative actions and learning actors. Studies on regional leadership are rare, but can be found inter alia in Judd and Parkinson (1990), Heenan and Bennis (1999), Hofstede (1997) and Stimson et al. (2005). This is certainly a promising and important new field of research, for both policy-making and industrial organization.

Finally, in recent years, we have also witnessed the emergence of a new strand of literature, coined the 'new economic geography', in the vein of endogenous growth theory (see e.g., Brakman et al. 2001, Krugman 1991, and Neary 2001). Although the term 'new economic geography' is arguably not appropriate (most concepts can already be found in the regional economics and regional science literature since the 1950s), this seemingly new approach has attracted quite some attention within the neoclassical economics literature. It marries the increasing-returns monopolistic competition model (à la Dixit and Stiglitz 1997) with the micro-foundations of spatial-economic behaviour, including interregional trade (see Fujita et al. 1999, Fujita and Thisse 2002, Krugman 1991, Ottaviano and Thisse 2004, Redding and Venables 2004, Rivera-Batiz 1998, Romer 1986, Naudé 2005). This recent

approach emphasizes the importance of agglomeration externalities (caused by increasing returns to scale) for regional welfare creation, in the context of global competitive forces where trade (between regions or countries) plays a critical role. Thus, regions are then part of a global competitive network system. Recent contributions within this literature have found that agglomeration can be a welfare-improving outcome for workers in both core and periphery regions, for instance, if agglomeration raises the innovation rate (see Fujita and Thisse 2003). This result provides theoretical support for regional development policies destined to support and enhance existing clusters of specialization, which may show a resemblance to Marshallian districts.

5.   The Human Factor in Regional Development: Social Capital

Regional development is the outcome of socio-economic processes and decisions, in particular the smart combination of various production factors and local resources which are decisive for the productivity-enhancing potential of various agents involved. In the previous sections we have addressed locational decisions, factor mix decisions, and innovation and R&D decisions of firms as critical success conditions for regional growth. Institutional support systems and leadership talents were also mentioned as flanking incentives that might spur economic development of regions or cities. Textbook economics has paid extensive attention to the conditions under which these factors might lead to accelerated growth, with sometimes significant variation among regions (e.g., increasing returns to scale, product heterogeneity and specialization etc.). All these elements impact on the welfare and productivity pattern of regional-economic systems and may be a source of divergent economic achievements among various regions of the space-economy. Nevertheless, the analysis of spatial-economic disparities does often not provide us with a complete picture of all relevant background factors. In other words, many models trying to explain regional growth and spatial differences therein are semantically insufficiently specified. In various cases therefore, economists have resorted to the introduction of complementary explanatory factors, such as X-efficiency factors which refer to often intangible factors (e.g., personal devotion, altruistic behaviour, concern about the future or nature, social engagement etc.) and which may offer additional explanations for the performance of various agents (e.g., regions, administrations, entrepreneurs, employees etc.).

The search for such new complementary explanatory frameworks has induced in recent years an increasing interest in the contribution of 'social capital' to regional development. Social capital was defined by Bourdieu (1986) as follows: *"Social capital is an attribute of an individual in a social context. One can acquire social capital through purposeful actions and can transform social capital into conventional economic gains. The ability to do so, however, depends on the nature of the social obligations, connections, and networks available to you"* (p. 243). Social capital can assume different forms such as social skills, charisma, cooperative nature, or care for others which may create various benefits for the individual or his/her social environment. They are essentially a form of social externatilies, with positive revenues for all actors involved (see Glaeser et al. 2000, Sobel 2002). Social capital is thus a productive resource at the interface of individual and collective interest (see Dasgupta and Serageldin 1999, Putnam 2000), and serves as an intangible (often hidden) source of well-being in an individualistic modern society.

Social capital is essentially based on the notion of trust (see Fukuyama 1995) and was already introduced in the urban planning literature several decades ago by Jane Jacobs (1961). But it has emerged in a new form as a productive factor that may stimulate regional (or urban) development. An interesting study from this perspective was undertaken by Westlund and Bolton (2003) and Westlund and Nilsson (2005). The authors argue that social capital has several manifestations:

- capital in an economic sense (with a productivity-enhancing potential, with a blend of supporting factors, with accumulation and depreciation features, with a mix of private and public goods characteristics, and with various spatial and group levels);
- generator of producer surplus (with a quality-generating potential, with an area-specific social benefit and with a decline in transaction costs);
- facilitator of entrepreneurship (with a combination of skills, risk-taking attitude, market insights, and goodwill trust).

It is clear that social capital plays a prominent role in a networked society, where reliability, trust, standardisation and efficient inter-actor operations are the keys to success and competitive performance. Socio-economic interaction in networks and confidence and trust among network actors are closely related phenomena (see also Dyer 2000).

A final remark is in order here. There has been a rapidly rising volume of studies on social capital and trust, from the side of both economists and sociologists (see also Chou 2006). Unfortunately, the number of applied studies where trust and social capital are operationalized is disappointingly low. There is still further scope for innovative empirical research on social capital, in particular in the context of regional development where local resources such as social capital play a prominent role. Applied research on the significance of social capital is once more warranted, as differences in social capital among regions may contribute to widening spatial disparities.

6.   Spatial Disparities and Convergence

Regions and cities are not static socio-economic entities, but always in a state of flux. Regions and nations in our world show complex development patterns (cf. Englmann and Walz 1995, Evans 1996, Grossman and Helpman 1990). Textbook economics would teach us that under conditions of free competition, homogeneity of preferences and technology parameters, and free mobility of production factors across all regions in the space-economy would tend to a converge to the same per-capita income growth rate. In neoclassical economic growth models, convergence between regions takes place through capital accumulation. Regions that are further away from their state states grow faster in the short run, but in the long run diminishing returns to capital set in and the growth rate drops to the exogenous growth rate of technological progress. This tends towards a situation where the growth rate of GDP per capita falls and becomes constant (i.e., it becomes equal to the exogenously-determined technological growth rate). The neo-classical growth models therefore predict that in the long run countries and regions will converge in terms of per-capita income levels, if one controls for the effects of differences in initial conditions. However, these theoretical-conceptual findings are often contradicted by empirical results.

A basic problem in the above neo-classical explanation of the world is that technological progress is not exogenous 'manna from heaven'. It is part of the complex architecture of a regional economy and is determined by both internal and external R&D investments, on-the-job training, learning by doing and spillovers from university research. Spillovers resulting from R&D expenditures and other activities generate increasing returns to scale for reproducible production factors (Lucas 1988, Romer 1990), the existence of which implies the possibility of long-run divergence in per-capita income levels. Thus, usage of new technologies may aggravate regional disparities.

The conflicting predictions of the neoclassical and endogenous growth models have generated intense scrutiny and a plethora of empirical studies, known collectively as the 'convergence debate' (see Temple 1999, Durlauf and Quah 1999 and Islam 2003). The literature has generally found that while per-capita income levels between the poorest countries (of Sub-Saharan Africa) and the richest countries (Europe and the United States)

have diverged over the past few decades, there is convergence among countries that are similar in terms of initial conditions and policies, for instance, among the countries of the European Union or the fast-growing East Asian economies (a phenomenon known as 'conditional convergence'). The evidence also suggests that per-capita income levels among regions within countries have diverged markedly in recent years, particularly in large, diverse countries such as India and China. An increase in regional disparities in fast growing regions such as India and China is not necessarily bad news, however. Improvements in living standards in vast countries such as these implies that global inequality as a whole may be decreasing (in tandem with improvement in living standards in these countries). Moreover, economic theory suggests that an increase in agglomeration forces may lead to further improvements in the long run, as knowledge spills-over into other regions and sectors of the economy. The findings of the convergence literature therefore highlight the key role of regional development policies in promoting economic growth and human development. At the same time, they call for serious empirical work and comparative study.

7.   Epilogue

Roger development is a complex phenomenon in any policy attempt aimed at reducing spatial disparities. It calls for a through analysis of its driving forces. An important contributor to regional development is technological progress, an extensively studied topic in the recent economic growth literature. From a geographic (regional, urban, or local) perspective, much attention has been paid to the spatial conditions that induce technological progress (e.g., entrepreneurial climate, availability of venture capital, incubator facilities etc.). Furthermore, also the spatial diffusion of technology has obtained much attention, in particular in the geography literature. A particular case of knowledge and technology diffusion can be found in foreign direct investment (FDI). Several studies have demonstrated that FDI offers access to foreign production processes, so that interregional or multinational technology spillovers may occur (see e.g. Carr et al. 2001, Coe and Helpman 1995, Findlay 1973, Markusen 2002, and Xu 2000). These studies demonstrate clearly that the region is a dynamic player in an intricate web of spatial-economic interactions which impact on spatial disparities.

With more regional dynamism and a trend towards an open world, regional disparities tend to increase, at least in the short and medium term. There is a clear reason for more solid, empirically-based modelling work for identifying the key drivers of disparities in regional development. Meta-analysis – as a systematic set of tools to identify key drivers from a quantitative angle – may be a fruitful tool to arrive at a better understanding of the causes of spatial disparities.

Any attempt to cope with undesirable spatial disparities has to recognize the complex force field within which regional development – and differences therein – is shaped. Regional development policy is not a simple and single one-shot activity, but the result of endogenous forces in the space-economy itself. It is rather based on the self-organizing potential of regions, with a multiplicity of actors and change agents involved. A new fruitful way to analyze spatial disparities from a long-range strategic perspective may be to adopt an evolutionary economic perspective (see e.g., van den Bergh et al. 2007), in which notions like spatial diversity, mutation, stability and resilience, path dependence, bounded rationality and selection environment play a prominent role. Interesting recent contributions from an evolutionary viewpoint to the field of regional planning and development policy can be found inter alia in Bosschma and Lambooy (1999) and Cooke (1998). It goes without saying that further development of evolutionary thoughts on differences in regional development need foremost solid and applied research work, making use of quantitative comparative analysis of the evolution of regions in a complex space-economy.

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