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Reflections on Local and Economy-wide Effects of Territorial Competition

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REFLECTIONS ON LOCAL AND ECONOMY-WIDE EFFECTS OF TERRITORIAL COMPETITION[*]

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Abstract

As part of the global trend towards greater reliance on market forces in public sector activities, there is a growing tendency in many countries to devolve the responsibility for regional development to regional and local authorities. From this perspective, vigorous competition between such authorities to attract productive enterprises, finance and households is expected to enhance the competitiveness of regions and to lead to higher local and national growth. Yet uncoordinated policies that do not take network and external spillover effects into account may be wasteful in the short run and lead to lower growth in the long run. This paper focuses on lessons from conventional and new theories of growth for understanding the impact of territorial competition. In addition, notions of regional competitiveness and their effectiveness as indicators of the regional growth potential are discussed. Although increasing competitiveness may induce higher growth, observed high growth rates are sometimes erroneously interpreted as evidence of competitiveness. Forces leading to convergence and divergence in an open regional system are identified and the impact of territorial competition is addressed. Specific attention is paid to regional incentives to encourage inward investment. While footloose firms appear responsive to such incentives, regional competition in the form of tax or non-tax incentives may bear little relationship with the spatial variation in unemployment rates or other indicators of regional economic problems. Incentives are therefore not always welfare enhancing. Some issues for further research are suggested.

Keywords: endogenous growth, competitiveness, regional policy, incentives

JEL Classification Numbers: O11, O41, R11, R58

Reflections on Local and Economy-Wide Effects of Territorial Competition

Jacques Poot*

I. Introduction

When countries offer favourable conditions for firms to prosper, such countries contribute to the competitive strength of these firms in local or global markets and, as has been commonplace since Porter (1990), these conditions may be referred to as the *competitive advantage* of the nations concerned. This competitive advantage is neither static nor immune to government policy. The same idea of competitive advantage can be applied to regions.

Yet one could argue that competition and competitiveness are misleading concepts when referring to nations or regions. In an environment of free trade, countries or regions do not compete, but firms do. Free trade is not a zero-sum game, but yields net welfare gains. However, policy makers routinely think of their territories as competing for shares in global markets, for capital, new knowledge and technologies, and sometimes for human resources. Government actions that are perceived to strengthen the competitive position will affect national and regional outcomes.

It is therefore useful to take a constructive approach and assign in this paper an explicit meaning to the concept of *territorial competition*. Territorial competition refers to the actions of economic agents that are taken to enhance the standard of living of their own territories, such as regions, cities or countries. This may be judged as a rather broad definition, as it does not restrict the actors to being only the territorial authorities, but it could include the behaviour of firms and households too. This broad definition of territorial competition has the advantage that it coincides with widespread notions of *territorial* (regional, international) *competitiveness*. Territorial competitiveness is a measure of a territory's *potential* to achieve sustainable high growth rates in the standard of living of its constituents. Thus, as people throughout the world aspire to a sustainable improvement in their standard of living, cities, regions and nations compete through the actions of firms, households and

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governments. Sometimes the desire for growth leads to direct interjurisdictional competition for resources, finance, people, markets, etc.

Causes of the spatial dispersion in the standard of living and ways in which this dispersion can be altered over time have been core issues in economics ever since Adam Smith's (1776) inquiry into the nature and causes of the wealth of nations. During the last few decades, the standard paradigm for growth of the standard of living has been the neoclassical model formulated by Solow (1956) and independently by Swan (1956). However, a weakness of their theory was that it did not provide an explanation for the long-run rate of growth of a region or country. The model merely described an economy's transition to a long-run steady state, characterised by rates of population growth and productivity growth that were assumed to be exogenous. Krugman (1995) argued that a formal description of the forces which "drive" growth, such as innovation and agglomeration, was simply not yet possible with the tools of economic theory available in the 1950s. Consequently, development economics emerged as a more pragmatic field for understanding growth and for prescribing policies to enhance growth.

However, during the last decade there has been a resurgence of interest in long-run development, following influential contributions by Romer (1986) and Lucas (1988). Many new theories have been formulated to describe and analyse the engines of growth in national and regional economies in detail and such theories are therefore referred to as *endogenous growth* models in the literature.

The endogenous growth literature has now reached a mature stage in which many surveys (e.g. Mankiw 1995, Jones and Manuelli 1997, Nijkamp and Poot 1998) and (text) books (e.g. Barro and Sala-i-Martin 1995, Aghion and Howitt 1998) provide an extensive discussion of the key theoretical models. At the same time, there has been much empirical work that aims to identify the key forces driving a spatial variation in growth rates, particularly at the national level (examples are Kormendi and Meguire 1985, Baumol 1986, Barro 1991), but more recently also at the regional level (e.g. Sala-i-Martin 1996). Of course, besides being of scientific interest, such research may also reveal instruments that are available to policy makers to enhance the growth of their territories. However, the theoretical modelling of economic growth has until now made much more progress than the empirical research. Klenow and Rodriguez-Clare (1997) argue that there is not yet a good link between (micro) theory and

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(macro) evidence and that it has been hard to distinguish empirically between competing theories of endogenous growth. Consequently, the empirical literature to date has provided little insight into the impact of territorial competition on growth.

As the world is witnessing a continuing political transformation from a regime of border protection, regulation and coordination to one of international integration, deregulation and devolution, it is natural to shift the attention from competition at the national level to that of competition between sub-national or supra-national regions. Indeed, there are powerful *centripetal* forces and diminishing *centrifugal* forces regarding the spatial allocation of economic activity: the former due to strengthening advantages of agglomeration, the latter due to declining real transportation and communication costs (e.g. Fujita and Thisse 1996). Consequently, a new economic geography is emerging in which the key level of competition is one of metropolises in a global urban network (see e.g. Ohmae 1995).

This paper focuses briefly on the new theories of growth and the ways in which the competitive actions of economic agents (firms, households and regional governments) can lead to differences in regional development. However, the next section comments first on the notion of regional/territorial competitiveness and the attributes of competitiveness that can enhance development. Section III reviews briefly how growth rates could differ between *closed* economies. Endogenous growth theories point to the importance of competitive forces leading to process or product innovations, human capital investments, an increased thriftiness and the enhancement of market forces. Section IV provides some comments on the effects of *openness* on long-run development. Hence the consequences of globalisation and growing regional integration are also addressed. The role of policy with respect to growth in an open regional system is briefly addressed in section V. Section VI focuses on a specific, but prominent issue of regional policy, namely the incentives offered to attract footloose firms to establish a new plant in the region offering such incentives. However, an analysis of the strategic interactions between territorial authorities by means of game theoretic models is beyond the scope of the present paper. The final section sums up and suggests some issues for further research.

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II. What Is Territorial Competitiveness?

As stated in the previous section, territorial competitiveness is defined in this paper as a measure of the territory's potential to achieve sustained high growth rates of the standard of living of its inhabitants. In recent years, the concept of competitiveness has received considerable attention at the national level. Because government policies can influence economic growth - although our knowledge of the linkages between policies and growth is as yet far from complete - statistical measures of competitiveness are sometimes used as a "score card" of the success of government policies. Several institutions attempt to measure the competitiveness of nations by means of a broad set of indicators. Countries are then ranked by an overall index that is a weighted sum of the indicators. Two institutions whose measures of competitiveness are widely published are the World Economic Forum (WEF) and the International Institute for Management Development (IMD). Before 1996, WEF and IMD published a joint index, but since then the two institutions revised their methodologies independently and publish separate competitiveness measures.[1]

It has been found that measures of competitiveness based on too many indicators are less informative than those based on a more targeted set of "fundamental" indicators. However, WEF and IMD use still more than one hundred indicators based on official statistics and surveys of business people in close to 50 countries. The indicators are based on the results of the literature regarding cross-country regression analyses of the determinants of economic growth. Weights are attached to indicators based on their relative importance. For example, the WEF index gives a two-third weighting to the following four factors:

* the openness of an economy to trade and investment;

* the role of government (e.g. public spending, public debt, marginal tax rates);

* efficiency of the financial sector;

* the labour market (flexibility, the average level of education and skills);

and a one-third weighting to:

* the quality of management;

* infrastructure and technology;

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[1] For the reasons behind the decision of WEF and IMD to publish separate indices, see "The C-word strikes back", p.86, *The Economist*, June 1st 1996.

*   the effectiveness of legal and political institutions.

Similarly, the IMD index is built up from eight categories: domestic economy, internationalization, government, finance, infrastructure, management, science & technology and people (human resources). However, the WEF index is somewhat more attractive on theoretical grounds: it excludes variables which are *consequences* rather than causes of competitiveness, such as GDP growth, export growth and inflows of foreign direct investment. Nonetheless, the two approaches give broadly similar results, with competitiveness being the highest in the United States and the "city states" of Singapore and Hong Kong. In contrast, South American and East European countries tend to have low scores. The scores of several Asian countries such as Japan, Thailand, South Korea and Indonesia have declined recently in the wake of the Asian economic crisis.

In the same way as the combining of forecasts of several agencies can yield a more accurate forecast, it may be useful to combine competitiveness indexes. Table 1 reports a "super index" of national competitiveness based on the sum of the ranking by WEF and IMD for the years 1996-1998. Annual competitiveness measures are subject to short-run fluctuations in their components. These fluctuations may have little impact on the potential for long-run sustainable growth. Consequently, the super index reported in Table 1 is based on the aggregate of the rankings for the three years 1996-1998 rather than on the rankings in any single year.

When the ranking of competitiveness changes quite markedly on a year by year basis, this points to a weakness of the methodology. The forces determining long run growth are unlikely to change rapidly over time and, except for major policy changes, rankings should be relatively stable in the short run. When they do change, this may reflect that several indicators of economic outcomes - and perceptions of entrepreneurs - are highly correlated with the business cycle. An example is New Zealand. Its WEF ranking was 3rd, 5th and 13th in 1996, 1997 and 1998 respectively, while its IMD ranking was 11th, 13th and 13th in those years. The relatively good competitiveness measures of this country are due to a process of fundamental economy-wide reforms, which commenced in 1984 (see e.g. Evans et al. 1996).

Rank	COUNTRY	WEF98	WEF97	WEF96	IMD98	IMD97	IMD96	SUPER INDEX
1	Singapore	1	1	1	2	2	2	9
2	United States	3	3	4	1	1	1	13
3	Hong Kong	2	2	2	3	3	3	15
4	Switzerland	8	6	6	7	7	9	43
5	Norway	9	10	7	6	5	6	43
6	Canada	5	4	8	10	10	12	49
7	Netherlands	7	12	17	4	6	7	53
8	Luxembourg	10	11	5	9	12	8	55
9	New Zealand	13	5	3	13	13	11	58
10	United Kingdom	4	7	15	12	11	19	68
11	Denmark	16	20	11	8	8	5	68
12	Japan	12	14	13	18	9	4	70
13	Finland	15	19	16	5	4	15	74
14	Taiwan	6	8	9	16	23	18	80
15	Malaysia	17	9	10	20	17	23	96
16	Australia	14	17	12	15	18	21	97
17	Ireland	11	16	26	11	15	22	101
18	Germany	24	25	22	14	14	10	109
19	Chile	18	13	18	26	24	13	112
20	Sweden	23	22	21	17	16	14	113
21	Austria	20	27	19	22	20	16	124
22	France	22	23	23	21	19	20	128
23	Belgium	27	30	25	23	22	17	144
24	Thailand	21	18	14	39	29	30	151
25	South Korea	19	21	20	35	30	27	152
26	Israel	29	24	24	25	26	24	152
27	Iceland	30	36	27	19	21	25	158
28	Spain	25	26	30	27	25	29	162
29	China	28	28	34	24	27	26	167
30	Portugal	26	29	32	29	32	36	184
31	Philippines	33	33	29	32	31	31	189
32	Indonesia	31	15	28	40	39	41	194
33	Argentina	35	35	35	31	28	32	196
34	Italy	37	37	38	30	34	28	204
35	Czech Republic	34	31	33	38	35	34	205
36	Mexico	32	32	31	34	40	42	211
37	Turkey	36	34	39	33	38	35	215
38	Hungary	39	42	43	28	36	39	227
39	Greece	40	44	36	36	37	40	233
40	Brazil	42	39	45	37	33	37	233
41	Colombia	43	38	37	44	42	33	237
42	South Africa	38	40	40	42	44	44	248
43	India	45	41	42	41	41	38	248
44	Venezuela	41	43	44	43	45	45	261
45	Poland	44	45	41	45	43	43	261
46	Russia	46	46	46	46	46	46	276

Sources: World Economic Forum, International Institute for Management Development. To enable a direct comparison between the two measures, the following countries were deleted from the WEF data and the rankings were recomputed: Jordan, Peru, Egypt, Vietnam, Slovakia, Zimbabwe and Ukraine.

Table 1: A "Super Index" of National Competitiveness

However, the decline in the ranking of New Zealand in recent years coincides with domestic business cycle phenomena leading to a recession in 1998 and with the impact of the Asian economic crisis. The latter influences growth directly through lower exports to these countries and indirectly through exports to Australia, which has an even greater exposure to Asia. Yet the fundamentals that could influence long-run growth did not change markedly. In conclusion, competitiveness measures are sometimes too sensitive to the business cycle. One reason is that some of the statistical indicators, from which the competitiveness measures are derived, report the perceptions of business people and these perceptions are often highly correlated with the actual rates of economic growth. This particular problem is also clearly illustrated by the widespread erroneous interpretation of the causes of high rates of growth among some Asian economies. These were commonly considered evidence of strong competitiveness, innovation and efficiency gains. However, Krugman (1994) argued convincingly that the main source of growth in these economies was a massive mobilisation of resources (a rapid growth in the supply of labour and capital) rather than a growth in total factor productivity.

In principle, the notion of competitiveness as defined in this paper can be applied at any spatial level. The practicality of computing measures of competitiveness at the *regional* level will depend on the availability of relevant data. Such data are more likely to be available in federal or other systems where regional or local government has considerable discretionary power in areas of public finance, education, R&D and infrastructure.

An example of the monitoring of regional competitiveness indicators can be found in the United Kingdom (Department of Trade and Industry 1998). The statistical indicators that make up the regional profiles of competitiveness are listed in Table 2. It can be seen that there is a considerable similarity between the measures of national competitiveness described above and those of regional competitiveness listed in Table 2.

Given new information technologies and lower transportation and communication costs, regional governments face an increasingly competitive environment in a number of ways. First, firms are becoming more footloose as the economy becomes more services-oriented and the spatial organisation of activity becomes more complex (see also Bruinsma et al. 1998).

A   OVERALL COMPETITIVENESS
        1.   Gross Domestic Product
        1a.   Total household disposable income
        2.   Labour productivity in manufacturing
        3.   Social security benefit claimants
        4.   Manufacturing investment and output by foreign-owned
                companies

B   LABOUR MARKET
        5.   Average earnings
        6.   Employment
        7.   Unemployment

C   EDUCATION AND TRAINING
        8.   Educational and vocational attainment
        9.   Investors in people

D   CAPITAL
        10.   VAT registrations and survival rates
        11.   Research and development intensity and employment in
                high technology industry

E   LAND AND INFRASTRUCTURE
        12.   Transport
        13.   Industrial and commercial property costs

Source: Department of Trade and Industry (1998)

Table 2: Regional Competitiveness Indicators in the United Kingdom

For example, firms may carry out "backroom" activities and "top-level managerial" activities at different locations. Regions may compete for such footloose establishment of firms by means of offering varying packages of public goods and incentives. Similarly, they may wish to attract inward migrants. With a high mobility of workers and firms, the spatial variation in public goods and services will be efficient (Tiebout 1956, Oates and Schwab 1991).

The question of the efficient provision of public goods and services at the regional level is not unrelated to the question of the ways in which regional governments can influence growth. In this context, traditional policies of providing tax incentives to firms for attracting inward investment and wage subsidies for encouraging employment growth are now supplemented or superseded by supply-side measures to generate a "fertile" competitive environment. Examples of such measures are the encouragement of small firms, the provision of information services, transportation

infrastructure and the support of technoparks (see e.g. Armstrong and Taylor 1993). To some extent, the new policy orientation with respect to regional development is backed up by the theoretical modelling of the engines of growth during the last decade. It is in this context useful to separate out the forces influencing growth in the absence of spatial interaction and the consequences of permitting economic integration in the form of mobility of outputs, production factors and information. The former case is briefly reviewed in the next section, the latter in section IV.

III. Why Growth Rates May Differ Between Closed Regional Economies

A schematic classification of old and new theories of growth that emerged from different schools of thought is displayed in Figure 1. The key schools and seminal papers from these schools have been positioned in Figure 1 around a circle. This signifies that we can interpret each theory as highlighting a particular aspect of reality. There are three broad and different perspectives on economic processes, namely *equilibrium*, *competition* and *coordination*. In addition, theories can be dichotomised into being either *static* or *dynamic*. Alternatively, they can either focus on *efficiency* (wealth creation) or *equity* (wealth distribution). Given the complexity of reality, examples can be found (in terms of times, places and processes) which would provide supporting evidence for reality highlighted by any of the theories listed in Figure 1.

Growth in real income per person in an autarchic regional or national economy can be described in a simple way by the Solow-Swan neoclassical model. This model explains economic growth by means of capital accumulation that results from savings behaviour. The key assumption that characterises the long-run growth process in the Solow-Swan model is the presence of diminishing returns to capital accumulation. An economy gradually approaches, without technological change, a steady state in which the amount of capital per worker and income per head are constant. In this steady state, savings lead to new gross investment that either just matches population growth or is offset by depreciation of the existing capital stock, or both. As long as the same technology is available to all regions and all markets are perfectly competitive, spatial variation in growth is simply due to spatial variation in capital per worker. Regions with a relative lack of capital will have lower real incomes, but grow faster.
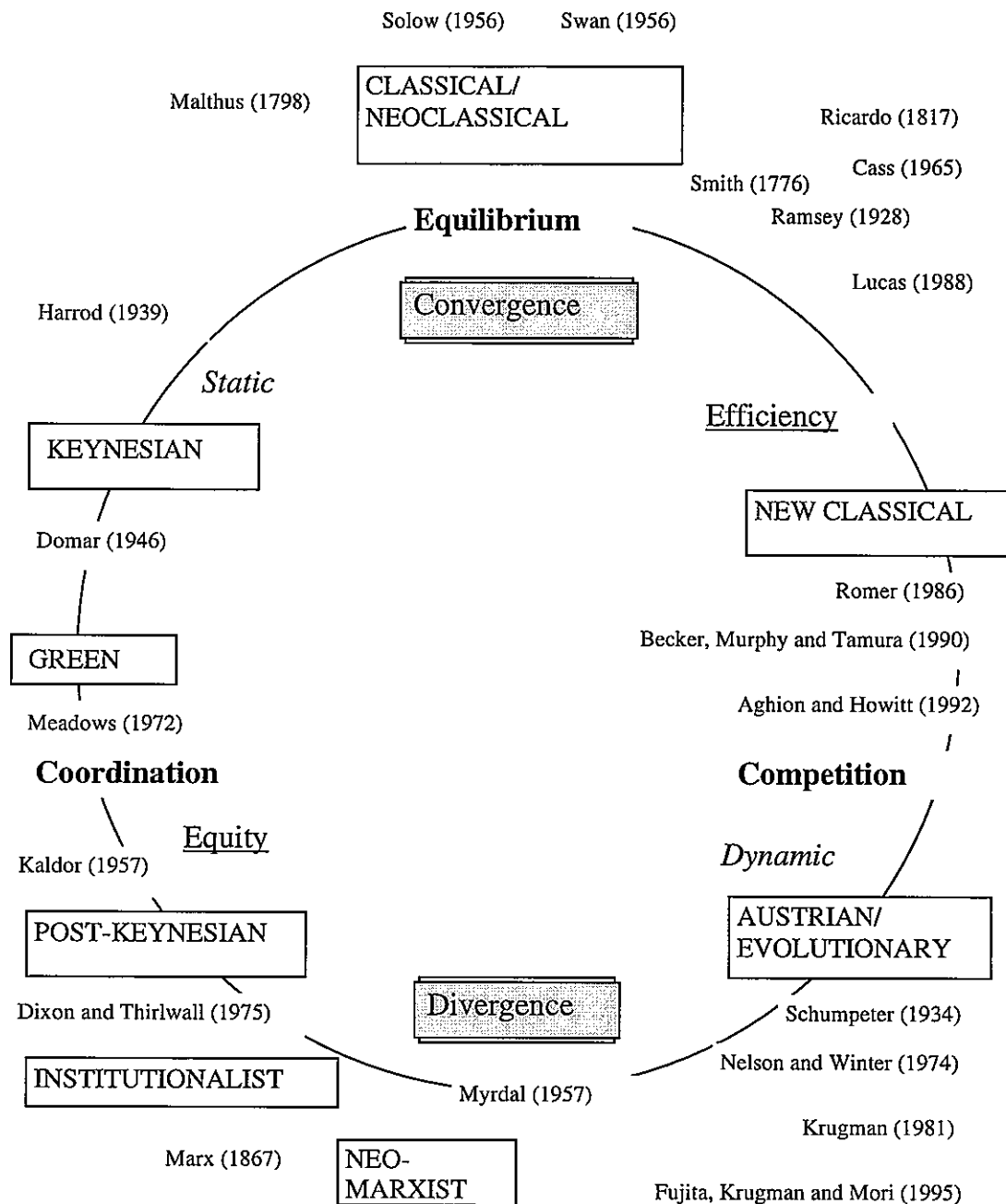
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Solow (1956)　　Swan (1956)

CLASSICAL/
NEOCLASSICAL

Malthus (1798)

Ricardo (1817)

Smith (1776)　Cass (1965)

Ramsey (1928)

Equilibrium

Lucas (1988)

Convergence

Harrod (1939)

Static

Efficiency

KEYNESIAN

NEW CLASSICAL

Domar (1946)

Romer (1986)

Becker, Murphy and Tamura (1990)

GREEN

Aghion and Howitt (1992)

Meadows (1972)

Coordination

Competition

Equity

Dynamic

Kaldor (1957)

POST-KEYNESIAN

AUSTRIAN/
EVOLUTIONARY

Dixon and Thirlwall (1975)

Divergence

Schumpeter (1934)

Nelson and Winter (1974)

INSTITUTIONALIST

Myrdal (1957)

Krugman (1981)

Marx (1867)

NEO-
MARXIST

Fujita, Krugman and Mori (1995)

Figure 1: A Schematic and Selective Classification of Theories of Economic Growth

Convergence is just a matter of time, although when the neoclassical model is calibrated with macro data, the predicted speed of convergence appears very slow (e.g. Mankiw 1995). Even when there are innovations that lead to permanent increases

in productivity, eventually all countries converge on a growth rate equal to this rate of technological change - provided that these innovations are (gradually) adopted by firms in all regions. Total output grows in the steady state at this rate of technological change plus the rate of population change. High per capita growth rates are then simply a *transitional* phenomenon, due to high rates of return to capital at low levels of capital per worker.

The Solow-Swan model remains important because many of the growth models formulated in recent years can generate long-run growth paths that resemble those of the Solow-Swan model. The only fundamental difference between the new and the old models is that the new ones provide explanations for aspects of the Solow-Swan model that were assumed to be constant and given in the old ones (i.e. the production function, the rate of technological change, the propensity to save and the population growth rate).

Moreover, the Solow-Swan model is actually not a bad model to explain the "stylized" macroeconomic facts of development of economies, provided capital accumulation in the model is interpreted as including human capital accumulation through education and training (Mankiw 1995). For example, real world data tend to confirm the prediction of the Solow-Swan model that the steady-state level of real income per head is a function of the propensity to save and of population growth. However, the model also predicts a convergence of all economies to the *same* long-run steady state, irrespective of initial conditions. As will be elaborated later, this is not` a feature of some of the new growth models, nor is it a property of global development that is unambiguously confirmed by empirical research.

The oldest way to endogenise one of the aspects of the Solow-Swan model is an explicit description of savings behaviour. Barro and Sala-i-Martin (1995) named the resulting model the Ramsey model because the original idea of optimal savings behaviour was developed by Ramsey (1928). The advantage of the Ramsey approach is that it permits a description of the economy in terms of the rational optimising behaviour of individual households and firms, which is now the cornerstone of modern macroeconomics. The Ramsey model predicts, like the Solow-Swan model, a long-run steady state with a constant savings rate. However, the savings rate is in the Ramsey model a function of the preferences of the population (the intertemporal elasticity of substitution and the discount rate), the rate of population growth, the rate

of technical change, capital depreciation and the production technology. Yet in both models real income grows in the long run simply at the exogenous rate of technical change.

Thus, the Solow-Swan and the Ramsey model provide only two reasons for differences in growth rates between regions or countries. The first is that the rate of technological change can differ between economies. However, causes of such differences are not explained in these two models. Secondly, economies may not yet be on the steady-state growth path. In this case, poor economies with a low quantity of capital per worker would grow faster than rich economies. This is referred to as the *convergence* or *catching-up* hypothesis.

The convergence that we observe in practice is only very slow. It is described by the so-called "2 percent rule": only 2 percent of the gap between current income and the steady state is reduced each year. Such a slow convergence can only be explained by the diminishing returns to capital setting in very slowly. This, in turn, makes only sense if capital is interpreted as a broad concept that also includes human capital, i.e. the total quantity of skills available in the work force due to education and training.

The purpose of many of the models of growth that have been developed during the last decade is to provide an explanation for the population growth rate or the rate of technical change, or both. For example, Becker et al. (1990) describe a closed-economy model in which technical change and population growth are both explained (with productivity growth driven by education). In this case, multiple equilibria emerge with the possibility of an economy becoming trapped in a state of low income growth with high fertility. This is an example of a growth model in which the steady state is sensitive to initial conditions, a general feature of increasing returns and other "positive feedback loop" models (see also Arthur 1994). Thus, historical endowments and "luck" may be critical determinants of differentials in growth between countries or regions in such models.

The multiplicity of equilibria is also a feature of many of the models of the New Economic Geography, a research programme that attempts to explain the spatial distribution of households and firms and the spatial organisation of economic activity (see also Fujita et al. 1995, Fujita and Thisse 1996). In this case, the driving force is the self-reinforcing advantages of the agglomeration of economic activities. Moreover, the emergence of a particular site as a major agglomeration does not only

depend upon the intrinsic features of this site, but also on its position within the geographical system.

The process of labour-augmenting technological change, which proceeds at a constant rate in the Solow-Swan model, is the simplest formalisation of many phenomena that may lead to long-run productivity improvements. In macroeconomic models with only one good, technological change represents a growth of knowledge. There are four ways of accumulating knowledge: research, schooling, learning-by-doing and training. Alternatively, if a model permits more than one good, technological change may be due to an increase in the *variety* of intermediate inputs or consumer goods. Furthermore, the *quality* of goods may improve for a given variety. Finally, increasing returns may result from economies of scale.

Endogenous growth models have been formulated for all of these situations. For example, Lucas (1988) describes one model in which education generates external benefits and another model in which productivity improves through learning by doing. The idea that experience spills over to other producers goes back to Arrow (1962) and is also the engine of growth in Romer's (1986) model.

A key feature of growth models which provide an explanation for technological change is that these models suggests ways in which economic policy can be used to "manipulate" the long-run growth rate (see also section 4). Long-run growth is no longer a "black box". For example, thriftiness is good for the growth rate in these new growth models. For example, if a removal of tax distortions raises the propensity to save, the per capita growth rate becomes permanently higher. Similarly, if capital is depreciated faster or the population grows faster, the rate of growth of output per capita decreases (a view consistent with Malthus' 1798 classical perspective). Finally, if the proportion of income devoted to the generation of technical change increases, the rate of growth of output per capita increases. Thus, the new growth models provide theoretical support for the common belief among policy makers and development economists that economic growth can be influenced by policies which affect savings behaviour, education and training, R&D and population growth. However, there is an important difference between the policy implications of the new growth models and those of more traditional theories of regional development. The latter, such as Dixon and Thirlwall (1975) tended to emphasise demand factors, such as the potential for export growth and ways in which government could enhance this

potential, more than supply-side factors.

Some of the new growth models generate ever-increasing growth rates due to a "virtuous circle" of productivity growth and capital accumulation. Romer (1986) defended such a conclusion by the observation that in the very long-run (over several centuries) worldwide labour productivity growth has been accelerating, although it is equally true that from the 1950s until the 1980s productivity growth exhibited a downward trend among developed countries. Nijkamp and Poot (1993) formulate a model of increasing returns in which the potentially ever-increasing growth is eventually checked by technological, social and economic capacity constraints. Another plausible break on ever-increasing growth is a deterioration of the natural environment. Although the scarcity of natural resources, the effectiveness of pollution control measures and the severity of global environmental problems remain contentious issues (Figure 1 lists Meadows 1972 as an early but influential contribution to this issue), it is generally recognised that measures of economic growth based on conventional national (or regional) accounts are inadequate with respect to environmental issues and non-market activities (e.g. Mishan 1984). Consequently, it would be desirable to build new theories and design empirical research around measures that adequately reflect long-run welfare gains.

IV.   Effects of Openness on Long-Run Development

Regions are small open economies. Their long-run development cannot be adequately understood without taking into account the implications of trade, factor mobility, the migration of households, the diffusion of new technologies and transportation and communication linkages in a multi-regional system. With respect to the impact of such spatial interactions, there are two views that are usually presented as a dichotomy: spatial convergence or spatial divergence (see also Figure 1).

If differences in preferences, factor endowments or technology between regions generate differences in returns to production factors, a reallocation of production factors may be expected when there are no large barriers to labour or capital movement. In standard neoclassical analyses in which spatial factor price differentials are due to differences in factor endowments, factor movements have an equilibrating effect. Alternatively, trade may lead to factor price equalisation even in the absence of

factor mobility. Consequently, there is spatial convergence in incomes when trade and factor movements are substitutes. This convergence view is synonymous with a *laissez faire* perspective on policy: initial conditions do not matter, externalities are unimportant and regional policies are generally ineffective. The main role for policy is then to remove market imperfections and to promote trade and factor mobility, as this will increase the speed of spatial convergence.

However, with differences in preferences or technology, factor movements may reinforce a classical Ricardian comparative advantage. Thus, when trade and factor mobility are complements, regional incomes may divergence (see e.g. Nana and Poot 1996). In the case of divergence, there is *path dependency*: initial conditions do matter. There are also likely to be strong agglomeration forces. As these may be due to economy-wide externalities, they may be compatible with perfectly competitive markets, but the explicit consideration of transportation costs and product heterogeneity is better understood in imperfectly competitive markets. Matsuyama (1995) provides an extensive survey of how the theory of monopolistic competition has been used to model firm behaviour and growth in open systems where there are complementarities. Such complementarities may refer to spillover effects from one industry to another due to e.g. *scale* and *clustering* effects. They may lead to cumulative causation, i.e a virtuous growth cycle. Regional policies can then have lasting implications.

In practice, capital and labour are not perfectly mobile. Moreover, their movement is not always in the direction of the region with the highest average factor payment. For example, it may be rational for highly skilled workers to move to regions with a relative skilled work force and new direct investment may flow to regions that already have a high capital intensity. Causes for such phenomena are production factor heterogeneity, the distribution of factor returns, asymmetric information, imperfect credit markets or labour markets, or adjustment costs for investment. Alternatively, the incentives for capital mobility may be exaggerated, because real risk-adjusted rate of return differentials may in fact be small. Causes are significant spatial differences in human capital accumulation, the spillover benefits of human capital, capital market imperfections and political uncertainties (Lucas, 1990; Mankiw 1995).

However, as long as a production factor moves in the "right" direction (i.e. to where its price is higher) it has in the neoclassical growth models the tendency to speed up

convergence to the steady state. Another potential source of growth convergence is the diffusion of new technology. However, without the right local conditions, the adoption of diffused technological innovations may also not be effective. For example, when adoption requires a skilled work force, a low level of human capital accumulation will slow down technological change.

The mix between local innovation and the adoption of ideas from elsewhere may vary between regions. As the adoption of imported technology usually also requires resources, firms must compare at the margin the cost of adopting imported technology with the cost of their own R&D activities. Barro and Sala-i-Martin (1995, p.276) show that it is likely that a leader-follower situation will emerge in which a firm in one region eventually allocates its entire product and process development budget to imitation of imported ideas while the R&D sector in another region generates all new ideas. Switches of roles may take place in the long run (see also Choi 1994).

As is well known, the traditional neoclassical perspective is that growth is determined on the supply side of the economy. From this perspective, trade has no role to play beyond speeding up convergence (through Heckscher-Ohlin resource reallocation effects) and determining the steady-state equilibrium prices. The long-run growth rate itself remains purely a function of technological change.

However, it has been demonstrated by means of several endogenous growth models that trade does not only yield short-run welfare gains, but may raise the long-run rate of productivity growth also.[2] For example, Rivera-Batiz and Romer (1991) show that when R&D activity is driven by the monopoly rights of producers to sell new intermediate goods, economic integration of these type of economies (assuming they are structurally identical) can raise the overall growth rate. Thus there are both static and dynamic gains from trade in this type of model. However, Rivera-Batiz and Xie (1993) show that when the regions have different sizes and diverging resource endowments, economic integration will lower the growth rate of a region with a high (autarky) growth rate, while it will raise the growth rate of a region with a low (autarky) growth rate. Moreover, a specialization based on comparative advantage may lead to a sub-optimal investment in R&D activities by resource-rich economies (Grossman and Helpman, 1994).

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[2] Grossman and Helpman (1991) provide an extensive discussion of the links between innovation, trade and growth in the open economy.

It is likely that investigators, who attempted to formulate theories of regional growth during the 1970s, intuitively expected trade to matter. However, the absence of a role for trade in determining the long-run growth rate in the neoclassical model led to a widespread adoption of (post) Keynesian models in the regional context (see also Nijkamp and Poot 1998). It is now clear that the latter export-led growth models are not necessarily incompatible with the endogenous growth models. The same forces that lead to productivity growth following trade and specialisation may be responsible for the exogenous productivity growth factor that drives the growth process in the Keynesian models. A well known example is the use of the Verdoorn law (labour productivity growth is positively related to output growth) in the Kaldor-Dixon-Thirlwall model (see Dixon and Thirlwall 1975).

Parallel to the development of the new theories of growth discussed above, a related empirical literature has burgeoned. However, much of this literature has not attempted as yet to verify empirically whether the new sophisticated models provide an adequate description of cross-section or intertemporal differences in growth rates. It is often difficult to derive from the new theories estimable equations, for example because the behaviour away from the steady state is theoretically uncertain. Also, some of the variables of the new models such as knowledge are hard to measure (Mankiw 1995).

Because it is possible to describe exactly in the Solow-Swan model how an economy develops over time from any initial position, and therefore how the transition to the steady state will be made, much of the literature on transitional dynamics and convergence is based on this traditional model (e.g. King and Rebelo 1993).

There are two notions of convergence. Weak convergence, also called β-convergence, takes place when low income regions or countries grow faster than high-income ones, all else being equal. This is also referred to as conditional convergence. Strong convergence, also called σ-convergence, takes place when the standard deviation of the distribution of income across regions or countries declines. β-convergence is a necessary but not sufficient condition for σ-convergence (Sala-i-Martin 1996). In simple terms, β is the slope coefficient from a regression of the growth of real income on the logarithm of its level. Convergence to the steady state would imply a negative coefficient. This type of regression can be carried out both with time series data or with cross-section data.

As mentioned in section III, Barro and Sala-i-Martin (1995) found that the Solow-

Swan model is consistent with the gap between current income and the steady state being reduced by 2 percent each year. There is indeed some evidence of convergence at this rate, as was noted in the previous section. The speed of convergence of about 2 percent per year is only consistent with the Solow-Swan model when capital is interpreted as including human capital (so that the share of capital in income is as high as 75 percent). The evidence for convergence is stronger for regions than for countries and, within a cross section of countries, stronger for similar nations than for a broader cross section. For example, Barro and Sala-i-Martin (1992) and Sala-i-Martin (1996) find convergence across the states of the USA, prefectures of Japan and five European countries. Similarly, Andres et al. (1996) find convergence among OECD countries. Even Quah (1996), who is generally skeptical of claims of strong convergence in economic growth, finds evidence of such convergence across US states. Ben-David (1996) finds that convergence is stronger among countries that have strong trading relationships.

A by-product of studies of conditional convergence is that the additional explanatory variables may lead to some insight into the causes of differences in growth rates. For example, inter-country differences in education policies (school enrollment rates) can play an important role (e.g. Barro and Sala-i-Martin 1992; Mankiw et al. 1992). A vast literature has emerged during the last decade on which factors, in addition to the convergence effect, explain differences in growth rates between regions or countries. Much of this literature gives conflicting results.

A good example of contradictory evidence can be found in the study of the impact of infrastructure on growth. De Long and Summers (1991) find that equipment investment can raise growth rates, and more strongly than investment in structures. Yet, Kocherlakota and Yi (1996) find that among types of capital investment only roading and other transportation infrastructure have permanent effects on GNP.[3]

There is also an important issue of *causality* in the relationship between infrastructure and growth. Nijkamp (1998) argues that public capital consisting of infrastructure (roads, railways, (air)ports, pipelines, etc.) and suprastructure (knowledge, communication networks, culture, etc.) are as much a consequence of the growth

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[3] It could be argued that the changing sectoral composition in developed economies towards light industries and services, combined with growing footlooseness of firms in such industries (referred to as nomadic behaviour, see Bruinsma et al. 1998), reduces the tradional role of infrastructure as a precondition for development.

process as they are a cause. Thus, good infrastructure and suprastructure are not sufficient conditions for development. If they do have an effect on growth, it may be in a synergetic way that is not captured by traditional growth regressions. More generally, there are many data and specification problems in empirical studies that try to explain why growth rates differ (Levine and Renelt 1992).

The new theoretical insights and the empirical research on growth that have been discussed so far have not explicitly taken into account the *geography* of economic activity. Yet economic geography highlights the fundamental trade off between scale economies and transportation costs. The balance of centripetal and centrifugal forces on the location of firms and households leads to a concentration of economic activity in cities. Thus, the spatial distribution of cities across regions and the hierarchy of cities are non-trivial aspects of regional growth. Fujita and Thisse (1996) provide an extensive survey of the literature on the causes and consequences of agglomeration.

Transportation costs are the main source of the spatial dispersion of economic activity. As real transportation costs decline, the forces leading to a clustering become stronger due to fixed costs and external benefits. Yet eventually congestion effects may be come strong enough to encourage again dispersion.

The economic geography literature may be helpful to resolve the apparent dichotomy between spatial divergence and convergence. Both processes may take place at the same time, but at different spatial levels. Consequently, empirical tests of convergence or divergence become sensitive to the size of the regions, particularly with respect to the relationship between regions and the hierarchy of cities. For example, at the level of large regions which each include a major growth pole and which are economically integrated, we may expect convergence. However, *within* these regions, there may be divergence as the core-periphery spatial structure is reinforced. In the evolution of the spatial hierarchy of cities, these trends may be non-monotonic, as shown by Krugman and Venables (1995). Changes in transportation and communication technologies and infrastructures may also have important impacts on the growth process (e.g. Justman 1995). However, the incorporation of such ideas into axiomatic general equilibrium theories is very difficult.

V. Territorial Competition and Policy

There has been a significant change in the nature and extent of policy making at all levels of government during the last decade. The worldwide trend towards closer economic integration and the recognition that policy interventions have often led to welfare losses, have encouraged market liberalisation and the corporatisation or privatisation of public activities. The responsibilities of government at different spatial levels have been redefined following the principle of *subsidiarity*: a public activity should be run at a level at which it can be delivered most efficiently.

In this context, there is an increased expectation that regional policies are more likely to be effective when funded and carried out from the "bottom up" rather than from the "top down". The merit of doing so is not undisputed. For example, Markusen (1996) responds to Porter's (1996) advocacy of regional competition that such sub-national competition may be wasteful and may strengthen the gap between rich and poor regions.

The extent of devolution and the nature of responsibilities at various levels of government vary considerably between countries. In New Zealand, for example, regional government's mandate is restricted to natural resources and infrastructure, while local government is encouraged to carry out business development policies. There, and in other countries, cities may build strategic linkages that cut across regional or even national boundaries.

Regional policy may have many objectives, such as the efficient management of regional resources, the stability or growth of regional population, the encouragement of regional diversity to reduce a vulnerability to external shocks, or the attainment of labour market equilibrium (see also e.g. Armstrong and Taylor 1993). However, a key objective of regional policy is likely to be long-run sustainable growth. If the responsibility for achieving this objective is devolved to the regional authorities, territorial competition to raise the regional growth rate is likely to emerge.

How can policy aid the achievement of regional growth? The answer depends, as noted earlier, on whether at the regional level of interest the spatial growth process is convergent or divergent. If it is convergent, the convergence can be accelerated by policies that enhance the role of market forces, such as the removal of barriers to

factor mobility or trade, or the removal of market failure due to imperfect competition, imperfect information of an absence of markets (see also Nijkamp 1997).

If growth leads to a spatial divergence in regional incomes, there is likely to be a much greater role for policy. Essentially, if the economy may move to one of a range of steady-state equilibria and uneven growth persists, the role of government is to ensure that the "best" equilibrium emerges. However, even in this case it may not be desirable to aim at reducing the spatial variation in regional growth rates by e.g. trying to attract production factors to lagging regions. Instead, there may be a positive correlation between the overall rate of growth and the spatial dispersion of growth. Spatial income differentials result then from the usual trade off between (dynamic) efficiency and equity and should be addressed by social policy. However, as initial conditions matter for the growth process from the divergent growth perspective, there may be benefits for regions from attracting new firms, from subsidising "infant industries" or from developing activities that are likely to have spillover benefits. Examples are the establishment of technoparks to encourage innovation, or the building of new communication and transportation infrastructure. Empirical evidence regarding the incidence and impact of regional incentives is discussed in the next section.

Given the fundamental role of capital accumulation in the growth process, it is not surprising that both theory and data suggest that high savings rates are good for growth. The extent to which government can influence aggregate savings, beyond endeavours to reduce public debt, is not clear. Consequently, many regional governments attempt to attract foreign savings in the form of foreign direct investment (FDI). However, the effectiveness of FDI is by no means certain as there are political, monetary, social-cultural, infrastructural and other barriers that must be overcome (Nijkamp 1997). In a recent study of the impact of FDI, based on cross-country regression, Borensztein et al. (1998) conclude that it is an important vehicle for the transfer of new technology (through the impact of foreign firms on the new buildings, plant and equipment and production processes it generates). FDI contributes therefore more to growth than domestic investment. However, FDI influences productivity only strongly when the recipient country has a minimum threshold stock of human capital. In other words, the absorptive capacity for new technologies is dependent on the available skills and on the social and physical

infrastructure. If the latter are inadequate, growth may be constrained despite the diffusion of technological change (for a model of this situation in a multi-regional system, see Nijkamp et al. 1991).

Irrespective of the role of FDI, there is no doubt that the current globalisation of output and factor markets and the emergence of the global network economy will have profound impacts of the nature and extent of regional policies (see also Kohno, et al. 1999). There is also no doubt that human resources are a key element in a regional growth strategy. However, exactly what type of educational policies can promote growth is not easy to determine. Creativity (the "American" model) may matter as much as knowledge (the "Asian" model).

Unfortunately, which policies matter most is not yet very clear from the empirical work on the relationship between government policy and growth.[4] Much of the current literature has adopted a macro perspective, albeit with carefully specified theoretical microeconomic foundations. A common problem in empirical macroeconomics is that the macro data are sometimes unable to permit the researcher to conclusively choose between competing theories. This is referred to as the *observational equivalence* of macroeconomic theories. For example, this problem has reduced what we can learn for policy formulation from the large literature on cross-country and cross-region growth regressions (see also e.g. Mankiw 1995).

There is nonetheless wide support for the view that economic liberalization, prudent fiscal and monetary policies, high savings and secure property rights (law and order) are beneficial for growth. The theoretical models do, however, also suggest that there can be cases of market failure in which the laissez-faire approach is not optimal, such as in research and development, for which at least some public funding will remain important.

VI. Are Regional Incentives Effective?

In the previous sections, we focussed on the engines of regional economic growth and the policies through which regional and local governments may influence the long-run

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[4] For a recent discussion on the measurement of the impact of government policy on economic growth by means of cross-country regressions, see Slemrod (1995) and two commentaries in the same journal issue.

growth performance of their territories. One commonly used strategy for enhancing regional economic growth is the provision of incentives for firms to establish new plants in a region offering such incentives. These incentives can take many forms. They include:

(i)   Abatement of land or property taxes.

(ii)   Tax credits for investment in plant and machinery, R&D or on-the-job training.

(iii)   Infrastructure incentives. Examples are publicly-funded investments in transportation or communication infrastructure to enhance accessibility.

(iv)   Financial incentives such as establishment grants, subsidised loans or loan guarantees.

(v)   Special concessions regarding environmental and resource management legislation.[5]

(vi)   Cost and price fixing agreements. These can be both on the input-side (the firm is offered certain inputs, e.g. supplied by public utilities, at a below-market price) or on the output side (e.g. Build-Operate-Transfer (BOT) agreements between the firm and the government).

(vii)   The provision of free or subsidised information and consultancy services.

Incentive-based territorial competition is likely to be particularly fierce in countries where regional and local authorities have considerable discretionary power with respect to the levying of taxes, such as in countries with federal systems. For example, state governments in the United States compete fiercely for foreign or domestic direct investment within their territory. The incentives offered to firms can involve large amounts of public money.

With respect to the impact of such incentive competition on regional development, there are four fundamental questions. The first one concerns the measurement of such incentives. In order to assess the likelihood that firms' locational decisions are influenced by fiscal and other incentives, the significance of such incentives relative to other factors influencing the location of new plants must be established. Consequently, what is the worth of the incentives to the firm? The publicly stated value of an incentive package is often exaggerated because it may include regional

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[5] See e.g. Markusen et al. (1995) for a recent theoretical model of competition between regions consisting of territorial authorities undecutting each other's pollution tax rates.

development initiatives (such as new infrastructure) which would be undertaken even if the firm did not decide to invest there.

In a major new study, Fisher and Peters (1998) quantify the incentives offered by states and cities in the United States by means of the so-called *hypothetical firm* method.[6] The first step of this method consists of the compilation of a detailed financial statement and balance sheet for a representative firm in each of a range of selected industries. Next, the full set of tax and non-tax incentives is identified and the financial impact of these incentives on the representative firm is computed. The value of the incentive package is referred to as the *standing offer*. Finally, the impact is computed of the standing offer on the rate of return to new investment by the hypothetical firm at each of the locations. An alternative method for measuring the value of the incentives is to compute the equivalent reduction in the hourly wage to be paid that would make the firm indifferent between obtaining an incentive package or paying out lower wages without incentives.

It should be noted that the hypothetical firm method does have some obvious weaknesses. One is that the results are sensitive to assumptions about future costs and revenues of the firm at any of the locations under consideration. Moreover, the parameters that describe the operational characteristics of the firm may actually change between locations. Furthermore, firms partly shift the incidence of the local tax regime on to consumers or respond to differences in business conditions between locations, irrespective of the incentive structure. Finally, the establishment of a new plant may have multiplier or general equilibrium impacts that are not considered with the hypothetical firm method.

The second fundamental question with respect to investment incentives is the extent of spatial variation in such incentives. If the main purpose of locational incentives is to enable distressed regions to boost their economic development, the evidence in the literature is rather disappointing. Using the hypothetical firm method, Fisher and Peters (1998) find that there is no clear evidence that the greatest incentives in the United States are offered by those states and cities with the highest unemployment or

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[6] There are a number of alternative approaches possible. These include surveying firms regarding their locational behaviour, case studies, econometric modelling and general equilibrium modelling. However, Fisher and Peters (1998) argue that those alternative approaches have not been able to yield firm conclusions and that the hypothetical firm method is a promising research direction that also exploits new financial analysis software.

lowest capacity utilisation. Consequently, the spatial pattern of incentives is not likely to have enhanced allocative efficiency at the national level (see also Bartik 1991).

The third fundamental question is whether firms are responsive to incentives. The literature suggests that incentives do matter in locational decisions, ceteris paribus (e.g. Bartik 1991). However, other factors may be far more important. Agglomeration advantages, non-economic factors such as a good climate or ideosyncratic preferences of managers may also strongly influence locational decisions.

The fourth and final fundamental question regarding incentives is the extent to which they are welfare enhancing. There are several important issues in this respect. There are several conditions under which incentives may be detrimental. First, in a competitive and open regional system, market forces may lead to a spatial allocation of resources which is optimal from the perspective of allocative efficiency. Incentives may then lead to price distortions that reduce overall welfare. In this case, incentive-driven interjurisdictional competition can be a negative sum game (Netzer 1991). Second, if there are economies of scale in the provision of locally non-traded goods (such as public services) or other agglomeration advantages, there may be both short-run and long-run costs to offering incentives for settlement in low density depressed regions. Thirdly, the region offering the incentives may benefit little if a resulting new plant is highly capital-intensive, transfers the profits to absentee owners and purchases inputs from outside the region. In this way, the only beneficiaries of incentive-induced growth could be the owners of immobile resources, such as land (e.g. Logan and Molotch 1987).

On the other hand, a spatial disequilibrium can persist for a long time due to the relatively low mobility of workers across regions. In practice, we find that there is regional convergence in market-driven economies, but the process is very slow (e.g. Sala-i-Martin 1996). Moreover, regional incentives may simply be a price mechanism which leads to an efficient sorting of firms across jurisdictions offering different bundles of local public goods (Oates and Schwab 1991). This is analogous to the classic idea of Tiebout's (1956) regarding urban residents "voting with their feet" with respect to public services supplied by local authorities. Furthermore, incentives may be useful from an equity perspective, e.g. if the offered incentives are larger in depressed regions with low incomes and high unemployment. Finally, incentives

offered in an open economy may attract a net inflow of foreign direct investment such that the competition becomes a positive-sum game at the national level.

As in many other cases of regional policy evaluation, the empirical measurement of the overall impact of incentives is fraught with difficulties. For example, it is hard to establish in case studies a *counterfactual* (e.g. Diamond and Spence 1983). Moreover, econometric analyses have suffered from difficulties in quantifying the spatial variation in tax and non-tax incentives.

At present, the general conclusion of the empirical literature appears to be that there is fierce interjurisdictional competition for new investment, but that the macro-level resource implications of this competition are relatively minor. Fisher and Peters (1998) find that the spatial pattern of incentive-modified returns on new investment bears little relationship to the spatial pattern of unemployment. They conclude that in the Unites States "..after at least a decade and a half of intense competition for investment and jobs, and the widespread adoption of pro-development tax policies and development programs, states and cities have produced a system of taxes and incentives with no clear inducement for firms to invest in higher-unemployment places" (p.212).

Yet De Bartolome and Spiegel (1995) find that governments of low wage regions spend more on economic development than those of high wage regions. However, there is general consensus that incentives are predominantly targeted at manufacturing industries.

Cheshire and Gordon (1998) support the view that territorial competition is wasteful, particularly when it is aimed at attracting inward investment. They argue that such competition may be more effective when it attempts to establish better conditions for the birth of new firms, for innovation and for skill enhancement of the work force.

VII. Conclusions

One of the most pervasive characteristics of economic policy throughout the world at present is the desire of national governments to enhance market forces through deregulation, the removal of market distortions and the corporatisation or privatisation of many public activities. In many countries one aspect of this trend has been the delegating of the responsibility for certain government activities to the regional or local levels. Where regional and local governments consider development as their prime objective, fierce territorial competition has emerged in many cases to attract new firms and sometimes households. Additionally, territorial authorities have devoted public funds to assist existing firms with expansion, diversification or the finding of new market niches.

This paper has interpreted territorial competition in a broad sense as the actions which economic agents take to enhance the territorial standard of living. We have considered, primarily from a macro perspective, the causes of variations in regional growth rates. However, the paper also focussed on territorial competition from a narrower perspective, namely the nature of incentives offered to attract inward investment in regions and the impact of such investment. In this respect, it is useful to note that there is a gap in the research to date in that it tends to focus primarily on incentives offered to firms in manufacturing industries. Presumably this is because regional governments believe that manufacturing can enhance the regional economic base the most and can generate the greatest multiplier effects. However, as the economy is increasingly oriented towards global markets and the private provision of education and health care, tourist services, finance, R&D, communication and technology, etc., (globally) a study of the role of incentives in the location decisions of service-sector firms is warranted. Such firms may have complex ownership and decision making arrangements, which impinge on decisions regarding the location of establishments, each of which may have specialised functions.

Whether the regional and industrial policies, which affect the spatial configuration of industry, is best approached from a top-down or bottom-up hierarchical structure of decision making is as yet an unsettled issue. Ideas developed in the 1970s regarding optimal decision making in a multilevel hierarchical framework could be revisited for studying this issue. Generally, however, there will be a need for some national co-

ordination of local initiatives in order to avoid a "race to the bottom".

In recent years there has been much empirical work on the determinants of long-run growth and this has led, at the national level, to indexes of competitiveness which signal the medium term growth potential. These measures have several limitations. Firstly, there is a tendency, in the absence of clear-cut evidence regarding the relative importance of various growth determinants, to include many official statistics and opinion surveys in the overall index. Yet the more indicators are included, the more likely it is that the growth process is "overfitted" and that the predictive power of the aggregate competitiveness indexes will be limited. Secondly, the measures tend to be too sensitive to the business cycle. Thirdly, by being linear aggregates of regional growth determinants, these measures have the theoretically unattractive property of an assumed infinite substitution elasticity of the various "inputs" into the growth process. Instead, it is likely that the different attributes that provide the right environment for sustainable growth are complementary. An example is the complementarity between the skill level of the work force and the rate of inward investment.

Taking this caveat into account, it appears that there is a considerable scope for further study that endeavours to identify the most informative measures of territorial competitiveness. Such measures must have a solid foundation in economic theory and also exhibit an empirically robust relationship with growth. These measures may assist in the design of regional development policies.

Further empirical work is also required regarding verification of the theoretically elegant endogenous growth and new economic geography models referred to in this paper. At the theoretical level, it is clear that there is too much emphasis on the paradigms of monotonic convergence or divergence. Some of the recent models of evolution of cities show that leapfrogging and other non-monotonic patterns are theoretically possible. Because such non-monotonic developments can be sometimes observed in practice, further theorising of the precise cause, e.g. by means of non-linear dynamic models, is desirable. A wide range of models of spatial competition have been proposed in this context (e.g. Nijkamp and Reggiani 1998).

The impact of the location of a region relative to the others is often insufficiently taken into account in such mathematical modelling. Growth models are primarily non-spatial. There is therefore a need for the formulation of new models that explicitly describe the state-time patterns of development in relation to the spatial interaction of

the constituent regions.

A full description of the growth paths that have been historically observed may require an approach that goes beyond the factors that are conventionally taken on board in economic studies. For example, Landes' (1998) study of the long-run development of the nations of the world points to the importance of institutional and cultural factors. While perhaps to a lesser degree, such factors play doubtlessly also a role in interregional competition and development.

Limits remain to what can be achieved with macro level data. Further micro level research in this context is also needed. It should be noted that regional development is an old problem that has attracted a vast empirical literature during the last four decades. New methodologies such as meta-analysis and value transfer may lead to a better synthesis of past research endeavours (see e.g. Bal and Nijkamp 1998 for a survey).

One particular research endeavour that is likely to benefit from meta-analysis is an assessment of the impact of government policies on economic growth. It is likely that the composition of government spending, the incidence and levels of taxation and the nature and extent of regulations could all play a role in the growth process. Again, there is a need to compare and synthesise micro-level cost-benefit or multi-criteria studies with macro-level research.

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