

Globalization and Endogenous Regional Growth

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Abstract Globalisation is not a state of the world but an evolutionary process, which entails the increasing planetary integration of markets for goods and services, markets of location sites for economic activities, markets of production factors as technologies and information. Regions are involved in the globalization process to a different extent depending on their structure and specialization.

The first aim of this paper is to highlight the importance of a regional dimension in the analysis of globalization trends, and to explore the debate between exogenous and endogenous factors driving economic development, with their relative importance appearing to be different according to the development stage of the economies.

The paper also investigates the factors of growth, showing that, after national effects and innovative capabilities, one of the most important aspects is represented by FDI penetration, whose impact is shown to differ according to the source, sector and technological level.

1 Introduction

Globalisation is not a state of the world but an evolutionary process, which entails the increasing planetary integration of markets for goods and services, markets of location sites for economic activities, markets of production factors as technologies and information.

For sure, globalisation is not a new phenomenon and in many periods of last century it reached very high and even comparable levels than today; moreover, it did not show up in a single, catastrophic jump, as the sudden adoption and fortune

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of the term in the political debate could suggest. What is new is the long-term, contemporary acceleration of many parallel integration processes, reinforcing and integrating one another in multiple ways. Since almost 30 years, international trade has been steadily growing at a rate which is the double of world GDP. Foreign direct investments, on their turn, have grown at rates which are the double with respect to international trade, and four times those of world GDP. Most of these investments are directed towards developed countries (they were 80 % in the years 1986–1990, around 60 % in years 1993–97 and still slightly more than 50 % in 2009 despite of the differential effects of the crisis at World level, UNCTAD 2010) and look particularly attracted by accelerations in economic integration processes: in fact EU countries, at the top of the process of creation of the Single Market in 1991–92, received up to 50 % of world FDI (UNCTAD 1997; Camagni 2002) and still attract 2/3 of FDI of developed countries (UNCTAD 2004, 2008). Moreover, mobility (and volatility) of financial capital has grown spectacularly: in 1995 financial exchanges reached 1,000 billion dollars a day, more than the foreign exchange reserves of all national governments together. The short term profit objective of these movements imposes serious constraints on the governance of the international financial system. Finally, the nature of international trade has evolved from pure exchange of (final) goods among national production systems, to exchange of intermediate goods through the internationalisation of functions within production networks organised on a world-wide scale, to the most recent unbundling of functions themselves in specific tasks, leading to a trade-in-task economy. With these qualitative changes, local production systems find themselves increasingly tied together and interdependent, mainly through the global strategies of multinational corporations.

Much theoretical and empirical work has been developed on globalization, trying to capture different effects of the quali-quantitative changes imposed by the integration of markets through either multilateral or “regional” liberalization policies (Panagariya 2000)¹; new international trade patterns which see more and more developing and emerging countries as exporters of manufacturing goods, thus forcing industrialized countries to change their specialization towards high quality goods and, mainly services (Bergoeing et al. 2004; Kucera and Milberg 2003), new composition of intermediate vs. final goods traded at international level, also as a result of multinational firms’ new strategies (Yi 2003; Hummels et al. 1998, 2001;

¹ We refer here to Regional Trade Agreements (RTAs), which have characterised the present wave of globalization not only because their number has exponentially increased since the World War II, but mainly because they have changed both in nature and motivations (Fiorentino et al. 2007). RTAs may have both positive and negative effects on international trade relationships. They can play an important role in promoting the liberalisation and expansion of trade and fostering growth and development and so acting as stepping stones on the way to a multilateral agreement. But regional agreements also risk making it harder for countries outside the region to trade with those inside and may therefore discourage further opening up of markets, ultimately limiting growth prospects for all. On this still open debate on RTAs as stumbling or building blocks toward multilateralism see Winters 1996; Panagariya 1999, 2000; Baldwin 1995; Baldwin and Venables 1995.

Hanson et al. 2005), new location patterns of foreign direct investments and consequent new growth opportunities for developing economies (Hansen and Rand 2006; Lall and Narula 2004; Moran et al. 2005), migration trends and international trade flows (Soubbotina 2004; Lucas 2008), represent some of the main issues treated in the recent literature.

From the perspective of the above mentioned studies, though, globalisation can be regarded as neutral for what concerns its spatial effects: opportunities and threats may look equivalent and specular. A number of good reasons exists, however, for claiming that a *regional perspective* is instead fundamental in order to understand the real economic effects of globalization, and that conceptual and empirical analyses at regional level are fundamental.

In particular, in front of the intensifying both quantitative and qualitative trends in globalization an old debate in regional growth becomes again a hot topic of discussion: regional patterns of growth can be the result of either internal forces and endogenous capacity of a region to grow, or of exogenous forces, that reach a local economy from outside and give rise, in a cumulative self-reinforcing mechanism, to a local process of growth. In particular, in this paper the aim is to analyze the role of endogenous vs. exogenous factors allowing regions to grow. These factors are expected to vary between Western and Eastern regions.

The paper will hence be organized as follows: in the next section the importance of a regional dimension in the analysis of globalization trends is highlighted, and the debate between exogenous and endogenous factors driving economic development highlighted. Our impression is that the role of exogenous and endogenous factors highly depends on the development stage of the economies, and that it is therefore different between Eastern and Western countries. Section 3 presents the recent trends in regional disparities highlighting that the development stage is still rather different between eastern and Western countries and that growth disparities among regions in Europe persist.

Sections 4 and 5 will be devoted to highlight success factors behind the different regional performances, putting most emphasis on FDI as an exogenous factor of growth, compared to the traditional material factors explaining endogenous growth. Section 6 will conclude the paper.

2 Globalization and Regional Competitive Assets

As a consequence of the increase in globalization processes regional economies face fiercer competition, that leads to a worsening of regional disparities, especially driven by intra-national disparities, exacerbated by the concentration of economic resources in most advanced and dynamic places, where the most successful cities lie, and by resource inefficiency and lack of competitive advantage in peripheral regions. All this is even more remarkable, if one thinks that regional economic systems are more vulnerable to external shocks than nations; regions are by definition very open economies, highly dependent from external trade conditions and

international terms of trade, from external final goods for internal consumption and from external intermediate goods and natural resources for local productions.

Moreover, a situation of fiercer competition is even more dramatic if one thinks that, differently from nations, regions compete on the basis of absolute rather than comparative advantages. The two “classical” equilibrating processes of a comparative advantage rule *à la* Ricardo do not work properly or do not exist at the regional level: the first process relies on downward flexibility of prices and wages, which is widely hampered by the existence of national wage contracts in both private and public structures and by the homogeneity of import prices (we remind that regions are very open economies); the second “modern” process relies on the devaluation of the currency, and it is automatically excluded in an inter-regional context (Camagni 2002). The ricardian conclusion that each country will always be granted some specialisation and role in the interregional division of labour is not valid for regions. A region can well be pushed “out of business” if the efficiency and competitiveness of all its sectors is lower than that of other regions, and its fate is, in this case, mass unemployment and, in case of insufficient public income transfers, emigration and possible desertification. In front of this possible scenario, taking care of the regional effects of stronger global competition bears a strong economic rationale.

The capabilities of a region to grow require deep understanding. As it is widely accepted nowadays by the most advanced literature on the subject, long-term local development is largely a supply-side phenomenon, based on general rules and institutional frames and above all nourished by the internal entrepreneurial capabilities of regions and places and by the local capability of efficiently exploiting existing resources, local policies require a deep knowledge of local resources and potentialities. This means that the possibility for any region to contribute to the general EU growth is dependent on the fact that it creatively exploits its territorial capital, enriches it in the right ways setting appropriate priorities to local and regional policies, and “taps” and mobilizes previously “untapped” assets of its territorial capital.

Territorial capital may be seen as the set of localised assets – natural, human, artificial, organizational, relational and cognitive – that constitute the competitive potential of a given territory (Camagni 2009). It was launched explicitly in the early 2000’s by the OECD (OECD 2001) and re-launched by the EU Commission in its *Guidelines to Structural Funds* in 2005²: agglomeration economies, equilibrated and polycentric urban structures, accessibility, skilled labour force, R&D and high level education facilities, business networks and social capital, natural resources and cultural heritage, territorial diversity and territorial identities are indicated as the assets and preconditions for regional growth that need to be properly identified, wisely protected and strengthened, smartly utilised, continuously re-interpreted and re-oriented.

The strategic factors that enable a region to achieve and maintain a position in the international division of labour over the long run are more and more non-material

²“Each Region has a specific ‘territorial capital’ that is distinct and generates a higher return for specific kinds of investments than for others. Territorial development policies should first and foremost help areas to develop their territorial capital” (CEC 2005).

factors, linked to knowledge, culture, taste and creativity (see also Crescenzi and Percoco in the introductory chapter to this volume). The laws of accumulation of these elements are especially dependent on local aspects: in fact all these elements develop through slow learning processes, fed with information, interaction, long term investments in research and education. Like all learning processes, they are inherently localised and cumulative, as they embed in human capital, interpersonal networks, specialised and highly skilled local labour markets and local innovative *milieux*; therefore they are highly selective in spatial terms (Camagni 1991a; 1999). Moreover, while traditional material production factors are subject to a hyper-mobility, marketed and utilised everywhere (playing apparently no role in a competing environment), the skills and “relational capital” required for their most efficient or innovative use are by no means available everywhere, and are these elements that make the difference: trust (Glaeser et al. 2000; McCloskey and Klammer 1995), social capital (Glaeser et al. 2002; Knack and Keefer 1997; La Porta et al. 1997; Beugelsdijk and van Schaik 2005), sense of belonging to a society (Bowles et al. 2001; Lazear 1999; Alesina and La Ferrara 2000) are nowadays the main sources of increasing returns for traditional economic production factors (Capello et al. 2011a; Caragliu 2009). These elements are highly heterogeneously distributed at regional level, something that explains the high and persistent level of TFP heterogeneity across regions (see Diliberto and Usai in this volume).

All these reflections lead to the consideration that the capabilities of regions to compete in a global world mainly lie in endogenous territorial assets (Affuso et al. 2011; Fratesi 2012). However, some realities exist in which exogenous forces, in the form of foreigner productive capital, play an important role. This is especially true in areas where the stage of development is still lower than the EU average and where endogenous territorial capital assets are, in qualitative and quantitative terms, lower than the EU average. A firm becomes multinational in order to exploit three kinds of advantages, summarized in the acronym of the well-known OLI paradigm: ownership, internalization and locational advantages (Dunning 2001). For what concerns the locational advantages, foreigner firms are attracted by either large market potentials or by labour cost advantages, as also most of the empirical literature has demonstrated (Resmini 2007, 2008).

Whether the presence of exogenous or endogenous factors play a role in regional growth is empirically investigated in this chapter in the context of globalization. In particular, our hypothesis is that endogenous factors play a more important role in advanced stages of development, while exogenous elements are more striking in lower development stages. This will be empirically analysed by running the empirical analysis in Western and Eastern Europe respectively. Moreover, our a-priori is that regional territorial capital assets are fundamental for explaining the capacity of a local area to grow more than its nation; however, among the causes of regional success and failure are factors which are directly linked to certain pervasive and generalized characteristics of the national economy. We refer in particular to institutional factors such as the performance of the high functions of the nation-state – legislative, judicial and governmental; to organizational factors such as the efficiency of services of general interest like education, transportation,

communication, health and security services; to economic factors such as general fiscal pressure, the effectiveness of public expenditure, the pervasiveness of environmental regulations, and the efficiency of contract enforcement procedures. Once competition is at world level, the international disparities in legislative, judicial and governmental factors, as well as in the efficiency of public services widen dramatically; as a consequence, the role of these elements in regional growth explanations grows (Capello et al. 2011b).

In the rest of the paper, we will hence investigate the effects of endogenous and exogenous factors on regional growth, considering territorial capital assets as the endogenous factors and considering two different exogenous ones: on the one hand national growth, which reflects exogenous national factors and, on the other hand, foreign direct investments, which account from global push forces.

3 Different Stages of Development and Regional Disparities in Western and Eastern Countries

We claim in the chapter that Eastern and Western countries are still in a different development stage. An analysis of the trends in regional disparities is presented here to confirm that, despite the growth rates measured in recent years in Eastern countries, Eastern regions still lag behind.

To represent regional disparities the Theil index is used, which has the precious characteristics of being decomposable into parts, i.e. of allowing to disentangle how much disparities depend on one factor or another.

Figure 1 represents the general Theil indexes of regional disparities, i.e. without taking into account globalization forces in order to work as benchmark. If we look at the total European regional disparities (Fig. 1a) we can observe that the total Theil index of regional disparities has decreased significantly from 1995 to 2005 (our period of analysis). This is due, as found in other works, to the decrease of the between countries disparities, whereas within countries there is a small but consistent increase of disparities, signalling that lagging countries have generally outperformed the strongest ones, but lagging regions have generally been unable to catch up with their national frontrunners.

The aggregate effects, however, hide the fact that an important effect in the convergence process has been due to the stronger performance of the New12 member countries of the EU, which are still significantly less rich than their western counterparts but have been growing much faster. This can be observed in Fig. 1b, where it can be observed that a large part of EU total disparities (about two thirds) is due to the difference between Old15 and New12 member countries and that, while this part has decreased fast, the disparities within the two parts of Europe have increased, though with a lower pace.

By using an additional and innovative decomposition it is possible to examine the role of three levels at the same time. For this reason in Fig. 1c it can be observed that, once the very large and decreasing effect of Old15-vs-New12 countries has been

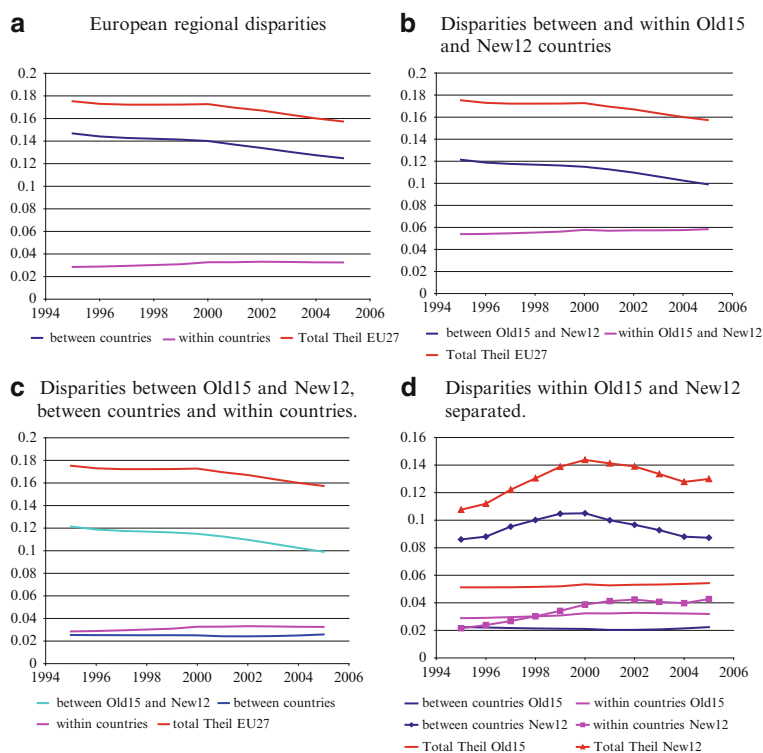


Fig. 1 General Theil indices of regional disparities

extracted, the remaining of regional disparities can be attributed in similar parts to between country and within country disparities, with the latter slightly larger than the former, signalling that the results of Fig. 1a are biased by the difference between Old15 and New12, and once it is wiped out, within country disparities are even more relevant than between country ones. Notice that the two effects are slightly increasing, differently from the disparities between New and Old member states, which decreases steadily and consistently throughout the period of analysis.

In order to see if the two groups of countries hide different patterns, Fig. 1d represents in the same picture (for comparative purposes) the Theil indexes calculated between and within countries for Old15 and New12 countries separately. It is immediately evident that the total level of disparities within the New Member States is considerably higher; moreover, in these countries total disparities exhibit in many years a tendency to increase, whereas they are substantially stable in Old15 countries. This is due to the fact that, in New12 member states, between country disparities first increase and then decrease, whereas within countries exhibit a clear growing pattern, due to the fact that the core areas of these countries have normally outperformed the rest of their respective countries, probably because they were better fit for global challenges. This appears to be consistent with the old

Williamson (1965) curve, which sees regional disparities grow as income per capita grow in the earlier stages of development and with the findings of Monastiriotis in this volume.

Interestingly enough, within countries disparities in the New12 member states have now exceeded those in Old15 countries, which have only marginally increased. All types of disparities (total, between countries and within countries) have remained quite stable in Old 15. The last aspect which is interesting to observe is that in Old15 countries the disparities between countries are lower than those within, signalling that dualisms between rich and poor regions are more important than differences among countries, whereas in the New Member states the disparities between countries remain significantly higher than those within countries despite the doubling of the latter.

4 Endogenous and Exogenous Regional Success Factors

The previous sections have evidenced that the patterns of growth of European regions are differentiated. The descriptive analysis has evidenced that the characteristics associated with the performance of regions are very different between Eastern and Western regions.

Figure 1 also evidenced that country effects take place, so that the general performance of regions highly depends on the country to which they belong. National economic trends, especially some trends linked to globalization processes, like the movements of financial capitals, interest rates and exchange rates, are exogenous growth factors which exert their effects at national level. Other aspects of the globalization processes, on the contrary, despite being exogenous, show their effects at regional level, for instance most aspects linked to the reorganization of the production processes, on which the attraction of local economies of high or low value added tasks and phases plays a crucial role. It becomes therefore interesting to analyze what of the regional structure affects regional performance once country-wide, mainly monetary, variables are kept separate.

In this section of the paper, therefore, the use of regression analysis will be made with the purpose of investigating in a causal way the factors which explain the growth rate of European regions, focusing on FDI, the main globalization channel for which we have data. One way to do such an analysis would be to use as dependent variable the GDP differential growth of the regions with respect to their respective countries, but this assumes that country effects are taking place for all of them in the same way; a better option is to use regional growth as dependent variable and introduce the national growth rate among the regressors, so that the data are allowed to estimate the elasticity of regional growth to national growth without imposing the restriction that it is 1, a restriction which is implicitly assumed when regressing the differential growth rate.

To detect the structural features more associated with positive regional economic performance of regions in an age of globalization we hence use

multivariate regression analysis in which a number of factors be used together in an explicative model.

The choice of the success factors explaining regional performance was based on the consideration that the differential growth rate is what remains to be explained once the national effects have been considered by including the national growth rates among the regressors. A recent theory summarises the elements explaining endogenous regional growth in what is termed ‘territorial capital’, which consists of material and intangible, private and public, soft and hard elements (Camagni 2009). For this reason, a rather differentiated set of local assets were chosen: some were traditional material factors like transport infrastructure, geographical position, and the functions in which a region is specialised; others were intangible, like agglomeration economies, with the usual limitations that characterise a database that must cover the entire European territory.³

In particular, the following endogenous territorial capital variables were selected (see Table 1 for the description of variables):

- The growth effects induced by the regional geographical position, whether it is close to fast-growing regions or close to regions unable to grow fast (*spill*). These effects can be positive or negative depending on the role of neighbouring regions, which may induce growth through demand effects or steal it away through competition. The indicator used was a spatial growth spillover indicator for a generic region r , capturing economic potential (Clark et al. 1969) as the sum of the annual absolute difference between income growth rates of all other regions j divided by the distance between each region r and region j , defined as⁴:

$$SP_r = \sum_{j=1}^n \frac{\Delta Y_{jt}}{d_{rj}}; r \neq j \quad (1)$$

where:

ΔY_{jt} = income growth rate of region j at time t

j = all regions except region r

d_{rj} = physical distance between region r and j

n = all regions of the sample;

³ All independent variables were lagged in order to reduce problems of endogeneity and reverse causation.

⁴ An indicator weighting each regional growth rates for the share of each regional economy (GDP) on the European total GDP was calculated in addition to the non-weighted one. A high statistical correlation emerged between the two, as shown by a Pearson correlation coefficient of 0.93. Moreover, the difference between the two standardised indices showed a low spatial autocorrelation, with a Moran’s I index of 0.30. On removing a few outliers (mainly Nordic and Spanish regions), the Moran’s I index was 0.18. On the basis of this correlation, it was decided to use the non-weighted spillover indicator, given its closer similarity to the classic spatially-lagged models of spatial econometrics. This indicator is an economic potential measure which is generally calculated as the accessibility to total income at any location allowing for distance, following Clark et al., 1969. Here the concept of economic potential is measured in terms of accessibility to the income growth rates.

Table 1 Variables description and data sources

Data and indicators	Definition	Source of raw data
Regional GDP	Regional GDP in real terms at NUTS2 level in the period 1995–2005, computed from the nominal one, using national GDP deflators.	Eurostat
Regional average annual differential GDP growth rate	Annual average regional GDP growth rate less national GDP growth rate in the period 1999–2002	Eurostat
FDI	Number of new foreign firms per million inhabitants. Reference period 1999–2001	FDIRegio database
Regional employment by function (ISCO)	Regional employment by function at ISCO 2 digit classification at Nuts 2 level	European Labour Force survey
Innovation/regional share of human resources in S&T	Share of people working in S&T on population in the year 2000	Eurostat
Regional infrastructure endowment	Km of high speed railways, main rails, express roads, motorways and inland waterways in year 2000	KTEN data within the Espon database
Per capita structural funds	Total structural funds expenditure/population in the period 1994–1999. Also divided into 5 types of expenditure	Espon database
Spatial growth spillovers	Calculated for the period 1999–2002	Eurostat
Agglomerated regions	With a city of > 300,000 inhabitants and a population density > 300 inhabitants/km sq. or a population density 150–300 inhabitants/km sq.	Espon database
Urban regions	With a city of between 150,000 and 300,000 inhabitants and a population density 150–300 inhabitants/km sq. (or a smaller population density – 100–150 inh./km with a bigger centre (>300,000) or a population density between 100 and 150 inh./km sq).	Espon database
Rural regions	With a population density < 100/km sq. and a centre > 125,000 inh. or a population density < 100/km sq. with a centre < 125,000	Espon database

- a soft and private element of territorial capital, namely the degree of innovation of regions (*inno*), expected to affect positively the regional growth rates, as a large body of literature suggests.⁵ Innovation was proxied by the share of human resources in science and technology;
- a hard element of the territorial capital: the transport infrastructural endowment of regions, which ought be positive but may also be negative if this variable

⁵For a review of the role of innovation in regional growth, see Howells 2005; Johansson and Karlsson 2009; de Groot et al. 2009; Audretsch and Aldridge 2009.

measures the density of roads and congestion effects prevail.⁶ This aspect was measured by the endowment of roads per square kilometre;

- regional specialisation in high-value functions. In a period of globalization, it is to be expected that the higher the functions that a region performs, the higher its growth rate.⁷ These functions were approximated by the share of high-value service functions (i.e. share of corporate managers) (*funct*) reported by the labour force survey;
- a mixed (hard/soft) element of territorial capital: agglomeration economies, which were captured with a dummy measuring the settlement structure of regions (*Daggec*). In particular, agglomeration economies were proxied by dummies measuring the presence in regions of dense and large cities. Specifically, use was made of two different dummies built on different thresholds of densities and sizes of cities;
- last, but not least, an important variable explaining regional differential growth is the presence of public funds (*pol*) which, because they are aimed at either demand-side support or supply-side development, should yield positive growth effects. We used structural funds expenditure per capita as a proxy for this factor

In addition to the endogenous growth factors, we take into account two main exogenous factors, i.e. the national trends and the regional specific globalization trends, by using the following variables:

- the national growth rate (*natgrowth*), which measures all the national factors with an equal impact for all regions of the same country. In order to avoid endogeneity, this national growth rate was calculated using only the GDP of the other regions of the country to which the region belonged.⁸ We expected national factors to positively influence regional growth;
- FDI penetration in a region as a measure of regional attractiveness and global flows (*fdi*). We consider total FDI as well as separate between FDI originating from within Europe and FDI originating out of Europe⁹:

The model estimated is therefore the following:

$$regrowth_r = \alpha_0 + \beta_1 natgrowth_r + \beta_2 inno_r + \beta_3 spill_r + \beta_4 in_r + \beta_5 pol_r + \beta_6 funct_r + \beta_7 fdi_r + \alpha_1 Daggec_r + \varepsilon_r \quad (2)$$

⁶ For a review of the role of transport infrastructure in regional growth, see Bröcker and Rietveld 2009.

⁷ On the role of functions in regional growth, see Capello et al. 2011b.

⁸ This had the drawback of eliminating from the regressions countries which have only one NUTS 2 region, namely Luxembourg, Cyprus, Malta, Estonia, Latvia, Lithuania. Nevertheless, this decreased the sample by only 6 observations.

⁹ This is possible thanks to the FDI-Regio database, kindly provided us by Laura Resmini of Bicocca University of Milan.

Table 2 Growth factors for regions in a period of globalization

	Model0 stand. coeff.	p-value	sig.	Model1 stand. coeff.	p-value	sig.	Model1 stand. coeff.	(Western regions) p-value	Sig.
National growth rates of all other regions in the country 2002–05	0.774	0.00	***	0.784	0	***	0.603	0.00	***
Share of science and technology employment 2000	0.147	0.019	**	0.142	0.026	**	0.055	0.413	
Growth spillovers 1999–2000	−0.031	0.00	***	−0.028	0.001	***	−0.050	0.00	***
Total infrastructure on sqm 2000	−0.140	0.00	***	−0.140	0	***	−0.227	0.00	***
Structural funds per capita 1994–1999	0.047	0.046	**	0.053	0.015	**	0.071	0.008	***
High level functions (share of private managers) 1999–2001	0.063	0.164		0.055	0.219		0.226	0.005	***
Urban dummy	0.104	0.00	***	0.114	0	***	0.104	0.005	***
Total FDI penetration rate 2001–03				0.071	0.049	**	0.047	0.339	
Constant		0.191			0.127			0.724	
Obs	246			246			195		
R2	0.5938			0.5984			0.4927		
F	43.3			42.29			34.84		
Moran's I	1.678	0.093	*	1.288	0.198		3.282	0.001	***
Spatial error									
Lagrange multiplier	0.146	0.702		0.005	0.941		1.808	0.179	
Robust lagrange multiplier	0.797	0.372		0.243	0.622		0.222	0.637	
Spatial lag									
Lagrange multiplier	0.446	0.504		0.363	0.547		2.053	0.152	
Robust lagrange multiplier	1.097	0.295		0.6	0.438		0.468	0.494	

*** p < 1 %; ** p < 5 %; * p < 10 %. Independent variable: regional growth rates 2002–05. Coefficients are standardized

The results of the regression model are reported in Table 2.¹⁰ In the first reported model (Model 0, for reasons which will be evident below), which has all variables except from the settlement structure, all coefficients have the expected sign, apart

¹⁰ We tested for spatial autocorrelation our regression models, but, due to the fact that among the regressors spatial spillovers and country effects are present, the spatial tests turned out as non significant so that the reported standardized coefficients are those of OLS with robust standard errors.

from infrastructure which has a negative one, and all coefficients are highly significant, with the exception of high-value functions which are positive and (nearly) significant. In particular, the coefficient of the national growth rate is positive and, being close to 0.8, the highest, implying that exogenous national factors are very important and being part of a country which grows 1 % faster imply 0.8 % faster growth rate for a region *ceteris paribus*, i.e. independently from the regional endogenous characteristics.

The human resources in science and technology are also positive and significant, meaning that the hypothesis that they are needed for regions to thrive in an age of globalization is confirmed.

Growth spillovers are on the contrary negative and significant, meaning that being close to strong and fast growing regions has more negative effects due the presence of strong competitors nearby than positive effects due to induced demand.

Somehow puzzling, infrastructure endowment has a negative and significant coefficient, probably due to the fact that road endowment is not able to capture the smoothness of traffic on these roads, but rather tends to capture the excessive density of some areas, which are hence subject to congestion diseconomies.

Public policy support has a small but positive and significant coefficient, implying that within their countries, the most assisted regions take benefit of this assistance *ceteris paribus*.

High level functions are not significant at 0.1 threshold. However, their coefficient is positive, quite stable (as we will see in the rest of the Section) and has a p-value which is only slightly higher than 0.1. For this reason it is possible to keep this variable in the regressions, also because of the theoretical importance of this variable for the globalization processes.

The last variable which is used in this general regression model is the amount of total FDI on population received by regions, whose coefficient is positive and significant, meaning that being able to attract FDI has a growth effect in a period of globalization.

To the first model, we added the dummy capturing the settlement structure of the regions (*Daggec*), which turns out to be significant without altering the other coefficients, nor their significance. In particular, it turns out in Model 1 that the “urban” regions (i.e. the intermediate ones in terms of density and presence of large cities¹¹) have outperformed the rest of the regions *ceteris paribus*. Probably, the most “agglomerated” regions suffer for decreasing agglomeration economies, if not congestion diseconomies, which are still not present in the intermediate category. On the contrary, the more sparsely populated “rural” regions, also due to the absence of large cities within, are unable to reach the critical mass needed to generate agglomeration economies and, consequently, growth.

¹¹ Urban regions are defined as those regions with a city of between 150,000 and 300,000 inhabitants and a population density 150–300 inhabitants/km sq. (or a smaller population density – 100–150 inh./km with a bigger centre (>300,000) or a population density between 100 and 150 inh./km sq).

As a technical but important note, being regional growth the dependent variable, the models have been tested for spatial effects using different matrices, including standardized distance matrix and a standardized distance matrix with a threshold. All test reject the presence of spatial autocorrelation in the regressions, and the need to use a spatial lag or spatial error model. This is likely to be due to two concomitant effects: on the one hand the regressions have an explicit growth spillover coefficient inside, i.e. some sort of spatial lag; on the other hand, the fact that the regressions include the national growth rate is another way in which growth in neighbouring regions is taken into account.

To test whether our hypothesis that more advanced stages of development imply a more important role of endogenous factors, we re-run model 1 in the sub-sample of Western regions.¹² The results are reported in Table 2.

It is immediately evident that the exogenous factors are clearly less important for the richest Western regions with respect to the poorest Eastern ones, as evidenced by the fact that the national growth coefficient is still highly significant but considerably lower, and the fact that the coefficient for FDI is lower and much less significant (and this is in line with the findings of Pietrobelli et al., in this volume).

It is also evident that the coefficient of science and technology employment is no longer significant, but we interpret this result as evidence that beyond R&D personnel, which is quite diffused in Western Europe, what matter are the socio-economic conditions for regional innovation (see also the contribution by Rodríguez-Pose and Comptour in this volume).

In order to go more in depth into the role of exogenous factors in regional growth, the next section will investigate the growth effects of different types of FDI, first among all the European regions and then in the sub-sample of Western regions.

5 The Effects of FDI by Source, Sector and Technological Level

FDI are not homogeneously distributed over space, they belong to different sectors, and vary in terms of origin and technological development. Given their important role in explaining regional growth, a more detailed analysis is worth inspection.

In order to test all differential effects in FDI, starting from Model 1 of Sect. 4 a number of FDI typologies were regressed to see if they have a more or less important role in regional growth with respect to generic FDI. The results are presented in Table 3, where the first two models are in order to differentiate between intra-European and extra-European FDI.

First it has to be observed that the coefficients and the significance of the other regressors are stable, including the endogenous territorial capital factors and the exogenous national growth. Concerning FDI, those coming from intra-EU appear to have a very similar coefficient with respect to those coming from extra-EU and the

¹² It is on the contrary not possible to run a similar regression on Eastern regions only because of lack of degrees of freedom.

Table 3 The effects of FDI on regional growth by source, sector and technological level

	Model1	Model2	Model3	Model4	Model5	Model6	Model7
	stand. coeff.	stand. coeff.	stand. coeff.	stand. coeff.	stand. coeff.	stand. coeff.	stand. coeff.
	p-value	p-value	p-value	p-value	p-value	p-value	p-value
	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
	0	0	0	0	0	0	0
	***	***	***	***	***	***	***
National growth rates of all other regions in the country 2002–05	0.784	0.789	0.786	0.801	0.784	0.800	0.746
	0.026	0.027	0.019	0.018	0.022	0.017	0.013
Share of science and technology employment 2000	0.142	0.144	0.146	0.148	0.144	0.150	0.155
Growth spillovers 1999–2000	–0.028	–0.023	–0.030	–0.028	–0.022	–0.022	–0.028
Total infrastructure on sqm 2000	–0.140	–0.156	–0.119	–0.127	–0.131	–0.113	–0.134
Structural funds per capita 1994–1999	0.053	0.054	0.054	0.054	0.056	0.056	0.058
High level functions (share of private managers) 1999–2001	0.055	0.063	0.056	0.055	0.081	0.030	0.061
Urban dummy	0.071	0.072	0.066	0.066	0.065	0.064	0.071
Total FDI penetration rate 2001–03	0.114	0.103	0.104	0.104	0.101	0.074	0.071
Total intra-European FDI penetration rate 2001–03							
Total extra-European FDI penetration rate 2001–03			0.104	0.075	0.065	0.067	0.076
High value-added service FDI penetration rate 2001–03					0.007		
Low value-added service FDI penetration rate 2001–03							
High value-added manufacturing FDI penetration rate 2001–03						0.074	0.149

(continued)

Table 3 (continued)

	Model1 stand. coeff.	Model2 stand. coeff.	Model3 stand. coeff.	Model4 stand. coeff.	Model5 stand. coeff.	Model6 stand. coeff.	Model7 stand. coeff.	
	p-value	Sig.	p-value	Sig.	p-value	Sig.	p-value	Sig.
Low value-added manufacturing FDI penetration rate 2001–03	0.127		0.107		0.095	*	0.097	*
Constant							0.088	*
			0.111					0.092
								0.002

Obs	246		246		246		246	
R2	0.5984		0.5977		0.5974		0.5912	
F	42.29		56.5		37.34		35.6	
Moran's I	1.288		1.137		0.979		1.667	
Spatial error			*		0.109		0.095	*
Lagrange multiplier	0.005		0.724		0.743		0.737	
Robust lagrange multiplier	0.243		0.464		0.6		0.55	
Spatial lag			0.113		0.082		0.358	
Lagrange multiplier	0.363		0.315		0.493		0.074	
Robust lagrange multiplier	0.6		0.427		0.552		0.319	
	0.547		0.574		0.482		0.786	
	0.438		0.513		0.457		2.228	
								0.136

*** p < 1 %, ** p < 5 %, * p < 10 %. Independent variable: regional growth rates 2002–05. Coefficients are standardized

significance of these coefficients is high for both but higher for extra-EU FDI (models 2 and 3 in Table 3). This implies that both types of FDI are significantly able to help regional growth, though with different intensity.

One could also analyze the effects of service FDI, which have increased their importance over the last few years. In Models 4 and 5 service FDI are divided into high value added and low value added, with the first ones being more of support to production and/or producing services which can be exported, whereas the low value added ones are those related to the personal services and retail.¹³ It turns out that the second coefficient is slightly higher and also slightly more significant, but both types of services FDI are relevant in explaining regional growth.

The same distinction between high level and low level has been done for manufacturing FDI (models 6 and 7 in Table 3), which have been divided in high-tech and low-tech using the Pavitt classification.¹⁴ The results show an interesting result: differently from the service sector, high-tech manufacturing FDI, though having a positive coefficient, do not have a statistically significant impact on regional growth, whereas the coefficient for low-tech FDI is positive and significant. Among the different explanations for this apparently counterintuitive result, one can recall that high tech manufacturing FDI in Europe are very limited in their number and that manufacturing FDI in general are a phenomenon typical of Eastern countries, where they induce growth and what matter is more their quantity than their specialization; manufacturing FDI are less common and less important in the West, providing further support to the possibility that the role of exogenous growth factors is more important for regions at a lower stage of development.

This calls for a more specific analysis on Western vs. Eastern regions, in order to disentangle their possible different behaviours as far as FDI are concerned. The number of regions in the East is insufficient to provide regressions for them alone, but by analysing the behaviour of Western regions it is possible to induce that any difference with respect to the total sample is due to Eastern regions.¹⁵

Table 4 hence reports the same regressions of Table 3 performed on the subsample of European countries which belong to the Old 15 members of the EU. The two tables are rather similar, spatial effects are still not present and the significance of the general regression coefficients is also normally the same.

In addition to the far lower coefficient for national growth which was already pointed out in Sect. 5, the only noticeable differences regard the significance of the dummy for urban areas, which is no longer significant, and the share of employment

¹³ In particular, High-value service FDI are those of Ateco 1.1 sectors I (Transport, storage and communication), J (Financial intermediation) and K (Real estate, renting and business activities). The other service sectors are included in low-value.

¹⁴ In particular, high-tech manufacturing FDI are those in sectors classified high-tech or medium-high tech by Pavitt (1984), with the other sectors (Pavitt medium-low tech and low-tech) composing low-tech FDI. Notice that the results are consistent when using only the high-tech and the low-tech of Pavitt.

¹⁵ We also performed a Chow test which, due to the high significance of national growth in regional growth, did not identify a differentiation of growth model between the two.

[illegible]

$p < 1\%$; $p < 5\%$; $p < 10\%$. Independent variable: regional growth rates 2002–05. Coefficients are standardized

in science and technology which is less significant with respect to high-value added functions.

Our main interest lies here in FDI coefficients: first, the standardized coefficient for intra-European FDI is now, for Western regions, larger with respect to the extra-European one, though the latter remains more significant (models 2 and 3 of Table 4). Even more interesting, the high-value service FDI increase their coefficient and their significance, whereas low-value-added service FDI have about the same coefficient but lose significance (models 5 and 6 of Table 4).

It hence appears that manufacturing FDI is less important within Western countries, as supported by the observation that high value added manufacturing FDI have a lower and much less significant coefficient and, even more strikingly, low value added ones were significant overall are now no longer significant for the Old15 regions, signalling that the growth rate effects of manufacturing foreign investments is mainly a feature of countries in transition or restructuring (models 6 and 7 of Table 4).

6 Conclusions

This paper has analyzed the growth performance of European regions in a period of fast globalization, focusing on the importance of endogenous and exogenous factors in different stages of development, indentified by the belonging to Old15 or New12 countries.

It first emerges that regional disparities have a clearly different pattern in the two groups, with the decrease of EU-wide disparities due to the decline of the East–west divide, but with between country disparities nearly stable in the West and clearly increasing in the East.

Our explicative analysis analyzed the role of endogenous and exogenous factors of regional growth, using many assets of territorial capital as the endogenous ones and as exogenous ones national factors and an internationally, globalization-related one, namely FDI.

A first result which emerges is that despite the strong integration process which is in place in Europe since many years, the national component of growth plays an important role in the explanation of regional growth. This result is strong in both the East and the West, but considerably stronger in the former, characterised by a lower stage of development.

A second important result is that the capacity of a region to grow depends on both territorial capital success factors, and the presence of foreigner direct investments. The latter appear to be more significant for Eastern regions, which again show a higher growth dependency on exogenous factors. Once the analysis is developed at sectoral level, it turns out that the presence of FDI in manufacturing low-tech sectors plays a significant role on growth in Eastern regions whereas manufacturing FDI does not play any role in explaining growth patterns in Western country regions.

Our intuition that exogenous vs. endogenous forces of development play a different role according to the stage of development of regions finds solid empirical support; also in a period of strong globalization, endogenous factors explain regional growth trajectories in areas characterised by a more advanced stage of development.

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