The Impact of the EU's Structural and Cohesion Funds
on Real Convergence in the EU

By

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Abstract

The main aim of this paper is to look at the impact of the EU's Structural and Cohesion Funds (the 'Funds') on economic growth and real convergence in the EU. The paper starts by providing some general information about the Funds and their development over time. This is followed by a review of some of the theoretical and empirical work on the main determinants of growth, focusing in particular on the impact of infrastructure and human capital. Looking more specifically at evaluations of the impact of the Funds on growth and convergence in some current EU Member States, the available evidence suggests that the funds can be a useful instrument to foster growth and real convergence. However, in order to be effective, the supported countries must be characterised by a stable macroeconomic environment and institutional and microeconomic structures that are conducive to growth. Finally, some modifications to the way the Funds currently operate would seem useful in order to take some of the specific features of the situation in the Acceding Countries into account.

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1) Introduction

Economists, politicians and 'practitioners' have often quite contrasting views on the usefulness of the EU's Structural and Cohesion Funds (subsequently for simplicity called 'Funds') for stimulating growth and (real) convergence. The following two quotes illustrate the contrasting views on these financial instruments rather clearly:

> "The evidence examined [in the 2nd Cohesion Report] shows that over the previous programming periods (1989-93 and 1994-99) Community cohesion policies have had some notable success. This is perhaps most visible in the case of the regions where development is lagging behind, where there has been a general process of catching up in economic and social terms." (European Commission, 2001)

> "The best thing the EU could do for Greece is to cut off the structural funds immediately (…); anybody who works hard at a regular business is regarded as an idiot, since it's much easier to set up a project to draw in European subsidies." (The Economist 27 March 2003, quoting a 'senior Greek official in Brussels')

Against the background of such differences in the perceived usefulness of the Funds, this paper looks at three aspects that are needed for a broad-based assessment of the Fund's impact on real convergence in the (enlarged) EU. First, the paper provides an overview of the main features of the current design of the Funds and their development over time. Second, the paper reviews those aspects of economic theory that are at the heart of the Funds' design. More specifically, the paper looks at economic growth theory and in particular the impact of infrastructure and human capital on growth. Third, some of the available evidence on the Funds' impact on growth and real convergence in the current EU Member States will be summarised. The focus of this section will be in particular on the catching-up process of the four so-called EU 'Cohesion Countries', namely Greece, Spain, Portugal and Ireland. The paper concludes by providing some rather tentative conclusions regarding the likely impact of the Funds on cohesion in the (enlarged) EU and in particular in the Acceding Countries (ACs).

2) The EU's Structural and Cohesion Funds

2.1) Origins and objectives of EU cohesion policy

In order to understand the operation of the Funds, it is important to keep in mind that the main aim of EU cohesion policy is to improve the long-term growth and employment prospects of the supported areas. Unlike fiscal federalism schemes it does not intend to provide a safety net against regional shocks. Furthermore, the Funds, unlike the EU's Common Agricultural Policy (CAP), aim at supporting economic change rather than trying to preserve existing economic structures. Finally, the Funds try to enhance the – broadly defined – infrastructure and human capital endowment in the supported regions rather than providing financial assistance at the firm level. This supply-side approach differentiates the Funds from the more traditional, state aid-based approach that is still the trademark of most national

regional policy schemes in the EU.

Although the origins of the Funds date back to the early days of EU integration, the resources used remained relatively limited until the late 1980s.[2] The main reason for the substantial increase in the Funds' budget as well as the complete overhaul of their procedures in 1988 was the Single European Market (SEM) project. In light of the uncertainty surrounding the country- and region-specific economic effects of the SEM, the poorer Member States asked for financial assistance from the EU in order to be able to increase their economic competitiveness. The richer Member States were willing to satisfy these demands in order to make sure that the economic integration process would further proceed.

The increased EU-level competence for economic and social measures was also manifested by the insertion of the Title 'Economic and Social Cohesion' (Article 158-162, EEC Treaty) into primary European law.

> "In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions, including rural areas."(Article 158, EC Treaty)

Economic and social cohesion gained even more importance after the Treaty of Maastricht. Article 2 of this treaty, listing the objectives of the EU, explicitly refers to the strengthening of economic and social cohesion. Furthermore, the Treaty of Maastricht led to the creation of the Cohesion Fund (CF). Prior to 1993 the main instrument of EU cohesion policy was the European Regional Development Fund (ERDF). The first 'wing' of the ERDF covers structural support in the so called 'Objective 1' regions. These are selected according to their *per capita* income relative to the EU average.[3] The second wing targets specific problems throughout the Community, such as regions with a declining industrial base, urban and rural development and cross-border co-operation.[4] Whereas EU cohesion policy prior to 1993 operated first and foremost at the regional level, the CF introduced in 1993 addresses real convergence issues at the country level. More specifically, the CF provides funding for transport infrastructure and environmental projects in Member States with a per capita GDP of less than 90 % of the EU average. Since 1993, Ireland, Spain, Portugal and Greece benefited from the CF.

One of the guiding principles of the 1988 reform was the concentration of regional policy on those parts of the EU that are in greatest need of support. In response to this, EU-wide regional policy objectives have been developed. Table 1 provides an overview of the objectives for the 2000-06 programming period.

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[2] *For an overview of the historical development see e.g. Martin (1999).*

[3] *More specifically, in order to qualify for Objective 1 status regional per capita income, expressed in PPS, must have been less than 75 % of the EU average for the last three-year period for which data is available at the start of the programming period. Objective 1 status is normally given only to NUTS II regions but not to smaller areas. Furthermore, the outermost EU regions (French overseas departments, Azores, Madeira and the Canary Islands) plus the sparsely populated Nordic regions are currently eligible for Objective 1 status.*

[4] *The other Structural Funds are the European Social Fund (ESF), the European Agricultural Guidance and Guarantee Fund (EAGGF, Guidance Section) and the Financial Instrument for Fisheries Guidance (FIFG).*

Table 1 European regional policy objectives during the 2000-06 period

1.	Development and structural adjustment of lagging regions, speeding up the adjustment of agricultural and fisheries structures and support for areas with very low population density.
2.	Development and structural adjustment of rural areas, regions seriously affected by industrial decline, economically 'problematic' urban areas, areas depending on fisheries and highly service-sector dependent areas undergoing conversion.
3.	Supporting the adaptation and modernisation of education, training and employment policies and systems.

Source: Adapted from Commission (1999)

Whereas Objectives 1 and 2 refer to certain eligible areas, it is possible to fund activities throughout the entire EU under Objective 3 (with the exception of regions covered under Objective 1).[5]

2.2)   The spatial and functional allocation of the Funds

Although it was an explicit aim of the 1988 reform to limit the geographical availability of EU regional assistance, Objective 1 and 2 together still cover around 40 % of the EU population. Following a substantial increase during the 1994-99 period the 2000-06 coverage for Objectives 1 and 2 is now slightly below the coverage during the 1989-93 period. Table 2 provides an overview of the population covered by EU regional policy objectives during the 1994-99 and 2000-06 programming periods.[6]

Table 2 Population covered by European regional policy objectives (in %)*

Objective Period	1 and 6 1994-99	2 1994-99	5b 1994-99	1 2000-06	2 2000-06	Total 1994-99	Total 2000-06
Austria	4	8	29	3	25	41	28
Belgium	13	14	5	./.	12	32	12
Denmark	./.	9	7	./.	10	16	10
Finland	17	16	22	21	31	55	52
Germany	21	9	10	17	13	40	30
Greece	100	./.	./.	99	./.	100	99
Spain	60	20	4	58	22	84	80
Sweden	5	12	9	5	14	26	19
France	4	25	17	3	31	46	34
Ireland	100	./.	./.	25	./.	100	25
Italy	37	11	8	33	13	56	46
Luxembourg	./.	35	8	./.	28	43	28
Netherlands	2	17	5	./.	15	24	15
Portugal	100	./.	./.	65	./.	100	65
UK	6	31	5	8	24	42	32
EU 15	**27**	**16**	**9**	**22**	**18**	**52**	**40**

* As of 2000 Objectives 6 and 5b were included in the revised Objectives 1 and 2 respectively. The new Objective 3 (for the 2000-06 period) is non-territorial and therefore not included in this table.

Source: European Commission

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[5]   *The designation process for Objective 2 status involves different sets of economic, social and demographic criteria for each type of region. The overall coverage for Objective 2 was limited prior to the 2000-06 programming period to 18% of the EU population. This was further broken down into sub-ceilings for the different type of regions.*

[6]   *The figures for the 2000-06 period are somewhat too optimistic because those regions that were eligible for support during the 1994-99 period but not during the 2000-06 period receive (decreasing levels of) transitional support.*

The development of the financial allocations for European regional policy shows the increased importance of structural action within the overall framework of the EU. Following the 1988 reforms, the available resources for the structural funds have grown from EUR 8 billion per year in 1989 to EUR 32 billion per year in 1999 (at 1999 prices). In relation to the EU budget this represents an increase from around 20 % in 1987 to above 35 % by 1999. The financial resources for the 2000-06 period were decided at the 1999 European Summit in Berlin. It was agreed that 'the resources available for commitment from the Structural Funds and the Cohesion Fund shall be EUR 195 billion over seven years at 1999 prices. In comparison with the 1994–99 period this represents a slight decline of the available resources.

Looking at the allocation of EU funding across the different objectives, more than two-thirds of the available resources are allocated to Objective 1 regions. A further 11.5% of the funding is currently allocated to Objective 2 regions and 12.3% have been allocated to the (non-territorial) Objective 3. This pattern has remained broadly unchanged since 1989.[7] The CF has become a very significant part of the total assistance for Ireland, Spain, Portugal and Greece ranging from just over 12% for Greece to around 20% in the case of Spain. Table 3 provides an overview of the EU resources committed in the context of the Funds during the 2000-06 programming period.

Table 3 EU resources committed to structural action, 2000-06 – Breakdown according to Member State and objective (Mio EUR, 1999 prices)

Objective	Obj. 1 1	Obj. 1 (transition)	Obj. 2	Obj. 2 (transition)	Obj. 3	CF	CI's	Fisheries support	Total
Belgium	./.	625	368	65	737	./.	209	34	2038
Denmark	./.	./.	156	27	365	./.	83	197	828
Germany	19229	729	2984	526	4581	./.	1608	107	29764
Greece	20961	./.	./.	./.	./.	3060	862	./.	24883
Spain	37744	352	2553	98	2140	11160	1958	200	56205
France	3254	551	5437	613	4540	./.	1046	225	15666
Ireland	1315	1773	./.	./.	./.	720	166	./.	3974
Italy	21935	187	2145	377	3744	./.	1172	96	29656
Luxembourg	./.	./.	34	6	38	./.	13	./.	91
Netherlands	./.	123	676	119	1686	./.	651	31	3286
Austria	261	./.	578	102	528	./.	358	4	1831
Portugal	16124	2905	./.	./.	./.	3300	671	./.	23000
Finland	913	./.	459	30	403	./.	245	3	2053
Sweden	722	./.	354	52	720	./.	278	60	2186
UK	5085	1166	3989	706	4568	./.	961	121	16596
EU 15	127543	8411	19733	2721	24050	18240	10281	1078	212057

Source: European Commission.

In absolute terms Spain is by far the largest recipient country during the 2000-06 period (as well as before), followed by Germany, Italy, Greece, Portugal and – with some distance – the UK. Per capita allocations, however, are by far the highest in Greece and Portugal (around 220 EUR per person), followed by Spain (around EUR 140 per person) and Ireland (around EUR 100 per person). Per capita

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[7] *Some of the EU funding available for regional policy (during the 2000-06 period 5.35% of the total Structural Funds budget) is used for so-called Community Initiatives (CIs), designed to support different types of regions suffering for example from their location along national borders at the extreme periphery of the EU.*

allocations in all other Member States are substantially lower, ranging from around EUR 20 per person in the Benelux countries to around EUR 50 per person in Italy.

Table 4 provides a functional breakdown of Funds expenditures in Ireland, Greece, Portugal and Spain.

Table 4 Functional distribution of Structural Fund and Cohesion Fund expenditures in Ireland, Greece, Portugal and Spain, 1994–99 (in %)*

Type of expenditure	Greece	Spain	Ireland	Portugal
Structural Fund expenditures				
Infrastructure	45.9	40.4	19.7	29.7
Human resources	24.6	28.4	43.9	29.4
Productive environment	27.8	30.5	36.2	35.7
Cohesion Fund expenditures				
Transport infrastructure	51.2	49.7	50.0	48.1
Environment	48.8	50.3	50.0	51.9

*Cohesion Fund expenditures refer to the period 1993-99. Source: European Commission

The lion's share of Funds expenditures falls under three broad categories, namely Infrastructure (transport, utilities, environment and health), Human Capital Formation (education, training and R&D) and Productive Investment Support (support measures for industry and services, rural development, fisheries, tourism and agricultural structures).

Looking at the AC and Candidate Countries, the EU had started support programmes already in 1989 (PHARE) but the level of support was significantly stepped up as of 2000 when two new programmes were launched. SAPARD (Special Accession Programme for Agriculture and Rural Development) was primarily designed to support the efforts made by the applicant countries to join the CAP. However, it also impacts on the development of rural regions. ISPA (Instrument for Structural Policies pre-Accession) was modelled along the lines of the Cohesion Fund and finances large environmental and infrastructure projects. Until 2004 all the programmes together provided financial assistance in the range of EUR 3 billion per year to the 12 AC and Candidate Countries.

The countries joining the EU in May 2004 become eligible for support under the Structural and Cohesion Funds as of that date and are expected to receive a total of EUR 21.7 billion during the remaining 2.5 years until the end of the 2000-06 programming period (in prices of 1999). Around two-thirds of this funding is earmarked for the Structural Funds and the remaining third for the Cohesion Fund (Commission 2003).

Given their relatively low level of per capita income most parts of the new Member States will become eligible for assistance under Objective 1. The only likely exceptions are the city regions of Prague and Bratislava as well as Cyprus (unless there is a political settlement resulting in a unified Cyprus including the much poorer northern part joining the EU). The implementation of the Structural Funds in the new Member States will be a major challenge for the beneficiaries themselves, especially in view of the rather complex programming and implementation procedures outlined above.

2.3) Key aspects of the operation of the Funds

Since 1989 aid from the Funds is granted on the basis of the so-called 'programming approach', allowing the integration of different forms of regional support into an all-encompassing development plan. The idea behind this approach is to improve the coherence between individual measures and the co-ordination between the different institutions involved at EU, Member State and regional level. In practice the Commission adopts – relatively general – guidelines on common priorities for all Objectives, including e.g. a high degree of competitiveness and high levels of employment. Subsequently, national / regional development plans are drawn up by the national and/or regional authorities taking these priorities into account. Given that supported regions have often different problems and in view of country-specific preferences for certain regional policy instruments, national / regional development plans tend to differ significantly. Some Member States or regions put more emphasis on basic infrastructure or education whereas others prefer to strengthen business-related infrastructures or productive investments. On the basis of these development plans the Commission develops, together with the national or regional authorities, the more detailed Community Support Frameworks (CSF).[8]

It was sometimes argued that the influence of the Commission in regional policy design has become too strong and that the multi-stage programming arrangement has become too cumbersome. The complex programming system certainly creates a large potential for problems. The absorption of EU commitments by the Member States for instance was in some cases rather low, which has been blamed partly on the lack of efficiency of the national administrations (Tsoukalis 1997). The procedural changes for the 2000-06 programming period thus tried to simplify the process and – in order to enhance the national/regional role in the process – to decentralise the management of the programmes.

Another cause for the low absorption rates of the Funds in some Member States has been the Member States' unwillingness to provide the necessary co-financing to match EU funding. This co-financing is required by the 'Additionality Principle' (AP) which aims to ensure that EU funding increases total (national and European) expenditures for cohesion purposes.

Monitoring the AP is a highly complex task, at times resulting in legal disputes between the Commission and the Member States. As a result the Commission requires Member States to provide increasingly detailed financial information to ensure the appropriate implementation of the AP.

The effectiveness of EU structural policy depends on close cooperation between European, national and sub-national authorities. In this context the link between EU cohesion policies and non-spatial European and national policies is not unproblematic. CAP expenditures, for example, tend to favour the northern European Member States more than the cohesion countries. Furthermore, EU rules relating to the use of national state aids are still not fully in line with EU priorities in the field of regional policy. As a result the more prosperous Member States spend more on national state aids than the cohesion countries, thus to some extent offsetting the effects of the latter (Martin 1999).

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[8]   *The third step in the implementation process is the preparation of more detailed Operational Programmes (OPs).*

3)   Determinants of real convergence

3.1)   Convergence versus divergence theory

The question whether economic integration will lead to (real) convergence or divergence is hotly contested. 'Convergence theory' assumes that all regions have a technologically determined optimal capital intensity. Regional output and factor income will be below the utility-maximising level as long as the actual capital intensity in a particular region is different from the optimal capital intensity. However, according to convergence theory a sub-optimal capital intensity can not persist provided that there are no impediments to the free movement of goods, services, capital and labour. Economic integration across regions should thus by definition foster convergence, also in the absence of policy measures such as those financed by the Funds. According to the strongest form of convergence theory, economic integration will lead to identical production technologies in all regions and thus identical returns to labour and capital. 'Conditional convergence theory' relaxes this assumption and allows for regional / national differences in production technologies.

'Divergence theory' stresses the importance of lasting technological differences, transport costs, differences in regional economic structures and the importance of self-reinforcing agglomeration effects and economic clusters. Generally speaking, divergence theory predicts the development of a heterogeneous economic landscape within an integrated economic area such as the EU with significant differences in factor returns. Supporters of divergence theory thus argue that policy action is required to bring about regional convergence.[9]

Empirical observations for the EU provide partial support for both theories. Looking at the period since 1980 there is clear evidence in favour of per capita income convergence between the current EU Member States but less so at the regional level. This is partly because income gaps have increased between regions within Member States. The convergence process has been fastest during periods of high growth although it has never been fast enough to allow for a significant reduction of regional disparities in less than a couple of decades.[10] Regardless of the more fundamental question whether real income convergence will ultimately come about 'naturally' or not the establishment of the EU Funds suggests that the time horizon within which convergence could be expected is seen as politically unacceptable. The remainder of this chapter will thus address the question whether two of the main policy instruments used in the context of the Funds, namely infrastructure and human capital investments are likely to speed up (respectively ensure) the convergence process within the EU.[11] This provides of course no answer to the more far-reaching question whether such policy interventions are efficient from the point of view of aggregate EU welfare, which, however, is beyond the scope of this paper.

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[9]   *A useful overview of both strands of theory is for example provided in Barro and Sala-i-Martin (1995). On divergence theory see also Fujita, Krugman and Venables (1999).*

[10]   *With the exception of a couple of 'miracles' such as the catching-up process of Ireland (Canova 2001).*

[11]   *These sections of the paper benefited considerably from previous work by Lamo and Strauch (2001).*

3.2)   Infrastructure and real convergence

Public infrastructure can contribute to long-run growth by providing complementary inputs for private production and enhancing the productivity of private firms. However, this result depends on whether it crowds in more private investment than it crowds out by raising real interest rates and/or directly substituting for private investment. The transfer of resources from the private to the public sector could only be justified if the returns to public investment exceeded those of the private sector. In such cases public investment would be self-financing as it would lead to an expansion of output in excess of the financing costs of the public investment.

The economic literature suggests two rationales for the public provision of infrastructure, namely the public good case and the increasing-returns-to-scale / natural monopoly case. Although the two arguments are in fact somewhat contradictory, they lead to the same policy conclusions. The public good argument suggests that the private sector will under-provide infrastructure because it will not be able to appropriate a competitive return from providing the service.[12] The increasing returns-to-scale / natural monopoly case suggests that private infrastructure providers can charge prices above marginal costs and so provide fewer services than economically and socially optimal. These arguments led to the historic dominance of public infrastructure ownership in industrialised countries.[13]

The empirical evidence is mixed when it comes to assessing the net long-run benefits of public infrastructure. Clarida (1993) shows that public-sector capital can be positively correlated with standard measures of private sector multi-factor productivity. More recently, Hoffmann (2003) found a significant positive relationship between investment in public infrastructure and capital inflows in a cross sectional analysis of 30 developing countries. Empirical estimates of the positive effect of public infrastructure on private production generally increase with the level of aggregation of the data used. Aschauer has argued that this is because cost-benefit studies of local or project-based investments are unable to completely account for the indirect benefits that flow from public infrastructure. However, it is very difficult for aggregate level estimates to accurately account for the quality of public investment.

Another major methodological problem faced by empirical studies on growth and public infrastructure investment is reverse causality. Public investment is itself likely to increase as the economy grows and produces higher tax revenues, which in turn allow additional infrastructure projects to be financed. Some studies, using VAR models permit the explicit dealing with the causality issue. De Frutos and Pereira (1993) using data for the US find that output is not responsive to public investment in the short-run but a permanent shock to public capital of 1% induces a 7.4% increase in output after 10 years. Otto and Voss (1994) find for Australian data that the elasticity of output to public capital is 0.2 and that there is not reverse causation.

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[12]   *In practice, it is often difficult to establish what qualifies as a public good when it comes to infrastructure.Infrastructure can not always be considered as a pure public good. It is also possible that what once qualified as a public good might not do so at a later point in time due to technological progress (which lessens the problem of non-excludability) or the development of capital markets.*

[13]   *In recent years the role of the government as provider of infrastructure has been increasingly questioned (due to market distortions). The current tendency is rather to support public-private partnerships.*

In sum, there is reasonable evidence of positive effects of public investment on growth. However, the empirical growth literature shows that variables such as the public share of investment often become significantly negatively related with growth once aggregate (public and private) investment is held constant in cross-country regressions.[14] This suggests that the benefits of public investment are greatest in those countries with a low level of infrastructure capital stock but that as aggregate investment increases the benefits dry up and an increasing share of public investment might even start to negatively affect aggregate investment.[15] In this context the work by Biehl (Commission 1986, Biehl 1991) on the over- or under-utilisation of transport infrastructure in EU regions is interesting. He finds that over-utilised infrastructure is more often a growth constraint in core rather than peripheral regions. This in turn suggests that the identification of key infrastructure bottlenecks within countries and regions is crucial in order to ensure an appropriate return on public infrastructure investments.

3.3) Human capital and real convergence

Endogenous growth theory gives considerable importance to human capital as an explanatory factor for cross-country differences in technological change and long-run growth (see e.g. Lucas 1988). It is assumed that human capital, unlike (physical) capital and labour, has constant returns to scale and that countries can raise their long-run growth rates by raising their human capital stock through increased spending on education. The theory also takes into account that the social returns to individuals' investments in education might outweigh individuals' private returns. In such cases, government education subsidies would be warranted on the grounds that individuals would under-invest, resulting in a socially sub-optimal level of human capital.

Subsequent models incorporated the idea that human capital also increases the individuals' capacity to innovate as well as to adapt new technologies, thereby speeding up technological diffusion across countries and regions.[16] A key prediction of these models is that the level of educational attainment can increase the steady state growth rate of an economy by increasing its innovative capacity. Lagging countries are thus assumed to be able to close their 'technology gap' through education, which in turn also increases productivity and growth.

Overlapping generations models take into account that individuals' decisions to invest in human capital are partly dependent on the human capital accumulated by their parents. An interesting result of these models is that low-level development traps can arise if previous generations invested too little in education. This suggests another rationale for public education subsidies. The case for publicly subsidised education is reinforced if imperfect credit markets make it difficult for individuals to finance their

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[14] *See also Sala-i-Martin (1997).*

[15] *See e.g. Mas et al. (1996) for empirical work on the importance of infrastructure for productivity growth in Spanish regions. According to ECMT (1994) motorway construction in the Italian Mezzogiorno even damaged the productive sector in the Italian south by making products from the more competitive North of Italy relatively cheaper.*

[16] *See e.g. Aghion and Howitt (1998).*

education. Similarly, in the case of on-the-job training, firms may need to be given additional incentives in order to provide training if trained workers can subsequently leave the company.

Economic theory suggests a strong positive correlation between human capital accumulation and per capita GDP growth across countries. Growth accounting exercises provide some support to this prediction with increases in education attainment accounting for about a fifth of growth in output per worker (see for example Jorgenson et al 1987, Young 1995). However, an increasing amount of empirical evidence based on regression estimates offers more ambiguous results. Whereas the results of regression estimates based on cross-sectional data tend to support the theoretical predictions, the empirical results deteriorate when first-differences, fixed effects or specifications that incorporate the time variation element of the data are used.[17]

These empirical results can partly be attributed to deficiencies in the proxies used for human capital accumulation. Furthermore, many empirical tests are plagued by reverse causality as higher rates of human capital accumulation might themselves reflect higher expectations of growth and income.[18] More importantly, however, they reflect the persistent inability of existing growth models to fully explain the cross-country differences in total factor productivity (TFP) growth. More specifically, the results appear to reflect a wide range of omitted variables such as policy and institutional factors, openness to trade etc.

Overall, there seems to be some evidence that education is beneficial for growth. Furthermore, in view of the potential market failures outlined above, there appears to be also some economic rationale for the public sector to be involved in the human capital accumulation process. Some studies have also explicitly addressed the question how beneficial public education is in particular. Some papers find a positive although small effect of education spending on growth (Mankiw et al 1992, Kneller et al 1999, etc.). Using time series techniques (VAR) Cullison (1993) also finds that government spending in education and training has effects on economic growth. An important general result is that studies on the return of the different stages of education mostly find diminishing returns of education, primary education being the one with the highest return.[19] On-the-job training policies and adult education could be also very beneficial for growth but the available evidence relating to this aspect of human capital formation is still rather limited.

4)   Evaluations of the EU's Structural and Cohesion Funds

In line with the increasing political and financial importance of the Funds, evaluations of their economic and social impact have proliferated. The majority of these works are official ex-ante, interim and ex-post assessments of the different programmes.[20] Furthermore, a substantial number of academics are

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[17]   See e.g. De la Fuente and Domenech (2000).

[18]   See e.g. Bils and Klenow (2000).

[19]   For a list of references see Lamo and Strauch (2001).

[20]   A large number of evaluations are available at the website of the European Commission's Directorate General for Regional Policy (http://www.europa.eu.int/comm/regional_policy/sources/docgener/evaluation/rado_en.htm).

investigating the usefulness of the Funds although some of the academic work is in fact a by-product of EU-funded 'official' evaluations. Three main strands of work can be distinguished and will be selectively reviewed below. First, evaluations for specific projects or programmes. These can range from training initiatives and cross-border co-operation projects to particular infrastructure investments. This is almost exclusively 'official' work and it seems fair to say that the quality of the evaluations varies considerably (Bachtler and Taylor 1996). Second, there is an increasing body of – mostly academic – literature that tries to analyse the impact of the Funds using standard tools of empirical growth analysis. A number of papers use either aggregate public investment funding (national and European) or EU financial transfers as explanatory variable in Barro/Sala-i-Martin-type β-convergence regressions. Third, a number of macroeconomic models try to incorporate the impact of the Funds into their model framework. This third strand of evaluations is again dominated by commissioned work or is in fact conducted by the European Commission itself. Although these three types of analytical work are of course of a rather different nature, they suffer to some extent from common problems. First, the lack of sufficiently long and detailed regional time series for many variables limits the possibilities of using time series techniques and second, the time period during which the Funds have operated in their current form is relatively short. This is particularly problematic for the identification of possible Funds-induced long-term supply-side effects due to *inter alia*, enhanced human capital and better infrastructure. Such effects are indispensable for the Funds to have an impact on the recipient regions long-term growth performance. However, in contrast to the more easily identifiable short-term demand-side effects of the Funds, supply-side effects can only be identified with considerable time-lags.

Turning back to the three main strands of evaluations, the first type is somewhat less interesting from a macroeconomic perspective, although it is indispensable for making the right choices in designing projects and programmes supported by the Funds at the microeconomic level. A particularly interesting method to evaluate the general equilibrium effects of specific infrastructure projects co-financed by the Cohesion Fund has, however, been developed and applied by Venables and Gasiorek (1999). They investigate the welfare effects of these projects for the region where the project is located as well as for adjacent geographic areas by calibrating models based on economic geography. Applying this methodology to different projects shows that the inter-regional spill-over effects of major infrastructure investments depend strongly on the location of the project. Whereas they find that the completion of the centrally-located Spanish M-40 motorway (Madrid ring road) has strong spill-over-effects for large parts of the Iberian peninsula, the Tagus bridge in Lisbon and the Rias Baixas motorway in Galicia (Spain) have mainly a regional impact on transport costs and – although this is of course assumed rather than tested in the model – the location of economic activity.

The second strand of evaluations, econometric tests using cross-section or panel-data analyses of the impact of the Funds on growth and convergence, tends to be on balance somewhat pessimistic although there is some heterogeneity in the results. Canova and Marcet (1995) for example do not detect any significant impact of the Funds in their convergence regressions. The same holds for Vanhoudt et al. (2000), looking at the impact of public investment (national and European) in EU regions. By contrast, Ederveen et al. (2002) find that the Funds can contribute positively to convergence in EU regions.

However, this result only holds if indicators for institutional quality and corruption are included in the regressions.[21] The work of de Freitas et al. (2003) partly supports this view by concluding that the quality of national institutions appears to be positively related to regional income convergence in the EU. By contrast, eligibility for Objective 1 status under the EU Funds does not appear to exert a statistically significant impact. Beugelsdijk and Eijffinger (2003), however using a somewhat differently specified type of β-convergence regression find a positive impact of the Funds for income convergence. Interestingly they can not detect a significant impact of the quality of national institutions in the recipient countries on the effectiveness of the Funds. Midelfart-Knarvik and Overman (2002), finally, detect a significant impact of the Funds on the location of industry in the EU, which can be seen as an important indirect indicator for the Funds' effectiveness as a tool to foster income convergence. However, their results suggest that the Funds attract industries to countries and regions, which would not normally have a comparative advantage in these sectors.

Turning to evaluations of the Funds, which are based on macro-economic models, it should be kept in mind that the results of these evaluations can differ considerably, depending on the model specifications and – more specifically – the ways in which the models take the impact of the Funds into account.[22] The HERMIN models were specifically developed to gain comparable results for the economic impact of the Funds on the Cohesion Countries.[23]

HERMIN introduces the effect of the Funds on the supported economy in two ways. First, in the form of standard expenditure and income shocks and second via policy externalities arising from the enhanced infrastructure and human capital endowments due to Funds-supported investment. Externalities arise through increased TFP, an increased attractiveness for FDI and enhanced ability of endogenous industries to compete abroad.
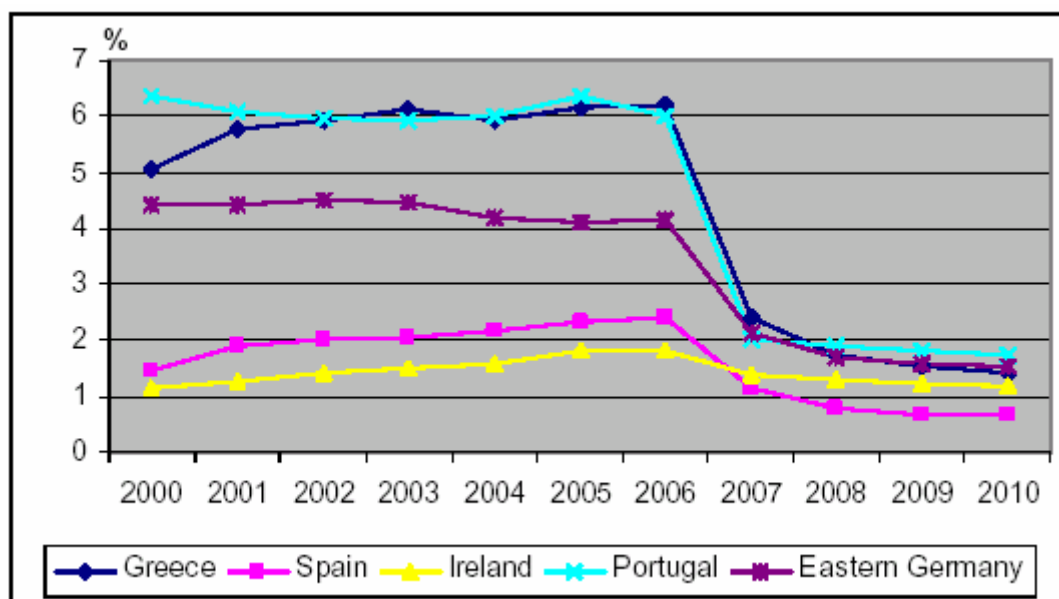
Figure 1 provides an overview of the estimated aggregate (demand and supply-side) effects of the CSFs in the Cohesion Countries and Eastern Germany, expressed as the percentage deviation from the baseline scenario. Funding is assumed to terminate after 2006 which allows a better identification of the estimated supply-side effects of the Funds on these economies.

Figure 1 HERMIN simulation results on the impact of Objective 1 CSFs 2000-06 on the level of real GDP in the Cohesion Countries and Eastern Germany (in % deviation from baseline)

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[21] *Interestingly, this positive result does not seem to hold once social cohesion variables are tested for, indicating that a strong degree of governmental redistribution hampers rather than supports convergence.*

[22] *This section is strongly based on the concise overview provided in Hallet (2002).*

[23] *HERMIN models were also developed for East Germany, the Mezzogiorno and some AC. The latter differ somewhat from the models for current EU Member States. More specifically, the short time series available for the AC require a more prominent use of calibration techniques.*

Source: Hallet (2002)

The results for Ireland and Spain seem rather low compared to those for Greece and Portugal, at least for the period up to 2006. With regard to Spain this is due to the fact that not the whole territory is eligible for Objective 1 assistance, yet the evaluation of the macroeconomic impact focuses on the Spanish economy as a whole. For Ireland, the explanation is similar. Objective 1 assistance in 2000-06 is gradually reduced so that the importance of the Funds for Ireland decreases. The result shows that the continuing annual supply-side effects for these five countries respectively 'macro-regions' are estimated by the HERMIN models in the order of 1 to 2% of GDP growth per year.[24]
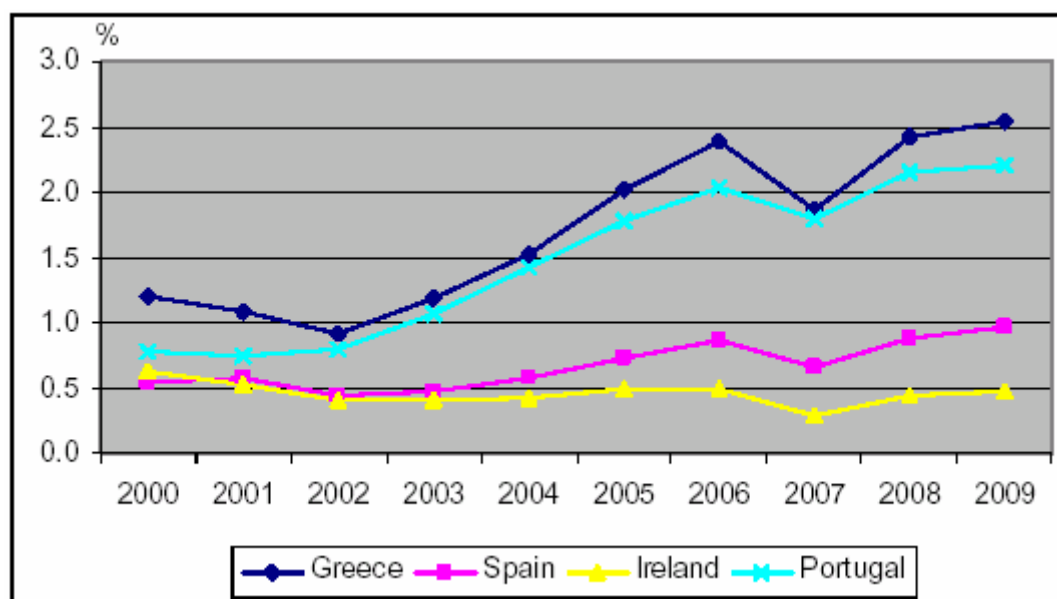
The European Commission's multi-country QUEST II model is forward-looking, with behavioural equations based on the intertemporal optimisation of households and firms. About 40 per cent of households' consumption depends on current disposable income and about 60 per cent on the life-cycle hypothesis. Furthermore, households foresee future tax payments arising from higher public expenditure. In contrast to the HERMIN models, real interest and exchange rates are determined endogenously, so that possible crowding-out effects can be taken into account. The macroeconomic impact of the Funds is modelled as an increase in the public capital stock, which in turn impacts on a neo-classical production function. The marginal product of the public capital stock is assumed to be 50 per cent higher than that of private capital and it is assumed to have positive externalities.

Figure 2 provides an overview of the QUEST II estimates for the aggregate (demand and supply-side) effects of the CSFs in the Cohesion Countries, expressed as the percentage deviation from the baseline scenario. As in the estimations reported in Figure 1, funding is assumed to terminate after 2006 which allows a better identification of the estimated supply-side effects of the Funds.

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[24] *Other variables tend to follow these patterns of GDP, i.e. there are increases in consumption, investment and employment while prices, public deficit and trade deficit tend to increase until 2006 as a consequence of higher demand, and to decrease afterwards due to an improved competitiveness.*

Looking at the 2000-06 period, the results of the QUEST II simulations for the Cohesion Countries are low compared to the HERMIN simulations. This is mainly due to the assumption of forward-looking expectations and the endogenous determination of real interest and exchange rates in the QUEST II model.[25] The HERMIN and QUEST II estimates for the supply-side effects are more similar, especially for Spain and Portugal but there are also some differences. Whereas the estimated supply-side effects for Greece are substantially stronger in the QUEST II model, the HERMIN model projects stronger supply-side effects in Ireland.

Figure 2 QUEST II simulation results on the impact of Objective 1 CSFs 2000-06 on the level of real GDP in the Cohesion Countries (in % deviation from baseline)

Source: Hallet (2002)

To sum up, whereas the short-term redistribution and demand effects of the Funds are more easily identifiable and relatively undisputed, there is still considerable uncertainty about the long-term supply-side effects of the Funds on economic convergence in the EU. The emerging 'smallest common denominator', also keeping in mind the more general review of the impact of infrastructure and human capital on economic growth, is that well designed measures to upgrade physical infrastructure and to increase human capital are likely to have a positive impact on growth. This holds in particular in regions

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[25] *The long-term employment effects estimated by QUEST II are modest due to the downward effect of productivity improvements on prices, which drive up real wages. The relatively strong openness of the cohesion countries is reflected in an initial deterioration of the trade balance. The appreciation of the real exchange rate – due to the effects on the price level – squeezes profits and crowds-out private investment.*

such as most AC where infrastructure and human capital are likely to represent growth bottlenecks. After all, even Boldrin and Canova (2003) conclude in their very sceptical assessment on the role of regional policies in the EU enlargement process that "efficient transport and communication infrastructures" and a "high level of human capital" are two of the key 'ingredients' for sustained above-average economic growth.

5)   Conclusions and policy recommendations

Since the late 1980s the Funds have become one of the most important policy fields of the Union. In terms of budgetary importance they are only surpassed by the Common Agricultural Policy and the future design of regional policy in the (enlarged) EU is one of the most hotly debated issues in EU politics.

Although the large body of work evaluating the effects of EU regional policy does not arrive at uniform conclusions, on balance the results suggest that EU regional policy can have a positive long-term impact on economic growth in the recipient countries and regions. At the same time, however, many observers of EU regional policy flag that the current system of regional support could be further improved. A further increase in the level of spatial concentration of support and further simplifications of the procedures would *inter alia* appear desirable. Furthermore, the co-ordination between EU regional policy, national regional policy and non-spatial European and national policies could be further improved. These are long-standing requests, which have only partly been taken into account at the beginning of the 2000-06 programming period. Looking at the functional allocation of the Funds, it would seem useful to further strengthen their focus on physical and human capital building. This could be done at the expense of somewhat more direct forms of business support, which are currently provided under the heading 'support for the productive environment' and which tend to be more prone to rent-seeking activity. Instead, the empirical analyses reviewed above suggest that improvements of the administrative capacity of Member States should become a new priority for the Funds.[26] Finally, in view of the fact that enlargement will shift the main dimension of income differences within the EU from regions to countries, it would seem logical that the allocation of funding becomes more strongly based on national socio-economic characteristics – thus following the example of the Cohesion Fund rather than the Structural Funds.[27]

The empirical work on growth and convergence reviewed above also provide some more far-reaching recommendations as to how spatial economic imbalances within the EU should be tackled. In this context it is of considerable importance to keep in mind that the Funds can only exert a positive impact on real convergence if the supported countries are characterised by a stable macroeconomic environment and institutional and microeconomic structures that are conducive to growth. The former includes a low level of inflation and sound budgetary policies. The economic policy framework of the EU in combination with a monetary policy focused on maintaining price stability helps to ensure a growth-enhancing macroeconomic environment. The latter includes inter alia a regulatory framework that facilitates the

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[26] *On this aspect see also Sapir et al. (2003).*

[27] *This assessment is shared by a large number of commentators such as Hallet (2002) and Sapir et al (2003).*

setting-up and growth of endogenous companies as well as FDI, a business-friendly tax system, sound financial markets, efficient transport and communication infrastructures and a high level of human capital endowment in the workforce. Furthermore, Member States and regions should look more closely at the link between factor returns and productivity in order to ensure for example that wage-setting systems take local productivity differences sufficiently into account.

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