

THE GROWTH EFFECTS OF EU COHESION POLICY: A META-ANALYSIS

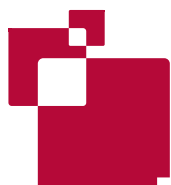
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Highlights

- We run a standard income convergence analysis for the last decade and confirm an already established finding in the growth economics literature. EU countries are converging. Regions in Europe are also converging. But, within countries, regional disparities are on the rise.
- At the same time, there is probably no reason for EU Cohesion Policy to be concerned with what happens inside countries. Ultimately, our data shows that national governments redistribute well across regions, whether they are fiscally centralised or decentralised.
- It is difficult to establish if Structural and Cohesion Funds play any role in recent growth convergence patterns in Europe. Generally, macroeconomic simulations produce better results than empirical tests. It is thus possible that Structural Funds do not fully realise their potential either because they are not efficiently allocated or are badly managed or are used for the wrong investments, or a combination of all three.
- The approach to assess the effectiveness of EU funds should be consistent with the rationale behind the post-1988 EU Cohesion Policy. Standard income convergence analysis is certainly not sufficient and should be accompanied by an assessment of the changes in the efficiency of the capital stock in the recipient countries or regions as well as by a more qualitative assessment.
- EU funds for competitiveness and employment should be allocated by looking at each region's capital efficiency to maximise growth-generating effects or on a pure competitive.

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SUMMARY

- We run a standard income convergence analysis for the last decade and confirm an already established finding in the growth economics literature. EU countries are converging. Regions in Europe are also converging. But, within countries, regional disparities are on the rise.
- At the same time, there is probably no reason for EU Cohesion Policy to be concerned with what happens inside countries. Ultimately, our data shows that national governments redistribute well across regions, whether they are fiscally centralised or decentralised.
- It is anyway difficult to establish if Structural and Cohesion Funds play any role, good or bad, in the recent growth convergence patterns we describe for Europe. The literature on the topic is inconclusive. Generally, macroeconomic simulations produce better results than empirical tests. It is thus possible that Structural Funds do not fully realise their potential either because they are not efficiently allocated or are badly managed or are used for the wrong investments, or a combination of all three.
- Nevertheless, a few regularities emerge in the literature and partially also in our empirical test. EU funds contribute to growth convergence i) if used in a supportive institutional environment, ii) in the presence of a decent industrial structure and some R&D intensity, and iii) when used for soft and not just hard investment.
- To the extent that the EU should not be concerned with regional disparities in each country (or not all of them), a larger share of the EU budget should go to countries instead of regions at any level of development.
- Structural and Cohesion Funds should be used in particular i) to reinforce (rather than substitute) Governments' geographical redistribution schemes, ii) to compensate losers from product market liberalisation, iii) to guarantee that SMEs have access to local credit, iv) for the purpose of supporting sectoral re-allocation in the whole country or across regions in each country. Disparities stemming from geography and efficient concentration of economic activities in well served regions should not be treated.
- *Ex-ante* institutional conditionality is important for the success of EU-funded investment, as suggested in the Commission's proposal for 2014-2020. Cohesion money should be allocated to countries that respect EU laws especially those pertaining to the single market and display a good record in the transposition of EU directives. At the regional level, technical assistance represents an important instrument for improving institutional capacity.
- Standard income analysis has but limits when it comes to assess the effectiveness of EU cohesion spending. As the objective of the post-1988 Cohesion Policy is to raise the marginal efficiency of capital in the periphery, any ex post assessment should also concentrate on this particular dimension and be juxtaposed to income convergence analysis.
- Structural Funds to rich regions should be allocated either by looking at the marginal efficiency of capital in each region, a condition that maximises the return to investment, or on a purely competitive basis by means of open calls.

1. INTRODUCTION

The EU uses about one third of the EU budget to run Cohesion Policy with the objective of promoting the Union's "overall harmonious development" and in particular "reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions"¹. This is done under the general assumption that market forces are unable to deliver such a result, for one reason or the other.

Reducing regional disparities in income (ie output) levels alludes to the fact that the distribution of income should become more equitable over time. Economists use the expression σ -convergence (sigma-convergence) to indicate that income is distributed more equally across regions (or countries) compared with the past. But the objective of reducing "the backwardness of the least favoured regions" signals that EU Cohesion Policy is also about fighting underdevelopment and poverty traps in the regions that are the least likely to take advantage of economic liberalisation². Economists use the term β -convergence (beta-convergence) to describe the catching-up process whereby poor regions (or countries) grow faster than rich ones to approach the "common income level"³. The concept of β -convergence is the empirical counterpart to the neoclassical growth model, for which investment is higher in low-income regions (or countries) given increasing returns to capital, which explains why – all else being equal – they shall grow faster than high-income regions where investment in fact generates decreasing returns to capital.

EU Cohesion Policy is largely a redistributive policy with eighty percent of all Structural and Cohesion Funds going from rich to poor regions of Europe⁴. However, the objective of the modern EU Cohesion Policy is not simple income redistribution. In one official document published in 2001 it is stated that "cohesion policies are aimed at increasing investment to achieve higher growth and are not specifically concerned with expanding consumption directly or with redistribution of income"⁵. Structural and Cohesion Funds are meant to increase returns to investment in the periphery through the provision of collective goods such as infrastructures, information networks, research and development, better skills, etc⁶. The goal of investing for growth in the periphery is embedded in a distinct vision of the impact of market liberalisation on inequalities that owes to the new economic growth models emerged in the 1980s and 1990s in substitution of the neoclassical growth model: regions that are advanced promise higher rates of return to investment than regions that are less advanced due, for example, to the presence of a minimum stock of physical capital and/or public infrastructures. Mobile production factors are attracted towards them, which would create agglomeration effects, enhancing the divide between the core and the periphery⁷.

Whether EU cohesion policy can deliver on growth convergence and economic growth in general is important for at least two reasons. First, European leaders have repeatedly advocated the use of Structural Funds to stimulate growth in vulnerable countries, especially those under financial assistance (ie Greece, Portugal). Their actual capacity to generate growth and the conditions under which this is more likely to happen determine the extent to which the recent proposals are truly relevant. Second, emphasis has been recently put on the idea of transforming the EU budget into an

¹ Art.174 of the Treaty on the Functioning of the European Union (TFEU).

² The next section describes how the link between economic integration and equity has been differently conceptualised over time.

³ This is a somewhat vague expression to refer to what economists call the long-run steady state.

⁴ Eighty percent of cohesion spending agreed under the Multiannual Financial Framework (MFF) 2007-13 serves in fact the so-called convergence objective, providing Structural Funds to regions, whose GDP per capita is below 75 percent of the EU27 average and Cohesion Funds to countries, whose GDP per capita is below 90 percent of the European average.

⁵ European Commission (2001), p.177.

⁶ Hooghe (1998).

⁷ See for example Krugman (1991).

instrument for growth and the same approach dominates the proposal of the European Commission for the next Multiannual Financial Framework (MFF) 2014-20, which is under negotiation. The “redistribution of growth opportunities”⁸ is not the sole objective of EU cohesion policy. Rich regions receive funding too. Sixteen percent of EU cohesion spending is earmarked for relatively high-income regions to improve their competitiveness and employment conditions.⁹ Whether EU funds are growth-enhancing also in the advanced regions is as important as their capacity to contribute to the catching up of the less advanced regions¹⁰.

In this paper we provide updated evidence on σ and β -convergence in Europe so as to verify whether the recent empirical evidence is consistent with the final objectives of EU Cohesion Policy. However, the crucial question is if Structural and Cohesion Funds play any role in the multifaceted process of convergence currently taking place in Europe. The existing research on the growth effects of EU funds is rather inconclusive. In general, macroeconomic simulations produce better results than direct empirical tests. This suggests that Structural Funds have the potential to generate growth but they do not (or not enough) either because they are inefficiently allocated¹¹ or poorly managed or used for the wrong investments. We will discuss the different approaches that have been used in the literature and the main reasons why their results differ so much from each other. The review of the literature is also an opportunity for providing an analytical tool-kit to assess the performance of EU Cohesion Policy in the light of its intended purposes. The discussion will also lead us to question the opportunity of sticking to simple income convergence analysis when analysing growth dynamics in EU-funded regions.

This paper is constructed as follows. Section 2 describes how the remit of EU cohesion policy has evolved over time. As policy effectiveness is a function of the intended objective, it is important to explain what EU cohesion policy is trying to achieve today compared with the past. Section 3 provides original evidence on the evolution of regional disparities in Europe. Section 4 is a meta-analysis of the literature that has studied the growth effects of Structural Funds. Section 5 provides an analytical tool-kit for assessing EU cohesion policy and provides policy recommendations for the future.

2. THE HISTORICAL PHASES OF EU POLICY

Whether EU Cohesion Policy is effective or not depends on its explicit objectives. Whilst EU Regional and later Cohesion Policy has been mostly about the elimination of income disparities and the fight against regional underdevelopment, the EU approach has changed over time along a number of significant dimensions: i) the assessment of prevailing market conditions; ii) the belief about the direction in which market forces push; iii) the underlying economic model that predicts such direction; iv) the type of disparities that might naturally emerge, whether small or large; v) the rationale for intervention; and vi) the policy instruments¹².

Concern for disparities is already expressed in the Treaty of Rome (1957), where it is stated that “*the aim of the community is to develop throughout the community a harmonious development of*

⁸ We use this expression to convey the idea that EU Cohesion Policy is indeed a redistributive policy but is not concerned, as explained above, with the mere redistribution of income from rich to poor countries.

⁹ Finally, four percent goes to 'territorial cooperation', which is thematic and independent of recipient countries relative income levels.

¹⁰ It should be noted that the criteria for distributing funds to rich regions are not explicit. Funds for the objective of regional competitiveness and employment are given to all regions that do not qualify for convergence money, formally as a function of size. But there is no explicit efficiency criterion, for example. Indeed Santos (2011) shows that there is no relationship between the size of funds received by each rich region and the return to capital in each region.

¹¹ For a critical assessment, see for example Santos (2011).

¹² See Table 1 in Appendix.

*economic activities, a continuous and balanced expansion, an increased stability, an accelerated raising of the standard of living and closer relations between its Member States*¹³. The European Economic Community (EEC) of the late 1950s was meant to foster market integration through the elimination of all existing barriers to trade. It was believed that free markets would lead to convergence in income levels, as in the predictions of the neoclassical growth model, and that only some categories of workers may be left out of the process, which explains why the only fund that was conceived at the time was the European Social Fund (ESF). Moreover, at this very early stage of the integration process, the relevant unit of analysis was mostly the country.

It was soon realised that the free-market scenario was an imperfect representation of the European common market, which in the 1970s remained highly fragmented due to the persistence of other non-tariff barriers ranging from technical standards to exchange rates and consumer preferences. At the time, the underlying theoretical model was still the neoclassical growth model, often combined with the technological gap literature. The former assumes that poor regions grow faster than rich ones because decreasing returns to capital imply that investment is remunerative only if the capital stock is low. The technological gap literature assumes, in a similar fashion, that poor regions grow faster than the others but just because they imitate technology produced at high costs elsewhere. Whilst the theoretical assumption is still that free markets deliver convergence, actual market fragmentation implies that some regions are likely to suffer from economic integration more than others if, for example, poorer regions do not have access to external capital due to the presence of barriers to capital mobility and the free movement of banking services, whilst rich ones have the option of using their own local capital. The EU regional policy that developed in the 1970s and marked by the creation of the European Regional Development Fund (ERDF) in 1975 shifted the focus of attention from countries to regions and aimed at providing compensations or side-payments to potential losers.

The late 1980s are associated with a paradigm shift in the understanding of growth dynamics and in the appreciation of regional policies. The Cohesion Policy of the EU as we know it came into existence in 1988 shortly after the enlargement of the EC to Spain, Portugal and Greece. It was meant to complement the project for the completion of the Single European Market (1987-92). At the time it was in fact believed that market integration increases regional disparities, as mobile factors of production move to core developed regions where returns to investment are highest¹⁴. In other words, the neoclassical growth model was substituted or rather associated with the endogenous growth theory and the new economic geography literature, according to which free markets inevitably generate agglomeration effects (ie income disparities) because economic activities tend to concentrate in technologically advanced areas. The Single European Act (SEA) of 1987 introduced the term “cohesion” and subsequent reforms in 1988 and 1993 significantly augmented the size of the new Structural and Cohesion Funds. The rationale for intervention was thus different from the past. EU Cohesion Policy does not provide compensations to losers but aims to create the conditions for increased returns to investment also in the periphery through the provision of collective goods such as infrastructures, information networks, research and development, better skills, etc¹⁵.

Today’s EU cohesion policy is largely indebted to the reform of 1988. Free markets are believed to generate agglomeration effects with economic activities concentrating more in some areas than in others. But compared with the past, the official view is that it is also important to raise the Union’s overall growth potential, which alludes to the fact that concentration of some types of investment in technologically advanced regions should not be excluded a priori¹⁶.

¹³ Art.2 of the Treaty of Rome.

¹⁴ Padoa Schioppa (1987).

¹⁵ One strong argument was that, by doing so, EU Cohesion Policy would also contribute to creating a more efficient single market, see Hooghe (1998).

¹⁶ There is obviously a tension between the efficiency and the equity objective of EU Cohesion Policy, see for example Martin (1999); Canova and Boldrin (2001).

3. RECENT CONVERGENCE TRENDS

Convergence is the process that describes the progressive elimination of disparities in income levels. The growth economics literature has isolated two types of convergence: σ - and β -convergence¹⁷. The former indicates whether the distribution of income across regions (or countries) has become less or more uneven over time. The latter describes the mobility of income within the same distribution and tackles the question of whether poor regions (or countries) have grown faster than the others.

The results from convergence analysis are normally used to test for the validity of the neoclassical versus the endogenous growth model. The neoclassical growth model predicts β -convergence, independently of whether there is no capital mobility, partial capital mobility or full capital mobility¹⁸. On the other hand, the endogenous growth model predicts divergence under full capital mobility. It is not anymore true that there are decreasing returns to capital. By contrast, high capital stocks are a guarantee of ever increasing returns, which explains why, under capital mobility, factors of production tend to move towards rich (high-capital-stock) areas where the return to investment is highest, thereby enhancing the divide between the core and the periphery. Some more recent literature however questions the usefulness of convergence analysis to test theoretical growth models¹⁹. This is also because convergence may be consistent with the endogenous growth model under, at least, two assumptions. First, the mobility of factors of production is impaired. Second, economies are multi-sector, with the result that convergence may occur if divergent developments in one sector are cancelled out by developments in another sector²⁰.

3.1. σ -convergence

We assess here whether the distribution of income has become more or less equitable in the last fifteen years. Chart 1 (a) looks at the dispersion of GDP per capita expressed in purchasing power standards (PPS) across European countries from 1995 to 2009²¹. We distinguish between euro area and non euro area countries to see whether enhanced mobility of factors of production, supposedly higher within the euro zone, leads to more or less intra-area convergence. Cross-country dispersion in income has been on the downside in the last decade across the Union as a whole. The fall in dispersion is slightly more pronounced for non euro zone countries. The result is not necessarily consistent with the neoclassical growth model, for which deeper market integration leads to faster convergence. But it is also true that non euro zone countries in this period entered the single European market, of which a single currency is only one, albeit important, element. The evidence speaks in favour of a more equitable distribution of income also across European regions²².

¹⁷ Barro and Sala-i-Martin (1992); Sala-i-Martin (1996).

¹⁸ See for example Sala-i-Martin (1996).

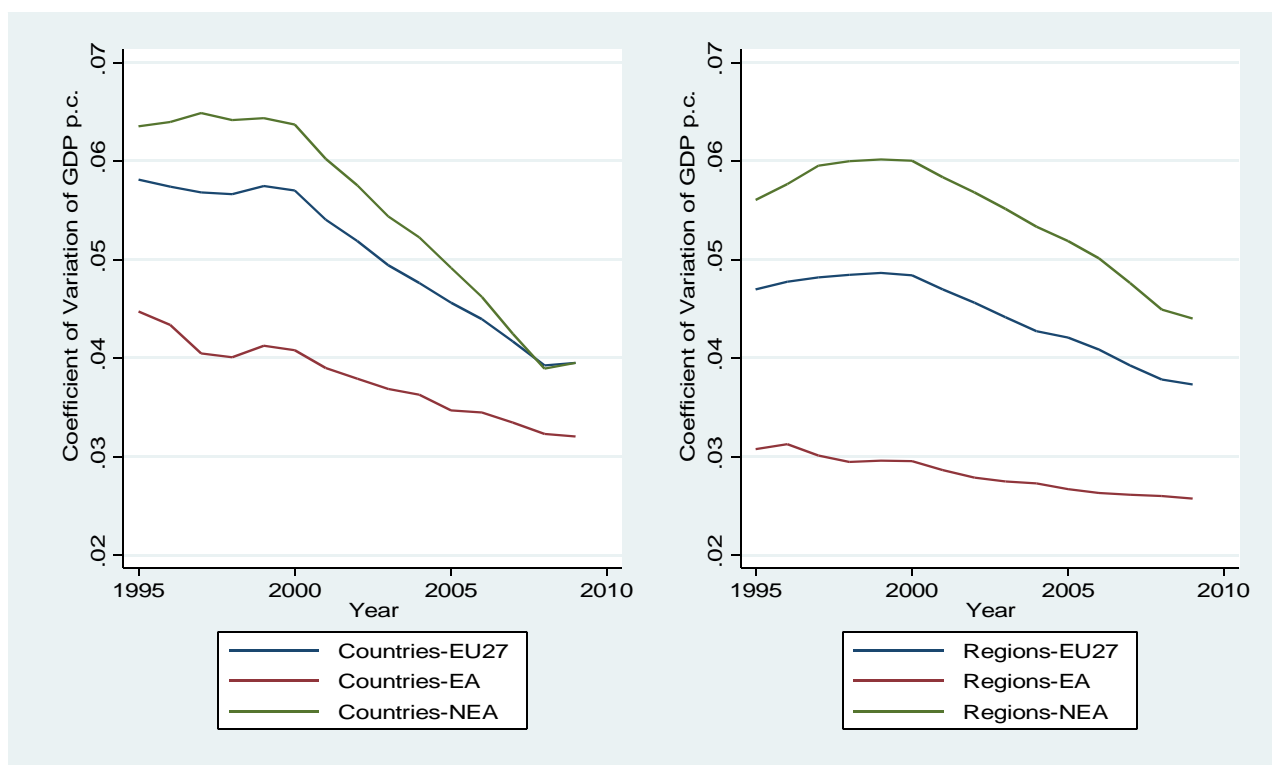
¹⁹ Magrini (2004).

²⁰ For example, rich regions engaged in manufacturing activities may continue attracting capital because initial levels of technology and quality of human capital importantly affect the size of the return to investment. On the other hand, poor regions may attract capital for investing in real estate, a sector for which there is not the sustained process of cumulative growth described in the "new economic geography" literature. Ultimately, figures on GDP per capita may reveal a convergence pattern but the setting in which this happens is consistent with the one envisaged by endogenous growth models, with capital attracted by expected returns from investment in the high-productivity manufacturing sector.

²¹ The variable is expressed in logs.

²² We do not control here for country-fixed effects.

CHART 1: DISPERSION OF GDP ACROSS COUNTRIES (a) AND REGIONS (b), 1995-2009
 (a) (b)



Source: Bruegel based on data from EUROSTAT.

Figures in Chart 1 also suggest that the convergence trend is less pronounced when using regional rather than country-level data. This is because national average GDP levels have grown closer to the EU average largely thanks to the strong performance of core regions in each country, but within countries regional income levels continue to diverge, which explains why the convergence pattern is more timid when pulling all regions together. This interpretation is confirmed by within-country regional data. Chart 2 (a) provides evidence of rising within-county dispersion in regional GDP per capita. All in all, whilst income is more equally distributed across European countries and regions, it is less equally distributed across regions in the same country²³.

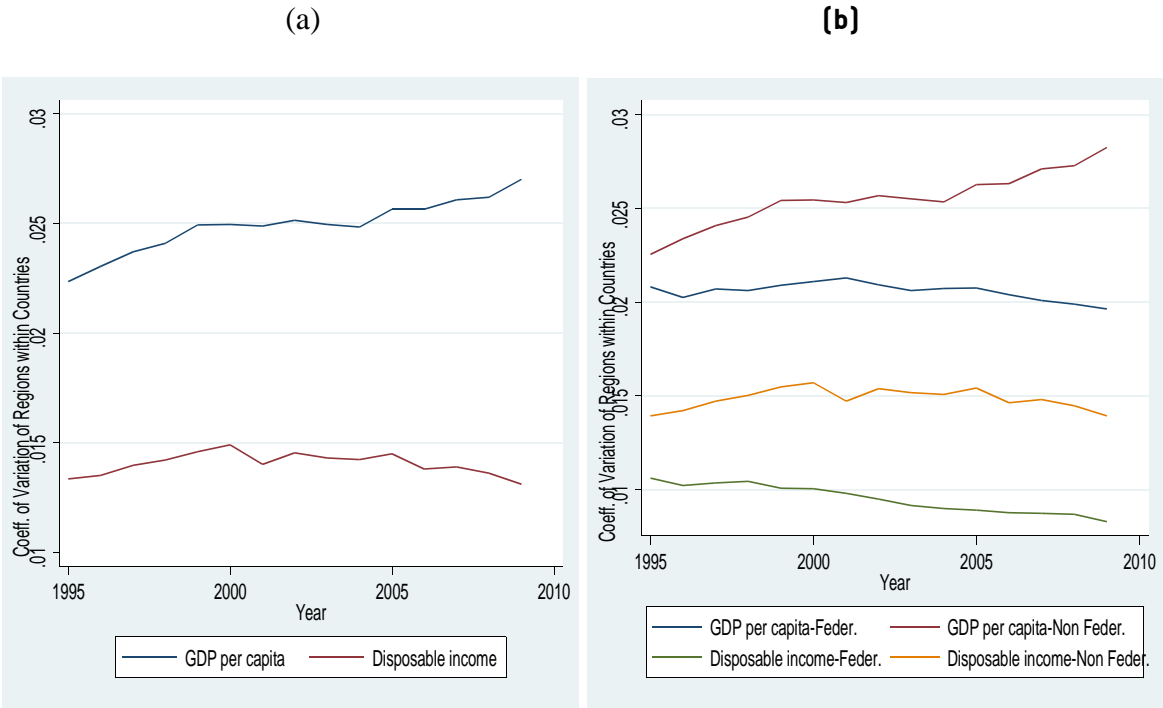
In Chart 2, we also provide figures for disposable income. The comparison between GDP and disposable income per capita allows us to determine the extent to which fiscal policy variables are responsible for regional redistribution patterns in each country. Figures in Chart 2 (b) shows that the dispersion in disposable income (after taxes and benefits) is lower than GDP dispersion, confirming that national governments perform an important redistribution function across regions²⁴. There is furthermore no clear evidence that fiscally decentralised countries are better capable of redistributing across regions than fiscally centralised countries²⁵.

²³ This pattern is not new and has been already detected for previous periods, see for example Barca Report (2009).

²⁴ Other analyses come to the same findings, see Checherita, Nickel and Rother (2009).

²⁵ There is a growing body of empirical literature studying the relationship between fiscal decentralisation and regional inequalities. Large samples do not show any correlation, similarly to what we find here, but the relationship becomes significant when accounting for the level of development. Only in high-income countries is decentralisation associated with a more equal inter-regional income distribution. In middle- and low-income countries, decentralisation comes with greater regional equalities, see Rodriguez-Pose and Ezcurra (2010).

CHART 2: DISPERSION OF REGIONAL GDP AND DISPOSABLE INCOME WITHIN COUNTRIES, 1995-2009



Source: Bruegel based on data from EUROSTAT.

3.2. β convergence

Evidence of σ -convergence suggests that there must be also β -convergence²⁶. This is evident in the case of countries. Over the last decade the new Member States that started from below-average income levels have grown much faster than high-income countries. We limit the analysis to European regions, as the current EU Cohesion Policy is primarily concerned with developments at the regional level²⁷. We also restrict the sample to the period 2000-09 to account for the fact a large number of countries (and in turn regions) joined the EU just at the beginning of the twenty-first century²⁸.

We find the expected negative sign between initial GDP levels and the growth rate of GDP per capita, which is an indication of (moderate) unconditional β convergence across European regions (see Chart 3). However, the neoclassical growth model builds on a very restrictive assumption, namely that regions are identical but in the initial level of income. It seems but more realistic to assume that European regions vary from each other in terms of levels of technology, preferences for saving, population growth, etc. Economists use the expression conditional β convergence to indicate that poor regions grow faster than rich ones, after having controlled for other structural differences across them.

We produce a simple test of conditional β convergence by dividing our sample into three groups of regions under the simplifying assumption that regions in each group are relatively similar to each other in terms of the three most important conditioning variables identified in the literature (ie technology, propensity to save and population growth). We assume that structural differences, some at least, are a function of how each region compares with the rest of the EU in terms of initial income level (eg technology and saving preferences). The three groups are as follows: regions with GDP per capita below 75 percent of the EU27 average; those with GDP per head between 76 and 90 percent of the rest of the

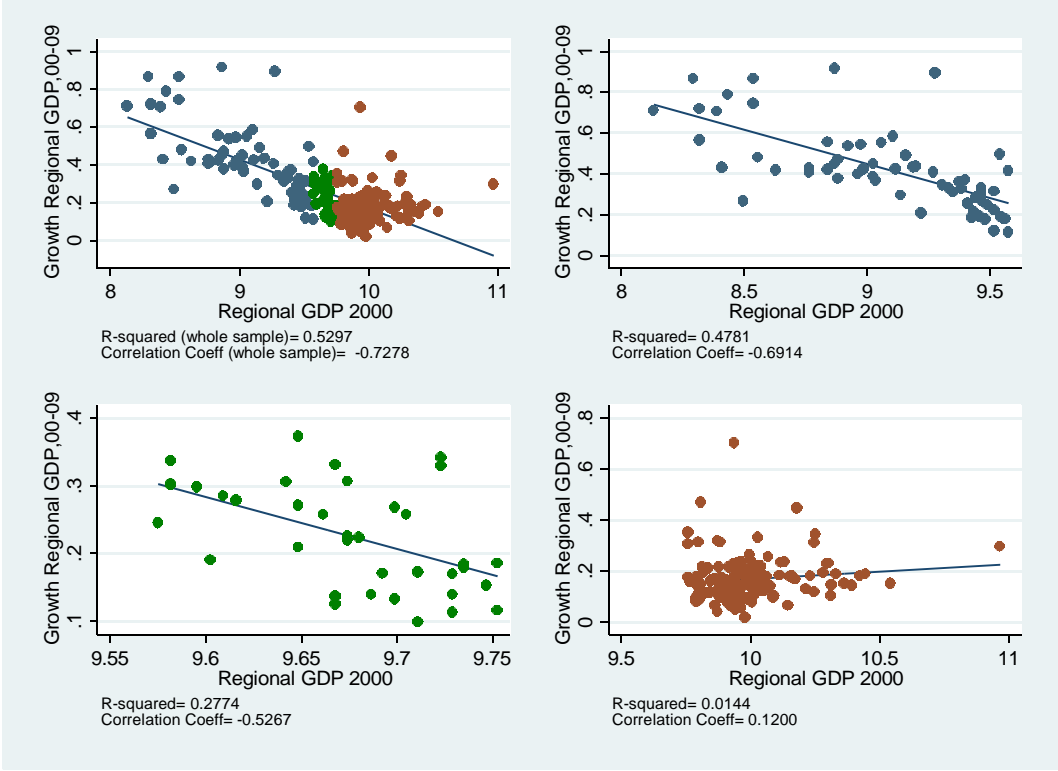
²⁶ Sala-i-Martin (1996).
²⁷ With the exception of the Cohesion Fund specifically designed for lagging countries.
²⁸ This is also when they started receiving cohesion funding from the EU.

EU; and a third group with GDP per capita above 100 percent of the EU27 average. This classification is relevant also because it mimics the eligibility criteria used to allocate EU funds to regions. In addition, it speaks to the literature that has identified “convergence clubs” or clusters in Europe, for which there is not a linear relationship between the initial level of income and successive growth rates but cut-offs (or break points) that justify the grouping of countries (or regions) into clusters²⁹.

Chart 3 relates initial levels of GDP per capita with growth over 2000-09. A convergence pattern is visible across the whole sample but the three groups behave differently. Low- and middle-income regions are on a convergence path with each other. High-income regions are instead relatively stable. If anything, they display a timid divergence pattern, implying that very rich regions grow faster than relatively less rich regions. Chart 4 displays the exact same analysis using disposable income as a variable. Interestingly enough, fiscal transfers are such that they convert the slight divergence pattern in rich regions into convergence. As above, the redistributive function of national fiscal policies is confirmed. Chart 5 uses yet another variable: GDP per capita relative to the EU27 average. The sign of the correlation is confirmed but the relationship between the initial GDP per capita and its growth rate is much weaker. There is a mathematical explanation behind it. The dynamics of absolute GDP per head suffers from a problem known as “reverse to the mean”, for which extreme values of one variable would look less extreme on a second-round observation, for almost a law of nature, which implies that absolute levels overstate convergence. By contrast relative GDP does, in a sense, control for the reverse to the mean by constructing a value in relation to the average in the same observed population.

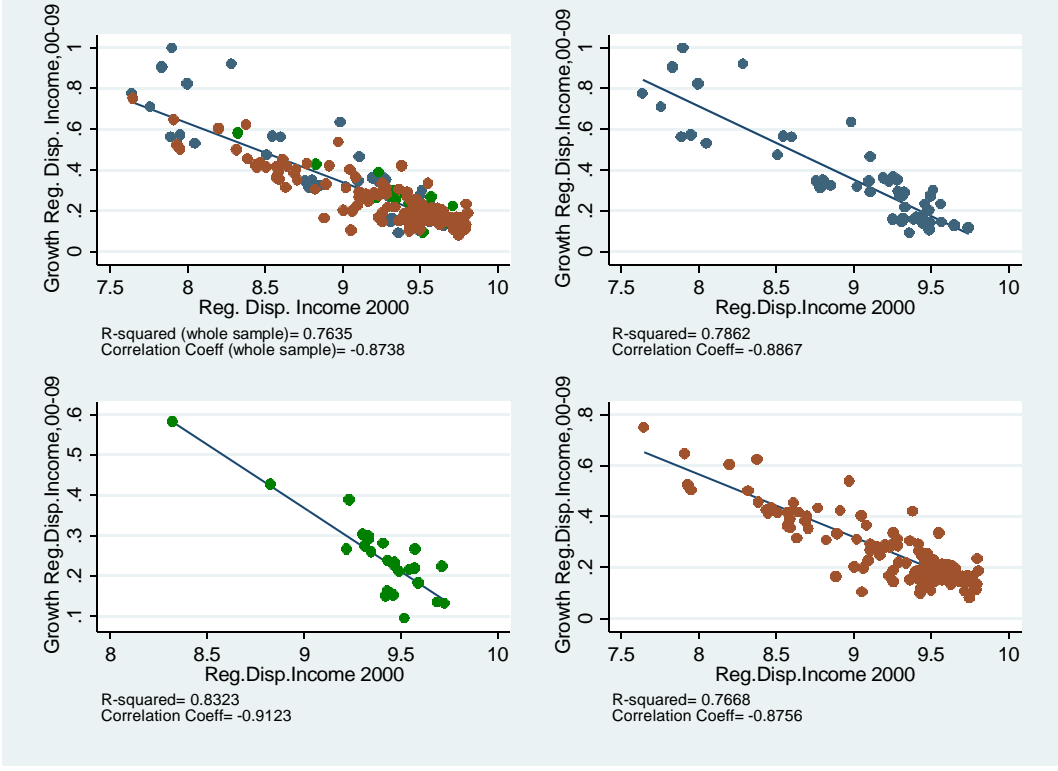
²⁹ Quah (1996).

CHART 3: β -CONVERGENCE OF GDP ACROSS GROUPS OF NUTS-2 REGIONS, 2000-09



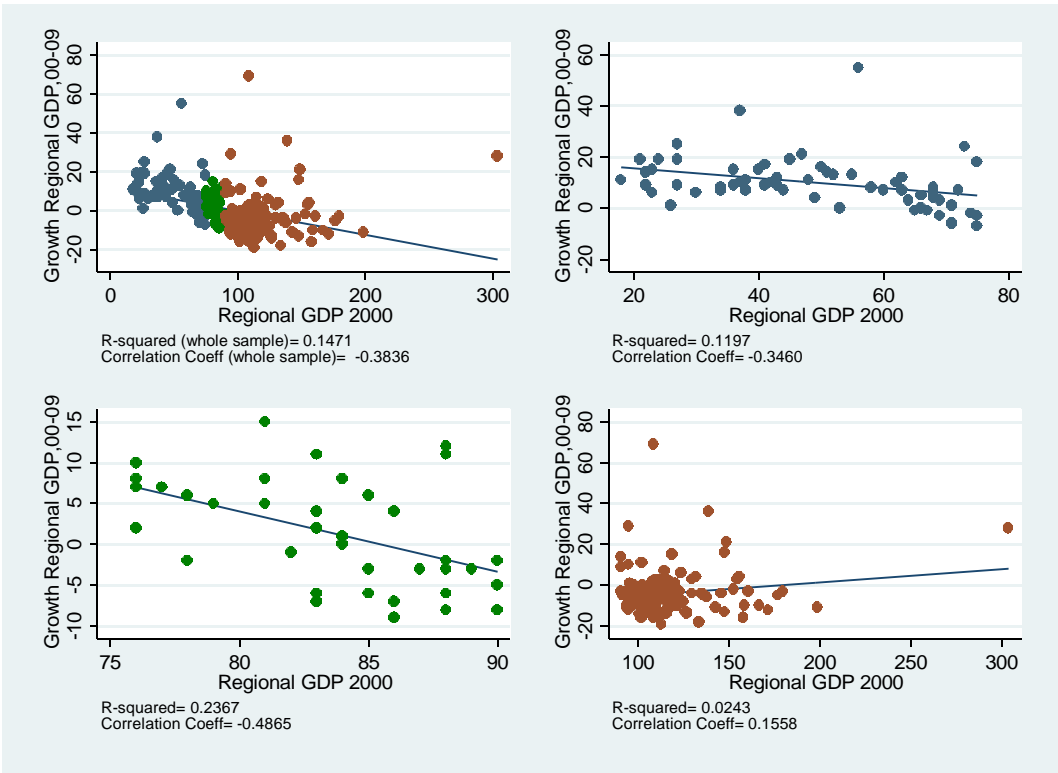
Source: Bruegel based on data from EUROSTAT.

CHART 4: β -CONVERGENCE OF DISPOSABLE INCOME ACROSS GROUPS OF NUTS-2 REGIONS, 2000-09



Source: Bruegel based on data from EUROSTAT.

CHART 5: β -CONVERGENCE OF RELATIVE GDP ACROSS GROUPS OF NUTS-2 REGIONS, 2000-09



Source: Bruegel based on data from EUROSTAT.

We have estimated growth dynamics econometrically and are thus able to say something also about the size or strength of convergence. We find that low-income regions converged at an annual rate of 3.7 percent between 2000 and 2009, middle-income regions at 8.5 percent, whilst high-income regions display a divergence pattern but this is in fact not statistically significant³⁰. However, when accounting for country-fixed effects, results change. Low-income countries are diverging internally at annual rate of 1.7 percent³¹. High-income countries also diverge, and the outcome is now statistically significant, yet at a lower 0.6 percent per year. The only countries that have been converging internally are middle-income countries, where the annual rate is 5.4 against 8.5 percent when country fixed effects are not accounted for³². These results corroborate a point made earlier: whilst European regions are converging with each other, regions in each country are in most cases diverging from each other (except for countries that are mostly populated by middle-income regions).

There may be numerous explanations behind the fact that middle-income countries have been able to reduce regional disparities at home at an annual rate that is much above standard estimations at around 2 percent a year³³. The neoclassical model predicts faster convergence under full capital mobility. Examples of countries populated by middle-income regions are Greece, Portugal and Spain. EMU may have fostered convergence for these countries because investors thought their capital stock was sufficiently low to be able to generate increasing returns to investment and/or that EMU was eliminating exchange rate but also default risks.

³⁰ The results are based on a cross-section analysis and displayed in Table 2 (Appendix).
³¹ We talk here of countries because, with country-fixed effects, we are de facto looking at countries that are mostly populated by low/middle/high-income regions.
³² See footnote 30.
³³ This is the typical speed of convergence estimated by the literature, see for example Barro and Sala-i-Martin (1992).

4. A META-ANALYSIS OF THE LITERATURE ON GROWTH EFFECTS

Structural and Cohesion Funds represent a significant share of recipient countries' GDP. Under the 2000-06 MMF, EU countries were allocated EU funds for an amount that was about 0.4 percent GNI, but reached 2 and 1.6 percent in Portugal and Greece respectively. The redistributive role of EU Cohesion Policy has become clearer after enlargement and the access into the Union of countries with income levels well below the EU average. Under the MFF running from 2007 to 2013, EU countries have been allocated average EU funds of about 1.38 percent of GNI, with marked differences across countries depending on starting conditions. The new Member States were allocated 2.60 percent of GNI, whilst older middle- to high-income Member States were granted about 0.35 percent of GNI, a figure that would but be sensibly lower if Greece and Portugal were excluded from this group of countries³⁴. All in all, the figures are comparable with the size of the Marshall Plan funds distributed to Europe after the second world war³⁵.

The crucial question is whether Structural Funds have played any role in the convergence patterns we have described above. This question speaks to the vast existing (neoclassical) literature that has attempted to quantify the impact of EU Cohesion Policy on growth convergence. The evidence is mixed and largely inconclusive, being very much dependent upon the approach and model specification used. The following sections discuss the practical problems each researcher has to face when trying to measure the growth effects of Structural Funds; how the findings change depending on the way in which practical and methodological problems have been solved; whether regularities may be still detected in the findings that go beyond differences in the approach, and if important aspects pertaining to the role of EU Cohesion Policy have been ignored or under-investigated by the existing literature.

4.1. Research problems

The exercise of estimating the growth effects of EU Cohesion Policy poses a number of methodological challenges. First, researchers need to find a way to disentangle the effects of cohesion support from market-driven dynamics given that the neo-classical model indeed predicts natural convergence even in the absence of external interventions. Fundamentally, they need to define the baseline, namely develop a method for establishing the regional growth dynamics in the absence of EU cohesion support. Once this is defined, the exercise is to calculate the deviation of GDP growth from the baseline in the presence of EU cohesion support. In a neo-classical framework, the exercise is simplified by the fact that the baseline is the growth rate conditional on a certain level of initial GDP and the growth effect of Structural Funds the extent to which the rate of convergence deviates from the baseline in the presence of cohesion support.

Second, researchers need to determine the counterfactual. Structural and Cohesion Funds are meant to finance medium- to long-term investments and not to subsidise consumption, which explains why they are normally modelled as shifts in investment. They have to build an assumption about whether EU support will add to existing public investment, partially substitute it or fully substitute it. Baseline and counterfactual are artificial constructions, which accounts for the fact that the literature may come up with dramatically different results.

Third, reverse causality is a serious constraint in econometric estimations. So, for example, large amounts of Structural Funds may be associated with high growth rates, but this may be due to the fact that low-income regions, which according to the neo-classical model grow faster than high-income regions, receive proportionally more at the outset given that the allocation method is based on initial levels of GDP per capita relative to the EU average. Moreover, Structural Funds payments may be

³⁴ Greece was allocated 1.4 percent of GNI, and Portugal 1.9 percent.

³⁵ Marzinotto (2011).

associated with strong growth just because, in good times, regions (or countries) are better able to co-finance projects and thus to mobilise Structural Funds payments.

Fourth, EU-funded projects are meant to contribute to extending regions' growth potential and thus tend to manifest their impact in the long-term, and especially so if they are used appropriately. This poses the question of when it is more appropriate to assess their growth effects.

Fifth, there are problems with data availability, as there is little information on the actual time profile of spending at the regional level, the themes and sectors each region is investing in, and local institutional variables that may hinge on the effectiveness of EU cohesion spending.

We discuss below how these problems have been addressed in the literature and with what results distinguishing between two different approaches to the study of the growth effects of EU Cohesion Policy: macroeconomic simulations and empirical estimations, and amongst the latter between indirect and direct tests.

4.2. Macroeconomic models

Macroeconomic models assess the *potential* impact of EU funds on economic growth but abstract from management failures. Moreover, whilst they are able to quantify the potential growth effects of different forms of investment (eg infrastructure, R&D or human capital accumulation), they abstract from the *actual* allocation of EU aid across themes and sectors in each country.

All these models estimate positive growth effects from cohesion spending but their size changes depending on the theoretical assumptions upon which the model is based. The two most vastly used models - HERMIN and QUEST – produce very different measures of the so-called cohesion-support multiplier³⁶. The HERMIN model concentrates on the short-term demand effects of additional public investment, whilst QUEST focuses on long-term supply side effects. Table 3 in the appendix summarises the main differences between the two models on the example of simulations conducted for the MFF 2000-06. In a nutshell, both recognise greater gains in the long-term but these are proportionally higher in the QUEST model. Moreover, the size of the multiplier in the short-term is systematically higher for “Objective 1” or “convergence countries” in QUEST, whilst HERMIN does not unveil a divide between an Objective 1 and a non-Objective 1 context. Finally, the QUEST model is also explicit about short- and long-term effects of different forms of investments and predicts that infrastructural projects have the strongest short-term effects, and human capital development the strongest long-term effects compared with all other forms of investment.

4.3. Empirical tests

Half-way between macroeconomic simulation and direct empirical tests are studies that base their evaluation of EU Cohesion Policy on indirect evidence. Researchers would first test the economic impact of different types of investment and then explain the growth effects of Structural Funds by differentiating between the types of projects they may fund. By and large, the available literature shows that the most growth-enhancing investments are infrastructure and education³⁷. But, as in macroeconomic simulations, they abstract from the *actual* allocation of EU funds across themes of intervention and sectors.

³⁶ Cohesion-support multipliers are calculated as the cumulative percentage deviation of GDP from the baseline divided by the cumulative percentage share of EU funds in national GDP.

³⁷ De la Fuente and Givès (1995).

Direct econometric estimations have the advantage of capturing the *actual* impact of EU support on economic growth, accounting for both management failures and the possibility that regions (or countries) have picked the wrong theme of intervention or sector. Econometric estimations use country-level data, European regional level data, or regional data in each country. They may be based on cross-section analysis or (dynamic) panel data. The choice of the unit of analysis and of the estimation technique by themselves drives the results in one or the other direction.

Just like in macroeconomic simulations, any econometric estimation needs to account for the baseline. The standard approach is to apply a neo-classical setting and assume that the baseline is determined by the initial level of income. Structural Funds are then included in a linear regression³⁸, so that positive results would suggest that EU funds support regions' natural transition towards higher levels of income³⁹. The majority of studies that use the neo-classical framework tend to find a positive, even if often small, impact of EU funds on growth convergence, especially in "Objective 1" or "convergence regions" (or countries)⁴⁰. Positive effects in poor regions are further enhanced when accounting for spatial effects such as proximity to technologically advanced regions⁴¹. There is however no consensus in the literature. Other studies do not find that the rate of convergence has been higher in funded regions in comparison with non EU-funded regions⁴². The choice of the control (or conditioning) variables is of course crucial. Regional growth is affected by multiple factors. Unobserved or omitted variables would lead to a biased estimate of the impact of Structural Funds⁴³. The most common result is that Structural Funds contribute to growth convergence conditional on a number of other features ranging from national membership⁴⁴, openness⁴⁵, a relatively advanced industrial structure and R&D intensity⁴⁶, fiscal decentralisation⁴⁷, a high-quality institutional environment⁴⁸, lack of corruption⁴⁹, and a stable macroeconomic environment.

4.4. Some common findings

In spite of the large variation in the results, one can still try to identify regularities in the evaluation of the growth effects of Structural Funds. These are as follows:

- EU funds have a large growth potential but may not deliver in practice either because they are poorly managed or used for the wrong types of investment.
- EU funds indeed contribute to growth convergence but mainly in the presence of a supportive institutional environment⁵⁰.

³⁸ The typical (cross-section) regression equation is:
$$\frac{\ln(y_{it}) - \ln(y_{it0})}{t - t_0} = \alpha + \beta_1 \ln(y_{it0}) + \beta_2 \ln(SF_{it0}) + \epsilon_1$$

³⁹ Some include an interaction between the initial level of income and Structural Funds so as to obtain a readable estimate of the size of the Structural-Funds coefficient, see for example Eggert et al (2007).

⁴⁰ García Solanes J. and R. María-Dolores (2001); Becker et al (2008); Ramajo et al (2008) ; Gaspar and Leite (1994). Some researchers have isolated convergence regions to address reverse causality, for which the poorest regions receive relatively more than richer regions.

⁴¹ Dall'erba et al (2008); Mohl and Hagen (2008).

⁴² Fagerberg and Verspagen (1996); Canova and Boldrin (2001); Dall'erba and Gallo (2008).

⁴³ The recent rise in spatial analysis owes to the attempt of reducing the problem of omitted variables.

⁴⁴ Fayolle and Lecuyer (2000).

⁴⁵ Ederveen et al (2003).

⁴⁶ Bussolletti and Esposti (2004); Cappelen et al (2003).

⁴⁷ Bähr (2008).

⁴⁸ De Freitag, Pereira and Torres (2003); Ederveen et al (2006).

⁴⁹ Beugelsdijk and Eijffinger (2005).

⁵⁰ The same finding is confirmed by studies looking at the economic impact of aid in developing countries (Burnside and Dollar 2000).

- EU funds deliver positive effects or enhanced positive effects when used for investment in regions that have at least a basic industrial structure and small agricultural sectors, even if they are “Objective 1 regions”.
- Not all forms of investments deliver (long-term) growth effects. Macroeconomic simulations suggest that the strongest short-term growth effect comes from infrastructures; in the long-run, human capital accumulation and R&D are the most growth-enhancing forms of investment.
- Empirical tests equally confirm that, in “Objective 1 regions”, only investment in human capital generates positive long-term effects on growth convergence⁵¹.

4.5. Missing links

Most studies look at the impact of Structural Funds in isolation from other policies that have a regional dimension, such as redistribution by the central government, approved state aid and broader industrial policy initiatives.

There is also comparatively little attention to the types of projects that may be financed with Structural Funds. Macroeconomic simulations provide an exact estimate of the potential short- and long-term effects of different types of investment, differentiating between infrastructure (or hard investment), R&D and human capital accumulation (or soft investment). Nevertheless, they abstract from the actual thematic and sectoral allocation of Structural Funds payments in the individual regions. Empirical studies have also ignored this dimension mostly due to limited data availability, with few noticeable exceptions⁵². The literature gap is unfortunate because it seems plausible to imagine that growth effects raise as are also a function of the sector of investment, being possibly higher if used in sectors, for which a country (or region) has a comparative advantage (ie a natural endowment unexploited due to lack of finance) or a competitive advantage (ie an established value creating strategy that may or may not depend on natural resource endowment)⁵³.

One simplistic way to test for the impact of different forms of investment is by differentiating between EU Cohesion Policy Objectives, under the assumption that “Objective 1” or “convergence regions” will mostly use funds to finance hard investment and all others to finance also or only soft investment projects. We find, for example, that in poor regions, where Structural Funds are mostly used to finance infrastructural projects, the annual rate of convergence is 3.7 percent against a more robust 8.5 percent in middle-income regions that arguably spend more on soft investment. The results change when accounting for national membership and looking at inter-regional disparities in each country. Hard-investment (“Objective 1”) countries have witnessed a rise in inter-regional disparities. Only countries that have a predominance of regions whose GDP is between 75 and 90 percent of the EU27 average display a clear convergence pattern across all model specifications, which suggests that GDP convergence in each country is facilitated by a mixture of hard and soft investment in countries that start already from a minimum (threshold) stock of physical and human capital⁵⁴.

Researchers generally find that EU funds contribute to growth convergence in low-income regions but not or less so in high-income regions. Such a result is mostly driven by the fact that the estimate is done in a neo-classical framework, in which it is assumed that there is a linear negative relationship between initial GDP level and growth rates. And yet, as we show with our data on β convergence, the

⁵¹ The size of the effect is likely to depend on the degree of labour mobility.

⁵² See Rodriguez-Pose and Fratesi (2004), however the authors use commitments in different priority areas rather than actual spending, and Checherita, Nickel and Rother (2009), where instead actual expenditures are accounted for.

⁵³ Concentrating investment in sectors in which a country or region has a competitive advantage implies that some agglomeration may indeed occur, but not all agglomerations are to be fought.

⁵⁴ The test is run using panel analysis (with country and time fixed effects). The results are available upon request.

relationship is clearly non-linear implying that a different modelling is required, which would lead to potentially different results⁵⁵.

Linked to the point made above, most empirical tests study the impact of EU Cohesion Policy on income convergence. However, one thing is to support the transition of regions towards their respective steady-state and another is to truly contribute to long-term growth (ie productivity) at any level of development. There is comparatively little research that has attempted to quantify the growth (or productivity) effects of Structural Funds in advanced regions⁵⁶.

5. AN ANALYTICAL TOOL-KIT AND RECOMMENDATIONS

Based on the discussion above, we provide here an analytical tool-kit for assessing the effectiveness of EU Cohesion Policy and some tentative policy recommendations for the future.

5.1. A tool-kit for researchers

First, the standard way of testing for the validity of the neo-classical versus the endogenous growth model suffers from theoretical problems. By way of example, we have suggested that convergence is compatible with the literature on agglomeration effects under two conditions. First, there are limits to the mobility of factors of production. Second, economies are multi-sector, so that developments in one sector cancel out developments in another one. In turn the risk is that, at the country-level, an income convergence trend hides failures in the operation of the European single market and/or reflects a process of inefficient reallocation across sectors⁵⁷. Thus, income convergence is not always a positive outcome, potentially hiding inefficiencies that tap the overall growth potential of an area, counter to the principle of allocative efficiency. This is a significant limitation considering that one of the purposes of the post-1988 Cohesion Policy was to raise returns to investment in the periphery, with the objective of making the single market more efficient.

Second, not only is income convergence analysis not appropriate to test for the validity of different growth models, but it is also not the best tool to assess the effectiveness of EU Cohesion Policy. The objective of the post-1988 regional policy was to raise returns to investment in the periphery not to perform income redistribution at the EU level. The rationale for reform was thus tightly linked with the endogenous growth theory, but the practice of assessing performance has remained fundamentally neoclassical in nature, which implies also that higher returns to investment in the periphery are assumed by theory rather than being the subject of empirical investigation.

Third, the practical implication is that researchers should assess the effectiveness of EU Cohesion Policy also by looking at the extent to which EU funds have been truly able to enhance the marginal product of capital and not just by means of income convergence analysis⁵⁸. Chart A in the Appendix

⁵⁵ To address this problem, some researchers are indeed applying so-called discontinuity analysis. Most of the applications however are limited to convergence regions, and find that Structural Funds support growth in about half of all convergence regions, namely in those that have a sufficient level of human capital endowment and good quality of government not dissimilarly from studies that use a different modelling approach, see Becker, Egger and von Ehrlich (2008, 2011). The analysis should but be extended to all regions not just convergence regions.

⁵⁶ There is, on the other hand, some research on the impact of structural reform on the growth rate of frontier regions. Spilimbergo and Chen (2012) show that technological advanced regions grow faster in the presence of trade openness, lower minimum wages and lower labour taxes. This evidence would speak, for example, in favour of the argument of using Structural Funds to subsidise non-wage labour costs, see Marzinotto, Pisani-Ferry and Wolff (2011).

⁵⁷ One crisis-related example being the growth of manufacturing in countries such as Germany and Austria and the growth of low-productivity sectors such as construction in Ireland and Spain.

⁵⁸ And possibly also alter the allocation method of funds under the regional competitiveness and employment objective.

displays the average growth rate in 2000-10 against the GNI share of Structural Funds received by each country in the same period. There is a positive association between the two but it cannot be excluded that this owes to the problem of reverse causality described above: low-income countries receive proportionally more funds at the outset and are also deemed to grow faster because of increasing returns to capital in low-capital stock, so that strong growth might be in fact unrelated to cohesion spending. Chart B in the Appendix relates the size of used Structural Funds to the average gain (or loss) in the marginal efficiency of capital over the same period⁵⁹. The relationship here disappears and relative country performances are much different. In a nutshell, this type of analysis would produce different conclusions about the effectiveness of EU Cohesion Policy.

5.2. Tentative policy recommendations for the future

First, some spatial concentration of economic activities is unavoidable under full mobility of factors of production. It may also be economically efficient if it signal a virtuous agglomeration of economic activities. At the same time, national fiscal policies perform well their redistribution function across regions. EU Cohesion Policy should not substitute national redistributive policies and/or be concerned with fighting agglomerations that have a benign origin.

Second, the immediate practical implication from the suggestion above is that a larger share of the EU Cohesion spending should be allocated to Member States⁶⁰ at any stage of development as opposed to regions to address only internal disparities that signal a policy failure: eg incomplete implementation of single market rules, modest product market competition, little labour mobility, inappropriate social policies and the lack of an industrial policy strategy⁶¹. All other disparities, whether induced by geography or stemming from an efficient process of agglomeration of activities in technologically advanced regions, should not be treated.

Third, Structural and Cohesion Funds should be used to unlock bottlenecks and to smoothen country-level (or regional) sectoral reallocation, creating also the conditions for individual regions or smaller territories within regions to exploit their comparative advantage, thereby making also the single market more efficient. By way of example, the receiving countries may use the Funds i) to support (and not substitute) national redistributive policies using it, for example, to finance non-wage labour costs in some regions and sectors⁶², ii) to compensate losers from product market liberalisation, iii) to guarantee appropriate (non-discriminatory) local credit conditions⁶³, or iv) to support retraining of workers in ways that would facilitate the country's sectoral reallocation or the reallocation of workers across regions⁶⁴.

Fourth, objectives such as the elimination of bottlenecks and inefficiencies in the operation of the single market and the beneficial sectoral allocation of resources are not features that would be necessarily reflected in income convergence trends especially if the assessment is made short-term. Income convergence analysis should be accompanied with an assessment of the evolution of the marginal efficiency of capital and some more qualitative analysis.

⁵⁹ The variable is defined as follows: ratio of yearly change in GDP at constant market prices to change in gross fixed capital formation at constant prices.

⁶⁰ A similar recommendation was already put forward in the so-called Sapir Report, see Sapir (2003).

⁶¹ It may also allow a consistent and virtuous juxtaposition of EU Funds and regional aid by the State.

⁶² For a similar suggestion, see Marzinotto, Pisani-Ferry and Wolff (2011).

⁶³ A natural candidate is the Jeremie Initiative, through which Structural Funds are channelled to Small and Medium Enterprises (SMEs) with the support of national (local) banks.

⁶⁴ For positive evidence on measures that support sectoral reallocation, see Midelfart-Knarvik and Overman (2002); Spilimbergo and Che (2012).

Fifth, the quality of the institutional environment is paramount to the capacity of Structural Funds to generate economic growth. The European Commission suggested in its proposal for the next MFF 2014-20 that stronger emphasis is put on ex ante conditionality. Institutional conditionality is especially important. Cohesion Fund disbursements should be made conditional on a country respecting EU laws and with a good record in the implementation of EU directives. Special attention should be devoted to single market rules as a way to strengthen the link between EU cohesion spending and the efficiency of the single market.

Sixth, in light of the importance of the institutional environment, money should be also spent on improving institutions and their delivery systems. This concerns in particular the budget line “technical assistance”, which is a useful instrument for improving administrative capacity through knowledge transfers.

Seventh, the existing literature and our empirical analysis suggest that hard investment is not sufficient to generate growth convergence. The thematic and sectoral allocation of EU funds is potentially more relevant than size. It is important that regions combine hard with soft investment in R&D and human capital accumulation to make sure that the growth benefits are sustainable over time. Under the MFF 2007-2013, regions eligible under the Regional Competitiveness and Employment Objective were required to use at least 25 percent of EU funds in soft investment. The European Commission’s proposal for 2014-2020 extends the rule to all regions for the European Social Fund (ESF). This share may also be increased for middle-income countries (or regions). But it is important that ESF spending is associated also with R&D spending from other Funds to improve complementarities across policy measures. Moreover, soft investment needs be concentrated in the sectors for which a region has a clear comparative advantage and in training and re-training activities that support labour relocation to these sectors.

Eighth, EU funds for regional competitiveness and employment, which amount to 16 percent of total cohesion spending, are allocated by default to regions that do not receive funding under the convergence objective. They should be instead allocated based on each region’s marginal efficiency of capital to maximise the return to investment, or on a pure competitive basis by means of open calls⁶⁵.

⁶⁵ I am indebted to Philippe Aghion for suggesting this option.

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Appendix

Table 1: THE HISTORICAL PHASES OF EU REGIONAL/COHESION POLICY

	ECC TREATY (1957)	ERDF (1975)	SEA (1987)	CURRENT
ASSESSMENT OF PREVAILING MARKET CONDITIONS	FREE MARKETS	PARTIALLY FREE MARKETS	FREE MARKETS	FREE MARKETS
DIRECTION IN WHICH MARKET FORCES PUSH	CONVERGENCE	CONVERGENCE	DIVERGENCE	DIVERGENCE
UNDERLYING ECONOMIC THEORY	NEOCLASSICAL GROWTH THEORY	NEOCLASSICAL GROWTH THEORY + TECHNOLOGICAL GAP LITERATURE	ENDOGENOUS GROWTH THEORY + NEW ECONOMIC GEOGRAPHY	ENDOGENOUS GROWTH THEORY + NEW ECONOMIC GEOGRAPHY
DIMENSION OF POSSIBLE (SMALL OR LARGE) DISPARITIES	SOCIAL	SPATIAL (MAINLY DUE TO LACK OF LABOUR MOBILITY)	SPATIAL	SPATIAL/THEMATIC
RATIONALE FOR INTERVENTION	MARGINAL SUPPORT TO WORKERS	SUPPORT TO PERIPHERY TO COMPENSATE LOSERS	SUBSTANTIAL SUPPORT TO PERIPHERY SO AS TO INCREASE RETURNS TO INVESTMENT (THROUGH PUBLIC GOOD PROVISION)	SUBSTANTIAL SUPPORT TO PERIPHERY SO AS TO INCREASE RETURNS TO INVESTMENT (THROUGH PUBLIC GOOD PROVISION) AND SUPPORT TO CORE TO INCREASE OVERALL EFFICIENCY
POLICY INSTRUMENTS	EUROPEAN SOCIAL FUND	EUROPEAN SOCIAL FUND, EUROPEAN REGIONAL DEVELOPMENT FUND	STRUCTURAL AND COHESION FUNDS (EUROPEAN SOCIAL FUND, EUROPEAN REGIONAL DEVELOPMENT FUND, COHESION FUND)	STRUCTURAL AND COHESION FUNDS (EUROPEAN SOCIAL FUND, EUROPEAN REGIONAL DEVELOPMENT FUND, COHESION FUND)

Key: EEC = European Economic Community; ERDF = European Regional Development Fund; SEA = Single European Act

Table 2: CROSS-SECTION ANALYSIS, 2000-2009

	ALL NUTS-2 REGIONS	NUTS-2 REGIONS 1 (≤75% of EU)	NUTS2-REGIONS 2 (75% <X< 90% of EU)	NUTS2-REGIONS 3 (≥90% of EU)
In initial GDP	-0.029***	-0.037***	-0.085***	0.006
R ²	0.53	0.48	0.28	0.01
Country dummies	0.000	0.017**	-0.054**	0.006**
R ²	0.83	0.84	0.74	0.65
In initial d. income	-0.032***	-0.040**	-0.035***	-0.027*
R ²	0.76	0.79	0.83	0.77
Country dummies	-0.033***	-0.036***	-0.034***	-0.029***
R ²	0.84	0.85	0.89	0.83
In initial rel GDP	-0.014***	-0.022***	-0.082***	0.007*
R ²		0.12	0.24	0.02
Country dummies	0.15	0.065***	-0.049*	0.008***
R ²	0.006**	0.67	0.73	0.66
	0.57			
<i>OBS.</i>		56-62	27-37	133-148
	231-232			

Source: Bruegel based on data from EUROSTAT. We do not report standard errors. Full results available upon request.

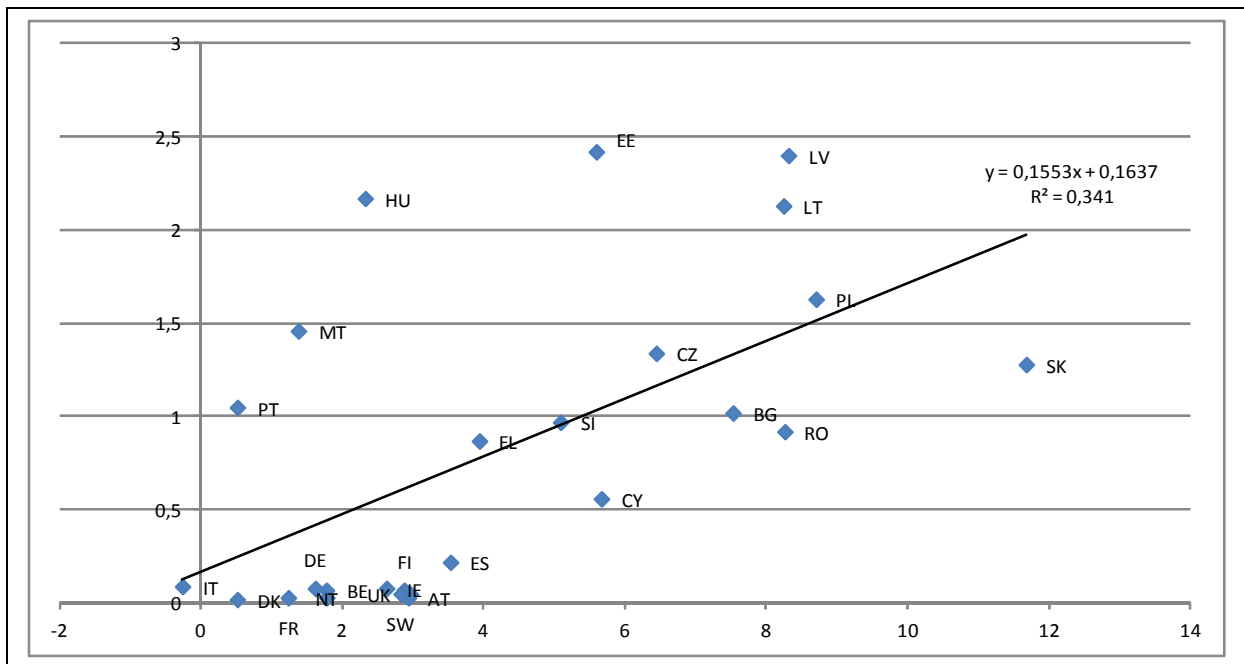
Key: d. income = disposable income; rel GDP = GDP relative to EU27

Table 3: MACROECONOMIC SIMULATIONS

	HERMIN (ST)	QUEST (ST)	HERMIN (LT)	QUEST (LT)
DEMAND EFFECTS	YES	NO	N.A.	N.A.
SUPPLY EFFECTS	NO	YES	YES	YES
STRENGTH OF GROWTH EFFECTS	++	+	+++	++++
STRONGER GROWTH EFFECTS IN CONVERGENCE COUNTRIES	NO	YES	UNCLEAR	UNCLEAR
STRENGTH OF GROWTH EFFECTS OF HARD INVESTMENT	N.A.	+	N.A.	++
STRENGTH OF GROWTH EFFECTS OF SOFT R&D INVESTMENT	N.A.	-/0/+	N.A.	++
STRENGTH OF GROWTH EFFECTS OF SOFT HR INVESTMENT	N.A.	-/0	N.A.	+++

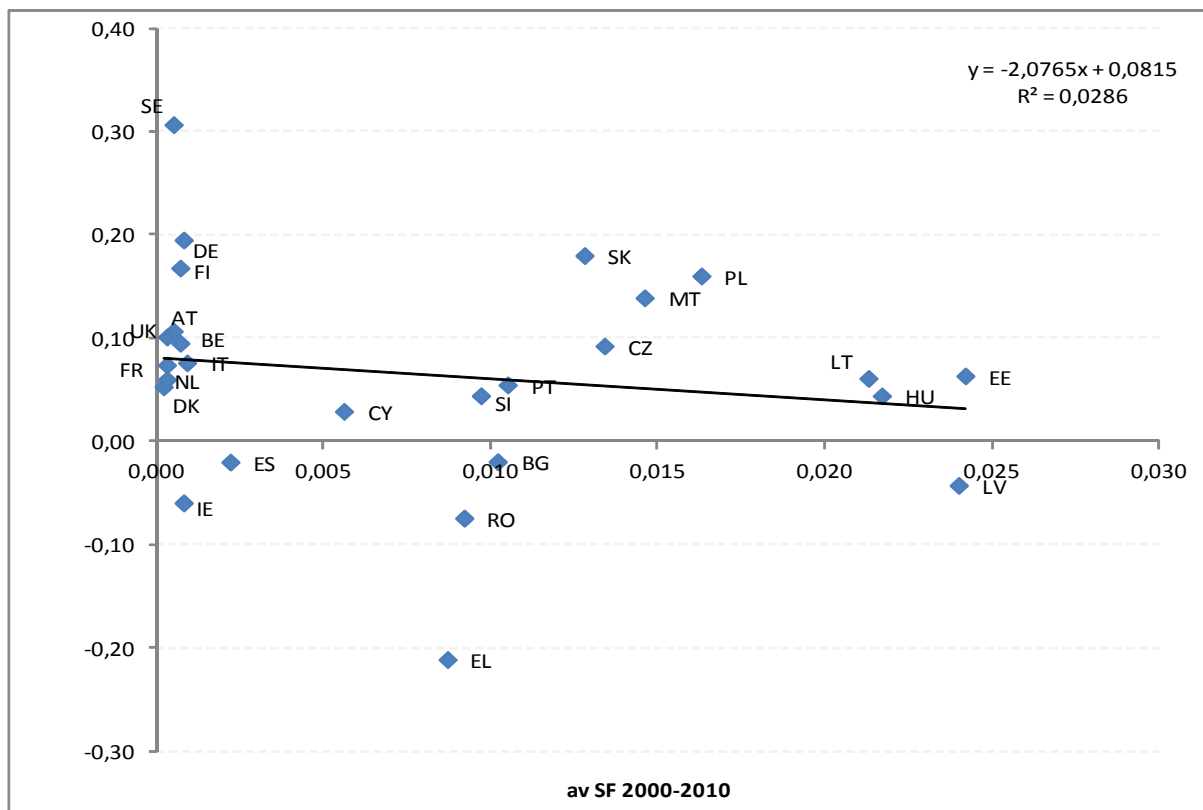
Key: ST = short-term; LT = long-term; NA = not applicable; HR = human capital.

CHART A: AVERAGE GNI GROWTH AND GNI SHARE OF STRUCTURAL FUNDS USED (2000-2010)



Source: Bruegel based on data from DGREGIO and AMECO

CHART B: AVERAGE CHANGE IN CAPITAL EFFICIENCY AND GNI SHARE OF STRUCTURAL FUNDS USED (2000-2010)



Source: Bruegel based on data from DGREGIO and AMECO