

## **Preparing for the next MFF: Where did the money go in the past?**

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### ***Abstract***

This paper presents the state of play of the preparations for the next Multiannual Financial Framework (MFF) of the EU for the period 2021-2027. It then turns to an analysis of the allocation of regional support funding over the last two MFFs, using a standard growth model to interpret the results. It finds that: First, the distribution of Cohesion spending across regions (as proportion of regional GDP) can be explained to a large extent by a few variables, namely income per capita, unemployment and the importance of agriculture. However, there are also important differences across different clusters of regions. Regions in Southern Europe received less funding than those in Central and Eastern Europe even accounting for differences in these determinants. Second, regions in Southern Europe have a relatively high capital/output ratio and thus a lower productivity of capital. Moreover, their investment rates do not seem to be affected by the Structural Funds they receive. These results suggest the need for a change in emphasis from infrastructure investment to measures that improve overall allocation of resources.

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## 1. Introduction

The EU has a peculiar way of deciding on its budget. The framework for the annual budget is fixed only once every 7 years for the next period. It is set out in a legal document, called the Multiannual Financial Framework (MFF), which lays down in considerable detail the spending priorities for a period of 7 years. The EU budget is worth only a little more than 1% of EU GDP, but given that it is decided once for 7 years, the decisions about its size and distribution are fairly significant. For eligible countries, total allocations for regional support can amount to close to 20% of GDP over one MFF. For some poorer regions in Central and Eastern Europe (CEE), the importance of European regional funding can be even higher, reaching 50% of GDP over a seven-year period. Ensuring the best allocation of this spending should thus be of paramount importance.

We are now close to the end of the current period (2014-2020) and it is time to reflect on the forthcoming programming period (2021-2027). This will be a first MFF without the UK, which so far had made a considerable net contribution. For the remaining 27 EU member states about 8-10 billion euro per annum, or 60-70 billion euro over the entire period, will thus be missing. The loss of the net contribution from the UK will make it even more difficult to achieve a consensus on the new MFF.

The present contribution does not tackle this issue. The focus is instead on the European Structural and investment Funds (ESIF) whose purpose is to help the lagging regions to catch up and accelerate the converge process towards the EU average.

In order to establish a benchmark for the assessment of ESIF and to evaluate what needs to be changed in the next programme, we investigate the use of Structural Funds during the two previous programming periods that have already ended. In this exercise we use a new data source on actual payments out of the various Structural or Investment Funds. Annual data of actual payments are also available for part of the current period, but this is of little use since experience shows that regions differ greatly in the time profile with which the funds are actually committed and spent. In addition, in most countries, funds tend to be spent in the last part of the programming period. It has often been observed that in some countries only a fraction of the funds has been absorbed. However, according to the data, most of the funding available is used in the end, even if sometimes up to 2-3 years into the following programming period. Utilisation rates hover around 97% and above for most countries, if one takes these late payments into account.

In our empirical work, we concentrated on ESIF payments received by regions in different member states, not in terms of total amounts but as a percentage of regional GDP, a ratio that is often called aid intensity. At the regional level, this 'aid intensity' can be as high as 5-7% of regional GDP, on annual basis.

Gros et al. (2018) found that in some countries, regions with low GDP per capita are also characterised by a low employment to population ratio. This applies in particular to Italy, where the Mezzogiorno has a much lower employment ratio than EU and even Italian average. Taken together with the high capital/output ratio of Mezzogiorno, this suggests the conclusion that the main problem in these regions is not necessarily a lack of resources, but an underutilisation of existing capital and available labour.

The main purpose of Structural Funds is to help lagging regions through investment projects aiming at upgrading the regional capital stock. The idea is that investment should spur productivity and growth in the region. In principle, one would thus expect ESIF funding to go to regions where there is little capital. However, this is not what we find. Regions with a higher capital output ratio receive more Structural Funds (given all other parameters) than those with a low ratio (and thus a higher capital productivity). The positive relationship between regional capital intensity and ESIF payments (as a percentage of regional GDP) is very robust across all the different specification of the model we implemented, but it seems to be confined to regions in CEE.

We also find that that CEE regions exhibit different patterns from those in Southern Europe. For example, regions in Southern Europe have on average a capital-to-output ratio close to 3. This is 50% higher than the ratio observed in CEE, which averages at around 2.

Moreover, we find that across regions in CEE there is a positive correlation between Structural Funds and regional investment rates, suggesting that there has been only limited crowding out of other investment. Regions in Southern Europe, which receive Structural Funds, have lower investment rates than in CEE countries. This results for Southern EU regions appears rational in light of the already high capital-to-output ratio of these regions.

The rest of the paper is organised as follows. Section two presents an overview of the main issues at stake in the negotiation process of the next MFF and of the main features of the ESIF. The section also contains an overview of the EU financial instruments, while outside the EU budget and hence not covered in the empirical analysis, such instrument may become increasingly important in the framework of the EU finances. Section three uses a simple theoretical framework to understand how and to what extent the EU funds can contribute to growth and convergence. Section four is devoted to the empirical analysis to identify the characteristics of the regions which received ESIF. Last section draws conclusions.

## **2. The new MFF: the starting point for the negotiations**

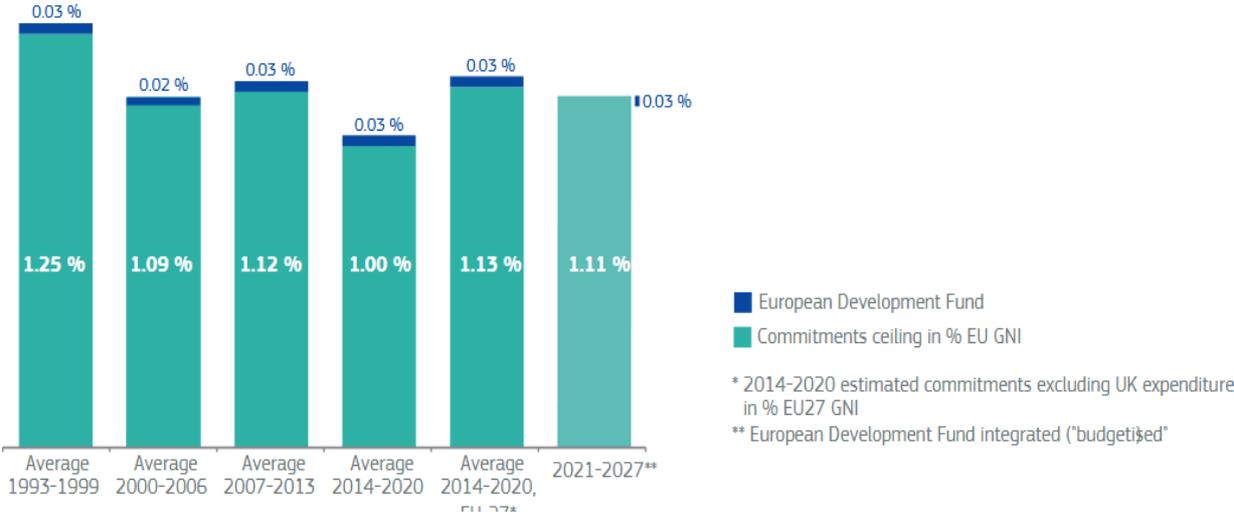
The MFF is the result of negotiations among Member States and requires unanimity. Experience suggest that Member States tend to agree only at the very last minute, when the last hold-outs give in because they prefer to have an agreement, even if it does not quite satisfy national political priorities. Gros and Micossi (2005) observe that, at least in the past, hold-out had little interest to cave in because the legal rules of the EU specify that in the absence of an agreement on a new MFF, spending would continue pro rata. This rule led to a strong status quo bias. However, this time might be different. The exit of the UK and the loss of a net contribution implies that a ‘pro rata’ budget for the EU 27 will not be possible. It may be therefore the case that changes will occur this time.

The negotiations for the 2021-26 programming period still have to begin in earnest. But they will not start from a blank slate. The Commission has already laid down some markers and the main points are the following.

First, the overall size of the budget should not increase, if measured as a percentage of GDP. Figure 1 below shows the EU budget has remained in a narrow range around 1.1% of GDP over the last decades. Little change is proposed, and little change should be expected in terms of the overall size. The EU-27 has grown, but only modestly in real terms, over the past 7 years. This

implies that the real resources available for the next MFF should increase only by a little over 10% compared to the present MFF based on EU-27.

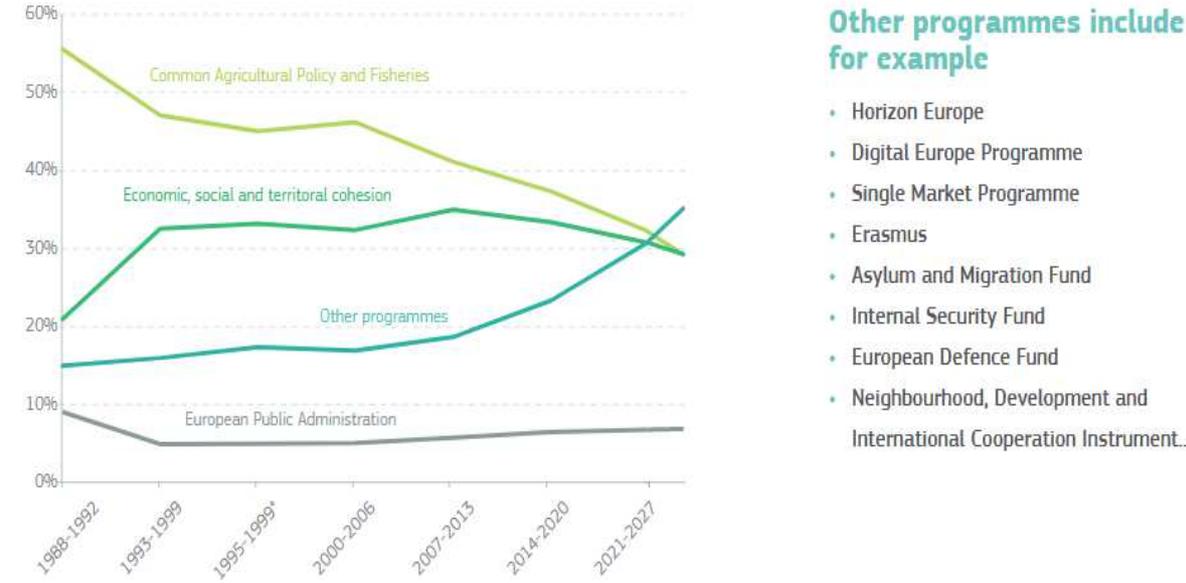
Figure 1. The size of the EU budget as percentage of Gross National Income (GNI)



Source: European Commission.

A second key point concerns spending priorities. Support for Agriculture and support for lagging regions have traditionally absorbed the largest share of the budget. Figure 2 below shows that there has been considerable change if one takes a long run view. The share of spending on agriculture has come down from close to 60% of the total to only about one third under the current MFF. Cohesion spending has hovered around one third since the mid-1990s. The new proposal of the Commission would imply that each of the shares of these two priority areas would fall below 30%, and that for the first time the EU would spend more on the many other programs listed on the right hand side of Figure 2.

Figure 2. Key priority areas: The proposal of the Commission



Source: European Commission.

Another key point is the introduction of an absorption and equity cap<sup>2</sup>, which would range from 2.3% of GDP for Romania, Bulgaria and Hungary to 1.55% for most other Member States. For some countries, this cap, which is not per region, is much lower than what has been allocated under the present MFF.

As an indication of the status quo bias and the general tendency to avoid abrupt change, the proposal contains restrictions to the changes in ESIF allocation, both in rises and reductions, by using safety nets and other limits. One ‘safety net’ stipulates that for no country the allocation should fall by more than 24%, which spread over a 7-year period means no annual reduction larger than about 3%. Likewise, what is called the "reverse safety net" limits increases to less than 8%, which translates on an annual basis increase of less than 1% per annum.

Moreover, Member States with a Gross National Income (GNI) above 120% of the EU average should in no case be able to expect any increase in their ESIF allocation.

An important aspect, which is not discussed in detail here, is that of the co-financing expected from Member States’ national budgets. The general co-financing ceiling is around 80% (implying that the EU covers up to 80% of the cost) and applies to different categories of regions, funds and projects:

- Less developed regions
- Outermost regions
- Cohesion Fund
- Interreg - European Territorial Cooperation

For the so-called transition regions, whose GDP per capita is between 75 and 90% of the EU average, the co-financing ceiling is 55%. It is 40% for more developed regions, with GDP per capita above 90% of EU average.

An important recent development, which might distinguish the forthcoming MFF further from its predecessors, is the increasing use of so-called financial instruments. In general, their aim is of increasing the impact of the limited resources. The most important example of this tendency is the so-called Juncker plan (officially, the European Fund for Strategic Investments - EFSI), through which a limited amount of budgetary resources (around 16 billion euro) were leveraged to finance investments of over 300 billion euro. Figure 3 below shows that the many financial instruments used (under many different legal regimes) have become a sort of ‘financial galaxy’. The finances of the EU thus contain many more elements than the EU budget.

Moreover, the next MFF should contain a further new element, namely a euro area budget line within the overall EU budget. The size of this new budget line, and its exact purpose, have not yet been decided. But it is likely to remain modest given that the overall size of the EU budget is supposed to remain unaffected. This implies that the euro area budget line will have to crowd out other spending.

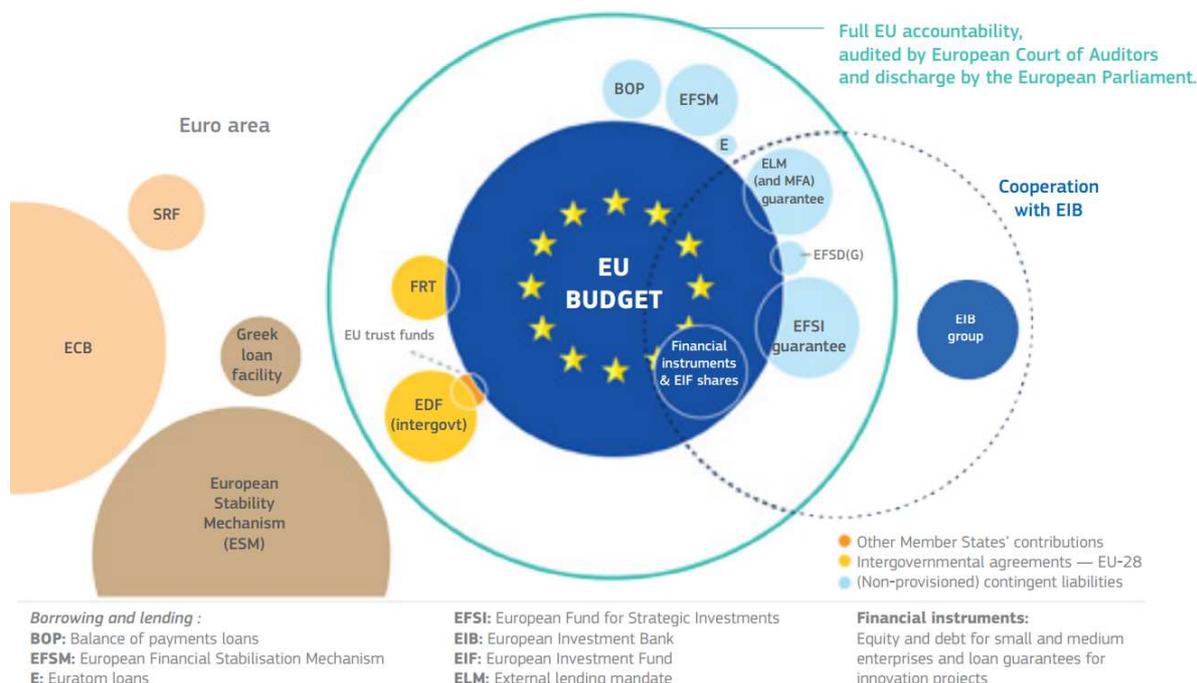
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<sup>2</sup> See European Commission (2018).

Figure 3. The financial galaxy of the EU

**EU finances: the whole picture**

Purely illustrative: the size of the circles does not correspond to actual volumes:



Source: European Commission.

**2.1. Cohesion: How does the EU support lagging regions and states?**

The broad umbrella for the EU’s action on cohesion is the European Structural & Investment Funds (ESIF), which consist of five (sub-)funds. The two most important ones are the European Regional Development Fund (ERDF) and European Social Fund (ESF). These two, also called Structural Funds, have slightly different purposes.

The ERDF, founded in 1975, provides financial support for the development and structural adjustment of lagging regional economies. Its purpose is to enhance competitiveness as well as territorial cooperation throughout the EU.

The ESF was set up in 1958 and contributes to the adaptability of workers and enterprises, to the access to employment and participation in the labour market, to social inclusion of disadvantaged people, to combating all forms of discrimination, and creating partnerships to manage reforms in employment. Member States administer these funds on a decentralised basis through shared management.

The other three funds constituting the ESIF do not have a regional focus<sup>3</sup>:

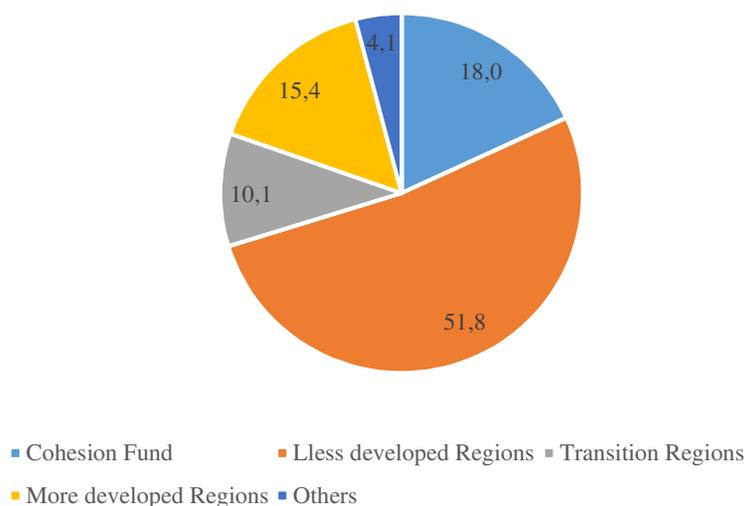
- the Cohesion Fund, which supports exclusively less-developed Member States;
- the European Agricultural Fund for Rural Development; and

<sup>3</sup> Other funds with a regional focus are the European Territorial Cooperation (ETC), better known as INTERREG, and Transnational Cooperation, TNC.

- the European Maritime and Fisheries Fund.

Figure 4 below shows the distribution of overall ESIF spending across these major funds. The funds for less developed regions constitute by far the biggest element, accounting for slightly over one-half of the total. The next item in overall importance is then the Cohesion Fund, which is reserved to countries with an income per capita of less than 90 of the EU average.

*Figure 4. Destination of the Structural and Investment Funds*



Source: European Commission

## 2.2. The growing importance of financial instruments for Cohesion policy

As mentioned in the introduction, EU financial instruments for cohesion policy are outside the EU budget but they have been steadily growing in importance, particularly over the last decade, and in the future their role may become as important as the EU budget.

Financial instruments are defined in the Financial Regulation (No 966/2012) as “*measures of financial support provided on a complementary basis from the budget in order to address one or more specific policy objectives of the Union. Such instruments may take the form of equity or quasi-equity investments, loans or guarantees, or other risk sharing instruments, and may, where appropriate, be combined with grants.*”

First introduced as a mechanism to increase lending in the area of small and medium enterprises in 1994 through the European Investment Fund (EIF), they gained prominence also in the area of infrastructures and innovation with the increasing demands on a restrained EU budget. Financial instruments were not a new concept in member states, such as the UK where Private Finance Initiatives PFIs were common, and private-public partnerships were also emerging in infrastructure projects, but the use of the EU budget as an equity and debt instrument, particularly as a guarantee was novel. Guarantees were slowly being introduced in the Trans-European Networks and the Connecting Europe facility under the Loan Guarantee Instrument for Trans-European Transport Network Projects (LGTT) and the subsequent Project Bond Initiative in 2010, all now merged into one, including the Marguerite Fund into the Connecting Europe Facility (CEF) Debt Instrument. In the meantime, the EU structural funds allowed

regions to develop financial instruments either by providing equity and debt instruments to banks or creating Holding Funds or Funds of Funds. The great push in financial instruments occurred, however, with the financial crisis and the need to mobilise private investors that lost confidence in the economy. The most important game changer being the creation of the European Fund for Strategic Investments, a game changer for the EU.

All those instruments play a role in the Cohesion Policy, as the instruments under the European Structural and Investment (ESI) Funds, which include the structural Funds, Cohesion Funds and Social Funds, can be combined with the centrally managed instruments, such as EFSI, CEF Debt Instrument or other research, energy or social centrally managed instruments.

The instruments in cohesion policy have steadily increased in importance over the years and their use reached new heights in 2017 according to the summary review by the European Commission (2018). In the European Regional Development Fund (ERDF) and Cohesion Fund the EU budget allocations for the present programming period reached around €20 billion, compared to the €10,8 billion in 2007-2013 programming period. For the European Social Fund these doubled from €498 m to €1 billion today.

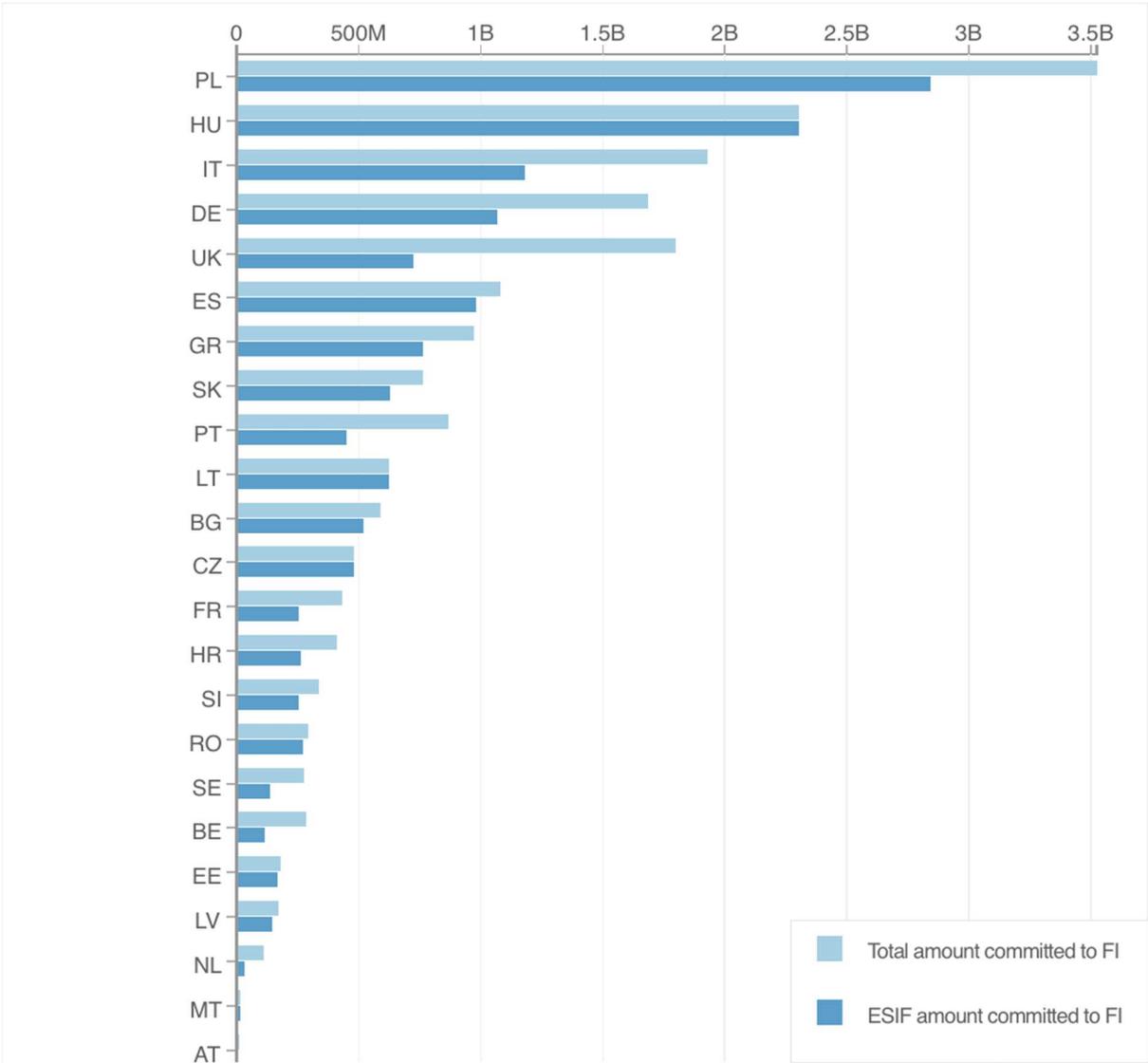
*Table 1. Amounts committed in the funding agreements and paid to the FIs at the end of 2017, in million EUR (programme contributions out of which ESIF)*

	<b>ERDF and CF</b>	<b>ESF and YEI</b>	<b>EAFRD</b>	<b>EMFF</b>	<b>Total</b>
<b>Programme amounts committed to FI</b>	17.892,20	557,33	384,84	11,20	18.845,57
<i>out of which ESIF</i>	13.536,00	381,47	268,89	8,40	14.194,76
<b>Programme amounts paid to FI</b>	5.301,10	157,95	67,70	2,80	5.529,55
<i>out of which ESIF</i>	4.270,80	107,12	45,67	2,10	4.425,69
<b>In percentage of ESIF commitments paid</b>	32%	28%	17%	25%	31%
<b>Programme amounts committed to final recipients</b>	2.519,80	50,13	25,68	0,97	2.596,58
<i>out of which ESIF</i>	2.027,00	36,69	23,62	0,73	2.088,04
<b>Programme amounts invested in final recipients</b>	1.871,50	20,47	18,19	0,97	1.911,13
<i>out of which ESIF</i>	1.503,20	13,51	16,04	0,73	1.533,48
<b>Disbursement rate of ESIF contribution</b>	35%	13%	35%	35%	35%

Source: European Commission (2018)

Using the latest data from the European Structural and Investment Funds database by the European Commission. We can see the important uptake in Poland and Hungary of such instruments, instruments that originally were considered difficult to use in new member states. Figure 5 below shows the total amounts committed to financial instruments and the amount allocated to ESI Funds.

Figure 5. ESIF 2014-2020: EUR volume of Financial Instruments approved by MS



Source: ESI Funds Database, <https://cohesiondata.ec.europa.eu/Country-Level/ESIF-2014-2020-Financial-Instruments-Implementatio/vi4p-bw9r?referrer=embed> (20 December 2018)

Note: The financial volumes represent the EUR total reported by year from "Funds of Funds" and "Specific Funds".

**2.2.1. Requirements to set up financial instruments.**

Setting up such instruments is a complex task, requiring adherence to strict principles to avoid crowding out the private sector or breaking state aid rules. Managing authorities are thus required to perform ex-ante assessments for each instrument demonstrating the need for it and its functioning. Managing authorities can also allocate ERDF or European Agricultural Rural Development Fund (EAFRD) funding for financial instruments in support of SMEs to centrally planned instruments, avoiding the ex-ante assessment. The latter are set up based on an ex-ante assessment per country at EU level by the European Commission supported by the European Investment Bank and the European Investment Fund.

A review of 40 ex-ante assessments by managing authorities (Núñez Ferrer et al. 2018) shows many weaknesses of the ex-ante assessments in quality and content, but also the absence of a real reason for the requirements in the assessments and the striking low level of detail in centrally managed instruments.

While the emergence of financial instruments shows promising developments, there is a need to simplify the procedures while focusing on a key aspect, namely the additionality of the instruments and the absence of crowding out of the private sector.

### **2.2.2. The leverage factor**

The financial instruments have as a key objective to attract funding from the private sector to invest in the EU objectives (although the leverage figures include non-EU budget public sector support). This means that one prominent performance indicator is the leverage achieved. The Financial Regulation (EU, Euratom N° 966/2012) Article 140(2)(d) defines leverage as ‘the Union contribution to an FI shall aim at mobilising a global investment exceeding the size of the Union contribution’ and in the Rules of Application in Article 223 it is referred to as ‘the amount of finance to eligible final recipients divided by the amount of the Union contribution’.

This means that the leverage effect is just the total amount the beneficiary got as funding from all sources (EU support plus any other source) for the specified investment, divided by the EU support. Depending on the area of investment the results are highly divergent.

For EFSI the EIB proudly presents large leverage (or multiplier – the wording being still a matter of discussions) figures across the line, exceeding the leverage factor of 15 targeted<sup>4</sup>. For the ESI Funds, leverage effects are often well below EFSI, but this is also due to the fact that ESI Funds instruments are smaller and more limited in scope thus suffer from a higher risk level. Leverage in areas of building renovation may not cross the factor of four, and micro credit schemes may not show much leverage at all.

In fact, leverage is an extremely poor indicator by itself, which may have had its role during the financial crisis, where financial instruments had the may objective to kick-start private investments, but could be counterproductive in times of more liquidity in the market. The higher the leverage, the more attractive the investment for the private sector, thus the less support any project requires the higher the “potential” leverage under the EU definition. The European Court of Auditors (2016) already warns that the methodology is flawed as the link between the level of the financial instrument support and the final level of investments is not necessarily linked. The leverage target missed the need for additionality and in the end under a better economic environment lead to crowding out of the private sector instead. A “belief” has now settled at political level that increasing the number of financial instruments and creating a larger EFSI for the future (InvestEU) with higher leverage targets is positive and desirable. This also means that the risk of misallocation of the support under the objective of maximising leverage grows, with a negative crowding out of the private sector (Núñez Ferrer, 2018). Let’s not repeat the mistake of the “absorption capacity” as measure of success in the EU structural funds with an equivalent bad indicator in the financial instruments. Additionality, impact and effectiveness are not necessarily related to leverage.

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<sup>4</sup> <http://www.eib.org/en/infocentre/press/releases/all/2018/2018-192-juncker-plan-exceeds-original-eur-315-billion-investment-target.htm>

### 3. What to expect from Structural Funds: a simple growth model approach

The purpose of this section is provide an analytical framework for understanding the contribution labour and capital can make to growth and progress on cohesion.

The starting point is the standard, neoclassical model, which links output,  $Y$ , to inputs of capital,  $L$ , and capital,  $K$ .

$$\text{Output} = Y_t = A_t K_t^\alpha L^{1-\alpha} \quad (1)$$

The parameter alpha indicates the elasticity of output with respect capital. It is usually assumed to be about 1/3.<sup>5</sup> In standard Cobb-Douglas production function, like in equation (1), with constant return to scale the elasticity of output to labour is given by the complement to 1 of alpha. The parameter  $A$  represents what is called ‘Total Factor Productivity’, i.e. an indicator of the technology and other know-how which affects the overall productivity of both labour and capital.

This setting implies that output per worker is given by:

$$Y/L \equiv y = A K^\alpha L^{-\alpha} = A (K/L)^\alpha = A (k)^\alpha, \quad k \equiv K/L \quad (2)$$

In other words, output (and in this simple model income) per worker can be determined solely on the basis of the capital worker ratio ( $k$ ). The output is an increasing function of this variable, but much less than 1:1, given alpha smaller than 1. In technical terms, the elasticity of output per worker with respect to capital per worker is only one third.

This low elasticity of output with respect to capital has important implications. For example, if one were to double  $K/L$  (the amount of capital available per worker), output per worker would increase only by much less, namely about one fourth (the cubic root of 2 is equal to roughly 1.26). The same calculation could also be viewed the other way round: in order to double output per worker, one would need to increase the capital per worker by a factor of 8.

By contrast, the elasticity of output with respect to increases in labour, holding capital constant, is 2/3.

A typical implication of this standard growth model is that both investment and labour are subject to decreasing returns to scale, however returns to scale decrease more quickly when capital accumulates than when labour increases.

Gros et al. (2018) showed that in some countries, including in Italy, differences in regional GDP per capita are strongly correlated with inter-regional differences in employment rates. For this reason, it is important to distinguish output per capita from output per worker. Considering the higher elasticity of output with respect to labour, one can conclude that differences in the local labour can explain indeed a large part of inter-regional differences in output. This is true even

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<sup>5</sup> The European Commission (2010) provides estimates of the parameters of a Cobb-Douglas production function. The Commission uses the mean wage share for the EU15 as guidance for the estimate of the output elasticity of labour. Over the period 1960-2003, this gives a value of .63 for  $1-\alpha$  and, by definition, .37 for the output elasticity of capital. These values are close to the conventional mean values of 1/3 and 2/3 used here for the share of capital and labour, respectively.

without taking into account that it would be desirable to provide any additional unit of labour supply with additional capital.

If one denotes the overall population by  $N$ , one can write output per capita (as opposed to output per worker) as:

$$Y/N = A K^\alpha L^{1-\alpha} (L/N) = A (K/L)^\alpha (L/N) = A (k)^\alpha (L/N) \quad (3)$$

Changes in employment rates ( $L/N$ ) translates one to one into changes in income per capita, if one capital to labour ( $K/L$ ) ratio remains unchanged.

In order to consider the output growth rate (as opposed to levels) and how it links to growth rates of inputs, the easier way is to take logarithms of both sides:

$$\ln(y_t) = \ln(A_t) + \alpha \ln(k_t) \quad (4)$$

In an inter-temporal setting, the first difference of the logarithm translates into compound growth rates:

$$d(\ln(y_t)) = d(\ln(A_t)) + \alpha d(\ln(k_t)) \quad (5)$$

With  $\alpha=1/3$ , this simple equation implies that changes in the growth rate of capital-to-labour ratio translated only to one third into the growth rate of output per worker. However, the growth rate of the productivity parameter  $A$  translates one to one into output growth. This provides an explanation of why growth rates across regions might differ even if the rates of capital accumulation differ little.

For example, the new Member States from CEE had been cut of market economy know how and technology until 1990. They thus started with a low value of Total Factor Productivity. However, one would expect their technology and knowledge of market mechanisms increases rapidly over time, resulting in a higher growth rate of TFP. This is indeed what one can observe. Growth rates in CEE have been high although investment rates have not been much higher than elsewhere.

Convergence in TFP through diffusion of knowledge might be described by a simple equation, which determines the speed,  $\beta$ , at which the  $A$  changes as a function of the difference between the present level of  $A$  and the EU average:

$$d\ln(A_t)/dt = \beta \{ \ln(A_{EU}) - \ln(A_t) \}, \quad \beta > 0 \text{ and } A_t < A_{EU} \quad (6)$$

This would imply that for the transition countries in CEE, productivity growth should be initially high, but then decline gradually over time as market know-how and advanced technology from the 'old' EU states is absorbed.

Since most of the Structural Funds take the form of investment, it is useful to consider the marginal productivity of capital in this framework. Formally the marginal productivity of capital is given by:

$$dY/dK = \alpha A K^{\alpha-1} L^{1-\alpha} = \alpha A (K/L)^{\alpha-1} = \alpha A (k)^{\alpha-1} \quad (7)$$

This implies that the marginal productivity of capital declines as the capital/labour ratio increases. With the share of capital about  $1/3$ , if a big investment push doubles the capital to labour ratio, the productivity of capital falls to 0.6 of the previous level.

Conversely, this also implies that if a region starts out with a much lower capital labour ratio than the rest of the EU, the initial investment should have a much higher return.

One practical problem with the rate of return on investment is that it is difficult to measure. The incremental capital output ratio (ICOR), which economists often use, tend to vary a lot over time. In this setting, one can use the average capital to output ratio, which can be written as:

$$K/Y_t = [A_t (K_t/L_t)^{\alpha-1}]^{-1} = [A_t (k_t)^{\alpha-1}]^{-1} \quad (8)$$

A simple comparison with equation (7) above shows that the average capital to output ratio is proportional to the marginal one, with alpha as the factor or proportionality. Marginal productivity is just the inverse of the capital/output ratio, i.e. average productivity of capital, to a constant factor. If one compares different regions, this implies that one can take differences in the average capital to output ratio as a sufficient statistic for differences in the marginal productivity of capital. A high capital/output ratio means a lower return to capital.

The productivity of capital depends (inversely) on the capital/labour ratio, but differences in this ratio do not translate always in differences in capital productivity because TFP can differ as well. This is why if the capital/labour ratio is relatively low, it does not necessarily mean that these regions need more capital. One needs to look at the capital/output ratio, not the capital/labour ratio to determine the productivity of capital.

If the aim of the Structural funds is to achieve the biggest result possible with the available financing, it follows that the allocation of funds should be guided by the ratio of capital to output, rather than the amount of capital per worker. This has an immediate practical application. One observes that poorer regions usually have a lower endowment of capital, including infrastructure capital than more advanced regions, even within the same country. It is often argued that the aim of policy should be to build in lagging regions the same infrastructure as in advanced ones. But the sharply declining returns to capital suggest that this would not be the best use of scarce resources.

The overall implications of standard growth models would thus be the following.

Regions which had been cut off from technology and market mechanisms should greatly benefit, at least initially, from a transfer of capital. The productivity of investment should remain high for some time because of the overall productivity increase effect of the gradual transfer of knowledge and market mechanisms that comes with EU membership.

By contrast, one would expect a much lower return on additional investment in regions, which have been inside the EU and its internal market for a long time. For lagging regions within the older Member States, the main objective should not be to try to accumulate the same capital stock as in advanced regions, but to concentrate on structural factors, which inhibit the catch-up.

The model also implies that the marginal returns of increasing the effective labour force, for example by encouraging the participation of inactive groups, such as women or the elderly, should be much less subject to declining rates of return. Fostering investment in human capital would also be subject to less declining returns. However, this type of investment is difficult to keep local since the higher qualified labour will have a tendency to leave lagging regions for the more advanced ones where the return to their increased human capital is higher.

### 4. The distribution of regional support: an empirical analysis

In this section, we analyse the distribution of cohesion funding over the last two MFFs. The way ESIF spending was distributed over the last two MFFs gives an indication of the ‘revealed preferences’ of Member States and the EU. The analysis also allows us to shed some new light on issues, which have been discussed for a long time in the literature, namely whether ESIF spending substitutes other investment and whether it goes to places with the biggest needs.

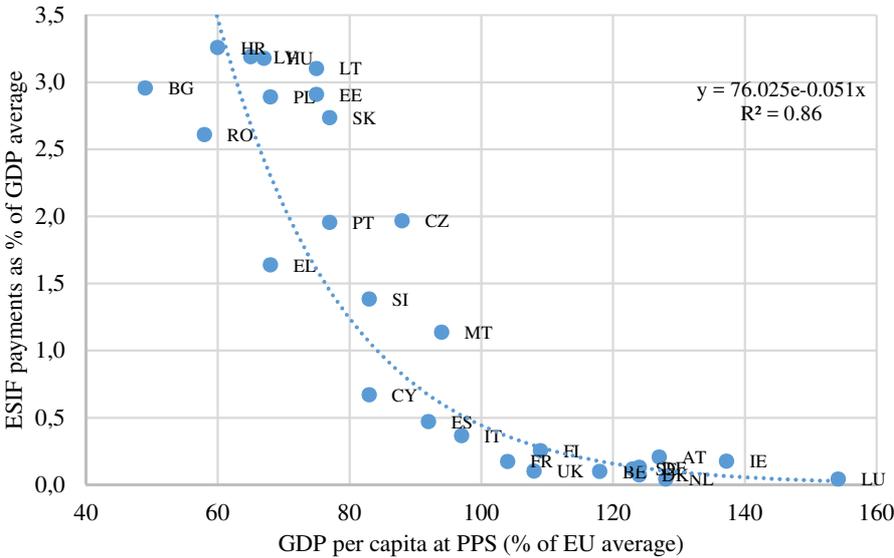
The occasion for this analysis is a dataset, which has recently been made publicly available by the European Commission and which details the amount spent under the various ESIF compartments by region (and by year). The annual data was found to be rather variable, we thus concentrated on the totals per region during the 2000-2006 and the 2007-2013 MFFs.

#### 4.1. More money to the needy?

The first question we want to answer is what regions receive most funds. For the current programming period, 2014-2020, the allocations (not the spending so far) seems to be fairly closely linked to relative income per capita of countries. Figure 6 below shows on the horizontal axis the GDP per capita (at Purchasing Power Standards, PPS, 2016 data) and on the horizontal axis the total amount of ESIF allocations as percentage of (2016) GDP. The statistical association seems to be non-linear, as one would expect, given that regions with a GDP per capita above 90% of the EU average should in principle receive no Structural Funds.

Moreover, one finds some large differences in the amount of funding allocated for countries with a similar income per capita. For example, Greece has a similar GDP per capita as Hungary and Slovenia, but receives only about one-half as much these two new Member States.

Figure 6. Allocations of Cohesion spending under the current MFF (2014-2020)

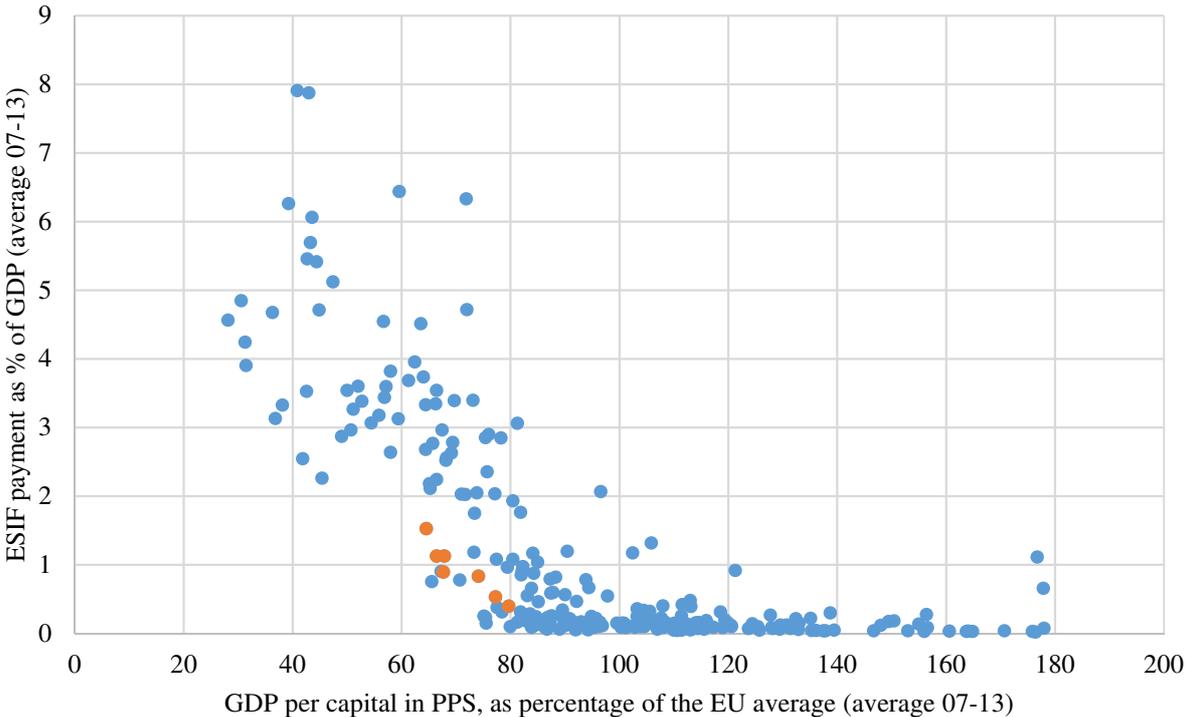


Source: own calculations from Commission Communication

The new data on the allocation of ESIF by regions allows one to check whether one finds a similar relationship between income per capita and allocation of ESIF funding at regional level. Objective 1 and 2 regions are in principle the only ones which should receive ESIF funding.

However, some other regions also receive Structural Funds, albeit usually much less (as a proportion of their economies). As shown in Figure 7, one finds that overall richer regions receive less than poorer ones, but this relationship is not as clear-cut as in Figure 6. Figure 7 shows on the vertical axis the amount of ESIF financing received per region (as a percentage of regional GDP) during the 2007-2013 MFFs (the last one for which we have complete data) and on the horizontal axis the real GDP per capita of the region, measured in PPS and as a percentage of the EU average (averaged over the programming period).

Figure 7. ESIF payments by region and income per capita, 2007-13



Note: On the horizontal axis: GDP per capita at PPS, as % of EU average (average for the programming period). On the vertical axis: ESIF payments as % of regional GDP (average for the programming period).

Source: own calculations data from DG Regio.

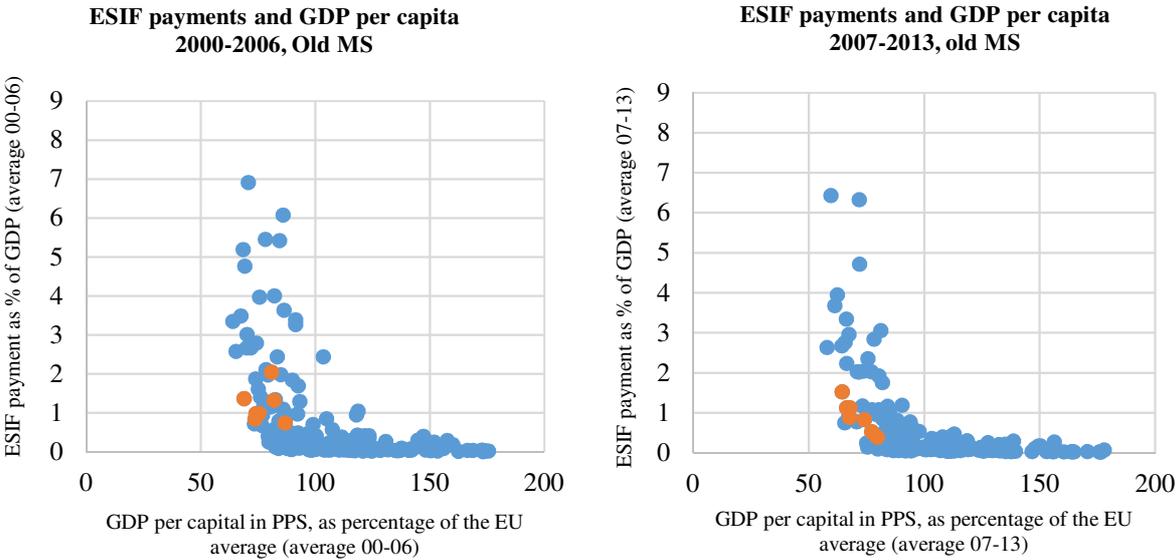
The non-linear relationship is still rather clear, but the variance is much larger. For some regions, ESI funding has amounted, on average, to more than 5% of regional GDP. At the national level the highest values had been only about 3% (see Figure 6 above). Receiving on average 7% of its GDP from ESIF (like Eszak Alföld and Dél Alföld in Hungary) implies that the total amount over a 7-year period cumulates to about 50% of GDP (and to 100% over two periods if the rate is maintained). ESIF can thus play a dominant role in the economy of some regions. The Mezzogiorno regions highlighted in Figure 7 lie generally below the line of best fit, suggesting that these regions receive less from ESIF (around 1% of GDP, on average) than one would expect given their low income per capita.

Overall, the link between income per capita and ESIF funding received, seems less strong at the regional, than at the national level. For example, a number of regions with a GDP per capita of only 40-45% of the EU average received only a little above 2% of their GDP from ESIF funding, whereas two other in the same bracket received almost four times as much. For the national data, that ratio is 2:1. From the Figures it also emerges that some regions with a GDP

per capita much above the EU average (at around 180% of it) still received about 1% of their GDP in ESIF funding. These are two capital regions in CEECs.

The data from the programming period 2000-2006 are more difficult to judge since the the countries which joined in 2004 could participate only partially in that programming period. During that period the regions from CEE received much less than one would expect given their low incomes. Figure 8 below, which shows data without NMS, suggest that among the Northern and Southern regions the picture for the 2000-2006 (Agenda 2000) period is similar to the one for 2007-13: a non-linear relationship.

Figure 8. ESIF payments under the ‘Agenda 2000’ compared to the period 2007-13, old Member States.



Source: own calculations data from DG Regio.

In principle one should expect a clear shift in the pattern around the 75% of EU average and 90% of EU average values. Indeed, the charts exhibit a fall in the payment at around 75% and then stronger at above 90%. Interestingly, there seems to be no ‘absorption, or equity’ cap, in terms of total payment as percentage of GDP. Even if they implicitly existed at country level, Member States managed to redistribute the available funding to their more lagging regions.

**4.2. Crowding in or crowding out: More Structural Funds, more investment?**

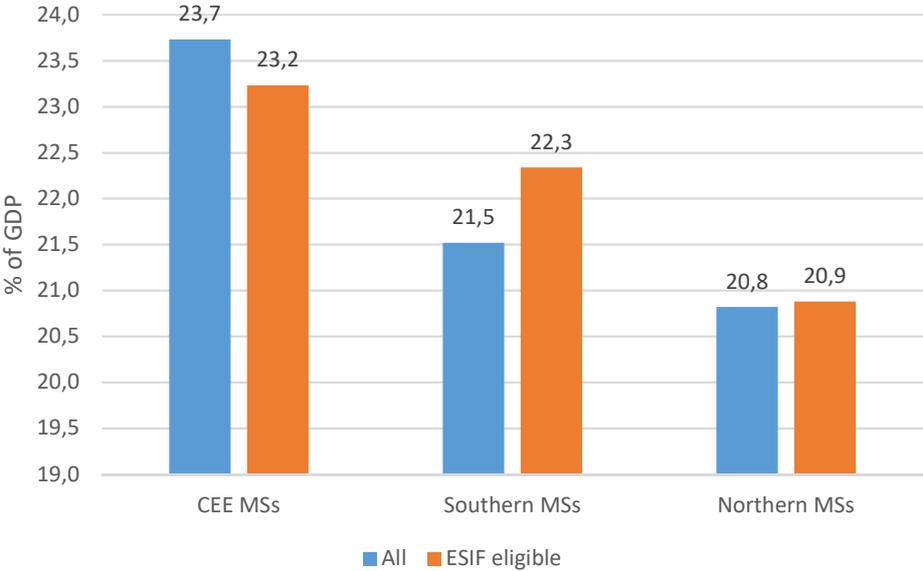
The vision behind many of the projects funded under the ESIF is that a better infrastructure (financed by the public sector) increases the productivity of the economy overall and thus also the productivity of private investment. In this view, infrastructure investment should be complementary to private investment and one would expect that higher infrastructure (and other) investment financed by ESIF should lead to higher overall investment rates.

Figure 6 above showed that a number of regions receive ESIF funding worth, on average over a programming period, of more than 5% of regional GDP. With regional investment rates of around 20 to 25% of regional GDP this implies that in some regions a considerable portion,

between one fifth to one quarter, of all investment (not just infrastructure investment) is financed by the EU budget.

One first question one can ask is whether regions, which receive more ESIF funding, have higher investment rates. Figure 9, which presents some of the relevant data, suggests that this does not seem to be the case, at least not in all regions.

Figure 9. Investment rates by major groups of regions, 2007-2013

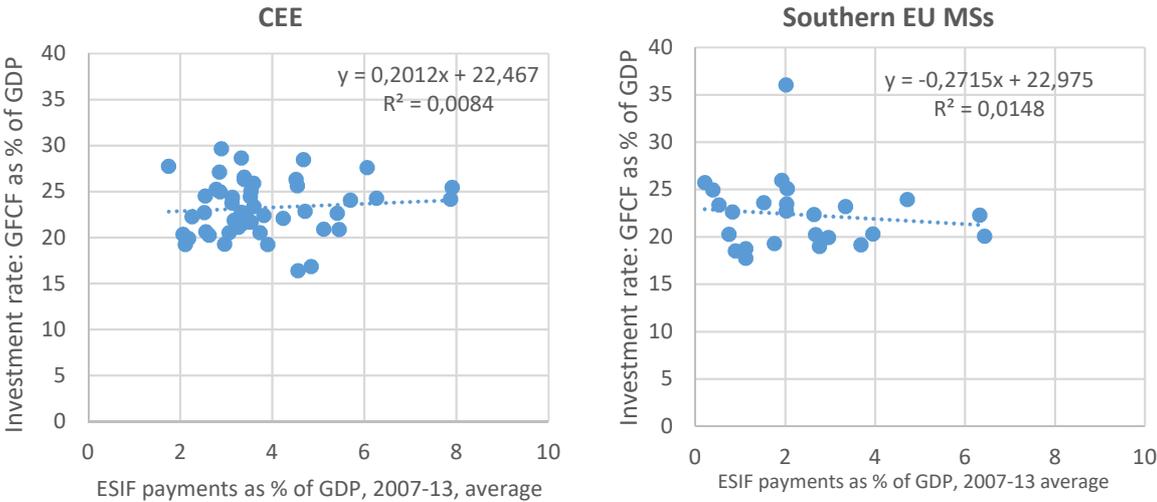


Source: Own calculations based data from DG-Regio.

First of all, the figure suggests a considerable difference between investment rates across the groups of regions. Investment rates are substantially higher in CEE regions than elsewhere. This is not very surprising and in line with the prediction of the Solow model presented in the previous section. Unexpectedly, the figure also shows that the (few) regions in CEE which do not qualify for ESIF (i.e. those with a GDP per capita above 90% of the EU average) have a higher investment rate than those which do qualify. In Southern Europe, the contrary is true. Hence from this picture no clear relationship emerges between Structural Funds and (regional) investment rates.

This is confirmed by Figure 10, which illustrates the (lack of) relationship between ESIF payments per region during the 2007-2013 programming period and the investment rates in each region, focussing on CEE and Southern regions. At first sight, there is little difference between the two groups of regions from CEE NMSs and those from Southern MSs.

Figure 10. ESIF and overall investment rates



Source: own calculation based on Eurostat and DG Regio databases.

However, if one controls for income per capita, a somewhat different picture emerges. Investment rates tend to be higher in poorer regions; and the regions in the CEEC regions tend to have a lower income than those in Southern countries.

In a more formal setting, we perform a regression analysis of the rates of investment per region, as a function of ESIF payments and the regional income per capita. The two columns in Table 2 below show the results separately for two groups of regions. The first column of results refers to those regions in CEEC with a GDP per capita at PPP below 90% of the EU average (so-called transition and less developed regions). The second column refers to the same category of regions in Southern MS.<sup>6</sup> The most interesting aspect of these results is that ESIF payments seem to have a strong impact on investment in CEEC, but not in the South.

The relatively low explanatory power shows that in both cases ESIF payments (and GDP per capita) do not seem to be major determinants of investment rates since these two variables can explain, together, only about 15% of the total variance of investment.

Table 2. Regression results, Structural Funds and investment rates (2007-2013 MFF)

	(1)	(2)
Dep. Var.: Investment rate % GDP	Central Eastern European MSs	Southern European MSs
ESIF, average payment as % GDP 07-13	0.74***	0.18
GDP in PPS as % EU, average 07-13	0.09**	0.22***
Constant	15.5***	6.76
Observations	48	25
R-squared	0.142	0.168

Cross section regression, robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>6</sup> Unfortunately, no data is available for investment by region for Spain.

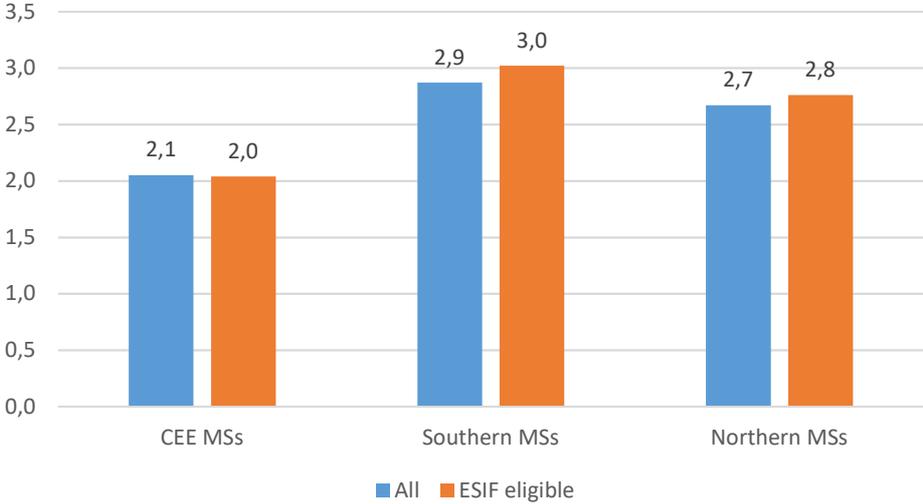
Note: The dependent variable in both estimations is the investment rate (GFCF as % of GDP, averaged over 2007-2013). The two explanatory variables are: Structural funds, measured by ESIF payments as percentage of regional GDP, averaged over 2007-2013, and second, GDP per capita measured at PPP, again averaged over 2007-2013.

**4.3. Where did ESIF funding go?**

The Solow growth model briefly explained above suggests that the capital to output ratio is a good (inverse) indicator of the productivity of capital. The higher the capital output ratio the lower the productivity of investment.

Figure 11 below shows thus the capital to output ratios for three broad groups of regions: Central and Eastern Europe (about 50 regions), Southern Europe (which has been hardest hit by the euro crisis, about 45 regions) and the rest, labelled Northern Europe (mostly relatively well-off regions, over 150).

Figure 11. Capital to output ratios by major groups of regions



Source: Own calculations based on data from DG-Regio.

It is apparent that the Southern European regions have the highest capital to output ratio, which implies that the productivity of capital in these regions is the lowest. By contrast, regions in CEE have the lowest capital to output ratio and should thus be the regions with the highest productivity of capital. There is very little difference in the ratio in all regions within these groups and only the ESIF-eligible regions. The relative difference in capital to output ratios between Southern Europe (around 3) and those in Central and Eastern Europe (around 2) implies a difference in the relative productivity of capital of 50% (capital yielding 50% more output in CEE than in SE). With a capital to output ratio of 2.7-2.8, the richer Northern European regions are closer to the South than to Central and Eastern Europe.

The regional data allows one to make a more detailed, econometric analysis of the factors, which have, in the past at least, been associated with the distribution of ESIF. We implement a simple cross-section regression with as dependent variable the amount of ESIF funding received by a region as a proportion of (regional) GDP, on average over the 2007-2013 period.

The main explanatory variables are four indicators. First of all, income per capita (at PPS and measured as percent of the EU average), with the expectation that higher income should be associated with lower ESIF allocations (i.e. a negative coefficient is expected). The second key variable is the capital output ratio. A positive estimated coefficient would indicate that regions with a capital/output ratio (low productivity of capital) receive more ESIF (*ceteris paribus*), which, in turn, would indicate a low impact of ESIF funded investment. In addition, we also included the unemployment rate (average over the period) as an explanatory variable since unemployment is one determinant of ESIF allocations (the expected sign for this coefficient is positive). Since the ESIF includes also the agricultural fund (EARDF), we also included the share of employment in agriculture as part of the explanatory variables (expected sign for coefficient again positive).

Furthermore, we introduce several groups of dummy variable. One dummy variable indicates the group of countries the region belongs to. We used the same three country groups as above: CEEC (all the member states, which joined 2004 and 2007), Southern Europe (the Cohesion countries among the old Member States plus Italy) and the remainder, called 'Northern Europe'. We then add one specification, with a separate dummy for the countries, which joined after 2004 (BG, RO, HR). However, this variable was of little significance. These three countries seem to have participated almost fully alongside the other CEE countries. Another dummy refers to the official thresholds for Structural Fund allocations, namely regions with a GDP per capita (at PPS) below 75% of the EU average, those (called transition) with a GDP per capita between 75% and 90% of the EU average, and those above 90% of the EU average.

Since we had found a non-linear, exponential relationship in the figures above, we used the natural logarithm of all variables. As a robustness check we also performed the same type of regression on the basis of the original data (not the logarithms). The results were largely the same.

The results of the two variants of the regression equation using natural logarithms are shown in Table 3 below. The first column shows the results when ESIF payments per region are explained using only the four economic explanatory variables and the dummy for the country groups. In this case the signs of the variables are those one might a priori expect. The estimated coefficient on income per capita is strongly negative and highly significant and the coefficient on the capital output ratio is also negative and significant at the same, low, level. Taken together this implies that richer regions received less in ESIF funding during the last MFF but also that, within the country groups, a higher capital/output ratio is associated with more ESIF funding, i.e. regions where the productivity of capital is relatively low, receive more funding for additional investment. This seems to contradict the prediction of the Solow model, but given that the dependent variable is a policy variable this result is likely to reflect the policy choice.

Another clear result is that higher unemployment and a higher share of employment in agriculture lead to more ESIF funding. The coefficients on the two MS group dummies are both negative. This implies that both Southern countries and richer, non-cohesion, regions receive definitely less ESIF funding than one would expect given all the other variables (unemployment, capital/output ratio, importance of agriculture).

In the second column, regional income classes are added. The purpose is to check whether income per capita plays a role in the allocation of ESIF funding even for regions below the threshold of 75% of the EU average. Column two thus adds to the previous explanatory

variables, one dummy which indicates transition regions (income per capita above 75%, but below 90% of the EU average), one for the ‘rich’ (non-cohesion) regions, i.e. those with an income above 90% of the EU average, one for the late comers during the 2007-2013 MFF and, lastly, a dummy representing the outermost regions. All previous results are confirmed in this specification, except for GDP which, not surprisingly, is no longer significant and captured by the new dummies. The coefficients on the first three regional classes are all negative. By contrast and as expected the outermost regions receive more (*ceteris paribus*) than other regions. The regions from the latecomer member states receive somewhat less. Same is true for the regions with a GDP per capita above 75% of the EU average, which receive less ESIF funding. However, for the transition regions the coefficient is not significant. This result suggests that ESIF allocations are subject to a threshold effect: once a region has an income per capita below 90% of the EU average, it can count on a certain amount of ESIF funding, independently of how much below the 90% threshold its income is. This finding confirms the visual inspection from the figures above, which suggested that among poorer regions there are large differences in ESIF allocations. However, these differences are not related to income per capita, but rather to differences in unemployment and the importance of agriculture.

*Table 3. Regression results, 2007-13*

<i>Dep. Var.: (Log-)ESIF payments, average 2007-13</i>	(1) Baseline	(2) Regional classes MS groups
GDP in PPS as % EU average	-0.76***	-0.37
Capital Output Ratio	1.50***	1.11***
Unemployment	0.83***	0.65***
Employment in Agriculture	0.48***	0.47***
Latecomers MSs		-0.33*
Southern EU MSs	-1.78***	-1.63***
Norther EU MSs	-2.27***	-2.05***
Transition Regions		-0.21
More Developed Regions		-0.71***
Outermost regions		0.88**
Constant	0.40	-0.28
Observations	235	235
R-squared	0.88	0.89

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Notes:* Latecomers MSs are Romania and Bulgaria, which joined the EU in 2007. Reference Group: CEE including Bulgaria, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia (no data available on Estonia). Southern EU MSs include Cyprus, Greece, Italy, Malta, Spain, Portugal. Northern EU MSs include Germany, Austria, Denmark, France, The Netherlands, Belgium, Luxembourg, the UK, Ireland, Sweden, Finland. Transition regions have GDP per capita in PPS as percentage of the EU average between 75% and 90%. Most

developed regions have GDP per capita in PPS as percentage of the EU above 90%

## 5. Concluding remarks

The allocation of ESIF funding is in the end a joint decision of member states and the EU. During the negotiations for the MFF, Member States bargain for ‘their’ allocation of regional funds. Once the general agreement has been reached, Member States retain considerable influence over how these funds are allocated across regions within the country.

This contribution has exploited a new database on the distribution of ESIF funding across regions to test which variables explain where ESIF funding has been allocated in reality (during the last two MFFs). The actual allocation seems to have followed closely the official priorities: GDP thresholds, unemployment and agriculture. Poorer regions receive more, but, below a threshold of 90% of the EU average, disparities in income no longer make a big difference. The most noteworthy finding is that regions with already a high capital-to-output (not capital-to-labour) ratio tend to receive more ESIF funding, even though they constitute the regions where investment should be least productive. Interestingly this applies mainly to CEE regions.

The allocation of cohesion spending is pre-determined for long periods, but the efficiency of this spending is difficult to determine *ex ante*. The finding that ESIF funding tend to go towards regions, which already have a high capital stock in relation to the output, that this capital helps to produce, suggests an issue of economic efficiency. To a certain extent, this may be the outcome of a policy choice to support regions which also high unemployment, but this strategy may be unable to deliver the long term positive growth effect, which one would expect from EU funds.

A partial solution to this problem could be making the pre-allocation of cohesion/structural funding more flexible. For example, a certain share of the total amount available to ESIF could be left out from the pre-assigned funds to countries and regions. Instead, a mechanism should be found to generate competition between regions, and possibly also countries. Those with the best projects, with highest value added, should get more funding.

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## Annex. Further regression results

CEE countries only	(1) ESIF 07- 13	(2) ESIF 07-13 Regional classes
GDP in PPS as % EU average	-0.82***	-0.62***
Capital Output Ratio	0.92***	0.86***
Unemployment	0.32***	0.27***
Employment in Agriculture	0.07	0.03
Transition Regions		0.01
More Developed Regions		-0.54***
Constant	3.01***	2.49***
Observations	53	53
R-squared	0.779	0.826

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note: ESIF 00-07: logarithm of average over 2007-13 period

GDP, Capital Output Ratio, Unemployment (20-64), Employment in Agriculture: logarithm of average over 2007-13 period. Transition regions have GDP per capita in PPS as percentage of the EU average between 75% and 90%. Most developed regions have GDP per capita in PPS as percentage of the EU above 90%

Surprisingly it seems that agriculture is not a major determinant of ESIF funding if one considers only regions in CEE. The capital output ratio has a very strong, positive coefficient and GDP per capita remain statistically significant even if one considers separately two different income classes.