

# The European Union's Cohesion Policy: Effectiveness and Efficiency

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## Convergence

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## Abstract

This paper aims at analyzing the effectiveness and efficiency of the European Union's Cohesion Policy under the first objective, convergence. The research covers the period of 2003-2009 and includes 223 regions of the European Union. I find evidence to support the fact that there is indeed convergence amongst these regions, both absolute and conditional, and that the Structural Funds given under the first objective increase economic growth significantly. In terms of efficiency, I find no evidence to support the theory that either moral hazard or substitution effects take place, thereby reducing the efficiency of the these funds, but I do find that corruption does decrease economic growth.

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## I. Introduction

The cohesion policy of the European Union is one of great importance, not only because it constitutes of more than one third of the EU's budget, but also because it is one of the fundamental objectives laid out for the European Union. As the current President of the European Commission, Barosso said "... it is important to know that cohesion policy is not just a policy for some countries in Europe, it is a fundamental objective of the European Union as a whole. It is a principle enshrined in our treaties."<sup>1</sup>

Of course, due to the large amount of investment into this policy, it is also one that is a regular topic amongst economists. The question of whether the cohesion policy is actually effective is one that many are interested in.

EU has 271 regions, classified in the NUTS classifications of the European Union. Due to the fact that there are large existing development differences across these regions, the EU has developed a cohesion policy. This policy has been developed to help close the gap between regions and encourages economic and social cohesion. The cohesion policy aims to increase economic growth, employment, competitiveness and territorial cooperation.

Existing literature in this topic has widely varying outcomes. There are papers who find that the Cohesion Policy has been reaching its goals (e.g. Beugelsdijk and Euffinger (2005)), however on the other hand many economists find evidence contradicting this, meaning the policy has not been effective at reaching its aim (Boldrin, Canova 2001), whilst some papers find limited or mixed effects (Bussoletti and Esposti 2004, Mohl and Hagen 2010).

A majority of these existing literatures look at the overall impact of the Cohesion Policy and the Structural Funds. However, in this paper I aim to focus on the funds given under the objective 1, convergence. In addition I look at a more recent time period of 2003-2009. It is interesting to look at a wide-range of EU countries, not just focusing on the EU-15, which constitutes of the more developed regions, but also including the newly joined in 2004 and 2007, for this reason I have both well developed regions (countries) and the newly joined less developed regions as

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<sup>1</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/12/411>

well. I expect this to give a good insight on the effectiveness of the Cohesion Policy since these latter regions receive the largest amount of funding under objective 1 and thus testing the effect of the structural funds given under objective 1 should be highly significant for this field of research.

In this paper, I focus not only on the effectiveness of the Structural Funds but also on their efficiency. Many economists fear that these structural funds might be used inefficiently due to the existence of moral hazard and the substitution effect. The fact that governments could be more inclined to hold back economic growth to a certain extent to continue receiving funding could be of real loss to the efficiency of the cohesion policy. In addition, the substitution effect might cause governments to invest less or withhold investments altogether in areas where they are eligible for structural funding. This could not only have serious efficiency loss effects but also violated the additionality principle of the European Union. For these reasons, I will attempt to test the efficiency of the structural funds.

The structure of this paper is the following. After this introduction, I will give an analysis of the most relevant literature on the topic of the Cohesion policy, its effectiveness. I proceed by looking at the history of the Cohesion Policy, its evolution and deterministic changes and improvements, the multiannual framework as well as its execution and monitoring. I then provide some insight on the setup of the Structural funds and its various parts, which is followed by an analysis of economic growth theory and convergence. The empirical model is then laid down and the results presented.

## II. Literature review

Economists' interest in the EU cohesion policy is great and increasing. The effectiveness of the structural funds has drawn increasing attention in economic literature. However, this vast amount of research in this field has not yielded a single consensual answer yet. Different studies seem to come up with varying results on the EU's structural funds' effectiveness, the EU's goal on economic, social and territorial cohesion.

There are several papers, which conclude that the Structural Funds have a significant and positive effect on the growth of EU regions. Cappelen et al. (2003) analyze the period of 1980-1997 and find a positive and significant effect of the regional support on economic growth performance of the EU regions. They also find that the effects have become larger after the reforms of 1988. They also find that more developed regions experience a greater effect of the funds, thus emphasizing the need for accompanying policies to improve the capabilities of less developed regions. Bouvet (2005) also draws positive impact conclusions with the difference that although the impact of EU regional policy is found positive, it has only a modest effect on economic growth. Beugelsdijk and Euffinger (2005) also find that there is a significant and positive effect of the structural funds on economic growth in the EU regions (EU-15) in their analysis of the period 1995-2001.

Most papers, however, do not find a clear cut positive impact of the Structural Funds on European regional growth. They are either inconclusive or find negative evidence on whether these funds are helping these regions to reach the EU's development and convergence goals.

Of the papers that do not find clear evidence for a positive impact of EU regional policies, Buscoletti and Esposti (2004) analyses the period of 1989-2000 for the EU-15 region. They find a marginally positive impact of Structural Funds which becomes limited and sometimes negative depending on the regions.

Ederveen et al (2003) examine the period of 1981-1996, and they look at the importance of the types of convergence being examined. They find that in a world of absolute convergence, the funds have a negative impact, whilst in a world of conditional convergence with country-specific effects the cohesion policy has a negligible and insignificant effect. Only in a world with conditional convergence and regional-specific effects does the EU's cohesion policy lead to positive results. They conclude that this could mean that the EU's policy is actually counterproductive or that the existing differences amongst regions will persist.

Mohl and Hagen(2010) find that the effectiveness of the EU structural funds depends on the objective being considered. The paper examines the period of 2000-2006 and it finds that only under objective 1-convergence- is there a clear positive and significant effect of the structural funds. When all 3 objectives are considered together, the findings do not show a clear effect. The paper also emphasizes the importance of time lags and their role in the growth effect of the structural funds.

Some authors do not find evidence that is statistically significant; Garcia-Mila and McGuire (2001) examine the period of 1964-1991 for Spain's regions only. The paper finds that the policies have not been effective at raising the level of private investment or improving the overall economies of the poorer regions.

Finally, many papers find that the EU's cohesion policy has actually failed in achieving economic, social and territorial cohesion. Dall'erba and Le Gallo (2008) fail to find statistically significant evidence of the Structural Funds effects on regional development from 1989-1999, whilst in another study they find a negative effect. Boldrin and Canova (2001,2003) also have found no or negative evidence on the effect of structural funds and economic growth in the EU regions. They claim that the EU funds have solely served the purpose of redistribution.

It is thus clear that there is no consensus yet amongst economists on whether the EU's cohesion policy and structural funds have an effect on economic growth in the European regions and if so, to what extent and what sign does this effect have. I will attempt to answer this question focusing on the very recent time period of 2003-2009. This means I will use the



data of a more recent period for analysis and also that my results will entail the enlargement effects of the EU during the 2000s.

### **III. The establishment of the Cohesion Policy and the Multiannual Financial Frameworks**

The European Union's cohesion policy was already developed and noted at the time of establishment of the European Community in 1957. In the Treaty of Rome, a policy to ensure the development of member states is clearly defined and where two structural funds were laid out: the European Social Fund and the European Agricultural Guidance and Guarantee Fund.

The importance of the Cohesion Policy and its framework became even larger as accessions to the European Union began. Enhanced by the economic problems at the time, the accession in 1973 of UK, Ireland and Denmark, lead to the establishment of the European Regional Fund in 1975. Despite the ERDF having limited financial resources at the time, this laid down the groundwork for an integrated cohesion policy system, which shifted the governmental to a community based mechanism.

The earlier Structural Funds system had several shortcomings. The actual amount of funding available under ERDF was not large scale enough, and the European Commission's role in the cohesion policy was undersized. It became clear, that rather than countries focusing on national priorities, member states should use their funds to promote regional priorities and invest into comprehensive development programs, rather than individual projects. The need for a multiannual framework system became more evident to enhance efficiency of the funds.<sup>2</sup>

The Single European Act signed in 1986 was another major stepping stone in the history of the cohesion policy that strengthened the Community's objective of reducing regional disparities. It laid down rules, objectives and tools and noticed the ERDF as the main instrument for the cohesion policy. The European Commission focused on objectives and regions. It also recognized the importance of cooperation between regional authorities, member states and the European Commission for the planning and execution of the funds system. The importance

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<sup>2</sup> Lipovecz, J. (2009): The efficiency of the EU Cohesion Policy: A comparative Analysis

of additionality was introduced, whereby it is recognized that member states cannot replace investments by EU structural funds, but must contribute to these projects themselves in addition to the funds being received. Subsidiarity, another fundamental principle of the EU's cohesion policy was also defined, which states that decisions should be made at the lowest level possible to ensure efficient decision making by those who are most knowledgeable.

These new regulations were supported through the Delors I. Package. In 1988 the European Council decided to double the amount of funding for the financial next period (1989-1993). This package also established the multiannual programming and introduced local partners into the framework. It was also then that the Council set up the five main objectives under which the structural funds will be distributed: <sup>3</sup>

1. Support for regional development: for the regions whose GDP per capita does not reach 75% of EC average
2. Support for regions affected by industrial decline
3. Decreasing long-term unemployment
4. Promoting employment of young people
5. Supporting the adjustment of agricultural structures and the development of rural areas

This program covered about 25% of inhabitants (86.2 million) and the funding under objective 1 totaled ECU 43.8 billion, making it 64% of total funding received. The regions eligible were determined under the NUTS classification, the Nomenclature of Territorial Units for Statistics, and funding was thus allocated on the basis of the NUTS regions.

The Treaty on the European Union, signed in Maastricht in 1992, established another major foundation of the cohesion policy and the structural funds. The Cohesion Fund was introduced, meaning that from 1992 onwards the cohesion policy consisted of two main instruments: the Structural Funds (including ERDF, ESF, EAGGF, and the new Financial Instrument of Fisheries Guidance-the FIFG) and the Cohesion Fund.

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<sup>3</sup> <http://eustructuralfunds.gov.ie/files/Documents/InvestinginEuropesFuture.pdf>

For the 2000-2006 multiannual frameworks, several issues arose and were defined in the Agenda 2000. One of the issues was the need to simplify the Cohesion Policy's structure, the other main issue was the upcoming enlargement. Since the enlargement of 2004 entailed accession of states whose development was substantially below the EU's average, thus the need for a strong cohesion policy became clearer than ever.

In 1999, due to revised treaty provisions, the European Parliament became involved for the first time in the adoption of the ERDF and ESF regulations through co-decision making processes.<sup>4</sup> It was then that the Commission, together with the Council and with the Parliament also laid down the pre-accession instruments (later adopted by the Council as the Instrument for Structural Policies for Pre-Accession or ISPA).<sup>5</sup>

### 2000-2006 cohesion policy

For the cohesion policy of 2000-2006 frameworks, some major changes were laid out. The 1999 reform reduced the previous objectives from 6 to 3 through the merging of objectives 2 and 5 and the merging of objectives 3 and 4. In addition, the number of Community Initiatives was reduced from 13 to 4. The objectives for the period 2000-2006 thus became<sup>6</sup>:

1. Promoting development and structural adjustments of the regions lagging behind
2. Promoting economic and social conversion for areas facing structural difficulties
3. Promoting the adoption and modernization of policies promoting education, employment and training

This covered 37% of the population (169.4 million) of the EU-25 region and totaled to 149.2 billion Euros under the first objective from ERDF, ESF, EAGGF and FIFG funds. Under the Cohesion fund, the first objective received a total of 25.4 billion Euros. 41% of these funds

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<sup>4</sup> <http://eustructuralfunds.gov.ie/files/Documents/InvestinginEuropesFuture.pdf>

<sup>5</sup> <http://eustructuralfunds.gov.ie/files/Documents/InvestinginEuropesFuture.pdf>

<sup>6</sup> <http://eustructuralfunds.gov.ie/files/Documents/InvestinginEuropesFuture.pdf>

went into infrastructure, of which just under half went into transportation and a third went to environmental projects. 33.8% was spent on creating productive environment for enterprises and the remaining 24.5% was allocated to human resources.<sup>7</sup>

During the period of 2000-2006 cooperation between the European Commission and the Member states was strengthened. The responsibilities of the national managing authorities and the paying authorities were clarified, and the program management was speeded up through the implementation of the 'n+2' rule, which states that failure to provide proof of payment within 2 years means the allocation is lost. Stronger evaluation methods were implemented by Member states.

### 2007-2013 cohesion policy

This most recent and on-going period of cohesion policy also has 3 main objectives, with minor changes compared to the previous period. The previous objectives 2 and 3 were merged, and the program includes an interregional objective as the third objective:

1. **Convergence:** 81.5% of the cohesion budget is allocated to the poorest regions of EU, meaning those regions where GDP per capita is below 75% of the EU average. It aims at enhancing economic growth (transport, infrastructure etc.). This includes over 100 regions, totaling more than 170 million people (and an additional 16.4 million on a phasing-out basis), which gives 1/3 of the EU's population. Structural funds for the first objective come from all three categories of funding: the European Regional Development Funds, the European Social Funds and the Cohesion funds.
2. **Regional Competitiveness and Employment:** This incorporates around 16% of the budget. It includes around 170 regions that do not qualify for support under the convergence benefits. These budgets are used to finance projects that enhance competitiveness and employment, such as investing in human capital, promoting

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<sup>7</sup> <http://eustructuralfunds.gov.ie/files/Documents/InvestinginEuropesFuture.pdf>

entrepreneurship and innovations, creating a better workforce, improving transport links etc. The structural funds allocated under this objective constitute of European Regional Development Funds and also European Social Funds.

3. European Territorial Cooperation: This entails the remaining 2.5 % of the budget. This money is used to promote cooperation amongst regions and share experience amongst regions. This objective is financed through the European Regional Development Fund.

The previous number of financial instruments available is reduced from 6 to 3. Two of the original Structural Funds remain (ERDF and ESF) and the Cohesion Fund.

Due to the recent enlargements of 2004/2007, the EU's GDP per capita as a total has declined (due to poorer regions now being included in the EU) thus some regions eligible for funding before now do not fall into the eligible regions category anymore. For this reason, the EU has created funding for these so called "phasing out regions" which will still receive support under objective 1 until 2013.

For the period 2007-2013, €282.8 billion is given under objective 1, 199.3 billion of this is for the convergence regions and 13.9 billion is for the phasing out regions and 69.6 billion for the Cohesion Fund.

## **IV. Structural funds**

At present, the cohesion policy is financed through the structural funds. These structural funds today include the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund. Together these funds have 3 main objectives and areas of focus.

In this paper I focus solely on the first objective and the structural funds given under this objective. As I mentioned above, the funding under the first objective of convergence come from the ERDF, ESF and the Cohesion Fund.

### The European Regional Development Fund

The ERDF aims at strengthening economic and social cohesion amongst EU member states. It does so by closing up gaps between regions. It consists of four main goals under which it provides funds. It finances direct aid to investments in companies to promote employment (particularly SMEs).<sup>8</sup> It also finances projects aimed at improving infrastructure, particularly in research and innovation, technology, transportation etc. The ERDF also provides financial instruments (e.g. local development funds) to encourage regional and local cooperation and development. Last but not least, the ERDF also finances technical assistance.

### The European Social Fund

The ESF is aimed at increasing employment and creating job opportunities in the EU. It focuses on increasing access to employment for the unemployed, migrants and women, increasing access to the job market for disadvantaged people and decreasing discrimination, increasing human capital through investing into creating better education systems and creating innovative working environments and implementing life-long learning processes in the workplace.<sup>9</sup>

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<sup>8</sup> [http://ec.europa.eu/regional\\_policy/thefunds/regional/index\\_en.cfm](http://ec.europa.eu/regional_policy/thefunds/regional/index_en.cfm)

<sup>9</sup> [http://ec.europa.eu/regional\\_policy/thefunds/cohesion/index\\_en.cfm](http://ec.europa.eu/regional_policy/thefunds/cohesion/index_en.cfm)

## The Cohesion Fund

The cohesion fund is aimed at reducing economic and social disparities amongst the regions of the EU. It is allocated to those member states whose gross national income per capita is below the Community average's 90%. It provides financial support for projects under the Convergence objective. The cohesion fund provides finance for two main areas of development: trans-European transport networks and environment. The trans-European transport network entails the priority projects of European interest, whilst the environment projects can entail many types of projects including renewable energy projects, developing/improving rail transport or improving public transportation.

## **V. Efficiency of the Cohesion Policy and the Structural Funds**

It is important that this paper does not limit its scope to the effectiveness of the Structural Funds given under the first objective, but also examines the efficiency of the structural funds and how they are distributed and used within the given region.

As with any policy, there is a possibility that not the entire benefits of the structural funds are realized. There are two main reasons why the governments and local authorities could fall short of exploiting the full potentials of the funding received under objective 1.

The potential presence of moral hazard arises, due to the fact that regions only receive funding under objective 1 if their GDP per capita is below the EU average's 75%. This can provide an incentive for local authorities and governments to try to sustain a lower GDP per capita rate to continue to receive funding or to try and manipulate their data to avoid showing development levels which would cease their right to the funding. This in turn also implies that governments possibly invest the funding received inefficiently into projects, thus not exploiting fully and most efficiently the funding. Thus in this sense this moral hazard can create rent-seeking behavior, as the governments and local authorities might design the regional plans that ensure fund receiving instead of promoting efficient allocation of the funds.

Another efficiency decreasing effect can arise, known as the substitution effect. This can occur if a country plans to invest in a project, but once they receive EU funding for regional development, they would use the money from the funds and not invest from their own resources. This leads to a so called crowding-out effect, which also goes against the additionality principle of the EU, which states that the governments should help finance projects next to the funding received from the EU. Thus countries that withhold own finances in areas that receive from the European Union under objective 1, would thus be damaging the principle of additionality and creating a crowding out effect.



These two efficiency losses however, are difficult to test for in reality. Beugeldsdijk and Eijffinger (2005) suggest the level of corruption as a possible form of measure. Indeed, if either crowding out or moral hazard occurs, this in itself would imply the presence of corruption directly. On the other hand, this relation cannot be interchanged- if there is presence of corruption, this does not necessarily mean that either of the two mentioned types of efficiency losses may occur. However, it can be a good indication as to whether the structural funds have the same efficiency gains for countries considered more corrupt as for countries considered less corrupt.

## VI. Macroeconomic model of convergence

The convergence model is based on the theory that poorer countries grow at a faster rate than richer countries. The Solow growth model predicts that economies converge to a balanced growth path.

$$\ln y_{i,t} - \ln y_{i,t-1} = \beta_0 + \beta_1 \ln \text{GDP per capita}_{i,t-1} \quad \text{equation(1)}$$

Here  $\ln y$  is the log of per capita income, where  $y=Y/N$ . Thus this equation effectively measures the growth rate of GDP per capita from one period to the next, and this is regressed upon the GDP per capita in period  $t-1$ . In this equation, the  $\beta_1$  measures convergence. If the value of  $\beta$  is negative, this would be evidence of convergence. A value of  $-1$  for  $\beta_1$  would mean perfect convergence.

Barron d Sala-i-Martin (1991,1992) suggest that there are two different types of convergence one can test for, the  $\beta$ -convergence and the  $\sigma$ -convergence. Absolute  $\beta$ -convergence occurs when there is a negative correlation between initial levels of GDP per capita and the annual growth rate of the GDP per capita. Conditional convergence happens when this negative relationship holds when additional explanatory variables are held constant in the model.

Barro and Sala-i-Martin also created another convergence, called the  $\sigma$ -convergence, which looks at the various measures of dispersion in the distribution of per capita income at time  $t$ . Conditional  $\sigma$ -convergence happens when the  $\log(y_{i,t})-\log y^*$  decreases over time, where  $y^*_i$  is the steady state level. <sup>10</sup>

Therefore, when deciding which convergence to look at, we must consider what we aim to answer. The beta convergence looks at the how fast the per capita income/GDP catches up to

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<sup>10</sup> Beugelsdijk, M., Euffinger, S.C.W. (2005): The effectiveness of Structural Policy in the European Union: An Empirical Analysis for the EU-15 in 1995-2001. JCMS Volume 43. No.1. pp.35-49

average level of GDP per capita, hence whether the poorer countries tend to catch up the richer countries in terms of income per capita. The  $\sigma$ -convergence then looks at the distribution of per capita GDP and its evolution over time. Thus  $\beta$ -convergence is a necessary condition for  $\sigma$ -convergence to occur, but is not in itself a sufficient condition.

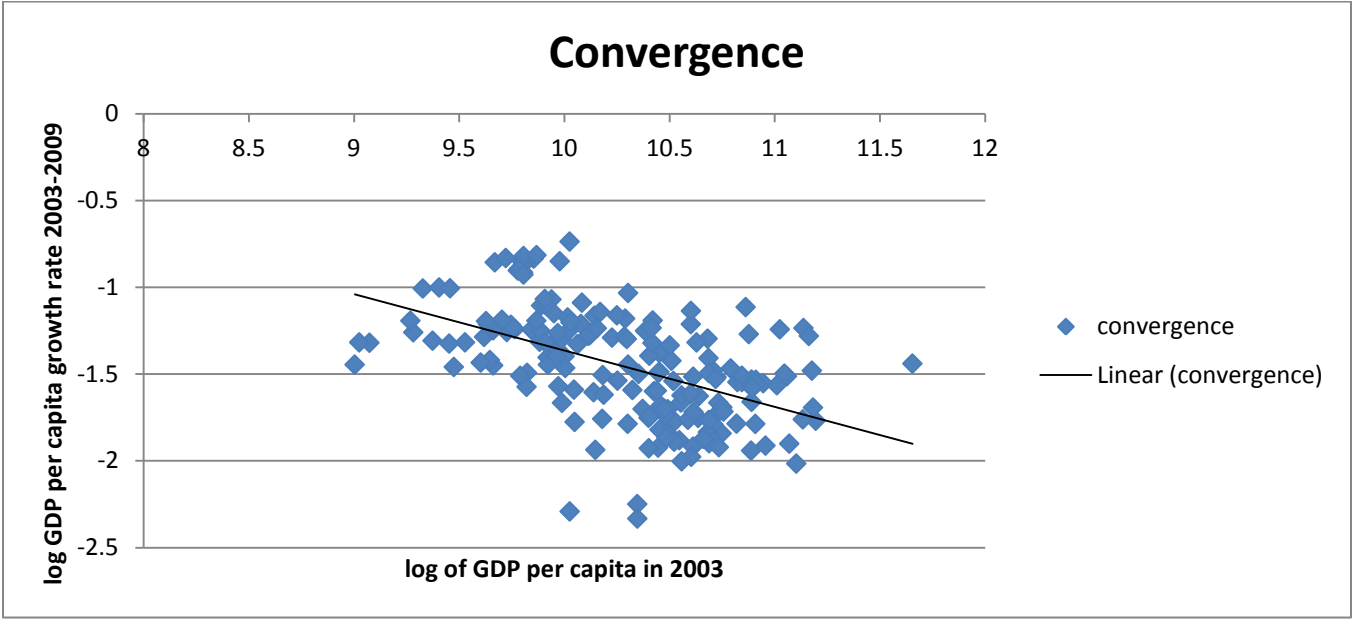
Since I aim to find out whether Structural Funds actually contribute to increasing economic growth in the receiving regions, I am essentially looking at convergence in the EU regions. I therefore aim to find out if structural funds have a positive effect on economic growth and also find out if  $\beta$ -convergence occurs across all the 223 regions included. Graph 1 below is a graphical representation of the log of initial GDP per capita in 2003 (the base year) and the log of GDP per capita growth over the whole period of 2003-2009 for 186 regions (excluding UK's regions) <sup>11</sup>. From the graph it seems that convergence does occur, as higher initial income regions seem to grow at a slower pace, whereas the regions with lower initial income in 2003 seem to be growing at a faster rate, hence the downward linear slope.

The negative log of GDP per capita growth rates can be explained by the financial and economic crisis during the end of the decade. Since European countries/regions were quite heavily affected by the crisis, the GDP growth per capita over the entire period of 2003-2009 were quite low, and thus the logarithmic values are negative. However, the graph still indicates the presence of convergence, as poorer regions grow at a less negative rate than the richer regions do.

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<sup>11</sup> This table consists of 186 regions as the United Kingdom's regions are excluded from the data set for this graph. The UK regions experienced negative per capita GDP growth rates over the period of 2003-2009, and hence logarithmic values cannot be taken of them.

Graph 1. Convergence



## **VII. Empirical model**

In this section I aim to find out whether the EU's structural funds given under the first objective have a significant effect on economic growth and convergence amongst the regions. To this extent, I first test for the presence of convergence, both absolute and conditional convergence. I then examine the effects of structural funds on economic growth in these regions. Furthermore, due to the potential possibility of moral hazard and substitution effects, I aim to find out whether corruption in these regions has an impact on the effectiveness of the structural funds in these regions.

In this section, I first introduce my dataset, and then explain the econometric models being used. This is followed by the findings and interpretations of the econometric analysis.

### **Data**

My aim was to examine data as recent as possible, as most preceding literature examine periods until the early 2000s. Constrained by data availability, I look at the time frame of 2003-2009. This means I look at a 7 year period, including over 200 regions in my dataset, therefore insuring that there is an abundant amount of observations for my panel.

The period I examine incorporates two of the cohesion policies, the 2000-2006 and the 2007-2013. This can be interesting, as my model is not constrained to one multi-annual framework but parts of two consecutive frameworks. Thus my results are less affected by an individual framework and its effectiveness, and provide an overview of the structural funds under the first objective whilst being less biased by the individual frameworks and changing policies.

The EU enlargements in 2004 and 2007 also affect the data since it falls under the period of interest. Since the recent enlargements include countries/regions that are much less developed than the EU average, my dataset should be very representative and should be highly

relevant to test for convergence and for the significance and effects of the structural funds, as these regions are the biggest receivers of the EU's structural funds.

I use 17 countries from the European Union, the countries were selected based on data availability. The countries included are Belgium, Bulgaria, Czech Republic, Germany, Ireland, Greece, Spain, France, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, and United Kingdom. This gives a total of 223 regions (at NUTS level 2) amongst these countries. The countries and respective regions can be found in Table 1 of the Appendix. I believe that this amount and range of regions give a very representative dataset of the entire EU region as it includes both more developed regions, some of which do not receive funding under objective 1, and less developed regions which receive a substantial amount of funding under the regional development policy.

## Dynamics of the model

As there are several hypotheses that I would like to test for, many variables are included in my empirical research. Not only am I looking at the EU's Structural funds' effectiveness and efficiency under the convergence objective, but also am interested in testing for convergence itself, both absolute and conditional. In order to test for conditional convergence I include several additional variables that could be relevant to our model. For a list of all variables used, their unit of measure and their sources, please refer to Table 2 in the Appendix.

Due to the fact that I am looking at regional level in my research, all data was used at regional level as well. However, for certain variables that are only measure at national level, were assumed to be the same at regional level, such as inflation, interest rates, and years in EU. For some measures, such as government consumption and government investment, I assumed these sums to be distributed on the basis of population size per region, and was calculated as such.

Economic growth is the basis of my econometric model and testing for convergence of any form at all. Economic growth here stands for the growth rate of the GDP per capita per year from 2003-2009. I use economic growth as the dependent variable instead of the classical change in GDP per capita from one year to the next as a logarithm, as seen in equation(1) of the convergence equation.

Initial GDP per capita is also one of the main variables used to test for convergence. This variable is important because the estimation value of the estimation of this variable shows whether or not convergence is present. I expect to find that there is  $\beta$ -convergence, both absolute and conditional.

Since this paper focuses on the effects and efficiency of the Structural Funds given under objective 1, I include this variable in the model. The data for this model was based on various calculations based on several different European Union sources and publications. The funds being used here only refer to and include the funds given under the first objective of

convergence. I expect to find that the structural funds have a positive effect on economic growth in these regions.

To measure economic growth in more detail, I decided to include Government Consumption as an explanatory variable. The government is one of the main driving forces generally in the economy, and as such, should be a driving force of economic growth. I thus expect to find that economic growth increases with government consumption.

Government Investment is a variable included that not only helps explain economic growth, but also is complementary to the structural funds given. As mentioned earlier, the principal of additionality implies that governments must invest into regional development projects next to the funding received from the European Union. Therefore I expect that to find that government investment increases economic growth, although it might take time to see the results of this effect.

I also include interest rates in my model in explaining conditional convergence. I believe that the level of interest rate generally has an impact on economic growth, and expect to find that economic growth increases with the higher level of price stability.

Since in this paper I also aim to explore the efficiency of the EU's structural funds, I include the variable of Corruption Index in my research. This index is on the scale of one to ten and the higher the value the less corrupt the country is assumed to be (in my case the region). I expect to find a positive relationship between corruption and economic growth, due to the fact that I anticipate that corruption decreases economic growth.

I additionally include an interaction term of the corruption index and the structural funds variables. This term should pick up the efficiency loss of the structural funds use if moral hazard and substitution effects are present. As such, I expect this term to be positive if there is an efficiency loss due to corruption.



## **Instrumental Variables**

Due to the fact that I am using a GMM model to eliminate endogeneity, since I use the logarithm of the GDP per capita both as a dependent and an explanatory variable, I also must choose instrumental variables that help explain my model that otherwise might be picked up by the error term. In addition to using the above mentioned explanatory variables (and their lags in some cases) as instrumental variables, I also use two additional variables as instrumental variables in some of the regressions.

One instrumental variable I chose to use is the number of years a country (region) is a member of the European Union. Because not every region receives funding when they join the EU, the structural funds variable does not pick up directly these effects. It is also an important variable, because some of the regions included joined the EU during the period of 2003-2009 and as such did not receive funding at the beginning of the period under investigation, whilst later on became some of the biggest receivers of funding later on during this period. This could, in itself, lead to misleading results. For this reason, the number of years a region is an EU member is added as an explanatory variable in the regressions including structural funds as an explanatory variable.

An additional instrumental variable I include in the model is inflation. Inflation is also a variable, that although is not included as an explanatory variable, has an effect on economic growth itself, but also influences interest rates and government spending, and as such is a good instrumental variable that helps explain effects in the model.

## **The Econometric Model**

To estimate my model I use the generalized method of moments (GMM). Since I use the lagged dependent variable (GDP per capita is included in the dependent variable of economic growth) as an explanatory variable as well, endogeneity arises. Since I use the lagged dependent variable, the error term is now not equal to zero, but is influenced by the lagged dependent variable. To control for this, I use the GMM model with instrumental variables to eliminate the arising endogeneity. To ensure reliable results, I use fixed period and fixed cross-section effects in all regression. Additionally, there are certain effects not measured directly by our model as they are not of direct interest to this paper, but are included as instrumental variables as explained above. I use exactly identified and over identified instruments, meaning that the amount of instruments used are equal to or exceed the amount of moment conditions being used, therefore insuring that the regressions can be solved.

## Regressions

I first test for absolute convergence. In the case of all my regressions, I use economic growth as my dependent variable, which of course is essentially the same as what the original model of convergence uses:  $\ln y_{i,t} - \ln y_{i,t-1}$ . The regression I run takes the following form:

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + u_{i,t}$$

Where  $u_{i,t}$  represents the i.i.d. error term of the specification.

Next I include additional explanatory variables to see whether conditional convergence is present. To test this I include as explanatory variables, apart from GDP per capita, government consumption, government investment and interest rate. With this I aim to see whether convergence still holds when including these additional explanatory variables on economic growth. The regression run takes the following form:

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2 government\ consumption_{i,t-1} \\ + \beta_3 government\ investment_{i,t-2} + \beta_4 interest\ rate_{i,t-1} + u_{i,t}$$

I then examine the direct effects of the structural funds on economic growth. Since it is reasonable to assume that it takes time for the effects of the structural funds to appear, I run the regression several times, lagging the structural funds variable from 1 to 4 periods behind. Many projects that are financed through these structural funds take years to completion and therefore their effects could possibly only appear after several years. The regression run are the following:

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2 structural\ funds_{i,t-1} + u_{i,t}$$

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2\ structural\ funds_{i,t-2} + u_{i,t}$$

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2\ structural\ funds_{i,t-3} + u_{i,t}$$

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2\ structural\ funds_{i,t-4} + u_{i,t}$$

Last but not least, I examine whether or not moral hazard or the crowding-out effect exists. To test this, I add into the basic convergence model an interaction term for corruption and structural funds, and the corruption index. The regression used here can be represented by the following:

$$GDP\ growth_{i,t} = \beta_0 + \beta_1 \ln GDP\ per\ capita_{i,t-1} + \beta_2\ structural\ funds_{i,t-3} \\ + \beta_3\ corruption\ index \times structural\ funds_{i,t-3} + \beta_4\ corruption\ index_{i,t} + u_{i,t}$$

## VIII. Findings

### Absolute Convergence

First, I would like to see whether there is absolute convergence. My findings are in Table 1. It is clear that absolute convergence or the so called  $\beta$  convergence is present since the estimation for the logarithm of the GDP per capita (in t-1) is negative and significant. This means that there is evidence to support the theory that these regions converge, such that the poorer regions grow faster whilst the richer regions grow slower. Thus poorer regions catch up to the richer regions.

**Table 1. Absolute Convergence**

Explanatory Variable	Estimation
Constant	1.796927*** (0.163743)
Ln GDP per capita i,t-1	-0.178923*** (0.016656)

Note: Figures in brackets are standard errors. Instrumental variables used are: Ln GDP per capita. Stars represent the level of significance: \* is significant at 10%, \*\* is significant at 5%, \*\*\* is significant at 1%.

## Conditional Convergence

Next, I wanted to see if conditional convergence is also present. This means that convergence would be present when including additional explanatory variables that could help explain the economic growth. Table 2 shows that the  $\beta$  convergence is still present and significant, the estimation for the logarithm of the GDP per capita (at time t-1) is still negative when including government consumption, government investment and interest rate as additional explanatory variables.

The estimation values for government consumption and government investment are negative. This implies that government investment and consumption seem to have a negative effect on economic growth.

Although at first sight this may seem contradictory to what we generally assume in economics, it is possible that this is an indication of governments being inefficient. It is highly likely that governments are not as efficient in investing and starting up new projects as for example profit-oriented companies are. On the other hand, this negative effect can also be explained by the type of investment and consumption the government is involved in. Since governments are also interested in improving the overall standards of living in a country, perhaps this negative effect can also be explained by governments investing more into absolute poverty reduction, which would of course show little results overall in economic growth terms.

On the other hand, as with large investment projects, it can be that these investments and spending have long-term effects that need time to show results in the actual economic growth. It could be that if we lagged behind these variables by several years more, the effects would be positive (due to data availability this is not possible in my model, although would be very interesting to look at).

Another possible explanation for the negative government consumption effects could be due to higher debt levels damaging growth and bureaucracy. Government over spending and high government debts can lead to a decline in economic growth. Bureaucracy is also a possible explanation, meaning that these countries/regions might experience high levels of

bureaucracy which would eliminate or even reverse the initial effects one would expect government consumption to have on economic growth.

The interest rate variable has a positive estimation value. This is expected as when economic growth is high, interest rates are generally raised, and as when economic growth is low generally then interest rates are lowered too to encourage investments and spending.

**Table 2. Conditional Convergence**

<b>Explanatory Variable</b>	<b>Estimation</b>
<b>Constant</b>	<b>4.871370***</b> <b>(0.309950)</b>
<b>Ln GDP per capita<sub>i,t-1</sub></b>	<b>-0.494509***</b> <b>(0.034219)</b>
<b>Government Consumption<sub>i,t-1</sub></b>	<b>-0.168498***</b> <b>(0.29858)</b>
<b>Government Investment<sub>i,t-2</sub></b>	<b>-0.228536***</b> <b>(0.056341)</b>
<b>Interest rate<sub>i,t-1</sub></b>	<b>0.080694***</b> <b>(0.009595)</b>

Note: Figures in brackets are standard errors. Instrumental variables used are: Ln GDP per capita, Ln GDP per capita(-2), years in EU, inflation, government consumption, government investment, interest rate(-1), government investment (-1). Stars represent the level of significance: \* is significant at 10%, \*\* is significant at 5%, \*\*\* is significant at 1%.

## Economic growth, Convergence and Funds

The main interest of this paper is of course to establish whether or not the European Union's funds given under the first objective of convergence have an effect on economic growth as they are intended to. To this end, I have run a regression on the convergence model including Structural Funds as an additional explanatory variable for economic growth. Due to the fact that these Funds given are generally invested into long-term development projects, which can take several years to complete and have a significant effect on economic growth, I used structural funds with several lags, to see if the effects of it increase or become significant with time.

**Table 3. Convergence and Funds**

Explanatory Variables	Estimation (1)	Estimation (2)	Estimation (3)	Estimation (4)
<b>Constant</b>	<b>2.995330***</b> (0.211234)	<b>0.983658***</b> (0.304390)	<b>3.464593***</b> (0.320243)	<b>6.403575***</b> (0.467399)
<b>LN GDP per capita</b> $_{i,t-1}$	<b>-0.303256***</b> (0.021652)	<b>-0.092761***</b> (0.031147)	<b>-0.349986***</b> (0.032774)	<b>-0.650376***</b> (0.047662)
<b>Structural Funds</b> $_{i,t-1}$	<b>4.129961***</b> (0.450614)			
<b>Structural Funds</b> $_{i,t-2}$		<b>-6.691058***</b> (0.699556)		
<b>Structural Funds</b> $_{i,t-3}$			<b>4.647981**</b> (1.951283)	
<b>Structural Funds</b> $_{i,t-4}$				<b>11.41709***</b> (2.039643)

Note: Figures in brackets are standard errors. Instrumental variables used are: ln GDP per capita and lags of structural funds. Stars represent the level of significance: \* is significant at 10%, \*\* is significant at 5%, \*\*\* is significant at 1%.



In table 3, my results show that first of all, convergence is still present. In addition to this, I find that the variable estimation for funds is positive in most cases (apart from the outlying one in period t-2) and significant. Thus it seems that the available structural funds increase economic growth, and that this effect grows over time, and as such the effects of the funds on economic growth seem to be the strongest after 4 years. Looking at the last row in the table, we can say that if there is a 1% change in structural funds, this would result in an 11.42% increase in economic growth four years later.

## **Funds and Corruption**

As mentioned earlier, it is also interesting to look at the efficiency of the structural funds. To this end, I use corruption and an interaction term of corruption and structural funds as explanatory variables. This corruption index used is high for countries with least corruption, I expect that if corruption plays a role in the efficiency of structural funds being used, these corruption variables will have a positive sign. This means that if corruption does affect the efficient allocation of the funds, that the higher the index (which means lower corruption), the higher the economic growth, implying that countries with higher corruption (lower index) have lower growth. In addition, I expect that if this relationship holds, the effect of the structural funds on economic growth will decrease, which is represented by the interaction term.

In Table 4 we see that convergence still is present. I also find that although the interaction term is negative, the corruption index has a positive and significant effect on economic growth. This means that higher levels of corruption seem to lower levels of economic growth, and the other way around, lower levels of corruption lead to higher economic growth.

The interaction term, however, is negative, and thus does not imply directly an efficiency loss on the effect of the structural funds on economic growth. Therefore, although I find evidence that corruption does play a role in economic growth overall, I cannot say that it directly influences the efficiency of the structural funds. Thus more corrupt countries do experience slower economic growth rates, but do not necessarily experience efficiency loss in the use of structural funds.

**Table 4. Corruption and Funds**

<b>Explanatory Variables</b>	<b>Estimation</b>
<b>Constant</b>	<b>3.729599**</b> <b>(1.672982)</b>
<b>Ln GDP per capita <math>_{i,t-1}</math></b>	<b>-0.497166**</b> <b>(0.214858)</b>
<b>Funds rate <math>_{i,t-3}</math></b>	<b>60.31377***</b> <b>(18.45314)</b>
<b>Corruption Index × Structural Funds <math>_{i,t-3}</math></b>	<b>-18.65182***</b> <b>(3.997286)</b>
<b>Corruption Index <math>_{i,t}</math></b>	<b>0.207975***</b> <b>(0.078211)</b>

Note: Figures in brackets are standard errors. Instrumental variables used are: Ln GDP per capita, years in EU, funds rate, funds rate(-1), funds rate(-2), corruption index(-1). Stars represent the level of significance: \* is significant at 10%, \*\* is significant at 5%, \*\*\* is significant at 1%.

## **IX. Summary of Results**

There is clear evidence to confirm that there is both absolute and conditional convergence in these 223 regions. This means, that taking several additional factors into account, poorer regions catch up to richer regions and will converge.

I also find evidence, that the structural funds given under the objective of convergence, seem to have a significant and positive effect on economic growth, thus implying that these funds seem to fulfill their initial purpose and promote regional development and enable convergence.

My results also seem to show that corruption is a decreasing factor in economic growth, but that this negative effect does not necessarily transfer into efficiency loss directly in terms of the structural funds use and effect on economic growth.

## **X. Limitations**

As every paper and model, my model has some limitations to it that must be kept in mind when interpreting the findings. One of the main limitations, that I believe many papers in the past have not mentioned or emphasized enough, is the fact that the data I use to test the effects and efficiency of the structural funds is based on the amount of funding available to countries and regions. This is not, however, in most cases equal to the actual funding used. The fact that regions use much less than is available to them is an important factor to consider. It can be misleading to interpret my findings as such that regions which use the most funding grow faster. It can be concluded, that regions which are eligible to receive (more) funding tend to grow faster, however, whether or not these funds are being used and to what extent is another question. As the current negotiations are on-going about the plans for the upcoming multiannual framework from 2013-2020, this is a topic much debated in the European Union. The sad reality is that countries still struggle to make use of available funding and as such are not exploiting the full potential of the regional development fund. Thus perhaps it should be concluded that although I find that structural funds do have a positive effect on economic growth and convergence, however, perhaps this effect can be enlarged by investing into teaching governments and local authorities to allocate these resources efficiently.

The matter of actual utilization of the funds available has also brought about the idea that these funds have led to a kind of redistribution of income within the EU, rather than an effective development policy. This is based on the ideology that the more developed countries of the EU, who finance most of the funds, are the countries that use the funds received most efficiently, whilst the poorer countries that are mainly the receivers of the funds tend to be less efficient at making use of the available funds. Thus this implies that countries contributing to the structural funds actually have a redistribution of these funds. Of course, this is not entirely true, as in my empirical findings it is clear that convergence does take place, structural funds do improve economic growth overall and that corruption (which is assumed to be higher in the poorer receiving regions) does not lead to a less efficient use of structural funds. However, it is

true that the poorer regions do not tend to use the funds as efficiently and to this end policy makers should put a larger emphasis on improving the efficient allocation process of the funds and full exploitation of the available amount of funds.

It is also perhaps a questionable assumption to base the possible effects of moral hazard and substitution effect on the variable of corruption on its own. Of course, due to the difficulty of measuring these effects, this is possibly the closest form of measurement to use, however the fact that the interaction term of the structural funds and the corruption index does not find an efficiency decreasing effect does not necessarily mean that moral hazard or the substitution effect do not take place. When interpreting the findings, there is no evidence to support the theory, but perhaps using more and detailed variables to measure these effects could lead to more insightful results. This could be interesting for further research, and unfortunately does not fit into the scope of this paper.

## **XI. Conclusion**

The main aim of this paper was to explore the effects and efficiency of the European Union's structural funds under the first objective, convergence. This is an important topic not only because these funds constitute over 80% of the EU's structural funds, but also because the EU's cohesion policy is one that has existed since the founding of the EU and has become of growing importance throughout the years. The consecutive rounds of enlargements have given the cohesion policy the spotlight of attention for the European Union, and have helped enhance its importance. Today, this policy receives more attention than ever, and with the current planning for the next multiannual framework, it is one that keeps policy makers busy.

This paper finds evidence through the research of 223 regions of the EU, that convergence is certainly taking place, both absolute and conditional. This is a good sign for policy makers, meaning that poorer countries are catching up to richer countries and that they are converging. This, being one of the main objectives of the Cohesion Policy, is a very important conclusion.

The empirics also show that the Structural Funds provided under the objective of convergence have a significant and positive effect on economic growth. This effect is more visible if we look at time lagged effects, thus the effect of structural funds given becomes larger with 3-4 years difference. It can be concluded from these findings that the convergence objective is being met and that these funds are effective in promoting regional development.

An important topic is also the efficiency of the structural funds given to these regions. I find that corruption does tend to decrease economic growth, but my findings do not show a direct decreasing effect of corruption on the efficiency of the structural funds. Thus it cannot be concluded that more corrupt regions use their funds less efficiently. This has important policy implications, as generally the more corrupt regions are also the regions which tend to receive the most funding as they are economically speaking less developed.

Of course these findings are based on the available amount of funding and not the actual amount used. It is important to keep this in mind when interpreting these results, as this shows that the available amount of funding that regions are eligible for increases the economic growth. It is, however, an interesting topic for further research to explore, how the actual use of funding behaves, as it is currently a much debated topic that these funds available to regions is not being fully exploited. This implies that policy makers could invest more into improving the efficient use of these funds.

The findings have further implications for the much debated topic of enlargement. The period of investigation includes two enlargements, in 2004 the accession of 10 countries and the 2007 enlargement of Romania and Bulgaria. These enlargements included some of the least developed regions of the current EU and as such receive a large part of the funding under convergence. Due to these enlargements, there is a growing importance of the cohesion policy. Thus, first of all, it is an important period to examine, and the fact that convergence is present shows these much poorer regions are also catching up to the richer regions. The findings also imply that the funds received in including these poorer regions are still effective and efficient. Thus in these times where the cohesion policy receives much attention and has become a central policy for the European Union, it is a very interesting and useful topic to look at and an important issue for policy makers.

Given the upcoming accession of Croatia on 1 July 2013 and the beginning of accession negotiations with Montenegro, the subject of convergence remains topical even from the perspective of further enlargement of the European Union.



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## Appendix

**Table 1. Countries and Respective Regions at NUTS 2 level**

country	region	country	region
BE	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	FR	Aquitaine
BE	Prov. Antwerpen	FR	Midi-Pyrénées
BE	Prov. Limburg (BE)	FR	Limousin
BE	Prov. Oost-Vlaanderen	FR	Rhône-Alpes
BE	Prov. Vlaams-Brabant	FR	Auvergne
BE	Prov. West-Vlaanderen	FR	Languedoc-Roussillon
BE	Prov. Brabant Wallon	FR	Provence-Alpes-Côte d'Azur
BE	Prov. Hainaut	FR	Corse
BE	Prov. Liège	FR	Guadeloupe (FR)
BE	Prov. Luxembourg (BE)	FR	Martinique (FR)
BE	Prov. Namur	FR	Guyane (FR)
BG	Severozapaden	FR	Réunion (FR)
BG	Severen tsentralen	NL	Groningen
BG	Severoiztochen	NL	Friesland (NL)
BG	Yugoiztochen	NL	Drenthe
BG	Yugozapaden	NL	Overijssel
BG	Yuzhen tsentralen	NL	Gelderland
CZ	Praha	NL	Flevoland
CZ	Střední Čechy	NL	Utrecht
CZ	Jihozápad	NL	Noord-Holland
CZ	Severozápad	NL	Zuid-Holland
CZ	Severovýchod	NL	Zeeland
CZ	Jihovýchod	NL	Noord-Brabant
CZ	Střední Morava	NL	Limburg (NL)
CZ	Moravskoslezsko	PL	Lódzkie
DE	Stuttgart	PL	Mazowieckie
DE	Karlsruhe	PL	Malopolskie
DE	Freiburg	PL	Slaskie
DE	Tübingen	PL	Lubelskie
DE	Oberbayern	PL	Podkarpackie
DE	Niederbayern	PL	Swietokrzyskie
DE	Oberpfalz	PL	Podlaskie
DE	Oberfranken	PL	Wielkopolskie
DE	Mittelfranken	PL	Zachodniopomorskie
DE	Unterfranken	PL	Lubuskie
DE	Schwaben	PL	Dolnoslaskie
DE	Berlin	PL	Opolskie
DE	Brandenburg - Nordost (NUTS 2006)	PL	Kujawsko-Pomorskie
DE	Brandenburg - Südwest (NUTS 2006)	PL	Warminsko-Mazurskie
DE	Bremen	PL	Pomorskie
DE	Hamburg	PT	Norte

<b>DE</b>	<b>Darmstadt</b>	<b>PT</b>	<b>Algarve</b>
DE	Gießen	PT	Centro (PT)
DE	Kassel	PT	Lisboa
DE	Mecklenburg-Vorpommern	PT	Alentejo
DE	Braunschweig	PT	Região Autónoma dos Açores (PT)
DE	Hannover	PT	Região Autónoma da Madeira (PT)
DE	Lüneburg	RO	Nord-Vest
DE	Weser-Ems	RO	Centru
DE	Düsseldorf	RO	Nord-Est
DE	Köln	RO	Sud-Est
DE	Münster	RO	Sud - Muntenia
DE	Detmold	RO	Bucuresti - Ilfov
DE	Arnsberg	RO	Sud-Vest Oltenia
DE	Koblenz	RO	Vest
DE	Trier	SI	Vzhodna Slovenija
DE	Rheinessen-Pfalz	SI	Zahodna Slovenija
DE	Saarland	SK	Bratislavský kraj
DE	Chemnitz (NUTS 2006)	SK	Západné Slovensko
DE	Dresden	SK	Stredné Slovensko
DE	Leipzig (NUTS 2006)	SK	Východné Slovensko
DE	Sachsen-Anhalt	FI	Itä-Suomi (NUTS 2006)
DE	Schleswig-Holstein	FI	Etelä-Suomi (NUTS 2006)
DE	Thüringen	FI	Länsi-Suomi
IE	Border, Midland and Western	FI	Pohjois-Suomi (NUTS 2006)
IE	Southern and Eastern	FI	Åland
EL	Anatoliki Makedonia, Thraki	SE	Stockholm
EL	Kentriki Makedonia	SE	Östra Mellansverige
EL	Dytiki Makedonia	SE	Småland med öarna
EL	Thessalia	SE	Sydsverige
EL	Ipeiros	SE	Västsverige
EL	Ionia Nisia	SE	Norra Mellansverige
EL	Dytiki Ellada	SE	Mellersta Norrland
EL	Sterea Ellada	SE	Övre Norrland
EL	Peloponnisos	UK	Tees Valley and Durham
EL	Attiki	UK	Northumberland and Tyne and Wear
EL	Voreio Aigaio	UK	Cumbria
EL	Notio Aigaio	UK	Cheshire (NUTS 2006)
EL	Kriti	UK	Greater Manchester
ES	Galicia	UK	Lancashire
ES	Principado de Asturias	UK	Merseyside (NUTS 2006)
ES	Cantabria	UK	East Yorkshire and Northern Lincolnshire
ES	País Vasco	UK	North Yorkshire
ES	Comunidad Foral de Navarra	UK	South Yorkshire

<b>ES</b>	<b>La Rioja</b>	<b>UK</b>	<b>West Yorkshire</b>
ES	Aragón	UK	Derbyshire and Nottinghamshire
ES	Comunidad de Madrid	UK	Leicestershire. Rutland and Northamptonshire
ES	Castilla y León	UK	Lincolnshire
ES	Castilla-la Mancha	UK	Herefordshire. Worcestershire and Warwickshire
ES	Extremadura	UK	Shropshire and Staffordshire
ES	Cataluña	UK	West Midlands
ES	Comunidad Valenciana	UK	East Anglia
ES	Illes Balears	UK	Bedfordshire and Hertfordshire
ES	Andalucía	UK	Essex
ES	Región de Murcia	UK	Inner London
ES	Ciudad Autónoma de Ceuta (ES)	UK	Outer London
ES	Ciudad Autónoma de Melilla (ES)	UK	Berkshire. Buckinghamshire and Oxfordshire
ES	Canarias (ES)	UK	Surrey. East and West Sussex
FR	Île de France	UK	Hampshire and Isle of Wight
FR	Champagne-Ardenne	UK	Kent
FR	Picardie	UK	Gloucestershire. Wiltshire and Bristol/Bath area
FR	Haute-Normandie	UK	Dorset and Somerset
FR	Centre (FR)	UK	Cornwall and Isles of Scilly
FR	Basse-Normandie	UK	Devon
FR	Bourgogne	UK	West Wales and The Valleys
FR	Nord - Pas-de-Calais	UK	East Wales
FR	Lorraine	UK	Eastern Scotland
FR	Alsace	UK	South Western Scotland
FR	Franche-Comté	UK	North Eastern Scotland
FR	Pays de la Loire	UK	Highlands and Islands
FR	Bretagne	UK	Northern Ireland (UK)
FR	Poitou-Charentes		

**Table 2. Data Sources**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
<b>Economic growth</b>	GDP per capita growth rates from one year to the next	Eurostat
<b>Ln GDP per capita</b>	Natural logarithm of GDP per capita every region	Eurostat
<b>Structural Funds</b>	Structural funds given under objective 1 per region.	Calculated according to data from the European Union website
<b>Government Consumption</b>	General government final consumption expenditure (% of GDP)	World Data Bank
<b>Government Investment</b>	Government fixed investment as a % of GDP	Eurostat
<b>Years in EU</b>	The amount of years a country has been a member state	European Union Website
<b>Corruption Index</b>	The level of corruption on a 1-10 scale per country, 1 being highly corrupted and 10 being 'clean'	Transparency International
<b>Interest Rate</b>	Long-term interest rates, monthly data	European Central Bank
<b>Inflation Rate</b>	Inflation, consumer prices (annual %)	World Data Bank
<b>Corruption and Structural Funds</b>	Interaction term of the Structural funds and the Corruption Index, per region	See above