

Regions Matter:
Regional Prosperity and
Convergence in the European Union

Benjamin Joseph Moats Au

Na regionech záleží
Regionerne tæller
Regionen machen den Unterschied
Regionid on tähtsad
Οι περιφέρειες έχουν σημασία
Regions matter
Las regions son importantes
Compter avec les regions
Il valore delle regioni
Regionų svarba
Reģioniem ir nozīme
A régiók számítanak
Ir-Regjuni huma importanti
De regio's zijn van belang
Siła regionów
Regiões marcam a diferença
Regióny sú důležité
Tudi regije imajo besedo
Alueilla on merkitystä
Räkna med regionerna

Introduction

Decreasing the economic disparity within its member countries' regions is one of the premier goals of the European Union. To accomplish this goal, the European Union (EU), beginning in 1994, has allocated billions of euros through its Structural Funds, which act as welfare for regions and provide funding for regional projects. These projects are intended to stimulate high growth rates in the poorest regions in Europe in order for them to become more equal to their rich neighbors. This process of eliminating imbalances between regions is known as convergence. Aside from creating economic convergence, the Structural Funds are intended to have linkage effects on improvements in the welfare of peoples across Europe in health, social station, and employment.

“Regional policy...helps to achieve one of the fundamental objectives laid down in the [Treaty on European Union]: the strengthening of the EU's economic and social cohesion by reducing developmental disparities between its regions. It has a significant impact on the competitiveness of the regions and on the living conditions of their inhabitants.”¹

Although billions of euros have been spent attempting to create convergence across Europe, two questions remain. First, has prosperity increased in those regions which have been granted Structural Funds? Second, have these regions converged with richer regions?

These questions have been debated through literature and numerous studies since the inception of the Structural Funds. Scholars have not reached a consensus as to the positive or negative effects of this policy. A large reason for this is the fact that only one variable, GDP, has been used as a measure of convergence. This exclusion of other variables, such as socio-economic and socio-political indicators, is a detriment to this

field of study as it does not create a full picture of prosperity. This paper will seek to correct this problem.

The importance of this study is determining whether Structural Funds are capable of creating convergence over a large and disparate area. If Structural Funds have been able to create convergence among the regions of Europe, and do so without harming the growth of the more advanced regions, then this policy can serve as a model for international financing of developing countries and world-wide convergence. With this, we can begin to answer one of the contentious debates in capitalism today: Can capitalism solve the problems of inequality?

In this paper, I expand and extend the analysis present in current literature and include a larger range of variables which will better create a true measurement of the impact of the Structural Funds. I argue that although there has been prosperity growth in the indicators used in this study across the poorest regions, and that this growth has led to convergence, the Structural Funds have had no impact on these trends. Furthermore, I argue that the poorest countries (Ireland, Portugal, Spain, and Greece) have had mixed results in prosperity and convergence as recipients of Structural Funds.

This paper will analyze data over several variables to gauge the impact the Structural Funds have had on economic prosperity in the regions. The dependent variable in this study is prosperity. Prosperity is defined as an increase in GDP, purchasing power, patent application, high tech patent application, research and design expenditure, and decreases in unemployment and agricultural land use. A decrease in agricultural land should represent a shift in the region's economy away from the agrarian sector to more

industrial and innovative sectors. What is not known is whether changes in these areas are correlated to the Structural Funds.

The indicators used for measuring prosperity increases are valid. The variables have been chosen so as to get a range of important socio-economic indicators. GDP increases are frequently used as a measure of improvement in prosperity in the literature and by the EU, and when coupled with purchasing power, conclusions can be drawn as to the economic power and viability of the region. A reduction in the unemployment rate of the region is also a strong measure of prosperity and economic strength.

The “value-chain indicators,” which include patent applications, high-tech patent applications, and R&D expenditure, are used to measure a shift in the economy away from basic production systems and agriculture production to more high-tech and high-skilled-labor production sectors. Increases in these variables should be correlated with a reduction in agricultural production. Because of incomplete data, agricultural land use will be used as a proxy indicator for agricultural production. As the value-chain indicators increase, agricultural land use should decrease. The changes in these prosperity indicators will be compared against the Structural Funds allocations, which compose the independent variable in the study.

To test convergence, the growth rates in these indicators for the poorest regions will be compared against the growth rates of these indicators of the EU15² averages. In order for convergence to be present, a “catching up” effect must be present. The poorer regions must be growing at a faster rate than those regions without Structural Funding. Thus, a narrowing of the gap between the Objective 1 regions’ average and the EU15 average represents a convergence effect between the poorest and richest regions.

The Debate: Convergence Effects of Structural Funds

The literature concerning Structural Funds and their possible influence on convergence of the regions has been divisive. The literature is divided into two camps – those who believe convergent trends have taken place, and those who believe that convergence has not been an outcome of Structural Fund policy. Both sides are able to support their claims through similar data. Some studies show positive trends in convergence, while others see only short-term gains which level out or change to negative trends in the mid-to-long term. However, as I will explain, these studies have a commonality in their inadequacy to fully incorporate all necessary indicator variables of prosperity.

One position argues that convergence among the regions is present and has accelerated since the inception of the Structural Funds. More recent studies, such as Cappelen, Castellaci, Fagerberg, and Verspagen (2003), argue that regional growth is an outcome of three sets of factors: diffusion, innovation, and complimentary factors aiding in diffusion and innovation. For their complementary factors, they list physical infrastructure, population density, industrial structure, and long-term unemployment. Using this as a base, they add Structural Funds. Thus, Cappelen et al. have a model for growth and convergence that uses a range of economic and social variables.

Cappelen et al. find “that EU regional support has a significant and positive impact on the growth performance of European regions.”³ However, they conclude that most regional convergence slowed around 1980 and any convergence since occurred at the country level, particularly through “catch-up by the relatively poor southern countries.”⁴ Portugal and Spain in particular have benefited from their ascension and EU

support. “Within countries,” they write, “there has been a standstill.”⁵ It is unclear if these results pertain solely to those regions of the poorest countries or includes regional convergence across Europe, but the regional sample includes regions throughout Europe. Similar results for country-level convergence are also found by Solanes and Maria-Dolores (2002). Solanes and Maria-Dolores find that Structural Funds have increased GDP between 0.3 and 0.9 percent in Greece, Portugal, Ireland, and Spain.⁶ Support for the convergence school of thought is also present in Beugelsdijk and Eijffinger (2005) and in an earlier study by Gaspar and Leite (1994).

The anti-convergence position has found that there have been no convergent trends among the regions. The most persuasive of these is Rodriguez-Pose and Fratesi (2004). Rodriguez-Pose and Fratesi agree that other non-economic factors have an impact on the outcome, but state that they are difficult to control and are therefore not implemented in their study. They initially find “weak but positive and significant impact of European Structural Funds on regional growth across Europe” when running a regression model between Objective 1 funding and GDP per capita over all regions in total.⁷ However, when the Structural Funds are “divided into (their) regional and multiregional components” the correlation between Structural Fund allocation and regional growth disappear.⁸ Furthermore, they find that the short-term gains become negative gains in the mid and long-term. As evidence, they cite that 43 of the original 44 regions that qualified for Objective 1 status in 1989 remained under Objective 1 funding ten years later.⁹ Support for the non-convergence argument is found in Ederveen, de Groot, and Nahuis (2002).

The problem with the majority of these studies is that they test convergence based only on GDP per capita. Only Cappelen et al. attempt to use other variables to measure convergence. Although Rodriguez-Pose and Fratesi give credence to the fact that other variables could, and likely do, have an influence on convergence, they ignore them because they deem them too difficult to operationalize.

This reliance on GDP per capita as a measure of growth is a glaring deficiency in the data of the studies. Although the results from these authors are not invalid, they are not as strong as they could have been if a more comprehensive study had been conducted. The failure to include a comprehensive variable list also helps to explain why previous studies have returned divergent results on the impact of Structural Funds. Because of this lack of accounting for other economic, political, and social factors, which almost all authors agree have an influence, none of these results can be accepted as a complete test of convergence. This is even more apparent when so many studies result in drastically different answers ranging from strong positive correlation to strong negative correlation.

This paper will operationalize numerous social-economic and socio-political variables including ethnic, linguistic, and religious fractionalization, and political organization. In addition, this will include several indicators, not just one, of prosperity increases in the poorest of regions. In doing so, I account for those variables mentioned in the other studies, and which were deemed important but immeasurable, and hence were left excluded. The inclusion of many prosperity indicators creates a more complete and accurate picture of “growth”. A better picture of convergence emerges from the more detailed picture of “growth”. This allows for a better analysis of that growth as well as better correlating Structural Funds allocation against this prosperity. Finally, this

paper will show that not only has there been prosperity growth in those regions using Structural Funding, but that convergent effects, though slight, have occurred across Europe.

Methodology

The European Union currently encompasses 254 regions, and the Structural Funds are allocated based on what are now three categories of need – Objective 1, 2, and 3.¹⁰ An analysis of all 254 regions and all Objective levels is difficult and creates numerous problems. First, Eastern European regions have been in the EU for only slightly over a year. The Structural Funds have just begun to take effect, and the long-term results are impossible to determine at this early stage. Because of this lack of noticeable effect, the analysis will incorporate only those 145 regions of the original EU15 from 1999 to 2002. In addition, I will also ignore those regions that lie off of continental Europe as they, in most cases, operate more directly with the economies of their neighbors rather than their administrative country, and at the very least are not located in Europe.

Second, the policies of the Objectives have changed over time. What is now Objective 3 used to be Objective 3, 5a, and 5b, so the allocations towards this fund and its objectives have changed over time, from long-term unemployment, agricultural and forestry assistance, and rural area development, respectively, to the modernization of education, training, and employment. Because of the transitory nature of this objective, it is not an accurate measure over time. Objective 2 funding focuses specifically on those regions undergoing severe cutbacks in the industrial, services, and fisheries sectors as well as regions with poor rural areas and/or urban areas. This makes these funds

exclusive to certain regions, and therefore cannot be used as an adequate measure across all regions.¹¹

Only Objective 1 funds have remained relatively constant in their focus and application. In addition, because it is not limited by the sectors which it is able to provide aid, all regions potentially qualify for Objective 1 funding, thereby making it a strong factor in comparisons across regions. Regions that qualify for Objective 1 funding have a GDP per capita of less than 75% of the EU average. Although GDP average of the EU is increasing, by setting a constant bar by which to appropriate funds, Objective 1 continues to grant money to the poorest regions and thus those in most need of convergence. Using Objective 1 funding as the sole measure has an additional advantage. Because Objective 1 regions are the poorest in Europe, the effects on convergence caused by these funds will be easier to notice and measure. Therefore, this analysis will focus on fifty-three regions in eleven countries of the original EU15 which were declared Objective 1 regions. These regions will be compared from an initial year of 1999 to the end year of 2002 for six of the seven indicators and from 1995 to 1999 for R&D expenditure. Although this time span does not correlate with the other variable time series, I argue that not only do the increases in R&D expenditure fall within the time frame of Structural Funding, but because of the lag between funding and the creation of a new product, the expansion of R&D expenditures from 1995 to 1999 led to the subsequent patent application increases of from 1999 to 2002.

The implementation of Structural Funds and their impact on prosperity, and therefore convergence, likely do not occur simultaneously. The monies allocated to the regions in one year will not affect the prosperity of the region until several years later at

the earliest. This creates a lag in effectiveness. For this study of prosperity and convergence from 1999 to 2002, it is necessary to use Structural Fund data from the previous EU budget, 1994 to 2000 in order to establish the proper lag effect. However, this Structural Fund data is not available. To circumvent this, I use data for the 2000-2006 budgetary period, and assume that this is a similar allocation as the 1994 to 2000 period.

Macro-analysis across the EU15 illustrates general trends, specific case studies best illustrate the effect that the Structural Funds have had on individual regions or groups of regions. This paper will look at what had historically been known as the “poor four” countries of Ireland, Spain, Portugal, and Greece. The large majority of the regions in these countries are subject to Objective 1 funding, and therefore are not economically strong, it would not be beneficial to conduct a regional convergence test within the country. Regions under Objective 1 funding within the individual countries will instead be compared against the overall EU15 averages. This is done to determine the effect the Structural Funds have had on the poorest individual regions, and groupings of the poorest regions. This should be a key determinant of how “powerful” the Structural Funds are in creating prosperity and leading to convergence.

There are two main reasons for the focus on these countries. First, at the time of their joining, they were the poorest countries of the EU and among the poorest countries in Europe. Therefore, they had the most to gain from the Structural Funds and the Cohesion Funds. Because of their initial starting point below the European average, their development and progress can demonstrate the positive convergence effect as a result of

Structural Funds. Second, differences in time are controllable because of the similar time frame of joining the EU.

Growth and Convergence

Using statistics provided by the European Commission through Eurostat, and including calculations based on this data, I assembled a comprehensive data set that includes numerous economic and social variables. The full data is available in Appendix 2.

Initial evaluations of the data show that over the time period analyzed, 1999 to 2002, there was an increase in prosperity on average in all key indicators used. All fifty-three regions studied show increases in their GDP levels, and the average real increase in GDP was over 14%.¹² Second, all regions showed improvements in their purchasing power, and there was an average gain across the regions of over 16%.¹³ The peoples of these regions were able to buy more in 2002 than they could in 1999, which makes them stronger consumers and helps the European economy as a whole by increasing demand which leads to increased production.

Table 1¹⁴

Indicator	Growth of Objective 1 Regions, 1999-2002
GDP	14.14%
PPS	16.39%
Unemployment	-14.78%
Patent Applications	16.03%
High-tech patent applications	54.49%
R&D expenditure (1995-1999)	29.36%
Agricultural area	-0.58%

Although average unemployment rates across the regions studied remained in the double digits, there was an average decrease in the unemployment rate of close to 15%.¹⁵

Furthermore, close to 70% of the regions had decreases in their unemployment rates over the time period studied. Those regions that underwent unemployment increases were confined primarily to East Germany and Portugal in addition to several regions in Greece. Because the increases in unemployment were largely located in two countries, this cannot be blamed on the Structural Funds, and instead was a symptom of a macroeconomic policy enacted at the country level. If Structural Funds were to blame for a rise in unemployment, increases would have occurred across the spectrum of the regions, rather than concentrated in only two or three countries. Furthermore, the rise in unemployment in the German regions might be explained by the continued stress of integrating the eastern Lander into the former Federal Republic of Germany, and by the movement of German firms into Eastern Europe and its cheaper labor markets.

Fourth, the regions moved up the value chain of production as measured by applications for patents, high-tech patents, and research and design expenditure. Patent applications increased more than 16 percent over the time period analyzed. This average would be higher, however, if not for several regions having zero patent applications in 1999. These regions were not included in the calculation of the average. Almost 60% of the regions increased their patent application over this four-year span.¹⁶ The decreases are found in regions that are more evenly distributed, but are focused in the Mezzogiorno, Portugal, and interestingly, Sweden and the United Kingdom. Germany, Greece, and Spain increased the most. High-tech patent applications also increased significantly over this time span, with a near 55% average increase across the regions.¹⁷ The regions of Spain, Belgium, and Finland had the highest gains, but Germany also experienced modest improvements.

One possible explanation for the increases in patent applications could be from increases in expenditure levels on research and design. Of the forty regions for which data was available, only three had a net decrease in R&D expenditure, and the overall average increase in R&D expenditure approached 30%.¹⁸

This across-the-board increase in patent applications and research and design spending should correlate with a reduction in agricultural production. As these economies focused on development, innovation, and moving up the value chain, there should be a decrease over this same time period in agricultural production, and thus agricultural land use.

The percentage of the regional area used for agriculture is used to operationalize the possible decrease in agricultural production. Average land use for agriculture, although declining in thirty-five regions, has declined less than 1% on average. Thus, it does not appear that the advances in patent applications or research and design have had a substantial negative impact on the agriculture of these regions. Overall, an average of 40% of land area has remained devoted to agricultural production across these regions.¹⁹

Because of correct directional changes (positive growth in GDP, purchasing power, and the value-chain indicators and negative growth in unemployment and agricultural land use) in the indicators, I argue that there has been prosperity growth across these regions on average. However, can it be shown that Structural Funds have had a role in creating this emerging prosperity? To test this, I ran linear regression tests comparing the independent variable – Structural Funds – against the dependent variable indicators.

The bivariate linear regressions show that the Structural Funds are not a significant influence on any of the changes over the four years in the study.

Table 2

	Objective 1 Structural Funds			
	Coefficient	R	R ²	Sig.
GDP growth	0.007	0.129	0.017	0.367
PPS growth	0.006	0.149	0.022	0.297
Unemployment growth	-0.006	0.046	0.002	0.751
Patent application High-tech patent app.	5.566	0.051	0.003	0.741
R&D ex. growth	0.081	0.093	0.009	0.639
Agriculture area	0.027	0.051	0.003	0.756
	-0.002	0.146	0.021	0.315

The Pearson's R scores from the linear regression tests suggest that the Structural Funds are barely correlated with any variation in the prosperity indicator variables. The R² scores show that only a small fraction of the total variance is explained by the independent variable, Structural Funds. The significance levels of the models are far from significant, and thus the Structural Funds can not be considered an adequate explanatory variable for the changes. The coefficients are also small, demonstrating that the changes in the indicators could have easily been influenced by anything else. However, there are negative coefficients for unemployment growth and agricultural area, supporting the conclusions drawn earlier that these indicators decreased over the time frame. Even though the Structural Funds lack significance, their coefficient values correspond directly to the direction of change in the indicators.

In addition, similar growth rates are found across the indicators under a wide range of Structural Funds appropriations per capita. This is important, as per capita appropriations range from €1.15 in Brandenburg, Germany to €4803.33 in Alentejo,

Portugal. In effect, Structural Funds range from zero to five thousand euros per person. Because similar growth trends in the indicators occur across the regions despite this wide range in appropriations, a region can experience the same prosperity growth with virtually no Structural Funds as those regions that received large amounts of Structural Funds. The results of this data lead to a rejection of the position that Structural Funds have had a positive influence on prosperity in the Objective 1 regions.

It is necessary to test whether Objective 1 regions in federal or non-federal states have performed better under Structural Funds. Federal states are those in which “political authority is shared between the national government and regional or state governments.”²⁰ Such a system exists in the United States and in Germany and Spain in Europe. Non-federal states have a power structural centralized at the national level without any regional autonomy or authority. The importance of this test is to determine whether national policies, or possible policy conflicts between the national and regional governments, have an impact on the growth and convergence of the regions.

Neither political system performed better across the board. However, regions in non-federal systems have growth rates for GDP and R&D expenditure more than twice that of federal system regions over the time period.²¹

Table 3

Growth Rates	GDP	PPS	Agriculture Area	Unemployment	Patent App.	High-Tech Patent App.	R&D (95-99)
Non-Federal	0.3267	0.1739	-0.0036	-0.1110	0.3342	0.8657	0.8771
Federal	0.1527	0.1506	-0.0099	-0.1288	0.2666	1.2758	0.3072

Fractionalization, or the divisiveness within the country or region in ethnicity, language, and religion, could also hinder growth and therefore is an important variable to analyze. Fractionalization was calculated by taking the average of ethnic, linguistic, and religious fractionalization for the country as a whole. This value was then applied to the regions. The results of linear regression tests for fractionalization and prosperity indicator variables are shown in Table 4. Although R&D expenditure and Unemployment are significant at the .05 level, their low R² scores do not allow for a large explanation of the variance. However, the coefficients for all variables except Agriculture conclude that there is a slight correlation between higher fractionalization levels and lower growth rates.²²

Table 4

	Fractionalization			
	Coefficient	R	R ²	Sig.
GDP	-0.074	0.119	0.014	0.396
PPS	-0.105	0.218	0.047	0.118
Unemployment	-0.488	0.334	0.112	0.015
Patent App	-72.810	0.056	0.003	0.708
High-Tech Patent				
App	-0.325	0.025	0.001	0.895
R&D Expenditure	-2.032	0.320	0.102	0.041
Agriculture (%)	0.000	0.002	0.000	0.989

Overall, Non-Federal regions performed better over the time span of this study. Higher fractionalization does not appear to be a significant influencer of lower growth rates for the variables tested. This is supported by the fact that Belgium, arguably the most fractionalized countries in Europe, has only one region receiving Objective 1 funding.

Has there been convergence between the Objective 1 regions and Europe as a whole? For this, the averages computed for the indicators will be compared with the

means of the EU15 from 1999 and 2002. If there is a narrowing of the gap between these means, then this represents convergence between the fifty-three regions and the overall European average.

There has been a degree of convergence among the poorest fifty-three regions and the EU15 (Table 5). Although data was not available for the EU15 for all indicators tested, and the time frames of data that were available for the EU15 do not match with the time span of 1999 to 2002, comparisons can be made.

To accomplish the convergence test, the time spans of the indicator growth rates at the regional level are shifted to coincide with the time spans of the EU15 data that are available. For example, when measuring prosperity of the regions, Unemployment figures were used for the time span 1999 to 2002. However, in order to create a convergence test, Unemployment figures from 2001 to 2004 were used.

Table 5

	Time Frame	53 Regions		EU15		Regional % of EU15		+/-
		Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	
GDP	1999-2002	24022.2	28026.9	8037700.4	9179495.5	0.30%	0.31%	0.01%
Purchasing Power Standard	1999-2002	14420.8	16785.6	N/A	N/A	N/A	N/A	N/A
Unemployment (%)	2001-2004	11.3	11.4	7.5	8.2	150.7%	139.0%	-11.64%
Patent Application	1999-2002	55.2	64.05	N/A	N/A	N/A	N/A	N/A
High-Tech Patent App.	1999-2002	8.02	12.38	N/A	N/A	N/A	N/A	N/A
R&D Expenditure	1995-1999	214.8	277.9	124883.2	154816.9	0.17%	0.18%	0.01%
Agriculture (%)	1997-2001	37.51	39.83	40.83	40.43	91.87%	98.52%	6.65%

GDP among the fifty-three regions has increased slightly against the EU15 average. Although this is only a modest increase, it shows that there is a degree of convergence with Europe as a whole. A similar story is present for R&D expenditure. Agriculture increased across the Objective 1 regions by 6.65%. This can be interpreted in one of two ways. First, it could demonstrate convergence by bringing the Objective 1

regions closer in line to the EU15 average. Or second, it could be a sign of divergence, as the poorest regions are increasing their agricultural production at a time when they would benefit from moving up the value chain. Unfortunately, due to data constraints, the convergence trends in the value-chain indicators can not be concluded.

The biggest change is in unemployment rates. Although the Objective 1 regions had an average of over one and a half times the EU15 average in 2001, by 2004 this number had dropped to under 140%. Despite an absolute increase in unemployment over the Objective 1 regions over this time, there was a relative decrease compared to the EU15.

For government system convergence, Non-Federal states outpaced Federal systems. Although both systems experienced an increase in Unemployment over 2001 to 2004, Non-Federal states had slightly more than half the increase across the EU15 while Federal states had more than one and half times the increase. In addition, Non-Federal regions far outpaced Federal regions in GDP and R&D expenditure increases.²³

Finally, to further test convergence effects, I took a random sample of 25 regions from the Objective 1 regions and 25 non-Objective 1 regions compared their growth rates in the prosperity indicators.

Table 6

	GDP	PPS	Agriculture (97-01)	Unemployment	Patent App	High Tech App	R&D (95- 99)
Δ Difference	-29.73%	5.86%	-42.19%	0.00%	9.98%	21.86%	29.72

Table 6 represents the change in difference between the Objective 1 regions and the Non-Objective 1 regions.²⁴ A negative change indicates convergence, a positive change indicates divergence, and 0 indicates no change. There was convergence in GDP

and particularly in Agriculture, while there was a modest divergence among the value-chain indicators and PPS. Unemployment, interestingly, experienced no change.²⁵ However, these results only partially agree with the results found in comparisons to the EU15 (Table 5).

Overall, there was a slight convergence effect in several of the indicators. The agricultural increases by the Objective 1 regions are, furthermore, an indicator, which could be construed as a convergence factor or an indicator of the Objective 1 regions falling further behind. This is supported by a sample comparison test of 25 Objective 1 and 25 Non-Objective 1 regions, which showed some areas of convergence and others of divergence. In conclusion, there was not a strong convergence effect over the time periods tested.

Poor Four Performances

In addition to the overall convergence effects among the Objective 1 regions, there have been individual success stories. The “poor four” of Spain, Portugal, Greece and Ireland have all shown prosperity effects over the time span of this study. These countries have also experienced convergence trends with the other Objective 1 regions as well as the EU15. Internal convergence effects, or convergent effects within a country, also appear to have occurred. Among the poor four countries, however, only Spain has regions that are not under Objective 1 status. Therefore, it is unnecessary to test for convergence among the regions of Portugal, Greece, and Ireland, as the entireties of these countries are under Objective 1 status.²⁶

These four countries experienced growth rates in GDP and R&D expenditure well above the EU15 average. There were, however, mixed results not only in unemployment, but also in the value chain indicators. Despite these mixed results, there was an overall decrease in agricultural land use in all four countries that signified a trend away from basic agricultural production and towards more innovative sectors. In sum, prosperity and convergence were present, in various degrees, in these four countries in the time frames of this study.

Spain

Spain has shown marked improvements in prosperity and convergence. First, in terms of internal prosperity growth, Spanish GDP in millions of euro has improved from €28,421.3 to €35,261.2 from 1999 to 2002, an increase of almost 20% in just four years.²⁷ The purchasing power of the average Spaniard in these regions has increased over 28%. Over this same time period there has been a decrease in unemployment of near 30%. Patent applications (25.5%), high-tech patent applications (94.1%), and R&D (41.5%) expenditure all increased significantly between 1999 and 2002. Correlated with this increase towards a more innovative production society, agricultural land use declined slightly over this time period.

Spain has shown improvements against the EU15 average in several indicators, noticeably in GDP (Table 7).²⁸ Although the increase is small when used as a percentage of the overall EU15 average, this represents a large increase in GDP in nominal terms.

There has also been a slight increase in land devoted to agricultural production. This is most likely attributable to the Common Agricultural Policy, of which Spain is a

large beneficiary. R&D expenditure also increased slightly in Spain against the EU15 average.

Table 7

Spain	Time Frame	Spanish % of EU15		
		Year 1	Year 2	+/-
GDP	1999-2002	0.35%	0.38%	0.03%
Purchasing Power Standard	1999-2002	N/A	N/A	N/A
Unemployment (%)	2001-2004	148.00%	148.78%	0.78%
Patent Application High-Tech Patent App.	1999-2002	N/A	N/A	N/A
R&D Expenditure	1995-1999	0.09%	0.11%	0.01%
Agriculture (%)	1997-2001	111.68%	112.00%	0.31%

The one negative trend in Spain was unemployment, which increased slightly from 2001 to 2004. However, this amounts to less than one percent of a change away from convergence. A more concerning feature is that Spanish unemployment remains well above the EU15 average, close to 150%. Overall, this unemployment problem needs to be resolved in order for Spain to catch up with the rest of Europe.

Internal convergence effects also appear to have occurred in Spain. Unemployment decreases in the Objective 1 regions outstripped the Spanish average. Of the value-chain indicators, Objective 1 regions surpassed the Spanish average in high-tech patents – by an astounding 349% - and R&D expenditure. However, Objective 1 regions only attained less than 85% of the Spanish average in GDP growth and less than 80% in patents. Despite these mixed results, the Objective 1 regions of Spain are becoming more competitive with their domestic neighbors.

Portugal

Portugal had mixed results in terms of prosperity over 1999 to 2002, and overall did not perform as well as its Iberian neighbor.²⁹ Though GDP and purchasing power increased almost 18% and 16%, respectively, unemployment increased by 10% over the same time period. Data on high-tech patent applications and R&D expenditure is largely missing, but data on patent applications showed a decrease of over 25% for the time period. Furthermore, there was an agricultural land usage decline. Thus, while Portugal was shifting away from agricultural production, it was not being replaced by a more high-tech production regime.

Despite these lackluster increases in the indicators, Portugal has managed to converge with the EU15. Portugal experienced similar growth rates in GDP and R&D expenditure as Spain (Table 8).³⁰ The largest differences between Portugal and Spain were unemployment and agricultural land use.

Table 8

Portugal	Time Frame	Portuguese % of EU15		
		Year 1	Year 2	+/-
GDP	1999-2002	0.26%	0.27%	0.01%
Purchasing Power Standard	1999-2002	N/A	N/A	N/A
Unemployment (%)	2001-2004	60.00%	82.93%	22.93%
Patent Application High-Tech Patent App.	1999-2002	N/A	N/A	N/A
R&D Expenditure	1995-1999	0.04%	0.06%	0.02%
Agriculture (%)	1997-2001	29.76%	86.50%	56.74%

Unemployment increased dramatically against the EU15 average. Despite this, Portugal remains well below the average unemployment rates of Europe. This trend must be corrected, however, if Portugal wishes to remain economically viable within the community.

The agricultural increase is not a reliable statistic because of the lack of data from three of the five regions in 1997. In reality, extrapolating from the surrounding data points, there was probably only a slight increase or decrease in agricultural convergence over 1997 to 2001. Similar convergence trends have taken place in Portugal since 1989, specifically by Alfredo Pereira and Vitor Gaspar (1999).³¹ Overall, prosperity in Portugal has increased, but the economy is performing behind European standards.

Greece

Greece has experienced similar directional trends in prosperity and convergence as both Spain and Portugal, but to a lesser degree.³² GDP growth increased less than 16%, purchasing power 23%, and unemployment decreased 10%. A more dramatic increase occurred in the value chain indicators. All three, patent applications, high-tech patent applications, and R&D expenditure, experienced growths approaching or well above 100% from 1999 to 2002. In addition, there was a shift away from agriculture, with land use decreasing near 2%.

Table 9

Greece	Time Frame	Greek % of EU15		
		Year 1	Year 2	+/-
GDP	1999-2002	0.11%	0.12%	0.01%
Purchasing Power Standard	1999-2002	N/A	N/A	N/A
Unemployment (%)	2001-2004	148.00%	135.37%	12.63%
Patent Application	1999-2002	N/A	N/A	N/A
High-Tech Patent App.	1999-2002	N/A	N/A	N/A
R&D Expenditure	1995-1999	0.03%	0.04%	0.01%
Agriculture (%)	1997-2001	70.54%	69.90%	-0.64%

Greece also showed signs of convergence. Table 9 shows GDP and R&D expenditure growth comparable to Spain and Portugal, an decrease in agriculture –

deviating from the Iberian cases, and a large reduction in the unemployment difference in the unemployment difference between Greece and the European average. However, like Spain, the percentage of unemployed in Greece is still well above that of Europe as a whole, and must be corrected.

It is important to note that Greece, particularly Athens, experienced a large construction increase over this time period in preparation for the 2004 Olympic Games. Indeed, Athens (Attiki) experienced the highest decrease in unemployment within Greece, the third highest increase in GDP, and the highest increase in R&D – most likely attributable to the numerous construction projects taking place at the time as well as the other services needed for the games. It is too early to tell what long-term social and economic effects hosting this event will have on the country. Overall, however, Greece has improved its economic sustainability, and has proven capable of hosting the largest of international gatherings.

Ireland

Ireland has been the pride of the European Union's efforts at stabilizing a faltering economy and creating growth. The "Celtic Tiger" has undergone astronomic growth since its ascension into the EU, particularly in its Southern and Eastern Region that includes the cities of Dublin, Cork, and Limerick where there has been massive multinational company investments – predominantly from the United States.³³

Because of this influx of foreign capital, which is largely lacking across the other "poor four" countries, prosperity rose dramatically between 1999 and 2002. GDP

increased over 34% from 1999 to 2002. When continued further back, Ireland experienced growth rates in GDP approaching 143% from 1995 to 2002. There was a corresponding increase in purchasing power, decline in unemployment, and slight reduction in agricultural land use. Because of these trends, Ireland experienced convergence over this time period.

Table 10

Ireland	Time Frame	Irish % of EU15		
		Year 1	Year 2	+/-
GDP	1999-2002	5.71%	5.73%	0.02%
Purchasing Power Standard	1999-2002	N/A	N/A	N/A
Unemployment (%)	2001-2004	57.33%	56.10%	-1.24%
Patent Application	1999-2002	N/A	N/A	N/A
High-Tech Patent App.	1999-2002	N/A	N/A	N/A
R&D Expenditure	1995-1999	N/A	N/A	N/A
Agriculture (%)	1997-2001	153.51%	154.59%	1.07%

Although the increase of GDP in Ireland is only slightly higher than the other three poor countries, the Irish contribution to the EU15 average is much larger than any of the other case countries in this study. In addition, Ireland boasts the lowest unemployment rate versus the EU15 mean than any of the other “poor four” countries.

There was unfortunately no data for 1995 of R&D expenditure in Ireland, but many bio-tech and chemical countries are conducting business and research in southern Ireland, specifically Cork and to a lesser extent Limerick and Dublin. The increase in business investment has raised the overall R&D, patents, and innovation in the region. In addition, many computer production and software companies have established branches in Dublin, which has increased the population and growth of the area substantially over the past decade.³⁴ Despite these high-tech growths, there were gains in agricultural land use, and kept Irish agriculture well above the European average.

Ireland has accounted for most of the growth within the Objective 1 regions, and also is a major factor in the convergence trends of these fifty-three regions towards the EU15 average. Ireland's regions have had the greatest success of any Objective 1 countries over the last decade.

In sum, these four countries have all experienced prosperity and convergence over the period of this study, though to varying degrees. Ireland has led the way, with rapid growth rates that account for a large percentage of the entirety of the Objective 1 regions' convergence with the rest of Europe. Both Spain and Portugal were able to increase prosperity. However, this resulted in only mixed convergence trends. Greece faced a somewhat similar problem, but also underwent more sizable growth than that of the Iberian countries. This could be the result of the Athens Olympic Games, and it is possible that the growth rates over 1999 to 2002 could recede as infrastructure investment and other construction projects decline.

Overall, these "poor four" countries have had a great deal of success, and have created for themselves a solid foundation from which to grow further. However, it is not a guarantee that these countries will embark on continued progress. Ireland seems well on its way to becoming a strong economic force in Europe, but it remains to be determined how well the other "poor four" countries will be able to compete in an increasingly globalized world market.

Conclusions

Given the prosperity increases in the fifty-three Objective 1 regions from 1999 to 2002, it would appear that the Structural Funds were an effective method for creating first, prosperity, and leading to, second, convergence. This does not appear to be the case, however. When running linear regressions between Structural Fund appropriations and indicator growth rates, very low coefficients of correlation and low significance are the norm rather than the exception. In addition, when controlled for population, the indicators experienced similar growth rates despite a wide range of Structural Funds appropriations per capita. Therefore, it can not be concluded that the Structural Funds have a positive impact on prosperity growth in these fifty-three Objective 1 regions. In fact, there appears to be no linkage effect between increased Structural Funds and higher growth rates. Thus, the EU, despite its claims, cannot take credit for the growth in these regions over the past decade.

From this, the question must be asked: What then caused the prosperity increases in these regions? Although this question is outside the realm of this study, I believe that macroeconomic and country-specific variables, specifically state policies and institutional interactions, are the cause of the differences in growth rates across the Objective 1 regions. This is supported by the substantial growth rates in Ireland versus the other “poor four” countries.

The second question of this study, has there been convergence, appears to be positive. However, the convergence is not strong. In those indicators for which data was available at both the regional and EU15 levels, unemployment decreased substantially against the European mean. But there were only moderate improvements in GDP and

R&D expenditure. Agricultural land use, used as a proxy for agricultural production, increased towards the mean. This could be interpreted either as a positive trend with the Objective 1 regions catching up to their neighbors, or as a negative trend with an increase in agricultural production resulting in a movement away from more high-tech production sectors.

An important convergence trend is that of the “poor four” countries of Spain, Portugal, Ireland, and Greece. Although there were different levels of prosperity growth and therefore convergence among these countries, overall they moved towards the EU15 average – though to varying degrees. Spain and Portugal in particular experienced mixed convergence results, while Ireland had strong convergent movements.

Because of the apparent disconnect between prosperity increases, convergence, and Structural Funds appropriations, the Objective 1 Structural Funds have been a misallocation of funds by the EU over the past sixteen years. The money allocated to the Structural Funds, specifically the Objective 1 regions, needs to be re-appropriated to more beneficial programs. One result of this would be a possible expanded Common Agricultural Policy. This would enable Eastern Europe to enjoy the same agricultural benefits as Western Europe without substantially reducing the agricultural appropriations to Western Europe. One negative impact, however, would be increased tensions with lesser developed countries that rely on agricultural production.

Despite these results, there is more research to be done. Indicators that could better measure prosperity and convergence were not taken into account, nor were regional and national political factors that could influence not only appropriations but, through policies, also overall prosperity. This is particularly important if macroeconomic

variables, and not Structural Funds, are a more significant influence on prosperity in these Objective 1 regions. Furthermore, indicators such as trade, the growth of human capital, and internal and international investment would also be important in determining the proper levels of prosperity growth.

In conclusion, this study expands on the literature on the impact of Structural Funds on convergence. This study agrees with the positive convergence school of thought, though with some reservations as to the strength of this convergence. The European Union cannot take credit for any prosperity and convergence in the Objective 1 regions over the period of this study, and calls into question the appropriateness of the Structural Funds. Because of this failure of the Structural Funds, this necessitates a rethinking at the supranational level of a better use of these funds, and perhaps the overall European Union structure as a whole.

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Notes

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- ¹ European Commission. 2004. "Regions Matter: EU Regional Policy and Structural Funds."
- ² Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom
- ³ Cappelen, Castellaci, Fagerberg, and Verspagen, 2003:621
- ⁴ Cappelen et al, 2003:639
- ⁵ Cappelen et al, 2003:640
- ⁶ Solanes and Maria-Dolores, 2002:63
- ⁷ Rodriguez-Pose and Fratesi, 2004:104
- ⁸ Rodriguez-Pose and Fratesi, 2004:104
- ⁹ Rodriguez-Pose and Fratesi, 2004:101
- ¹⁰ European Commission. 2005. "Regional Policy: Inforegio."
- ¹¹ Allen, David in Wallace and Wallace, eds. 2000: 252
- ¹² For list of regions, see Appendix 1, see also Appendix 2 for GDP
- ¹³ See Appendix 4
- ¹⁴ These are absolute differences across the period of study.
- ¹⁵ See Appendix 3
- ¹⁶ See Appendix 5
- ¹⁷ See Appendix 5
- ¹⁸ See Appendix 5
- ¹⁹ See Appendix 6
- ²⁰ Kesselman, Krieger, and Josphe, 2004: A-6
- ²¹ See Appendix 9
- ²² See Appendix 10
- ²³ See Appendix 11
- ²⁴ All comparisons are based on 1999 to 2002 unless otherwise noted
- ²⁵ See Appendix 11
- ²⁶ See Appendix 12
- ²⁷ For full data on prosperity see Appendix 7
- ²⁸ For full data on convergence see Appendix 8
- ²⁹ For full data on prosperity see Appendix 7
- ³⁰ For full data on convergence see Appendix 8
- ³¹ Pereira, Alfredo and Vitor Gaspar. 1999. "An Intertemporal Analysis of Development Policies in the EU." *Journal of Policy Modeling* 21 (7): 799-822.
- ³² For full data on prosperity see Appendix 8, for full data on convergence, see Appendix 9
- ³³ Au, Benjamin et al. 2005. "A Comparison of High-Tech Development in Malmö, Sweden and Dublin, Ireland." URL: http://apps.carleton.edu/curricular/ocs/maastricht/Spring_05/research/.
- ³⁴ Au, Benjamin et al. 2005. "A Comparison of High-Tech Development in Malmö, Sweden and Dublin, Ireland." URL: http://apps.carleton.edu/curricular/ocs/maastricht/Spring_05/research/.

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