Wageningen University – Department of Social Sciences
Chair Group Economics of Consumers and Households

BSc Thesis

The allocation of financial resources of the Structural Funds and Cohesion Fund of the European Cohesion Policy during the period 2007-2013.

A comparison between predicted and actual allocation for the current planning period.

ECH-81318
BSc Thesis Regional Economics
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August 2010
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Content

1. Introduction: Problem description and research method

"… the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas."

Treaty Establishing the European Community, 1958

Economic activity, income levels and levels of unemployment are not evenly spread across the European Union.

Since the start of European Integration in 1958 there was the political will to reduce economic and social disparities between different regions of what is nowadays the EU, leading to the current EU Cohesion Policy[1]. The main purposes of this policy is to stimulate economic output growth rates by e.g. investments in basic infrastructure and reducing the level of unemployment by sponsoring in traineeships and better education of less favoured regions.

The budget for the EU Cohesion Policy is roughly one third of the total EU budget, € 347.410 billion of € 974.769 billion euros at current (2010) prices for the planning period 2007-2013 and it is growing in importance (increasing relative share of EU budget), as figure 1.1 shows. There are different instruments to channel these funds to eligible regions of which the most important are the Structural Funds and the Cohesion Fund.

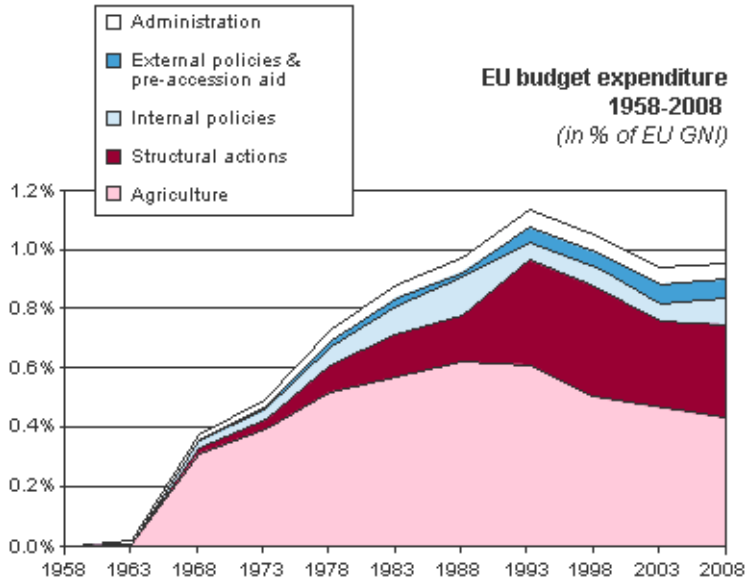

Figure 1.1 EU budget expenditure between 1958 and 2008

Source: http://ec.europa.eu/budget/reform/history/history1993_en.htm

[1] In this paper, I will prefer the use of 'Cohesion Policy' over 'Regional Policy'. Cohesion Policy is funded by the ERDF, the ESF and the CF and is a broader concept than Regional Policy which is specifically linked to the activities of the ERDF. In most literature and even on the official website for Cohesion Policy, both terms are used in a confusing way. Further questions to the European Commission revealed however that the two terms are not synonyms.

Distribution of funds takes place in cooperation with the EU Commission, the national government of a Member State and local authorities. A region becomes eligible conform criteria like a region must have an economic output less than 75% of the EU average. The major enlargement of the EU in 2004 lead to an eastward shift of structural spending away from the "traditional" countries like Greece, Spain and Portugal to countries like Poland and the Czech Republic. It appears that different countries have different expertise in using the Structural Funds and Cohesion Fund and different economic capabilities to absorb their financial resources.

The central question this paper address is: How are the financial resources available for the European Cohesion Policy allocated for the planning period 2007-2013? What is – according to a model of the allocation – the expected structural spending? What is the actual (empirical) allocation each EU country is able to attract? What should they get and what they are actually getting? Earlier research shows that some countries – in particular Spain – were able to receive more money than one would expect.

This paper will start with a description of the relevant theoretical background of the Cohesion Policy to place it in a broader context and to be able to make a model of the allocation of structural spending. The description is based on a literature review.

Second, in order to analyze the allocation of the financial resources, one linear-regression model in two specifications will be used to compare the predicted allocation and the real allocation of the financial means to Member States over the planning period 2007-2013. This comparison between the model and the 'real-world' data will give an indication whether or not member states receiving to much or to little financial support from the Cohesion Policy. The model is based on the idea that a country with a large population and a low income - like Poland - gets more money allocated than a country with a small population and an high income like Luxembourg.

The last step will be an evaluation of the outcome.

2. The Cohesion Policy of the EU

2.1. The current situation of the EU Cohesion Policy

There are considerable disparities of economic activity, income levels and levels of unemployment across the European Union. To give an impression, figure 2.1[2] shows the GDP[3] per capita, in PPS[4], by NUTS[5] 2 regions in 2006. It clearly shows that there are huge differences in terms of income

[2] Eurostat Statistical Books. Eurostat regional yearbook 2009. p. 51

[3] GDP stands for 'Gross Domestic Product' and measures the economic output (= market value of all final goods and services) within a region.

[4] Due to different national price levels, the same Euro (as an example) can buy more in one country than in another. GDP measured in purchasing power standards PPS contains a corrections for the different purchasing power of the same Euro in different countries. Until now, PPS is adjusted at national and not at regional level. Though, different price levels within countries are not taken into account. Source: Inforegio.
http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/p11_box2_en.htm.

[5] NUTS: Nomenclature des Unités Territoriales Statistiques = Nomenclature of Territorial Units for Statistics. NUTS was developed by Eurostat in the early 1970s as a system to divide the territory of the European Union into regions in order to collect

between different regions of the EU. Regions with a high income in comparison to the average of all EU regions, are mainly concentrated in the northern part of Italy, west Austria, South-West Germany and some regions in Belgium, The Netherlands and Great Britain. Countries with the relatively lowest income like Poland, Romania, Bulgaria, Czech Republic and others are located in the eastern part of the EU.

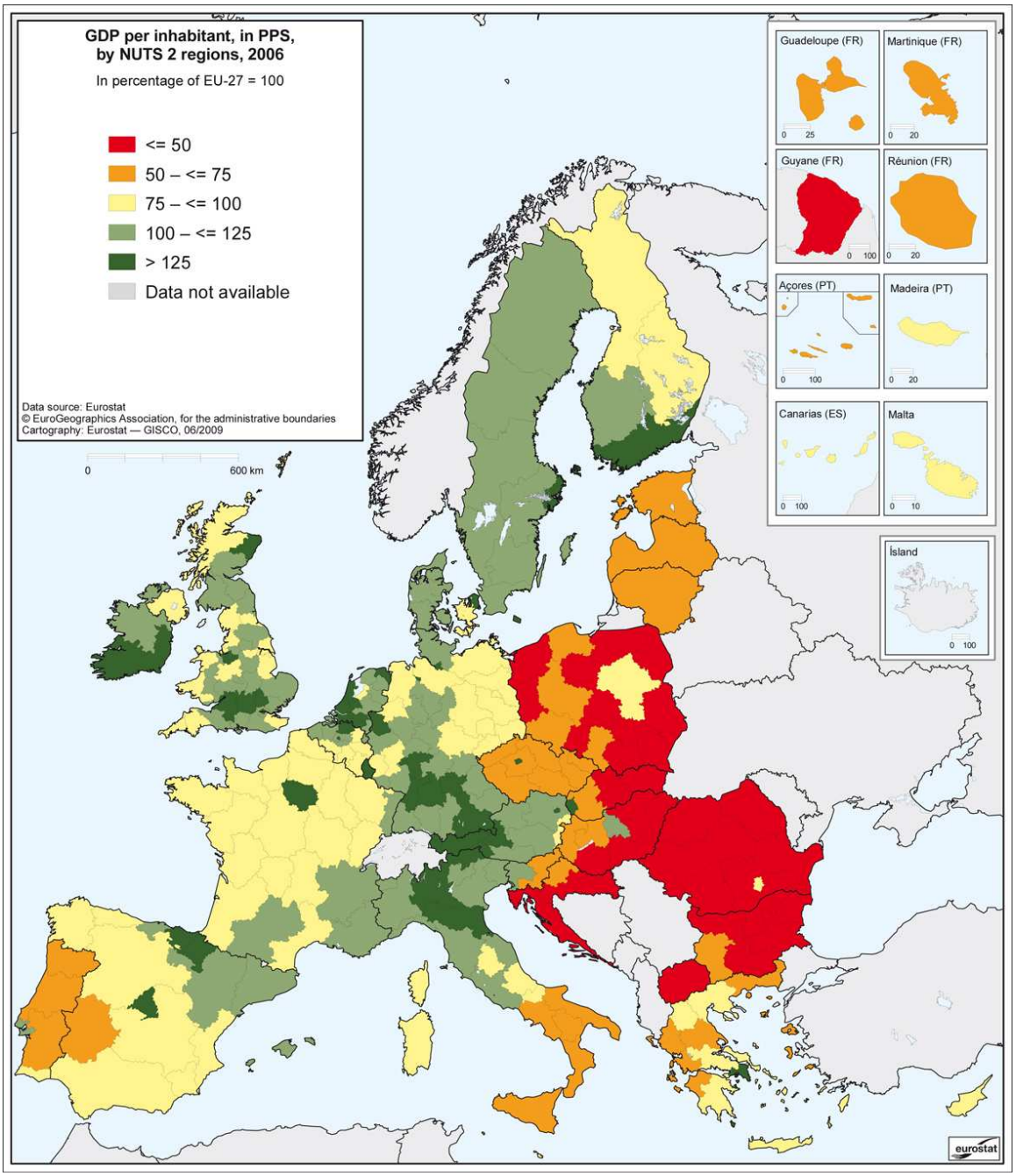

Figure 2.1. Showing GDP per inhabitant relative to the EU average, in PPS, by NUTS 2[6] regions in 2006. Source: Eurostat regional yearbook 2009. p. 51.

statistical data. When possible, NUTS favours for practical reasons – linked to data collection and the implementation of the regional policy – existing administrative boundaries. It consists of three levels: NUTS 1, NUTS 2 and NUTS3. The minimum and maximum population limits for each NUTS level are as follows: NUTS 1, 3 to 7 million people, NUTS 2, 0.8 to 3 million and NUTS 3, 150 to 800 thousand people.
Reference: European Regional and Urban Statistics Reference Guide. p. 5, 6

[6] Eurostat. Eurostat regional Yearbook 2009. p. 51

2.2. Objectives and Instruments

The reason for the Cohesion Policy is the existence of economic and social disparities between different regions of the European Union. The policy in general is aiming at reducing these disparities. For the current planning period 2007-2013, the Cohesion Policy has three objectives financed by three different funds, as shown in table 2.1.

In the planning period 2007-2013, for the first time in the history of the Cohesion Policy, all EU regions are eligible for structural spending[7], as can be seen in figure 2.2.

Structural Funds budget and its rules are decided by the Council and European Parliament on the basis of a proposal by the Commission. Each Member State makes a National Strategic Reference Framework for a period of seven years, containing strategy and operational programs, which were 450 in total for the current planning period. The operational program lists the individual projects. Supervision of the projects takes place through national or regional management authorities. The Commission commits and pays the expenditures and monitors each operational program alongside the Member State.[8]

The convergence objective assists 84 NUTS II regions with a gross domestic product (GDP) per capita measured in purchasing power parities (PPS) at or below 75% of the EU average. This objective aims to improve the conditions for economic growth and higher employment of the least developed regions by "the increasing and improvement of the quality of investment in physical and human capital, the development of innovation and of the knowledge society, adaptability to economic and social changes, the protection and improvement of the environment, and administrative efficiency"[9]. In addition to the 84 regions mentioned earlier, financial resources are also allocated to another 16 phasing out[10] regions on the basis of the convergence objective whose GDP level is pushed above the 75% threshold due to the eastern enlargement in 2004 and 2007, but would otherwise be eligible for structural assistance. In addition, regions with a very low population density, island and mountain areas are eligible under the convergence objective. It is by far the most important objective in terms of financial means: 282 billion euro or 81.5% of the total budget of the cohesion policy is allocated to it. Under the convergence objective capital is allocated from the European Regional Development Fund, the European Social Fund and the Cohesion Fund.

The second objective for Regional Competitiveness and Employment aims to improve competitiveness and attractiveness of regions as well as employment by "[…] anticipating economic and social changes, including those linked to the opening of trade, through the increasing and improvement of the quality of investment of human capital, innovation and the promotion of the knowledge society, entrepreneurship, the protection and improvement of the environment, and the improvement of accessibility, adaptability of workers and businesses as well as the development of inclusive job markets […]"[11]. It covers those regions which are not eligible for the Convergence objective, which is

[7] Regional Policy Inforegio. http://ec.europa.eu/regional_policy/policy/history/index_en.htm PowerPoint Presentation. Slide 32.
[8] Regional Policy Inforegio. http://ec.europa.eu/regional_policy/policy/etap/index_en.htm
[9] [9] Official Journal of the European Union. Council Regulation (EC) No 1083/2006 of 11 July 2006. Article 2 (a).
[10] Regional Policy Inforegio. http://ec.europa.eu/regional_policy/policy/object/index_en.htm
[11] Official Journal of the European Union. Council Regulation (EC) No 1083/2006 of 11 July 2006. Article 2 (b).

the reason why all EU regions are covered by the cohesion policy. Phasing-out regions are also excluded, as they are part of the Convergence objective. The majority of these 168 regions therefore have a GDP per capita higher than 75% of the Community average[12]. 55 billion euros or 16% of the total budget of the Regional Policy are allocated towards this objective.

The third and last objective is the European territorial cooperation objective and is aiming at reducing "regional disconnections[13]" and to support EU integration. It is funded by the ERDF with 8.7 billion euros or 2.5% of the total budget for Cohesion Policy. This objective covers currently three types of programmes:

A. 52 Cross-border cooperation programmes for areas sharing a "common space[14]" separated by internal EU borders. Budget: € 6.44 billion.

B. 13 transnational co-operation programmes for large spaces like the Baltic Sea, Alpine and Mediterranean Regions or the Northern Periphery. Budget: € 1.83 billion.

C. the interregional co-operation programme covering all 27 EU Member States facilitating exchange of experience and best practice between regional and local bodies in different countries. Budget: € 445 million euro.

Financial Instruments of the Cohesion Policy

The cohesion policy is financed by two Structural Funds: the European Regional Development Fund (ERDF) and the European Social Fund (ESF) as well as by the Cohesion Fund (CF). The Instrument for Pre-Accession Assistance (IPA) and the European Investment Bank (EIB) are two financial instruments facilitating the European Cohesion Policy, but they are not part of the budget of the Cohesion Policy.

The two Structural Funds ERDF and ESF are both targeting NUTS II regions and they support multi-annual programs. The Cohesion Fund supports Member States instead of regions and financial aid is allocated per project. Instead of the additionality criteria (EU resources are additional to national resources and no replacement) of the Structural Funds, a conditionality criteria with the objective to keep public deficit into limits is applied to Member States receiving financial support from the Cohesion Fund[15]. Structural Funds and Cohesion Fund are different with respect to the execution and criteria of financial assistance. What they do have in common is the same goal of economic and social cohesion within the EU.

European Regional Development Fund

With a current budget of € 201 billion, the European Regional Development Fund is the most important fund of the cohesion policy. It's task is to promote economic and social cohesion throughout the European Union by reducing regional disparities and by participating in the development of regions[16]. It finances projects of all three objectives of the European Cohesion Policy. It contributes to

[12] Official Journal of the European Union. Council Regulation (EC) No 1083/2006 of 11 July 2006
[13] European Union Regional Policy. Inforegio panorama No. 24 decemer 2007. p. 7
[14] European Union Regional Policy. From INTERREG II to European Territorial Co-operation. slide 2.
[15] Regional Policy – Inforegio. http://ec.europa.eu/regional_policy/sources/slides/slides_en.htm. Cohesion Fund.
[16] Official Journal of the European Communities No 1783/1999. Article 1.

investments that creates sustainable jobs, co-invest in infrastructure which (i) helps to increase the economic potential, development, structural adjustment and creation or maintenance of sustainable jobs in regions covered by the convergence objective, including investments in trans-European networks in the fields of transport, telecommunication and energy infrastructure, especially for insular, landlocked and peripheral regions. It also contributes to investments in infrastructure in regions (ii) with industrial decline, depressed urban areas, rural areas and areas dependent on fisheries, or where investment in infrastructure is a pre-condition for job-creating economic activity[17]. The ERDF especially supports small and medium sized enterprises with management, market research, information technology, innovation and with finance and loans.

European Social Fund

Established in 1958 with the Treaty of Rome, it is the oldest Fund of the European Regional Policy. It's main tasks are the improvement of employment opportunities and human resource development, "by improving employment and job opportunities, encouraging a high level of employment and more and better jobs"[18].

Cohesion Fund

The Cohesion Fund emerged out of the problem that some of the poorest Member States needed to make big investments in infrastructure as a precondition of economic growth on the one hand but are not allowed to run budget deficits greater than 3% at the other hand[19]. To allow those Member States to make the necessary investments anyway, the Cohesion Fund was legally established in the Maastricht Treaty, article 129c in 1992 and was set up in 1993[20]. A Member State is eligible for funding from the CF if it's gross national product (GNP) per capita, measured in purchasing power parities, is below 90% of the EU 27 average. In the actual planning period 2007-2013, there are 15 Member States receiving financial aid from the Cohesion Fund: Greece, Spain on a transitional basis, Portugal, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria and Romania. The Cohesion Fund is operating under the Convergence Objective. With a budget of currently € 70 billion it invests in infrastructure of the Trans-European transport Networks, as well as environmentally beneficial projects as energy efficiency, use of renewable energy and the development of railroads[21].

Table 2.1. Objectives and Instruments of the cohesion policy for the current planning period 2007-2013. Source: Inforegio: http://ec.europa.eu/regional_policy/policy/object/index_en.htm

Objectives	Funds
1. Convergence	ERDF, ESF, Cohesion Fund
2. Regional Competitiveness and Employment	ERDF, ESF
3. European Territorial Cooperation	ERDF

[17] Official Journal of the European Communities No 1783/1999. Article 2.
[18] Official Journal of the European Union. No 1081/2006. Article 1.
[19] Regional Policy Inforegio 2010. Cohesion Fund.
[20] Official Journal C 191, 29 July 1992. Treaty on European Union.
[21] http://ec.europa.eu/regional_policy/funds/cf/index_en.htm

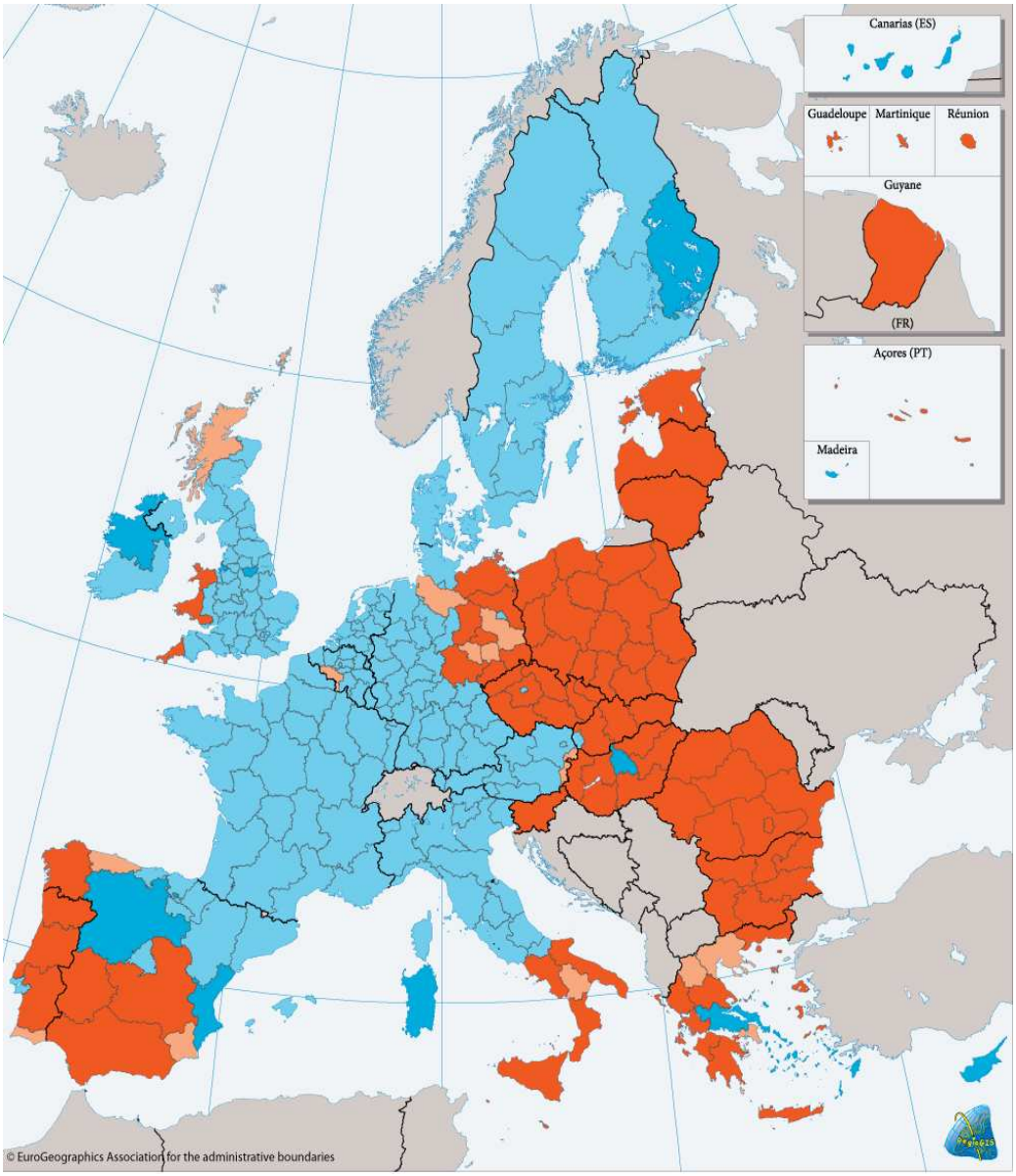

Figure 2.2. Geographical eligibility of Structural Funds Support 2007-2013[22]. Red regions are covered by the convergence objective, blue ones covered by the regional competitiveness and employment objective.

Source: Inforegio. http://ec.europa.eu/regional_policy/sources/slides/slides_en.htm.

EU regional policy – an overview.

[22] Regional Policy Inforegio. 2010. PowerPoint Presentation: EU Regional Policy: an overview.

2.3. A brief overview of the historical development of the European Cohesion Policy.

The roots of the Cohesion Policy goes back to the Treaty establishing the European Community ('Treaty of Rome') signed in 1957, which stated that "… the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas."[23] This led to the creation of the European Social Fund[24] and the European Investment Bank[25].

With the first enlargement (Ireland, Denmark and United Kingdom) in 1972 the Regional Policy gets off the ground. In 1975 the European Regional Development Fund is set up for a 3-year test period and with a budget of 1.4 billion "units of account" (a basket of member states currencies).

In the 1980s, Greece, Spain and Portugal joined the EU which brought increased imbalances. The Single European Act was signed in 1986 with the main goal to establish a common market. Cohesion policy was meant to "offset the burden of the single market for the less-favoured regions"[26] of the Community. In the Single European Act the legal foundation of the Regional Policy was laid in the articles 130a to 130e. In 1988, the European Council allocated 64 billion ECU over a five year period to the Structural Funds and four key principles were introduced: Concentration on poorest regions, Partnership with national, regional and local partners, Programming over a multi-annual period and Additionality of the EU- with national spending.

In the five years of 1994-1999 168 billion ECU were allocated to the Structural and Cohesion Funds. The Cohesion Fund was new in 1994 as well as the fisheries instruments.

The major event in the planning period 2000-2006 was the biggest enlargement of the EU ever with 10 new Member States in 2004. This enlargement added 20% more population, but only 5% more GDP to the EU. The instruments for pre-accession for candidates were introduced. The total budget of the Regional Policy in the planning period 2000-2006 amounted to 234 billion Euros.

The major event of the current planning period is of course the financial crisis that started in 2007.

Under the framework of the European Recovery Plan[27] the implementation of the Cohesion Policy has speeded up. Second, the focus of the policy lies on "Growth and Jobs" which in turn is influenced by the Lisbon strategy to make "Europe the most competitive and dynamic economy of the world".

One of the future social en economic challenges within the EU will be the ageing population.

[23] Baldwin R. & Wyplosz C. (2004): The Economics of European Integration. p. 242
[24] Treaty of Rome, Article 123
[25] Treaty of Rome, Article 130
[26] Inforegio. 2010_Regional_History_EN
[27] Inforegio Regional Policy. Economic Crisis – the response from European Cohesion Policy.

3. Allocation models: predicted versus real allocation of the budget for structural assistance

To predict the allocation of the budget of the Structural and Cohesion Funds on the Member State level and to compare it with the real allocation, a linear regression model in two specifications was used:

I. $A_i = \alpha + \beta * P_i + \gamma * I_i$

II. $A_i = \alpha * P_i^{\beta} * I_i^{\gamma} \rightarrow \ln A_i = \ln\alpha + \beta * \ln P_i + \gamma * \ln I_i$

Where *A* is the predicted allocation share of funding of Member State i, *P* is the population share of Member State i and *I* is the income share of Member State i. The model follows the logic of the income-based criteria of the allocation of structural funding, where regions with an average GDP per capita below 75% of the average GDP per capita of the European Union are eligible. Regions with a low income and a high population are expected to receiving more funding than regions with a high income and a small population. Both specifications of the model are applied with data of the gross domestic product measured in Euros at current market prices of 2010 as well as data measured in purchasing power standards (PPS) at current prices of 2010. The estimated coefficients α, β, γ and the R^2 are shown in table 3.1.

Table 3.1. Estimated coefficients and R^2

		α	β	γ	R^2
Linear Model	Euro	0.0078	2.82	-2.03	0.85
	PPS	0.0086	3.61	-2.84	0.76
Cobb-Douglas	Euro	-1.086	2.086	-1.25	0.83
	PPS	-1.17	2.8	-2.02	0.81

Specification I is a linear model and specification II is a Cobb-Douglas function, which is set in natural logarithms to be able to apply linear regression to it. Both specifications are predicting the actual allocation quite well with a R^2 between 0.76 – 0.85. The four graphs 3.1 – 3.4 shows the predicted allocation versus the real allocation of funding of the EU Cohesion Policy per Member State of the EU-27, for the planning period 2007-2013. The first two graphs picture the linear model with GDP measured in Euros, figure 3.1, and in PPS, figure 3.2. The second two graphs depicting the model with a Cobb-Douglas function, again with GDP in Euros (figure 3.3) and in PPS (figure 3.4).

Table 3.2 shows the countries that receives a higher real allocation of structural assistance than expected according to the model, countries with a lower than expected allocation of structural assistance and countries where it is not possible to draw conclusions, because of mixed results. Countries that are getting less in one and more in another specification of the model are left out of the comparison. These differences are likely to be caused by the different specifications of the model rather than real differences

Table 3.2 Member States receiving more or less than expected or where outcomes between models are different.

More than expected	Less than expected	Mixed results
Czech Republic	Austria	Cyprus
Greece	Belgium	Denmark
Hungary	Bulgaria	Estonia
Poland	France	Finland
Portugal	Romania	Germany
Slovakia		Ireland
Spain		Italy
		Latvia
		Lithuania
		Luxembourg
		Malta
		Netherlands
		Slovenia
		Sweden

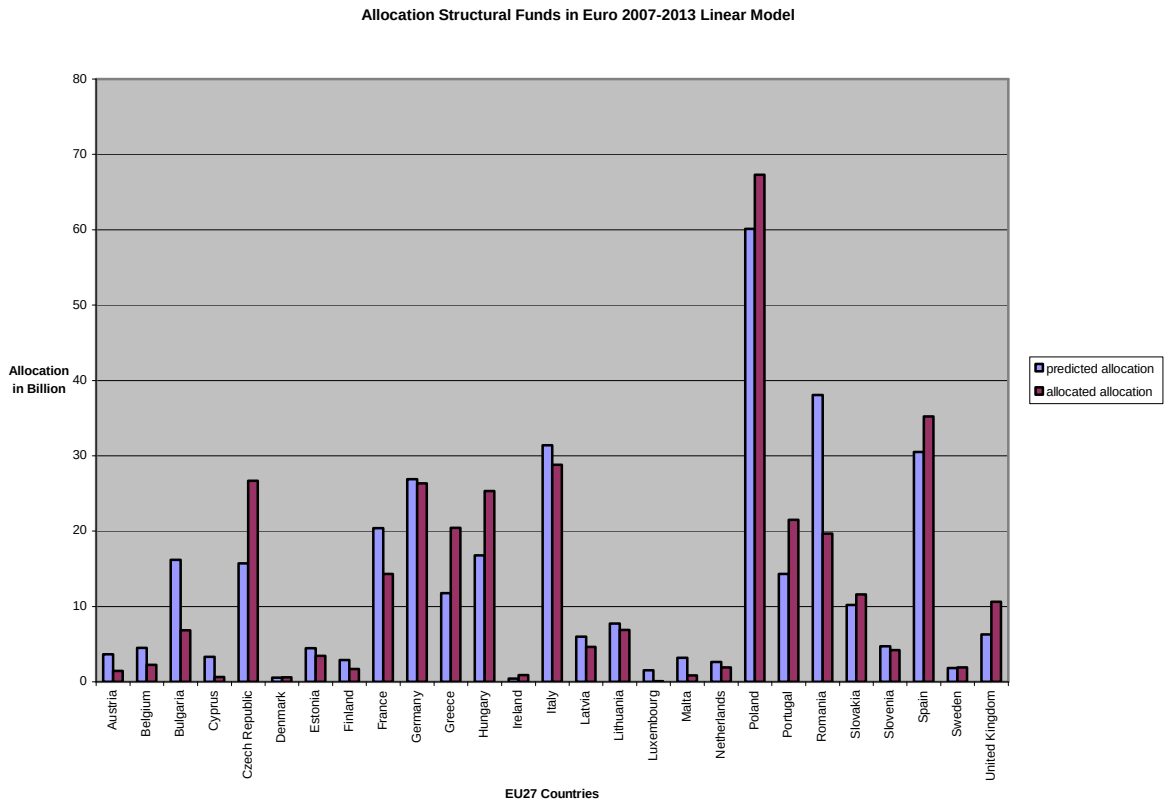

Figure 3.1. Allocation Structural Funds and Cohesion Fund in Euro over 2007-2013 with linear model.

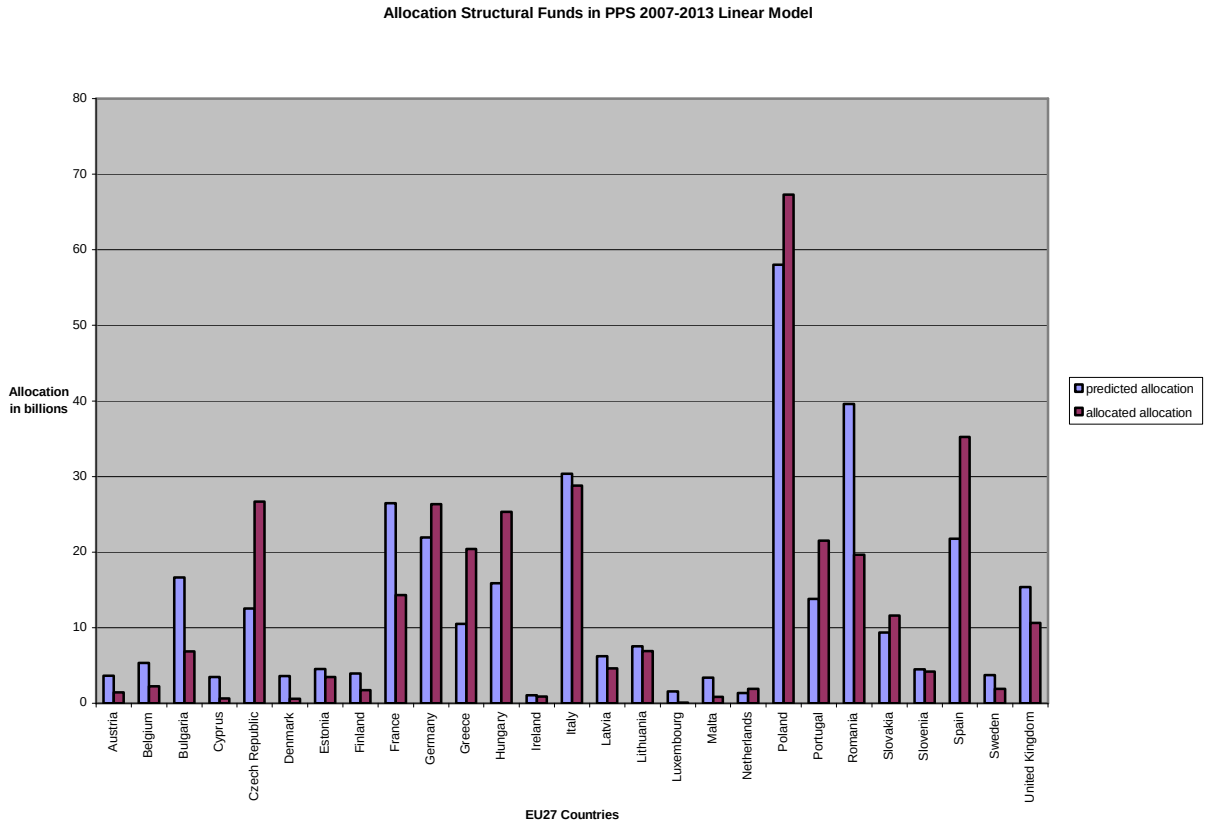

Figure 3.2. Allocation Structural Funds and Cohesion Fund in PPS over 2007-2013 with linear model.

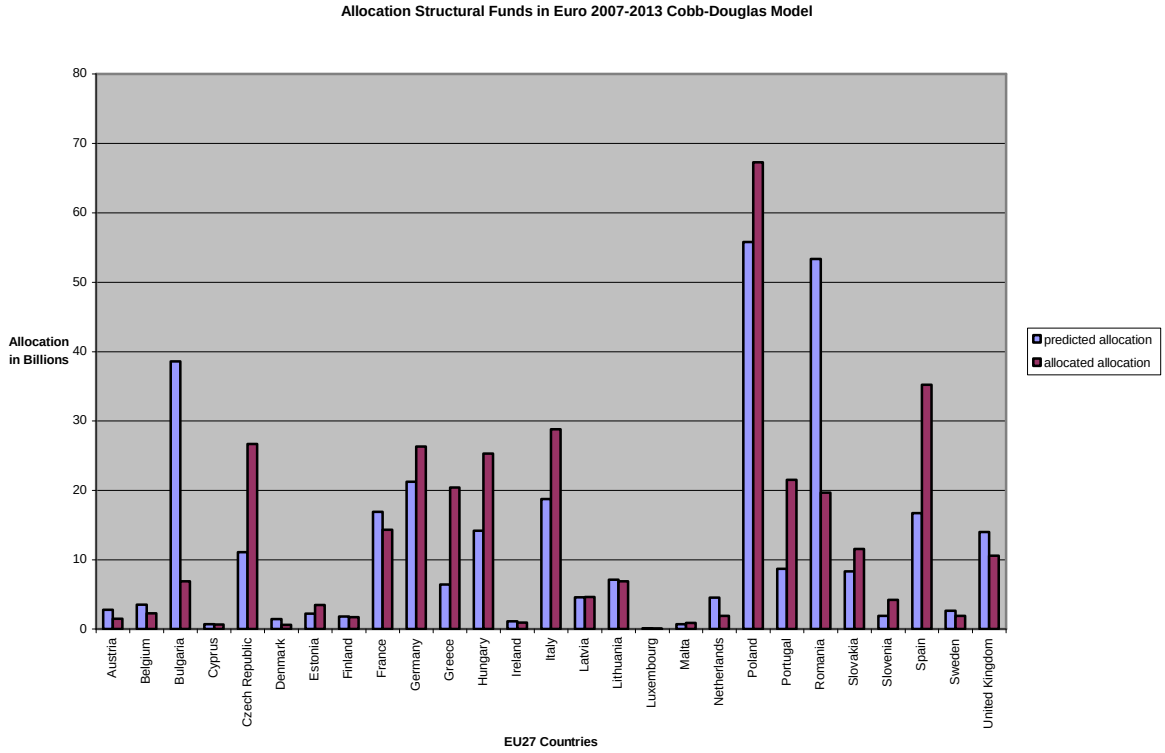

Figure 3.3. Allocation Structural Funds and Cohesion Fund in Euro over 2007-2013 with Cobb-Douglas Model.

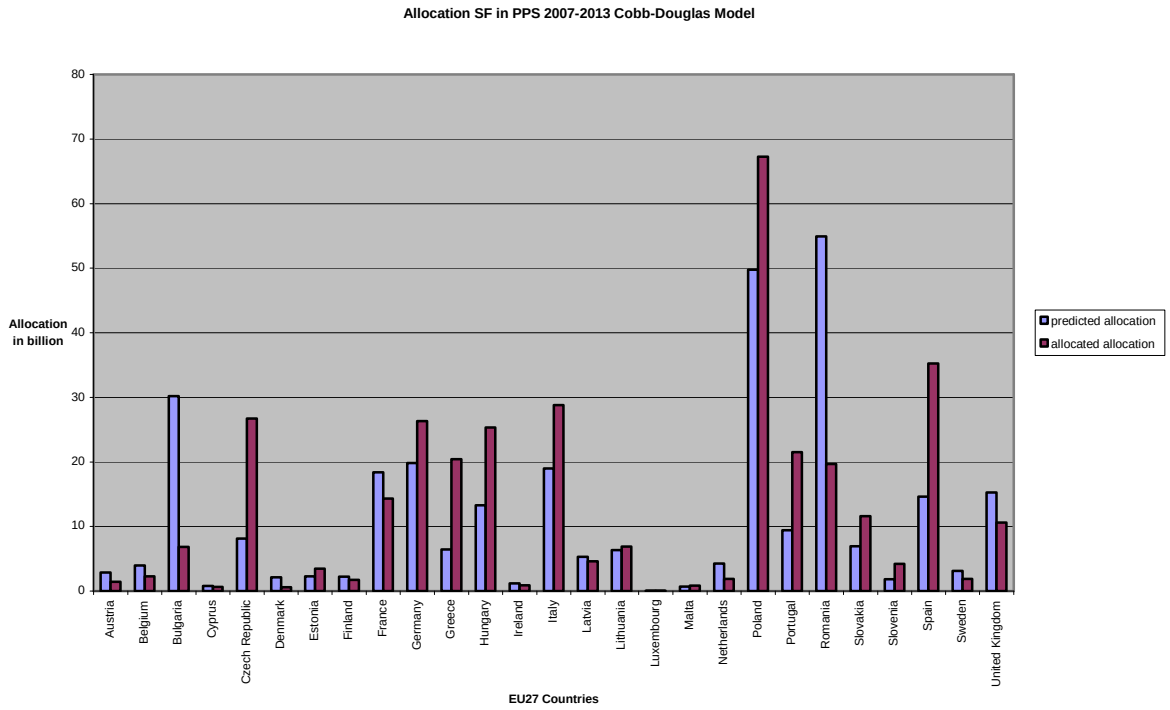

Figure 3.4. Allocation Structural Funds and Cohesion Fund in PPS over 2007-2013 with Cobb-Douglas Model.

4. Conclusion

A comparison between the predicted and real allocation indicates that some countries are getting more and others getting less funding within the framework of the EU Regional Policy. Countries that are getting more money allocated in the planning period 2007-2013 than predicted by the model are Poland, Czech Republic, Hungary, Portugal, Slovakia and Spain. Members States who receiving less financial support than expected are clearly Bulgaria and Romania as well as Austria, Belgium and France. For the remaining countries mixed results emerged between different specifications of the model.

Interesting is a comparison of the allocation between the current and previous planning period[28].

It suggests that Poland, the Czech Republic and Hungary switched from Member States who are getting to little to Member States who are getting more than the model would predict. The funding allocated to Spain and Portugal remains high during both planning periods.

The predicted allocation for Bulgaria and Romania is in all four models higher than 4% of GDP per year and is therefore too high. Financial assistance from Structural Funds and the Cohesion Fund is not allowed to exceed 4% of GDP.

This study gives only an indication that some countries receiving more and others are receiving less structural assistance from the Cohesion Policy then predicted by the model. Two factors could explain these differences. First, in different countries might different expertise be available how to attract EU funds. Second, countries could differ in their absorption capabilities. Money on the one hand is not enough; there must also be projects to spend the money on in a responsible way. Further research could be done to look at the causes of the different allocations.

Another question that might be quite interesting to investigate further is: what are the conditions that a specific investment, e.g. building a road, contributes to economic growth? Or put it different: what is the economic efficiency of the current Cohesion Policy and how could it be improved?

[28] Vostrovská, Monika. 2009. *The regional policy of the European Union: What can the Czech Republic do to improve the Structural Funds utilisation?.* p. 129

5. References

Baldwin, R. and C. Wyplosz. 2006. *The Economics of European Integration.* 2nd ed. London: Penguin Books Ltd.

Council Regulation (EC) No 1290/2005 of 21 June 2005 on the financing of the common agricultural policy. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32005R1290:EN:NOT

European Commission. Directorate-General Budget. *Analysis of the budgetary implementation of the Structural and Cohesion Funds in 2008.*

European Commission. Financial Programming and Budget. *http://ec.europa.eu/budget/documents/2010_en.htm?submenuheader=2*

European Union Regional Policy 2007. From INTERREG II to European Territorial Co-operation.

European Union Regional Policy. Inforegio panorama No. 24 December 2007.

Eurostat. European Regional and Urban Statistics Reference Guide 2010.

Eurostat Statistical Books. *Eurostat regional yearbook 2009.*

Heijman, Wim. 2001. *European Structural Policy: Bend or Break.* European Journal of Law and Economics 11, no. 2 (March): 165-175

http://demonstrations.wolfram.com/CobbDouglasProductionFunctions/

http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/

Official Journal C 191, 29 July 1992. Treaty on European Union.

Official Journal of the European Communities. Regulation (EC) No 1783/1999 of the European parliament and of the council of 12 July 1999 on the European Regional Development Fund. 13th August 1999.

Official Journal of the European Union. Council Regulation (EC) No 1083/2006 of 11 July 2006 *laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulations (EC) No 1260/1999*

Official Journal of the European Union. Regulation (EC) No 1081/2006 of the European Parliament and the Council of 5 July 2006 *on the European Social Fund and repealing Regulation (EC) No 1784/1999.*

Regional Policy Inforegio. 2010. http://ec.europa.eu/regional_policy/policy/etap/index_en.htm

Regional Policy Inforegio. 2010. http://ec.europa.eu/regional_policy/policy/fonds/pdf/annexe-verso.pdf

Regional Policy Inforegio. 2010. http://ec.europa.eu/regional_policy/policy/fonds/pdf/annexe-recto.pdf

Regional Policy Inforegio. 2010. http://ec.europa.eu/regional_policy/policy/fonds/index_en.htm

Regional Policy Inforegio. 2010. http://ec.europa.eu/regional_policy/sources/slides/slides_en.htm (site where all Power Point Presentation about the Cohesion Policy 2007-2013 can be found)

Regional Policy Inforegio. 2010 PowerPoint presentation *History of the Community Regional Policy*

Vostrovská, Monika. 2009. *The regional policy of the European Union: What can the Czech Republic do to improve the Structural Funds utilisation?.*

6. Appendices

6.1.1 Data with GDP measured in Euros

Table 6.1. Population, allocation of structural spending and GDP in Euros at current market prices, of the EU-27 Member States.

	population in millions 2007	population share	GDP in billions 2007	income share	allocation	allocation share
Austria	8,282984	0,016725189	270,7824	0,02190324	1,461	0,00422136
Belgium	10,584534	0,021372531	334,948	0,027093513	2,258	0,006524183
Bulgaria	7,67929	0,015506197	28,8986	0,002337571	6,853	0,019800807
Cyprus	0,778684	0,001572336	15,9512	0,001290272	0,64	0,001849193
Czech Republic	10,287189	0,020772126	127,3305	0,010299601	26,692	0,077122888
Denmark	5,447084	0,010998876	227,0249	0,018363752	0,613	0,00177118
Estonia	1,342409	0,002710623	15,6266	0,001264016	3,456	0,00998564
Finland	5,276955	0,010655347	179,536	0,014522436	1,716	0,004958148
France	63,623209	0,128469428	1894,646	0,153255481	14,319	0,041372794
Germany	82,314906	0,166212127	2428,2	0,196413978	26,34	0,076105832
Greece	11,14174	0,022497654	226,437	0,018316198	20,42	0,0590008
Hungary	10,066158	0,020325815	101,0865	0,008176757	25,307	0,073121119
Ireland	4,312526	0,00870795	189,7512	0,015348731	0,901	0,002603316
Italy	59,131287	0,119399237	1544,9151	0,124966198	28,812	0,083248338
Latvia	2,281305	0,004606463	21,111	0,001707642	4,62	0,013348859
Lithuania	3,384879	0,006834825	28,5766	0,002311524	6,885	0,019893267
Luxembourg	0,476187	0,000961528	37,4644	0,003030447	0,065	0,000187809
Malta	0,40781	0,000823459	5,4564	0,000441361	0,855	0,002470406
Netherlands	16,357992	0,033030429	568,664	0,0459985	1,907	0,005510016
Poland	38,125479	0,076983833	311,0017	0,025156528	67,284	0,194407926
Portugal	10,599095	0,021401933	163,0513	0,01318901	21,511	0,062153096
Romania	21,565119	0,043544778	124,7285	0,010089128	19,668	0,056827999
Slovakia	5,393637	0,010890954	54,8976	0,004440596	11,588	0,033481943
Slovenia	2,010377	0,004059399	34,5682	0,002796177	4,205	0,012149773
Spain	44,474631	0,089804184	1052,73	0,085153977	35,217	0,10175471
Sweden	9,113257	0,018401695	331,1472	0,026786072	1,891	0,005463786
United Kingdom	60,781352	0,122731086	2044,133	0,165347292	10,613	0,030664814
EU 27	495,240075	1	12362,6639	1	346,097	1

6.1.2 Linear model with Euros

Table 6.2 Linear model with Euros

	a share	*p* share	*i* share	*a* share predicted	*a* absolute predicted	*a* absolute allocated
Austria	0,00422136	0,016725189	0,02190324	0,01050106	3,634385422	1,461
Belgium	0,006524183	0,021372531	0,027093513	0,013067509	4,52262567	2,258
Bulgaria	0,019800807	0,015506197	0,002337571	0,046759444	16,18330329	6,853
Cyprus	0,001849193	0,001572336	0,001290272	0,009618793	3,32903531	0,64
Czech Republic	0,077122888	0,020772126	0,010299601	0,045445909	15,72869274	26,692
Denmark	0,00177118	0,010998876	0,018363752	0,001545092	0,534751787	0,613
Estonia	0,00998564	0,002710623	0,001264016	0,012879728	4,457635234	3,456
Finland	0,004958148	0,010655347	0,014522436	0,008370033	2,89684341	1,716
France	0,041372794	0,128469428	0,153255481	0,058915719	20,39055374	14,319
Germany	0,076105832	0,166212127	0,196413978	0,077716905	26,89758777	26,34
Greece	0,0590008	0,022497654	0,018316198	0,034044895	11,78283592	20,42
Hungary	0,073121119	0,020325815	0,008176757	0,048494892	16,78393673	25,307
Ireland	0,002603316	0,00870795	0,015348731	0,001205979	0,417385648	0,901
Italy	0,083248338	0,119399237	0,124966198	0,090747449	31,40741988	28,812
Latvia	0,013348859	0,004606463	0,001707642	0,017322169	5,995150875	4,62
Lithuania	0,019893267	0,006834825	0,002311524	0,022376532	7,744450637	6,885
Luxembourg	0,000187809	0,000961528	0,003030447	0,004367199	1,511474343	0,065
Malta	0,002470406	0,000823459	0,000441361	0,009230684	3,194711922	0,855
Netherlands	0,005510016	0,033030429	0,0459985	0,007566097	2,61860347	1,907
Poland	0,194407926	0,076983833	0,025156528	0,173708661	60,12004649	67,284
Portugal	0,062153096	0,021401933	0,01318901	0,041358859	14,31417719	21,511
Romania	0,056827999	0,043544778	0,010089128	0,110045777	38,08651341	19,668
Slovakia	0,033481943	0,010890954	0,004440596	0,02948731	10,20546959	11,588
Slovenia	0,012149773	0,004059399	0,002796177	0,013572208	4,697300552	4,205
Spain	0,10175471	0,089804184	0,085153977	0,088117471	30,4971923	35,217
Sweden	0,005463786	0,018401695	0,026786072	0,00531947	1,841052563	1,891
United Kingdom	0,030664814	0,122731086	0,165347292	0,018214154	6,303864096	10,613
					346,097	346,097

Table 6.3 Output of the linear model with Euros

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,921911243
R Square	0,849920341
Adjusted R Square	0,837413702
Standard Error	0,017832562
Observations	27

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0,043221032	0,021610516	67,95753757	1,30576E-10
Residual	24	0,007632007	0,000318		
Total	26	0,050853039			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0,007805595	0,004548437	1,716104958	0,099025473	-0,001581917	0,017193108
X Variable 1	2,817979911	0,254052427	11,09211964	6,25584E-11	2,293641477	3,342318345
X Variable 2	-2,028730983	0,212488486	-9,547486656	1,20483E-09	-2,46728566	-1,590176306

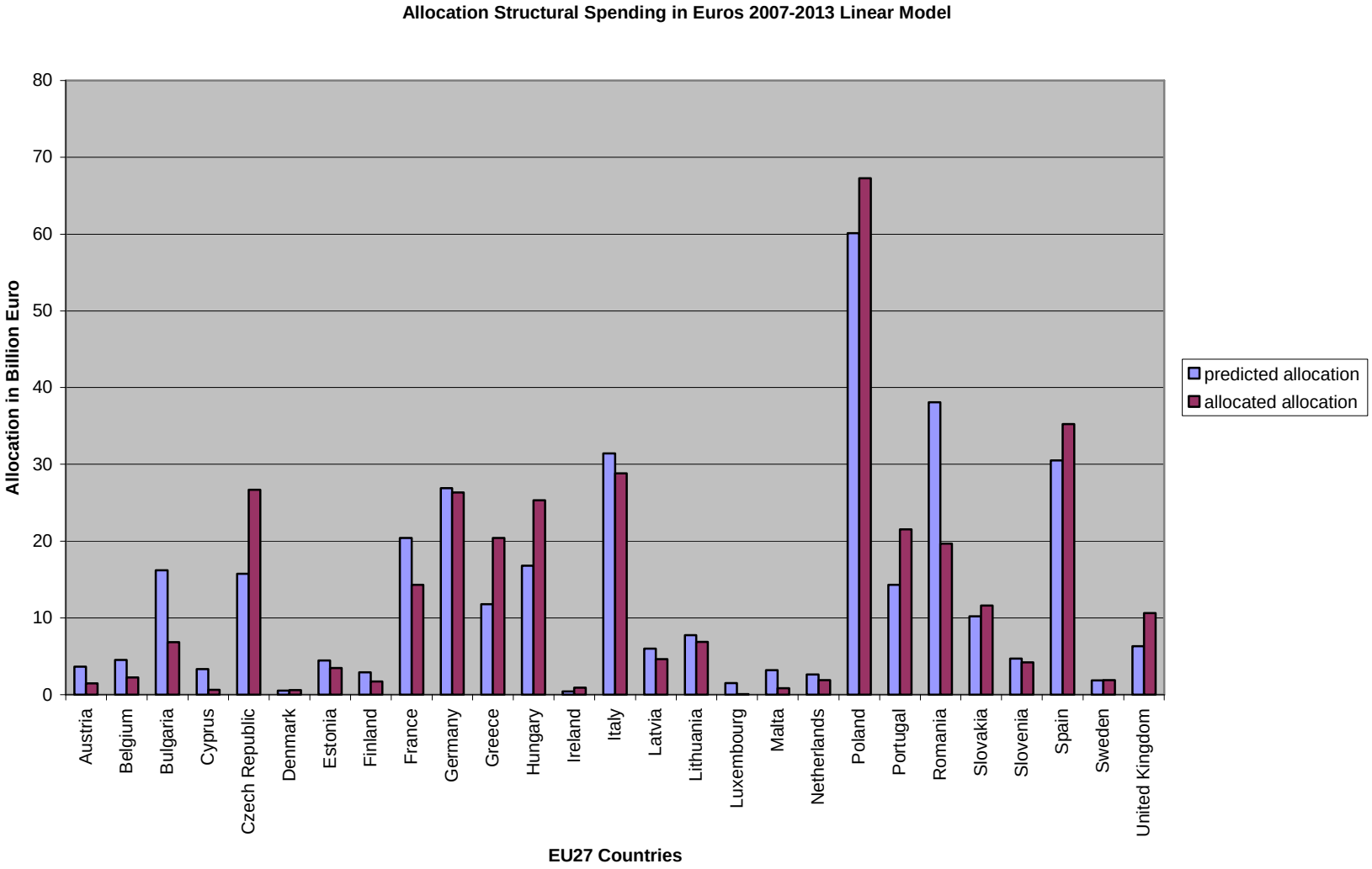

Figure 6.1 A graphic comparison of predicted versus actual allocation of structural spending of the EU-27 countries with the linear model and GDP in Euros.

6.1.3 Model with Cobb-Douglas function and GDP measured in Euros

Table 6.4 Model with Cobb-Douglas function and Euros

	ln*a*	ln*p*	ln*i*	ln*a* predicted	*a* share predicted	*a* absolute predicted	*a* absolute allocated
Austria	-5,46759795	-4,090839355	-3,821120687	-4,832376319	0,007967565	2,75755044	1,461
Belgium	-5,032239617	-3,845648766	-3,608460938	-4,587388623	0,010179406	3,523061867	2,258
Bulgaria	-3,92203257	-4,16651555	-6,058643083	-2,193366819	0,111540579	38,60385973	6,853
Cyprus	-6,293006185	-6,455192609	-6,652902172	-6,218457026	0,001992317	0,689534916	0,64
Czech Republic	-2,562355188	-3,87414331	-4,575650165	-3,437867616	0,032133133	11,12118076	26,692
Denmark	-6,336109426	-4,509962225	-3,997376531	-5,485206588	0,004147678	1,435498959	0,613
Estonia	-4,606607232	-5,910576884	-6,673461643	-5,058197952	0,006357005	2,200140301	3,456
Finland	-5,306723082	-4,541693418	-4,232060489	-5,25798055	0,005205807	1,80171418	1,716
France	-3,185131756	-2,05206432	-1,875648941	-3,016760002	0,048959591	16,94476745	14,319
Germany	-2,575630386	-1,794490436	-1,627530713	-2,790294265	0,061403142	21,25144341	26,34
Greece	-2,83020427	-3,794344229	-3,999969473	-3,991165993	0,018478156	6,395234415	20,42
Hungary	-2,615638045	-3,89586354	-4,806459648	-3,194629075	0,040981724	14,18365163	25,307
Ireland	-5,950969104	-4,743518834	-4,176722493	-5,747596607	0,003190439	1,10420153	0,901
Italy	-2,485927116	-2,12528247	-2,079711997	-2,914233812	0,054245577	18,77423161	28,812
Latvia	-4,316324377	-5,380294997	-6,372642002	-4,329488708	0,013174282	4,559579368	4,62
Lithuania	-3,91737395	-4,985724485	-6,069848033	-3,885965701	0,020527995	7,104677584	6,885
Luxembourg	-8,580087092	-6,94698729	-5,799045085	-8,310209302	0,000245993	0,085137284	0,065
Malta	-6,003372893	-7,101996544	-7,725647002	-6,225086055	0,001979153	0,684979087	0,855
Netherlands	-5,201187756	-3,41032606	-3,079146484	-4,342095341	0,013009241	4,502459225	1,907
Poland	-1,637796616	-2,564159846	-3,682637855	-1,825034298	0,161212115	55,79502932	67,284
Portugal	-2,77815465	-3,844274025	-4,328371358	-3,684714641	0,025104337	8,688535885	21,511
Romania	-2,867726133	-3,133965497	-4,596296859	-1,870097943	0,154108567	53,3365128	19,668
Slovakia	-3,396749003	-4,51982272	-5,416966602	-3,731414426	0,023958924	8,292111632	11,588
Slovenia	-4,410444789	-5,506720378	-5,879502049	-5,209233897	0,00546586	1,891717576	4,205
Spain	-2,285190162	-2,410123708	-2,463294165	-3,028188572	0,048403238	16,75221538	35,217
Sweden	-5,209613293	-3,995312478	-3,619873244	-4,884909001	0,007559812	2,61642814	1,891
United Kingdom	-3,484639418	-2,097759614	-1,799707216	-3,206872922	0,040483009	14,01104799	10,613

Table 6.5 Output of the Cobb-Douglas model with Euros

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,913394887
R Square	0,83429022
Adjusted R Square	0,820481072
Standard Error	0,691389567
Observations	27

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	57,75982883	28,87991442	60,41576208	4,28724E-10
Residual	24	11,47246881	0,478019534		
Total	26	69,23229764			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1,08618805	0,407975739	-2,662383926	0,013630141	-1,928208417	-0,244167682
X Variable 1	2,083233939	0,21383924	9,742056425	8,16863E-10	1,641891531	2,524576348
X Variable 2	-1,249891722	0,19017985	-6,572156427	8,4924E-07	-1,642403559	-0,857379884

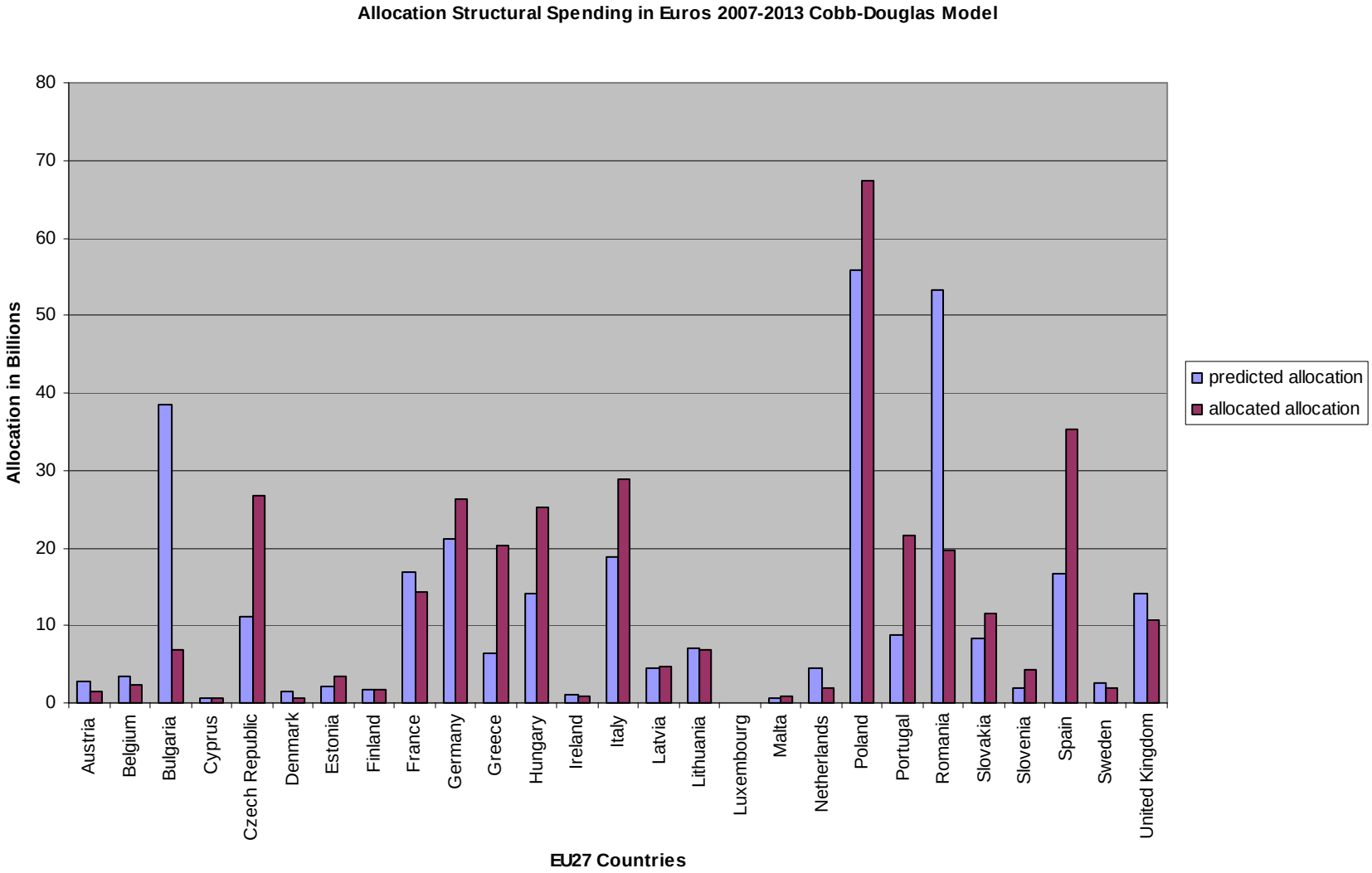

Figure 6.2 A graphic comparison of predicted versus actual allocation of structural spending of the EU-27 countries with the Cobb-Douglas model and in Euros.

6.2.1 Data with GDP measured in PPS

Table 6.6 Population, allocation of structural spending and GDP in PPS, of the EU-27 Member States.

	population in millions 2007	population share	GDP in billions 2007	income share	allocation	allocation share
Austria	8,282984	0,016725189	254,2342	0,020562421	1,461	0,00422136
Belgium	10,584534	0,021372531	306,1262	0,024759438	2,258	0,006524183
Bulgaria	7,67929	0,015506197	71,7866	0,005806089	6,853	0,019800807
Cyprus	0,778684	0,001572336	18,2748	0,001478063	0,64	0,001849193
Czech Republic	10,287189	0,020772126	205,9247	0,016655157	26,692	0,077122888
Denmark	5,447084	0,010998876	164,8946	0,013336649	0,613	0,00177118
Estonia	1,342409	0,002710623	23,0128	0,001861272	3,456	0,00998564
Finland	5,276955	0,010655347	155,3093	0,012561391	1,716	0,004958148
France	63,623209	0,128469428	1722,437	0,139310427	14,319	0,041372794
Germany	82,314906	0,166212127	2372,054	0,191851345	26,34	0,076105832
Greece	11,14174	0,022497654	258,6294	0,020917904	20,42	0,0590008
Hungary	10,066158	0,020325815	156,8661	0,012687305	25,307	0,073121119
Ireland	4,312526	0,00870795	160,7652	0,013002663	0,901	0,002603316
Italy	59,131287	0,119399237	1531,051	0,123831158	28,812	0,083248338
Latvia	2,281305	0,004606463	31,5753	0,002553805	4,62	0,013348859
Lithuania	3,384879	0,006834825	49,8581	0,004032515	6,885	0,019893267
Luxembourg	0,476187	0,000961528	32,9051	0,002661359	0,065	0,000187809
Malta	0,40781	0,000823459	7,8124	0,000631866	0,855	0,002470406
Netherlands	16,357992	0,033030429	539,1253	0,043604367	1,907	0,005510016
Poland	38,125479	0,076983833	516,9039	0,041807104	67,284	0,194407926
Portugal	10,599095	0,021401933	199,6609	0,016148541	21,511	0,062153096
Romania	21,565119	0,043544778	223,4049	0,018068952	19,668	0,056827999
Slovakia	5,393637	0,010890954	90,9425	0,007355415	11,588	0,033481943
Slovenia	2,010377	0,004059399	44,5735	0,003605097	4,205	0,012149773
Spain	44,474631	0,089804184	1174,027	0,094955114	35,217	0,10175471
Sweden	9,113257	0,018401695	279,7699	0,022627744	1,891	0,005463786
United Kingdom	60,781352	0,122731086	1772,096	0,143326839	10,613	0,030664814
EU 27	495,240075	1	12364,0207	1	346,097	1

6.2.2 Linear model with GDP in PPS

Table 6.7 Linear model with PPS.

	a share	*p* share	*i* share	*a* share predicted	*a* absolute predicted	*a* absolute allocated
Austria	0,00422136	0,016725189	0,020562421	0,010532578	3,645293762	1,461
Belgium	0,006524183	0,021372531	0,024759438	0,015381954	5,323648123	2,258
Bulgaria	0,019800807	0,015506197	0,005806089	0,048053573	16,63119751	6,853
Cyprus	0,001849193	0,001572336	0,001478063	0,010060985	3,482076649	0,64
Czech Republic	0,077122888	0,020772126	0,016655157	0,036238036	12,54187557	26,692
Denmark	0,00177118	0,010998876	0,013336649	0,010393366	3,597112711	0,613
Estonia	0,00998564	0,002710623	0,001861272	0,013080468	4,527110612	3,456
Finland	0,004958148	0,010655347	0,012561391	0,011355942	3,930257485	1,716
France	0,041372794	0,128469428	0,139310427	0,076477555	26,4686525	14,319
Germany	0,076105832	0,166212127	0,191851345	0,063431996	21,95362348	26,34
Greece	0,0590008	0,022497654	0,020917904	0,030355748	10,50603332	20,42
Hungary	0,073121119	0,020325815	0,012687305	0,045899317	15,88561585	25,307
Ireland	0,002603316	0,00870795	0,013002663	0,00307413	1,063947223	0,901
Italy	0,083248338	0,119399237	0,123831158	0,087717031	30,35860141	28,812
Latvia	0,013348859	0,004606463	0,002553805	0,017955248	6,214257295	4,62
Lithuania	0,019893267	0,006834825	0,004032515	0,021796709	7,543775474	6,885
Luxembourg	0,000187809	0,000961528	0,002661359	0,004494997	1,555705068	0,065
Malta	0,002470406	0,000823459	0,000631866	0,00976217	3,378657888	0,855
Netherlands	0,005510016	0,033030429	0,043604367	0,003920302	1,356804776	1,907
Poland	0,194407926	0,076983833	0,041807104	0,167655505	58,02506721	67,284
Portugal	0,062153096	0,021401933	0,016148541	0,039950248	13,82666099	21,511
Romania	0,056827999	0,043544778	0,018068952	0,114409015	39,59661675	19,668
Slovakia	0,033481943	0,010890954	0,007355415	0,026995604	9,343097564	11,588
Slovenia	0,012149773	0,004059399	0,003605097	0,01299432	4,497295075	4,205
Spain	0,10175471	0,089804184	0,094955114	0,062939618	21,78321314	35,217
Sweden	0,005463786	0,018401695	0,022627744	0,010715897	3,708739892	1,891
United Kingdom	0,030664814	0,122731086	0,143326839	0,044357681	15,35206025	10,613

Table 6.8 Output of the linear model with GDP measured in PPS

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,872476926
R Square	0,761215986
Adjusted R Square	0,741317319
Standard Error	0,022493418
Observations	27

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0,038710146	0,019355073	38,25462	3,43608E-08
Residual	24	0,012142893	0,000505954		
Total	26	0,050853039			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0,008585305	0,005740479	1,495573035	0,1478	-0,003262458	0,020433069
X Variable 1	3,609037093	0,456880076	7,899309437	3,95E-08	2,666083156	4,55199103
X Variable 2	-2,840840335	0,408441306	-6,955320858	3,42E-07	-3,683821585	-1,997859085

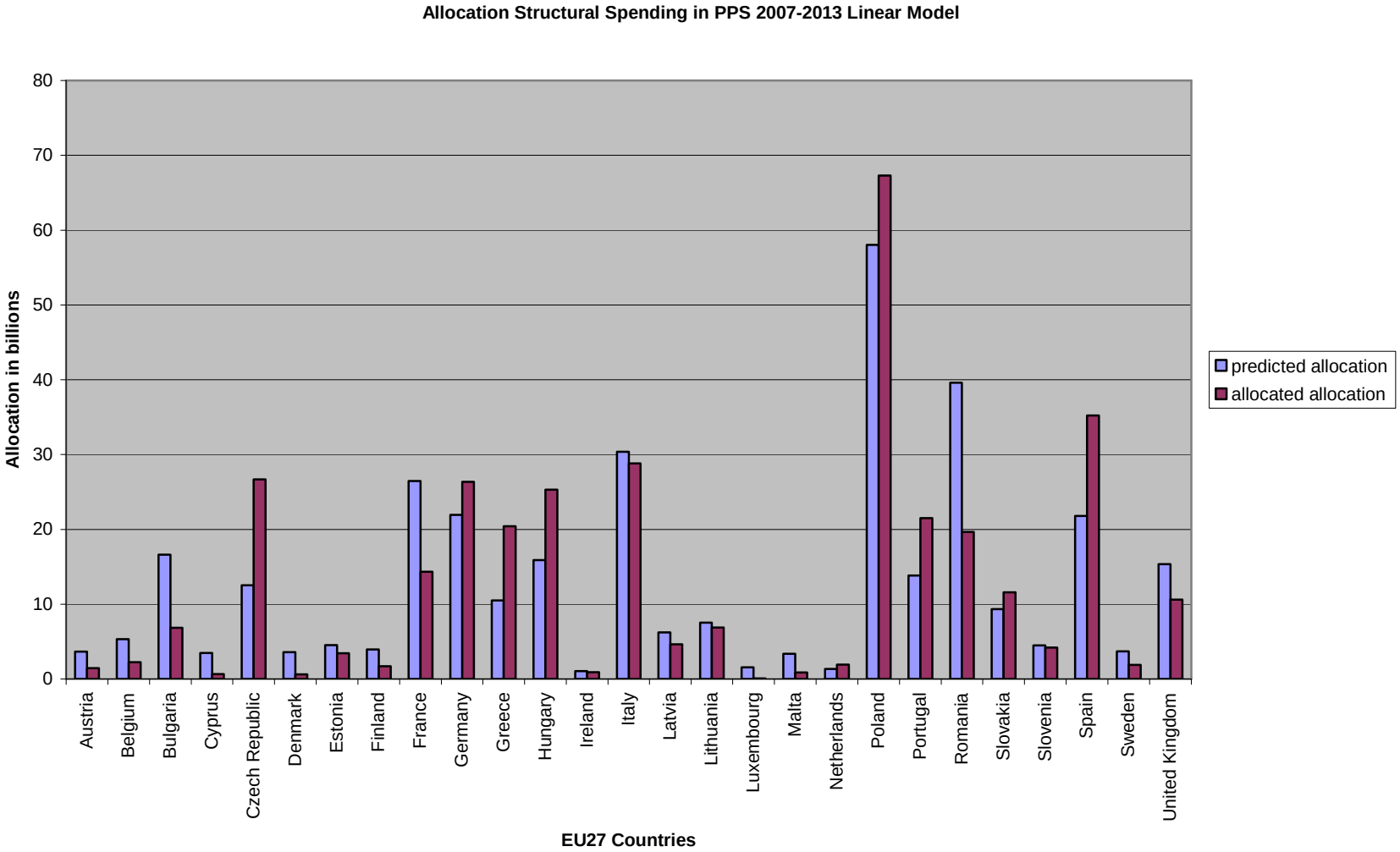

Figure 6.3 A graphic comparison of predicted versus actual allocation of structural spending of the EU-27 countries with the linear model and GDP in PPS.

6.2.3 Model with Cobb-Douglas function with PPS

Table 6.9 Model with Cobb-Douglas function and PPS

	ln*a*	ln*p*	ln*i*	ln*a* predicted	*a* share predicted	*a* absolute predicted	*a* absolute allocated
Austria	-5,46759795	-4,090839355	-3,884290088	-4,782909544	0,008371606	2,897387705	1,461
Belgium	-5,032239617	-3,845648766	-3,698548542	-4,471183651	0,011433774	3,957194967	2,258
Bulgaria	-3,92203257	-4,16651555	-5,148848148	-2,43996624	0,087163794	30,16712764	6,853
Cyprus	-6,293006185	-6,455192609	-6,517022916	-6,088357386	0,002269133	0,785340182	0,64
Czech Republic	-2,562355188	-3,87414331	-4,095035409	-3,749939511	0,023519168	8,139913655	26,692
Denmark	-6,336109426	-4,509962225	-4,317239496	-5,082510142	0,006204316	2,147295067	0,613
Estonia	-4,606607232	-5,910576884	-6,286495395	-5,028149412	0,006550922	2,267254599	3,456
Finland	-5,306723082	-4,541693418	-4,377127365	-5,050418152	0,006406654	2,217323708	1,716
France	-3,185131756	-2,05206432	-1,97105055	-2,936007008	0,053077243	18,36987464	14,319
Germany	-2,575630386	-1,794490436	-1,651034452	-2,860879658	0,057218406	19,8031185	26,34
Greece	-2,83020427	-3,794344229	-3,867149828	-3,986780226	0,018559375	6,42334402	20,42
Hungary	-2,615638045	-3,89586354	-4,367153402	-3,260995939	0,038350185	13,27288382	25,307
Ireland	-5,950969104	-4,743518834	-4,342601062	-5,685678959	0,003394228	1,174732103	0,901
Italy	-2,485927116	-2,12528247	-2,088836271	-2,903178801	0,05484859	18,98293243	28,812
Latvia	-4,316324377	-5,380294997	-5,970170808	-4,181453083	0,015276294	5,287079425	4,62
Lithuania	-3,91737395	-4,985724485	-5,513365007	-3,998847409	0,018336762	6,346298152	6,885
Luxembourg	-8,580087092	-6,94698729	-5,928918317	-8,654573862	0,000174328	0,060334284	0,065
Malta	-6,003372893	-7,101996544	-7,366833762	-6,183655867	0,002062872	0,713953972	0,855
Netherlands	-5,201187756	-3,41032606	-3,132597966	-4,394915077	0,012339928	4,270812143	1,907
Poland	-1,637796616	-2,564159846	-3,174689	-1,938968214	0,143852298	49,7868488	67,284
Portugal	-2,77815465	-3,844274025	-4,12592555	-3,603835525	0,027219122	9,420456594	21,511
Romania	-2,867726133	-3,133965497	-4,013560157	-1,840625563	0,158718107	54,93186067	19,668
Slovakia	-3,396749003	-4,51982272	-4,912318539	-3,907807943	0,020084479	6,951177989	11,588
Slovenia	-4,410444789	-5,506720378	-5,625406465	-5,232269927	0,005341387	1,84863801	4,205
Spain	-2,285190162	-2,410123708	-2,354350979	-3,164825169	0,042221523	14,61274239	35,217
Sweden	-5,209613293	-3,995312478	-3,788578498	-4,708630324	0,00901712	3,120798066	1,891
United Kingdom	-3,484639418	-2,097759614	-1,942627672	-3,121469467	0,044092329	15,26022264	10,613

Table 6.10 Output of the Cobb-Douglas model with PPS.
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,901052822
R Square	0,811896188
Adjusted R Square	0,79622087
Standard Error	0,736626859
Observations	27

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	56,20943855	28,10471927	51,79456043	1,96233E-09
Residual	24	13,0228591	0,542619129		
Total	26	69,23229764			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1,168673316	0,436524356	-2,67722362	0,013176059	-2,069615121	-0,267731511
X Variable 1	2,80193627	0,348901704	8,030732553	2,94872E-08	2,081838694	3,522033847
X Variable 2	-2,020455414	0,340577747	-5,93243519	4,02406E-06	-2,723373192	-1,317537636

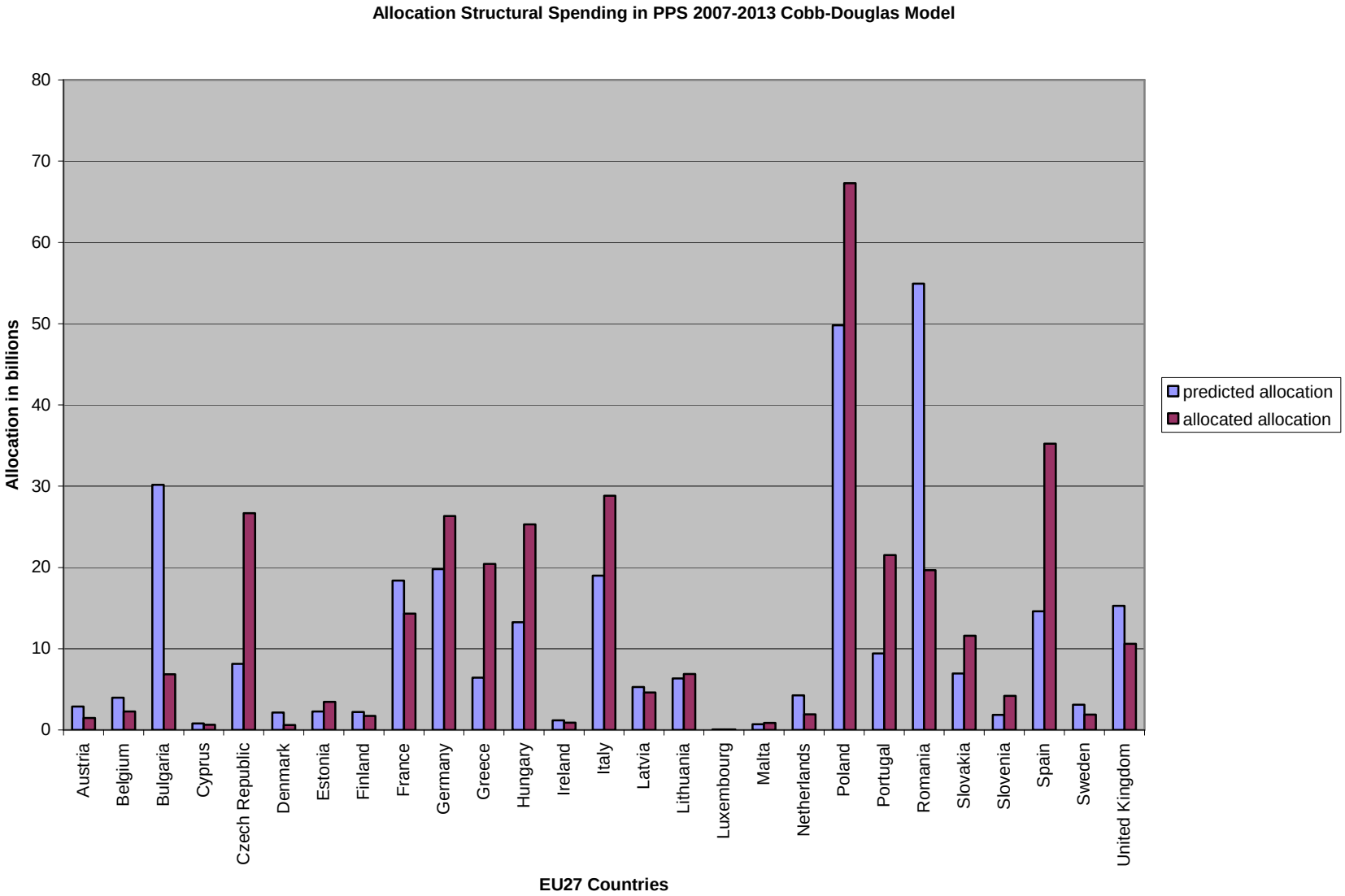

Figure 6.4 A graphic comparison of predicted versus actual allocation of structural spending of the EU-27 countries with the Cobb-Douglas model and PPS.