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BACHELOR THESIS

**Growth Enhancing Policies under Fiscal  
Austerity**

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## Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.

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Prague, May 17, 2013

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## Abstract

Currently, there have been two opposing views on how governments should support economic growth – either by fiscal stimulus or by fiscal consolidation. The most heated discussion has been over the question of whether a decrease in government expenditure can be expansionary and support economic growth. The objectives of this thesis are to provide a broader discussion of the economic theory behind the optimal design of fiscal policy, to analyse some opposing views on fiscal consolidation, and to present an overview of the policies that were implemented by selected Eurozone countries in response to the current situation. From the literature review we conclude that there is no significantly dominant view on the preferable approach to fiscal policy, which we confirm via the comparison of countries' expenditures.

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## Abstrakt

V současné době jsme svědky dvou protikladných názorů na způsob, jakým mají vlády podpořit ekonomický růst – pomocí podpůrných opatření nebo pomocí úsporných opatření. Nejživější diskuze je v současné době nad otázkou, zda může snížení vládních výdajů podpořit ekonomický růst. Cílem této práce je širěji diskutovat ekonomickou teorii, která stojí za návrhy optimální hospodářské politiky, analyzovat protichůdné názory na dopady úsporných opatření a poskytnout přehled hospodářských opatření uskutečněných vybranými zeměmi Eurozóny v reakci na současnou krizi. Z přehledu literatury můžeme usoudit, že neexistuje jeden významnější názor na způsob, jak správně navrhnout hospodářskou politiku, což potvrzujeme v rámci porovnání výdajů zemí.

<b>Klasifikace</b>	E61, E62, E65
<b>Klíčová slova</b>	ekonomický růst, prorůstová politika, fiskální restrikce, Evropská unie
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# Contents

<b>List of Tables .....</b>	<b>vii</b>
<b>List of Figures.....</b>	<b>viii</b>
<b>Acronyms .....</b>	<b>x</b>
<b>Bachelor Thesis Proposal .....</b>	<b>xi</b>
<b>1 Introduction.....</b>	<b>1</b>
<b>2 Literature review .....</b>	<b>3</b>
2.1 Stimulus.....	3
2.2 Consolidation.....	6
2.2.1 In support of expansionary consolidation.....	6
2.2.2 In opposition to expansionary fiscal consolidation .....	8
2.2.3 Tax vs. spending-based consolidation .....	10
2.3 Against consolidation as such .....	11
2.4 Recommended policies.....	12
<b>3 Comparison of expenditures .....</b>	<b>14</b>
3.1 Comparison by type of expenditures .....	14
3.2 Comparison of expenditures based on COFOG .....	26
3.2.1 General public services.....	27
3.2.2 Defence .....	28
3.2.3 Public order and safety .....	30
3.2.4 Economic affairs.....	31
3.2.5 Environmental protection .....	32
3.2.6 Housing and community amenities .....	34
3.2.7 Health.....	35
3.2.8 Education .....	37
3.2.9 Social protection .....	38

<b>4</b>	<b>Model.....</b>	<b>40</b>
4.1	Regression model .....	40
4.2	Estimation method used .....	41
4.3	Discussion of assumptions .....	41
4.4	Data .....	42
4.5	Empirical Results .....	45
4.6	Robustness.....	47
<b>5</b>	<b>Conclusion .....</b>	<b>50</b>
<b>6</b>	<b>Bibliography.....</b>	<b>54</b>
	<b>Appendix A: Comparison.....</b>	<b>57</b>
	<b>Appendix B: Model.....</b>	<b>61</b>

# List of Tables

Table 4.1: Estimation coefficients .....	46
Table A.1: Definitions of functions of government.....	57
Table B.1: Overview of variables .....	61
Table B.2: Descriptive statistics .....	61
Table B.3: Description of variables .....	62



# List of Figures

Figure 3.1: Total government expenditures .....	16
Figure 3.2: Changes in total government expenditure .....	16
Figure 3.3: Level of expenditures on social benefits .....	17
Figure 3.4: Changes in expenditure on social benefits .....	18
Figure 3.5: Expenditures on compensation of employees .....	18
Figure 3.6: Changes in expenditures on compensation of employees .....	19
Figure 3.7: Expenditures on intermediate consumption .....	20
Figure 3.8: Changes in expenditure on intermediate consumption.....	20
Figure 3.9: Expenditures on gross capital formation .....	21
Figure 3.10: Changes in expenditure on gross capital formation .....	22
Figure 3.11: Expenditures on subsidies .....	23
Figure 3.12: Changes in expenditure on subsidies.....	23
Figure 3.13: Deficit .....	24
Figure 3.14: Government consolidated gross debt .....	25
Figure 3.15: GDP growth.....	25
Figure 3.16: Unemployment .....	26
Figure 3.17: Expenditures on general public services .....	27
Figure 3.18: Changes in expenditure on general public services.....	28
Figure 3.19: Expenditures on defence .....	29
Figure 3.20: Changes in expenditure on defence .....	29
Figure 3.21: Expenditures on public order and safety .....	30
Figure 3.22: Changes in expenditure on public order and safety.....	30
Figure 3.23: Expenditures on economic affairs .....	31
Figure 3.24: Changes in expenditure on economic affairs.....	32
Figure 3.25: Expenditures on environmental protection.....	33
Figure 3.26: Changes in expenditure on environmental protection .....	33

Figure 3.27: Expenditures on housing and community amenities .....	34
Figure 3.28: Changes in expenditure on housing and community amenities .....	35
Figure 3.29: Expenditures on health .....	36
Figure 3.30: Changes in expenditure on health.....	36
Figure 3.31: Expenditures on education .....	37
Figure 3.32: Changes in expenditure on education.....	38
Figure 3.33: Expenditures on social protection .....	39
Figure 3.34: Changes in expenditure on social protection.....	39
Figure 4.1: General government structural balance .....	43
Figure 4.2: GDP growth.....	43
Figure 4.3: Current account balance .....	44
Figure 4.4: Unemployment .....	44
Figure 4.5: Output gap .....	45

# Acronyms

<b>COFOG</b>	Classification Of The Functions Of Government
<b>FE</b>	Fixed Effects
<b>GDP</b>	Gross Domestic Product
<b>IMF</b>	International Monetary Fund
<b>MMC</b>	Mining, Manufacturing and Construction
<b>OECD</b>	Organisation for Economic Co-Operation And Development
<b>PG</b>	Percent of 2007 GDP
<b>PP</b>	Percentage Points
<b>PPE</b>	Pre-Primary Education
<b>R&amp;D</b>	Research and Development
<b>RE</b>	Random Effects
<b>UN</b>	United Nations
<b>UNSD</b>	United Nations Statistical Database

# Bachelor Thesis Proposal

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<b>Author</b>	Robert Rott
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<b>Proposed Topic</b>	Growth Enhancing Policies under Fiscal Austerity

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## Topic Characteristics

In my thesis I will examine the possibilities of EU countries to apply pro-growth economic policies as an instrument of economic recovery in the context of austerity and strict fiscal discipline, to which most countries have already committed. I will explore possibilities to support economic growth in the current debt crisis and discuss ways to implement the same time pro-growth policy measures and fiscal discipline. Based on macroeconomic data for a specific group of European countries I will compare different types of economic policy.

## Charakteristika práce v češtině

Ve své bakalářské práci se budu zabývat možnostmi zemí Evropské unie aplikovat prorůstovou hospodářskou politiku, jako nástroj oživení ekonomiky, v kontextu úsporných opatření a přísné fiskální disciplíny, ke kterým se již většina zemí zavázala. Budu zkoumat možnosti podpory růstu ekonomiky v nynějším období dluhové krize a diskutovat způsoby současné implementace růstových opatření a politiky fiskální disciplíny. Na základě makroekonomických dat pro určenou skupinu evropských zemí budu srovnávat typy hospodářských opatření.

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# 1 Introduction

After the financial crisis in 2008, many Eurozone countries faced problems of high debt, negative GDP growth, and increasing unemployment. The standard monetary policy tools of interest rate manipulation are not effective as the central bank faces a zero-level bound and cannot decrease interest rates further. Therefore, fiscal policies play a crucial role in the resolution of such a crisis. However, governments also face limits due to already high debts and there is no broad agreement on the optimal design of fiscal policies. Currently, there have been two opposing views on how governments should support economic growth – either by fiscal stimulus or by fiscal consolidation. The most heated discussion has been over the question of whether a decrease in government expenditure can be expansionary and support economic growth.

DeLong and Summers (2012) are the main proponents of fiscal stimulus and point out that a hysteresis effect has a significant negative impact on the potential output of an economy. The main proponents of consolidation are Alesina, Favero and Giavazzi (2012), who find that government expenditure cuts were historically associated with mild recessions or no recession at all. They argue that decreased government expenditure increases the wealth of the private sector and therefore increases investment. On the contrary, the main opponents of the previous findings of Alesina et al. are IMF (2010) and Gravelle and Hungerford (2013). They criticise the method of analysis and point out that the cases of successful consolidation happened under accompanying favourable conditions. Chowdhury and Islam (2012) are also against consolidation and they argue that there is insufficient evidence for all the rationales behind the proposals to cut expenditures and reduce debts.

The aim of this thesis is to provide a broader discussion of the economic theory behind the optimal design of fiscal policy, analyse some opposing views on fiscal consolidation, and present an overview of the policies that were implemented by selected Eurozone countries in response to the current situation.

The thesis is organized as follows. In the first chapter we are going to discuss the current literature on optimal design of fiscal policy. We will outline the key aspects of fiscal stimulus, and we will compare the theory behind the supporting and opposing views to fiscal consolidation. We will also discuss the design of consolidation as an optimal fiscal policy. In the second chapter we are going to

compare the composition and development of government expenditures by their type and application across selected Eurozone countries. In the third chapter we are going to estimate the relationship between general government structural balance and key economic variables. Finally, we will discuss the obtained results.

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## 2 Literature review

In this chapter we are going to discuss theoretical approaches and empirical studies that try to explain how the economic performance of a country is linked to the government's fiscal policy. First, we will discuss literature that supports fiscal stimulus. Second, we are going to examine studies that find that it is possible to support economic growth through a decrease in government expenditure. Third, we are going to compare the effects of tax-based and expenditure-based consolidation. Fourth, we will discuss opposing views to the consolidation as such. Finally, we will conclude by outlining some recommendations for the government's fiscal policy.

### 2.1 Stimulus

DeLong and Summers (2012) claim that although discretionary fiscal policies are not appropriate tools during normal economic periods, in a recession their use is recommended. They base this recommendation on three arguments: first, during a recession the multiplier of government spending is much higher; second, a hysteresis effect reduces future potential output; and third, interest rates at a zero level bound make monetary policy ineffective and fiscal policy less costly. Padoan (2009) also stresses that it is important to support the economy because a recession can decrease the potential output of an economy significantly. He explains that there are several factors that could reduce the output. First, structural unemployment increases because the workforce loses its productivity after a prolonged period of not being at work. Second, the amount of capital stock in the economy reduces as the economic agents reduce their investment due to lower profits and higher costs of capital caused by higher risk premia. Third, the efficiency in using the capital stock decreases because some of the companies that operate it go bankrupt. Finally, investment into research and development (R&D), which is one of the key engines of economic growth, is cut significantly in the crisis. DeLong and Summers (2012) add to these causes of hysteresis effect a lower investment into education and stress, particularly the impact on young workers who cannot find work during a recession.

Padoan (2009) points out, however, that the effect of fiscal stimulus depends largely on the fiscal multiplier, which is very different in each country, and differs also between studies that examine it. He reviews the literature and shows that the mean of the government multiplier is 1.1 for studies considering the effect only in the first



period, 1.2 in two periods, and 1.3 in a three-period effect. Nevertheless, he explains that it is very difficult to estimate the multiplier of fiscal stimulus in a deep recession because economic agents respond differently. They have higher precautionary behaviour when connected with uncertainty about future economic environment, future taxes, and the sustainability of fiscal stimulus.

DeLong and Summers (2012) argue that even with modest multipliers and modest hysteresis effect, short term fiscal stimulus will support economic growth and will not increase debt in the long term. They claim that even a small hysteresis effect has a significant impact on estimates of future debt burdens, and they explain that short term fiscal stimulus can be self-financing if it reduces this effect by improving future output and growth. Higher output will increase tax revenues and therefore can alleviate the debt burden of the stimulus in the long run. However, this self-financing effect of discretionary fiscal policy is present only under specific conditions. In their framework, DeLong and Summers assume that the central bank is constrained by the zero lower bound and is not willing to adopt a quantitative easing policy. The fiscal multiplier has to be close to 1, which they claim is only when the economy is in recession and interest rates are close to zero. A key assumption of their analysis is that increased government spending is only temporary and that transitory spending will not affect the government's borrowing costs. In addition, other variables in the model such as potential gross domestic product (GDP) growth rate, marginal tax rate and real government borrowing rate all need to be at favourable levels.<sup>1</sup> Also, the time lags in implementation can alter the results. DeLong and Summers conclude that they do not address the question of sustainability of fiscal policy as such, or the long-term problem of unbalanced government revenues and expenditures. They only argue that fiscal stimulus in a crisis situation does not have to impose an additional burden on the government's long-term budget constraints.

Trimborn and Holger (2013) analyse fiscal stimulus at the time when its effect expires, and they find that there is a price for support of GDP in terms of reduced output afterwards. They also observe that GDP falls below its laissez-faire level<sup>2</sup> three or four years after the stimulus was implemented, even when the effects of that stimulus are still present. They explain that when the government finances its stimulus programme through the issuing of bonds, it changes the equilibrium composition of savings allocation in financial markets. This has the consequence that

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<sup>1</sup> For detailed review of possible combinations see DeLong and Summers (2012).

<sup>2</sup> The level of GDP that would be present had the government not intervened.

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people invest a larger part of their savings in bonds, but less in private capital, which causes the capital stock in the economy to decline over time. This could explain why output might be lower than it would be without the stimulus. Trimborn and Holger also compare different effects of the same stimulus package according to the rapidity of its execution, and they conclude that economic recovery in the medium term is slower when the initial deficit spending program is larger. When the economy is stimulated in a short period of time, GDP increases strongly at the beginning but the effect of the stimulus package fades out quickly, the total loss in output caused by lower investment into capital is large, and the process of catching up with the laissez-faire economy is slow and takes place over a long period of time. On the contrary, when the stimulus program is more gradual, its support to GDP and the following fading out of its effects is more gradual too and because of its progressive financing the loss in output is lower. Of course, it depends on what the composition of the government stimulus is. When it is composed of investments into capital only, the debate moves to the question which of those two types of investment is more productive.

Corsetti et al. (2010) distinguish two different results of a fiscal stimulus based on the way the government reverses the policy in the following periods. When the government reverses the stimulus through increased taxes, it will affect private consumption less negatively compared to the situation when it reverses the stimulus through the decrease in spending. The decreased spending can bring about a threat of lowering inflation, which implies an increase in the real interest rate. (When the central bank's rate is near the zero level, it cannot decrease it as a response.) However, this does not have to happen if stimulus increases private consumption enough to offset the following cut in government spending.

Another fact that we should take into consideration while discussing a policy of stimulus is the coordination effect. Padoan (2009) refers to the negative relationship between fiscal multiplier and the openness of countries in the European Union. Because of the spillover of the expansionary stimulus and low level of coordination between countries, much smaller stimuli than would be possible or desirable are implemented. Further, Padoan highlights that coordinated stimuli have effect by a significant amount larger than effects of each country's individual stimulus. On the other hand, Padoan identifies that possible obstacle to the coordination is that smaller countries can try to benefit from larger countries' stimuli and this threat of freeriding prevents larger countries from being interested to cooperate. In addition to that, countries that rely primarily on export will be less eager to support their domestic demand.

As Padoan (2009) remarks, while assessing the fiscal stimulus, we should also take into consideration its long term effects on potential output growth arising from investment into infrastructure, education, and research and development. It is, however, extremely difficult to calculate this impact, and, furthermore, the effects of public investment differ in each OECD country.

## 2.2 Consolidation

We are in a situation when the deficits are high and debts are approaching unsustainable levels. In their study Broadbent and Daly (2010) declare that during the Great Recession, how the crisis that begun in 2008 is often called, the deficits increased to such an extent that governments cannot just wait that the situation will resolve itself once the growth starts again. Therefore, they recognise that there is a need for fiscal consolidation. Chowdhury and Islam (2012) note that the situation is not that bad in all countries and recall that still a large part of the European countries has their debt to GDP ratio below 60 percent. However, they point out that the level of indebtedness has risen since 1981 in most countries significantly, even in those countries with a still low debt to GDP ratio. IMF (2010) recalls that it is generally agreed among economists that lower deficits have a positive effect on the economy in the long run. However, we can identify two opposing views on the effects of fiscal consolidation in the short run.

### 2.2.1 In support of expansionary consolidation

Expansionary fiscal consolidation is defined as a policy that enhances GDP growth through reduction in structural deficits. Alesina, Favero and Giavazzi (2012) conclude that spending-based adjustments in the past were associated with very mild and short-lived recession, in some cases with no recessions at all. They find that the growth of output, gross fixed capital formation and the business confidence worsen in the first year after the consolidation but then they rebound, ameliorate and start to grow two years after a consolidation. In an alternative model with time dummies for each period of their analysis, the output growth and gross fixed capital formation start to grow between two and three years after the consolidation. Business confidence gets after a similar period of time to the level when it does not significantly deteriorate further. The authors argue that what makes their results significant is that they evaluate effects of the combination of tax-based and spending-based measures, all announced at the same time, and not only effects of a single fiscal understand policies. In their analysis, Alesina and Ardanga (2012) also find that spending cuts have a positive effect on private consumption. In their empirics a 1 percent GDP

consolidation through spending cuts increased GDP by 0.46 percent after two years. Alesina, Favero and Giavazzi (2012) explain that spending cuts increase the wealth of people, which implies, under the condition that leisure and consumption are normal goods, that labour supply decreases and reduces real wages. Another factor pressing the real wage down can be a reduction in government employment as a part of its spending cuts. From a lower real wage then follows an increased profit for firms that in response increase their investment. The logic behind the authors' conjectures is clear, however, it might take quite a long time for this process to have impact. Alesina, Favero, and Giavazzi stress, that the perception of a consolidation as either permanent or temporary, is a crucial aspect of the spending cut. A permanent spending cut has a positive effect of increased confidence of firms in stable or lower future tax rates, which increases their motivation to invest. On the contrary, if the government decreases spending only temporarily, it causes uncertainty about future policy changes to reverse it. This type of stop-and-go policies decreases confidence of economic agents and has negative impact on efficiency and growth.

Another proponents of expansionary fiscal policy, Broadbent and Daly (2010), find that a reduced government spending implies improved GDP growth, decreased borrowing costs and a better equity market performance. In their analysis, Broadbent and Daly use cyclically adjusted time series and point out that during the observed periods of consolidation tax revenue declined, by which they confirm that a reversed causality (increased economic growth and reduction in government's expenditures as a consequence) was not in place. They also disprove the argument that periods of expansionary fiscal consolidation they observed did happen in recessionary parts of the economic cycle when the rebound of economy would naturally follow. Broadbent and Daly argue that the fiscal consolidation should be decisive and expenditure-driven. It should be decisive because when the consolidation is gradual it only prolongs uncertainty of the private sector over future tax corrections, and it should be expenditure driven because the decrease in public sector employment decreases unit labour costs, which improves employment and profitability in the private sector.

Alesina, Favero and Giavazzi (2012) argue that accompanying policies concerning goods and labour market liberalization and wage moderation play an important role in a successful spending-based consolidation, as this kind of measures were present in most of the consolidations favourable to growth. Chowdhury and Islam (2012) share this view and claim that successful cases did not result only from constraining the budget but from combination with accompanying measures such as monetary policy, exchange rate policy and structural reforms. They also refer to studies that show that

based on historical evidence, the probability that a fiscal consolidation will be successful (combined with growth) is only between 19 and 25 percent.

Broadbent and Daly (2010) explain that for the application of findings based on historical evidence in the current crisis, it is crucial to know, which of the factors that supported expansionary fiscal consolidation were the most important. From those identified factors – lower interest rates, lower exchange rate, lower unit labour costs and improved confidence and expectations – only the last two are relevant to the current situation. Broadbent and Daly find that the net export did not contribute much to the growth and that private consumption rebounded late. However, business investment accelerated sharply and represented the major factor of expansionary fiscal consolidation that contributed to GDP growth. Broadbent and Daly defend the literature which is in support of expansionary fiscal consolidation by highlighting that it is not anti-Keynesian, since it does not deny the positive fiscal multiplier in normal times; it only argues that during severe fiscal imbalances the multiplier can turn negative.

### 2.2.2 In opposition to expansionary fiscal consolidation

In contrast to Alesina, Favero and Giavazzi (2012), IMF (2010) find that fiscal consolidation reduces output and raises unemployment in the short run. These two opposing findings are based on different methods of identification of past fiscal adjustments. The method used by proponents of expansionary fiscal consolidation identifies periods of consolidation based on cyclically adjusted primary balance (CAPB): the difference between revenues and non-interest expenses, adjusted by estimated effects of business cycle. IMF (2010) claims that this is an imperfect way how to identify governments' deliberate decisions to reduce deficits. IMF states that this identification is subject to measurement error connected to business cycles. As the asset or commodity price bubbles affect revenues and expenditures of governments, an expenditure bias enters the data because authors are then including changes in CAPB that are not caused by government's effort to reduce deficit. Another problem with the CAPB approach which IMF identifies is shocks to the economy and policy responses to them. When a deliberate consolidation is followed by an adverse shock to the economy to which a government responds by discretionary expenditures, its resulting CAPB will be different from a country that adopted the same consolidation measures but was not hit by any shock or was hit by a positive one. IMF states a variety of combinations of policies and shocks, which it identifies as a problem of the "standard" approach – the approach used by Alesina, Favero and Giavazzi (2012) and Alesina and Ardanga (2012). IMF (2010) bases its

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approach on identifying actions that were intended to reduce public deficit, irrespective of their outcomes. IMF nevertheless admits that their approach also includes biases that are caused either by governments that postpone the implementation of consolidation, or by governments that are strongly committed to reduce deficit even when this decision would deepen a recession. IMF (2010) concludes that a 1 percent of GDP consolidation decreases demand by about 1 percent, by which they confirm the Keynesian theory and makes an interesting finding that the incremental effect of fiscal consolidation is almost the same for both large and small sizes of the consolidation.

Gravelle and Hungerford (2013) criticise, too, the studies that find consolidation expansionary because there exist problems connected to methods of cyclically adjusting fiscal variables. The potential flaw of the method that is based on unemployment and its elasticity is that the elasticity may change when the economy enters or exits from a recession. Gravelle and Hungerford (2013) also point out that short run conditions accompanying the successful expansionary consolidation were on average favourable. They point to the fact that most of the successful fiscal consolidations (defined as a debt-to-GDP reduction higher than 4.5 percentage points over a period of three years) occurred when the output was above potential and the rest when the output gap was negative but no more than slightly above 2 percent of potential output. On average, in countries that experienced a successful consolidation, the output gap was only slightly negative (-0.3 percent of potential output) in the period before the consolidation and positive (0.34 percent of potential output) in the year when the consolidation began. However, in cases when the consolidation turned out to be unsuccessful, the output gap was negative before the consolidation and it worsened in the first year of consolidation on average.

To conclude the discussion on the expansionary fiscal consolidation, Alesina and Ardanga (2012) made an interesting finding that in countries that achieved a decrease in debt through consolidation, the amount of debt to GDP reduction was similar regardless of whether the consolidation was expansionary or not. IMF (2010) concludes that lower government's debt decreases the cost of its servicing and this saving can be then used to decrease taxes on human and physical capital to support growth. According to model of IMF, the long run positive effects of cuts in government consumption and transfers start to outweigh the negative short term costs after three years and the total loss of output experienced in the first three years is then recovered in following two years.

### 2.2.3 Tax vs. spending-based consolidation

Concerning the composition of consolidation, Alesina, Favero and Giavazzi (2012) find that a tax-based adjustment is much more costly than the expenditure-based one. Tax-based consolidation even worsens the situation of economic recession by further deterioration in output growth, decline in gross fixed capital formation and business confidence in both regressions without and with year dummies, where the deterioration is even more substantial. On the contrary, they find that expenditure-based consolidation is much less costly, which we discussed in a previous part. Alesina, Favero and Giavazzi explain this difference through the Neo-Classical theory and a key role of private investment. They argue that, first, taxes can be distortionary and reduce profits – directly affecting the private investment, and second, a lower government spending increases perceived wealth of consumers as they expect to face a lower tax burden in the future. They also claim that the difference between these two kinds of policies is not dependent on economic cycles or monetary adjustments. Alesina and Ardanga (2012) find that increased taxes have a negative impact on the economy—1 percent of GDP consolidation through increased taxes reduces GDP after two years by 0.34 percent. Broadbent and Daly (2010) recall that higher taxes reduce labour supply (Barro 1981, cited in Broadbent and Daly 2010, p. 8) and crowd out investment (Baxter and King 1993, cited in Broadbent and Daly 2010, p. 8) and claim that it is easier for the private sector to replace the government expenditures if they do not face higher taxes.

IMF (2010) tests the conclusions of the standard approach and it also finds that spending cuts are less recessionary than tax hikes – a 1 percent of GDP consolidation through increased taxes reduces GDP after two years by 1.3 percent, while consolidation through spending cuts reduces GDP only by 0.3 percent. The explanation IMF (2010) gives is similar to that introduced by the standard approach – the effects of increased confidence of economic agents due to spending cuts offset the Keynesian effects of consolidation. This, however, holds according to IMF only for cuts in politically motivated spending such as transfers. Cuts in government consumption have a slightly negative effect which fades out after the second year, but cuts to public investment have a larger negative impact.

Broadbent and Daly (2010) show that in countries that implemented expenditure-driven consolidations a bond yield decreased after the implementation substantially. On the contrary, in countries implementing tax-driven consolidation the bond yields

increased. They also add that many governments that accomplished a successful<sup>3</sup> expenditure-driven consolidation carried out an unsuccessful tax-based consolidation before. From this Broadbent and Daly suppose that government often decides for a decrease in spending only when it is in a really bad situation with no choice of another policy.

## 2.3 Against consolidation as such

There are many opposing views to the fiscal consolidation among the top world economists concerning its consequences and conditions under which these consequences are valid. Chowdhury and Islam (2012) discuss three rationales behind concerns about the effectiveness of fiscal policy and a need for a debt and deficit management. First the authors discuss government spending and its crowding out of private spending. They point out that crowding out does not apply for the investments into infrastructure, education, and research and development that on the contrary increase the productivity of the economy. Moreover, they claim that the crowding out is according to a usual investment–saving/liquidity–money (IS-LM) model only partial. Second, Chowdhury and Islam refer to Ricardian equivalence – in a period of decreased taxes, people are saving rather than spending the additional disposable income they gain because they anticipate an increase in taxes in the future. Here Chowdhury and Islam stress that Ricardian equivalence concerns tax cuts only and does not say \_ at all that a temporary government spending will be saved. Moreover, “... exactly the same model implies that a temporary increase in government spending will increase demand. “ (Wren-Smith 2011, cited in Chowdhury and Islam 2012, p. 19). Third, Chowdhury and Islam question the conjecture that governments need to cut expenditures in order to regain the market confidence and point to two opposing views on this subject: supportive view of a former President of the European Central Bank Jean-Calud Trichet and opposing view of Paul Krugman. Chowdhury and Islam also call attention to the fact that economic growth is a more important variable for rating agencies in measuring sovereign risk of a country than is the level of its deficit and debt. Chowdhury and Islam criticise the usual empirical studies of debt-growth relationship. The interpretation of negative ceteris paribus effects of debt on GDP growth is according to them incorrect, because it does not take into account the future growth effects of the spending, which creates the increase in debt. Some studies take this into account, but they claim that income will grow slower than the debt, which authors of those studies, according to Chowdhury and Islam, do not support with any

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<sup>3</sup> Broadbent and Daly (2010) do not precisely define what a successful consolidation is.



proof. Chowdhury and Islam admit that it may be true that the analysis of the immediate effect can result in a negative relationship. However, if the future effects of improved infrastructure on the growth were taken into account, the relationship would be positive. Chowdhury and Islam refer to studies that show that the relationship between debt and growth is positive until a certain level of debt to GDP ratio and negative beyond. The level is, however, difficult to estimate and each study arrives to a different number ranging from 15 to 90 percent of GDP. Moreover, these studies find that after the tipping point, the relationship flattens – meaning that further increase in debt has only low consequences on growth.

Padoan (2009) recalls that the debt dynamics depends on GDP growth and interest rate and he warns against the possible vicious circle of lowering growth, increasing debt, and rising interest rate. Finally, we call attention to the fact that the above finding concerning fiscal consolidation hold only under specific conditions of the models used. It should be taken into account that the results of fiscal consolidation can be significantly different from previous experiences in a situation when a large group of countries implements substantial spending cuts at the same time. IMF (2010) models costs of fiscal consolidation to a small open economy in a situation when other economies consolidate too. They find that under the restriction of zero interest rate, the costs of fiscal consolidation for the small open economy are twice as high as would normally be.

## 2.4 Recommended policies

Chowdhury and Islam (2012) suggest that governments should invest into economy and turn to fiscal consolidation only after the situation is fully stabilised, otherwise they could trigger the vicious spiral of economic decline. Spilimbergo et al. (2008) find that for supporting the economy a fiscal stimulus is better than decrease in taxes since it is not sure how the tax cuts would help the households and firms in the current situation. Tax cuts to households do not have to be effective because consumers refrain from spending the additional money due to their precautionary savings caused by economic uncertainty. Corporate tax cuts are not recommended either as they will not have a large impact because of decreased company profits

Spilimbergo et al. (2008) argue that it is hard to estimate the effects that government spending will have because of many specific conditions, different approaches as same as frequency of data collection that play a role in the resulting value of fiscal multipliers. Therefore Spilimbergo et al. recommend that the governments rely on diversified portfolio of policies. They suggest that government should maintain

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existing programmes and implement new projects with large externalities, which would not have been carried out under standard circumstances for their large costs, but would have to be carried out in some time in the future anyway. However, these have potential drawbacks in slow implementation of the projects and time lags in their effects. Another policy Spilimbergo et al. propose is to increase transfers for the lowest income group of population that has usually the highest propensity to consume. Concerning businesses, governments should focus on those that lost proper access to credit and those that have problems with their operations. On the contrary, the authors warn against any distortionary measures such as increased supports to selected industries, increases in wages, and new entitlement programs. Gravelle and Hungerford (2013) recommend that in the long run government policies should not focus on creation of jobs because this is done better by market itself.

According to Gravelle and Hungerford (2013) government should focus on potential output growth and it is therefore desirable that they decrease deficit since some of the government's expenditures crowd out private investments. However, the question remains when to start consolidation and how to do it. According to Gravelle and Hungerford the earlier the better because in this way we will provide more space for gradual adjustment. On the other hand if consolidation started too early, it can stop the recovery or even worsen the recession. Corsetti et al. (2010) claim that timely fiscal consolidation that is following stimulus can even increase multiplier effect of that stimulus. The multiplier rises, because people perceive that the government is committed to keep finances sustainable, and because lower inflation expectations over the future periods decrease the interest rates of long-term loans, which supports new investments. The authors propose that stimulus should be reversed in a suitable time in the medium term. However, they do not give a more precise suggestion what the suitable time is; they just discuss what the implications are when the consolidation is done too early or too late. When it occurs too early, it adds to possibly still present deflationary pressures of a recession, which increases real interest rates and impedes the recovery or worsens the recession. On the other hand, if consolidation occurs too late, it does not disprove a fear over an increased inflation as a consequence of the stimulus, and does not help either. The timing is therefore crucial.

## 3 Comparison of expenditures

In this chapter we will compare the evolution of government expenditures in time and across selected Eurozone countries. We will use data of countries' aggregates and the Classification of the Functions of Government (COFOG), which is a framework "...developed by the Organisation for Economic Co-operation and Development and published by the United Nations Statistical Division (UNSD)" (Eurostat, 2013a) to examine the trends in the government expenditure on particular functions and to make the inter-country comparisons possible (Eurostat, 2012). We will use selected indicators from COFOG II level, which breaks down 10 divisions of COFOG I level – General public services, Defence, Public order and safety, Economic affairs, Environmental protection, Housing and community amenities, Health, Recreation, Culture and religion, Education, and Social protection – into 69 more detailed groups of expenditure. (UN, 2013)

We are going to compare the government expenditures in the period from 2008 to 2011 for ten Eurozone countries that adopted Euro before the year 2008 so that we do not need to take into consideration different monetary policies and the exchange rate movements. From those countries we will exclude Greece, which is the largest outlier in most of the statistics, Luxembourg which does not have comparable features of the government sector as other countries, and Belgium, which does not break down its expenditures into COFOG II level. The selected countries are: Germany (DE), Ireland (IE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), Austria (AT), Portugal (PT), Slovenia (SI) and Finland (FI). In the whole chapter we will use the abbreviation "pp" for "percentage point" change.

First, we are going to compare government expenditures based on their function. Second, we will comment on the evolution of key economic variables to complement the analysis. Finally, we are going to analyse differences between countries' policies in each division of expenditures based on the COFOG level II framework.

### 3.1 Comparison by type of expenditures

In this part we are going to compare differences in functions of government expenditures. We will consider the development of each of the following functions of expenditures: compensation of employees, gross capital formation, social benefits,

subsidies and intermediate consumption.<sup>4</sup> First, we will compare percentage changes of nominal values of expenditures adjusted for inflation. Second, we will compare the level of expenditure between countries. Finally, we will briefly summarize the development of the level of unemployment, government balance, GDP growth and debt.

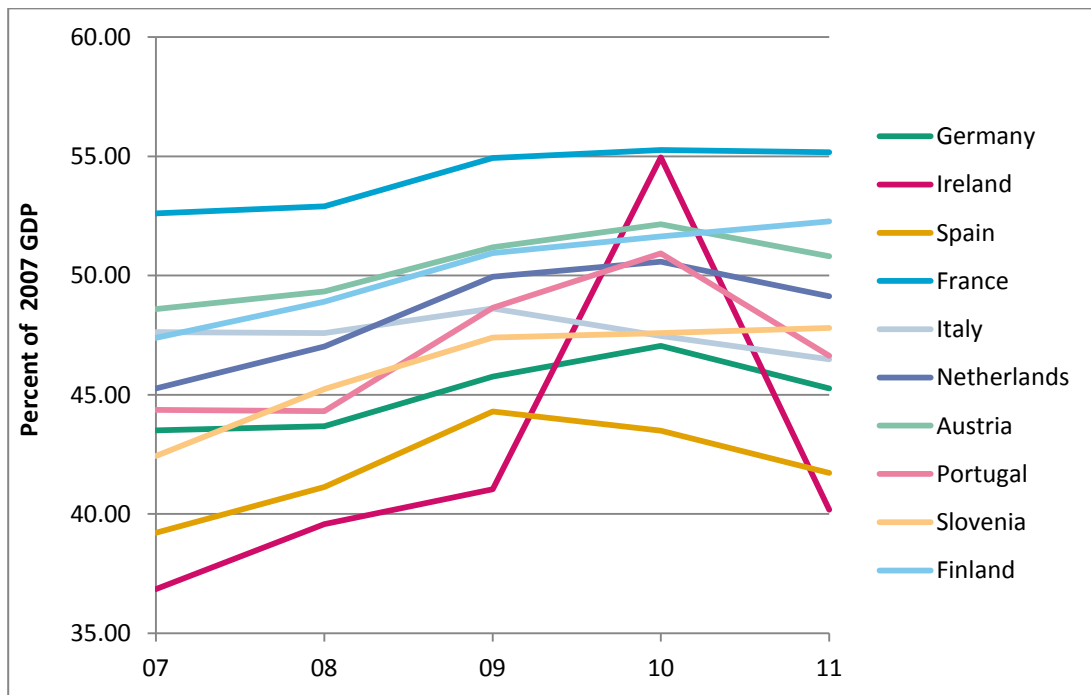
In our analysis we cannot use a simple percentage of GDP units since the GDP has changed during the recession significantly. A change in the level of GDP, which is the denominator in our indicators, would not make it clear whether the identified change was caused by a change in expenditure or by a change in GDP. Therefore, we are going to use the nominal values of expenditures and in each year scale them by the level of GDP in 2007.<sup>5</sup> The unit we are going to use is therefore the “percent of 2007 GDP”. Whenever we relate to a variable that is expressed in percent of GDP, we always mean percent of 2007 GDP. In other words, we will mean the “2007” implicitly, and we will refer to the unit as a “percent of GDP” only, or “pg” abbreviated.

Figure 3.1 shows that the total government expenditure to 2007 GDP increased from 2007 to 2011 in all countries. We can observe a sharp peak in 2009 for Ireland, which can be attributed to large expenditures of government to mitigate the financial crisis. Overall, the ratio of government expenditures to GDP was the highest in France (55.1 pp), and the lowest in Spain, where it has been declining since 2009 and fell to 41.7 percent of GDP in 2011. As we can see from the Figure 3.2, the proportion of the total government expenditure to 2007 GDP has been declining since 2010 in most of the countries. The only countries where the expenditures grew slightly in 2011 were Slovenia (0.5 percent) and Finland (1.3 percent). The largest decline in expenditures in 2011 in terms of percentage change was observed in Portugal. The average rate of decline in expenditures in 2011 was 5 percent, which points to the fact that most of the countries started reducing their expenditures in that year.

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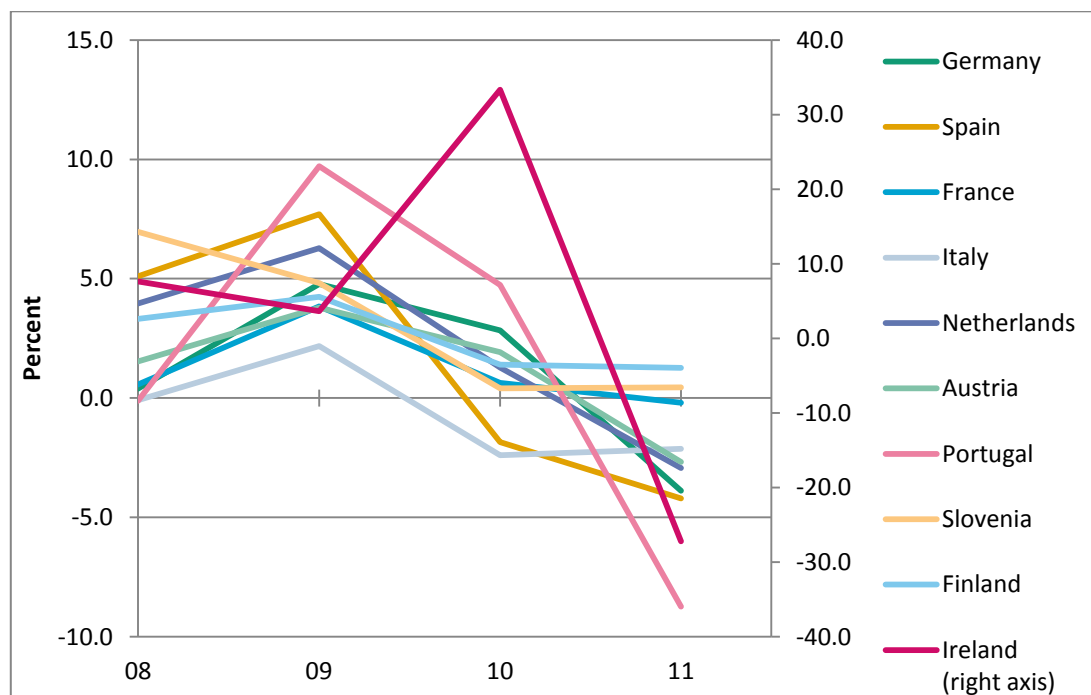
<sup>4</sup> For definitions of the categories see Table A.1 in the Appendix A.

<sup>5</sup> Furthermore, we eliminate the effect of inflation in the process of scaling. We take the year 2007 as a base period and before scaling the units for years 2008–2011 into percent of 2007 GDP, for each of the years we adjust the level of 2007 GDP according to observed inflation from 2007 until the scaled year.



**Figure 3.1: Total government expenditures**

Source: Eurostat (2013b, c, d)

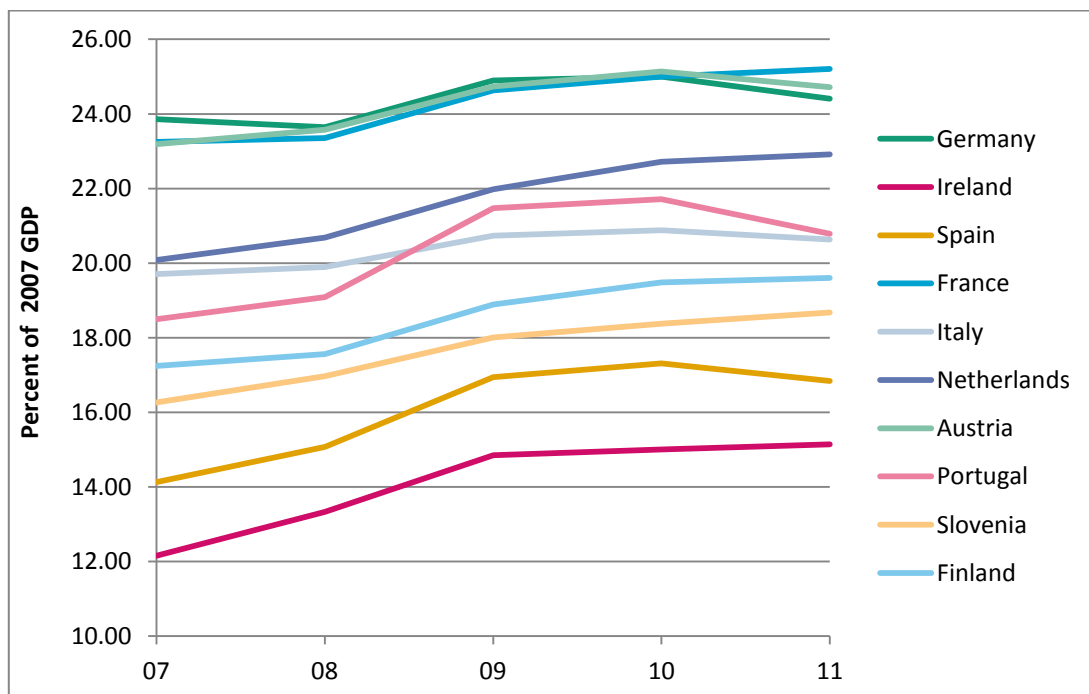


**Figure 3.2: Changes in total government expenditure**

Source: Eurostat (2013b, c, d)

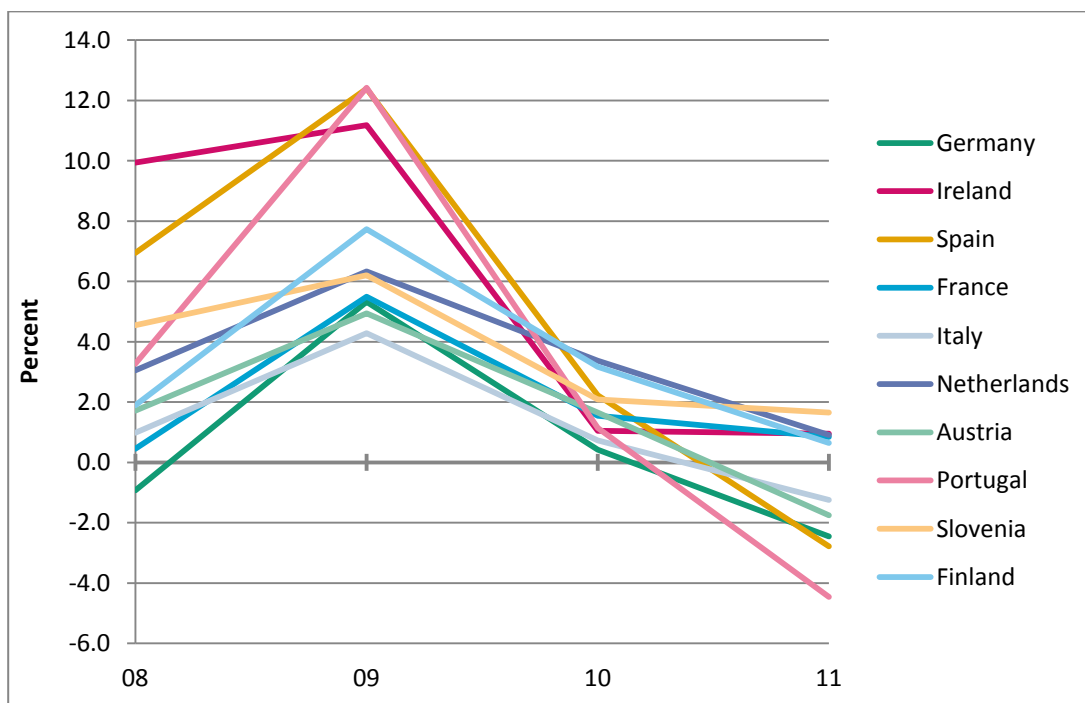
The largest portion of government expenditures has been represented by social benefits that, as we can see in Figure 3.3, amounted to 25.1 percent of GDP in France in 2011. A very similar level of expenditures could be observed in Austria and Germany – countries with historically high social protection and specific demographic composition of population. On the other hand, the lowest ratio of expenditures to 2007 GDP can be observed in Ireland (15.1 pg). In figure 3.4 we can clearly see that in most of the countries the level of expenditures increased sharply in 2009 but nearly levelled off in 2010, and started to fall in 2011, on average by -0.8 percent.

The second largest category of government expenditures has been compensation of employees, which represented on average 10.7 percent of GDP in 2011. As we can see from Figure 3.5, the largest ratio of expenditures on employees to 2007 GDP was in Finland (13.4 percent) and France (13 percent) in 2011. The lowest expenditure proportional to GDP can be observed in Germany, where its level was only 7.7 percent. When we focus on the change in government expenditures on employees in Figure 3.6, we see that they have increased moderately until 2009, when they started to decrease significantly – on average by -12 percent. The most significant reduction was observed in Portugal and Spain.



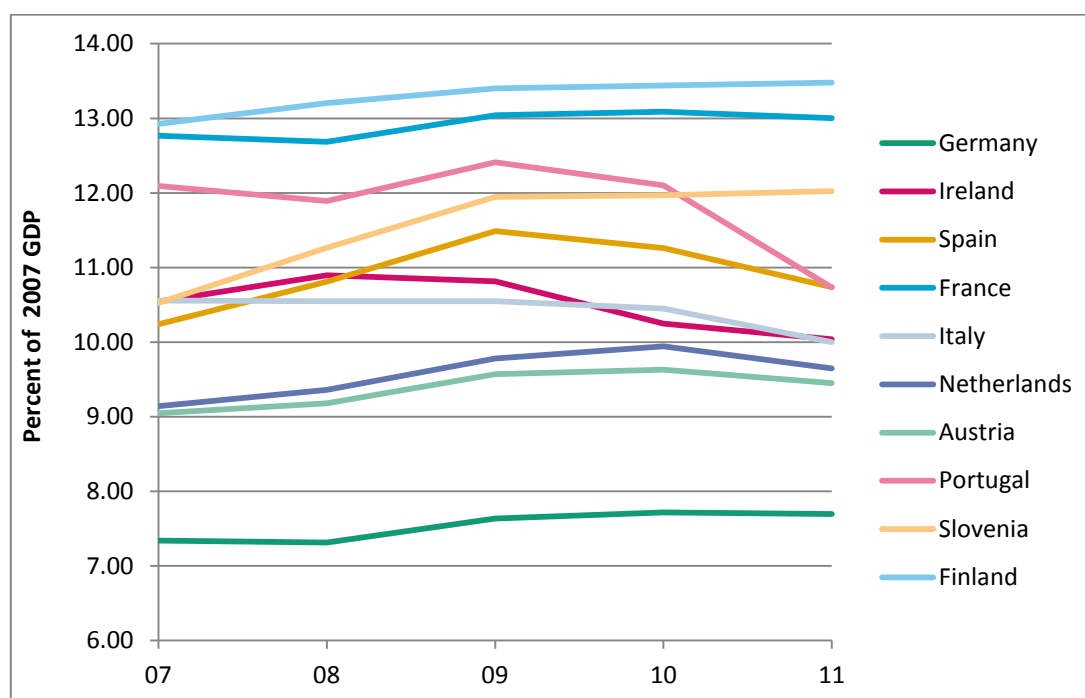
**Figure 3.3: Level of expenditures on social benefits**

Source: Eurostat (2013b, c, d)



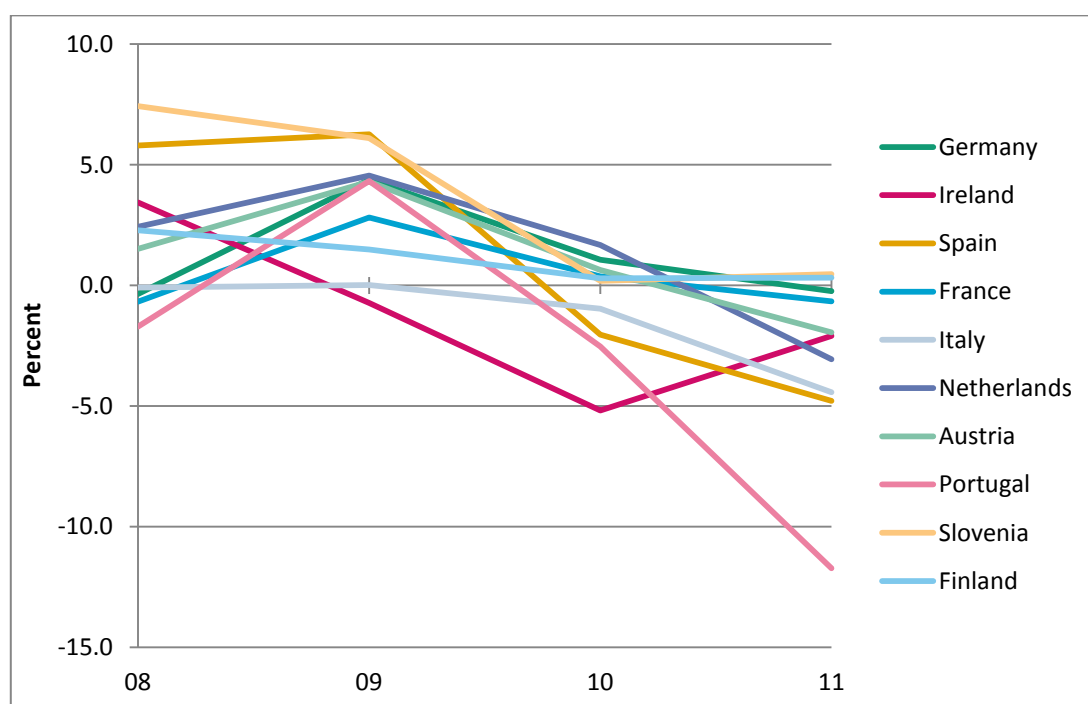
**Figure 3.4: Changes in expenditure on social benefits**

Source: Eurostat (2013b, c, d)



**Figure 3.5: Expenditures on compensation of employees**

Source: Eurostat (2013b, c, d)

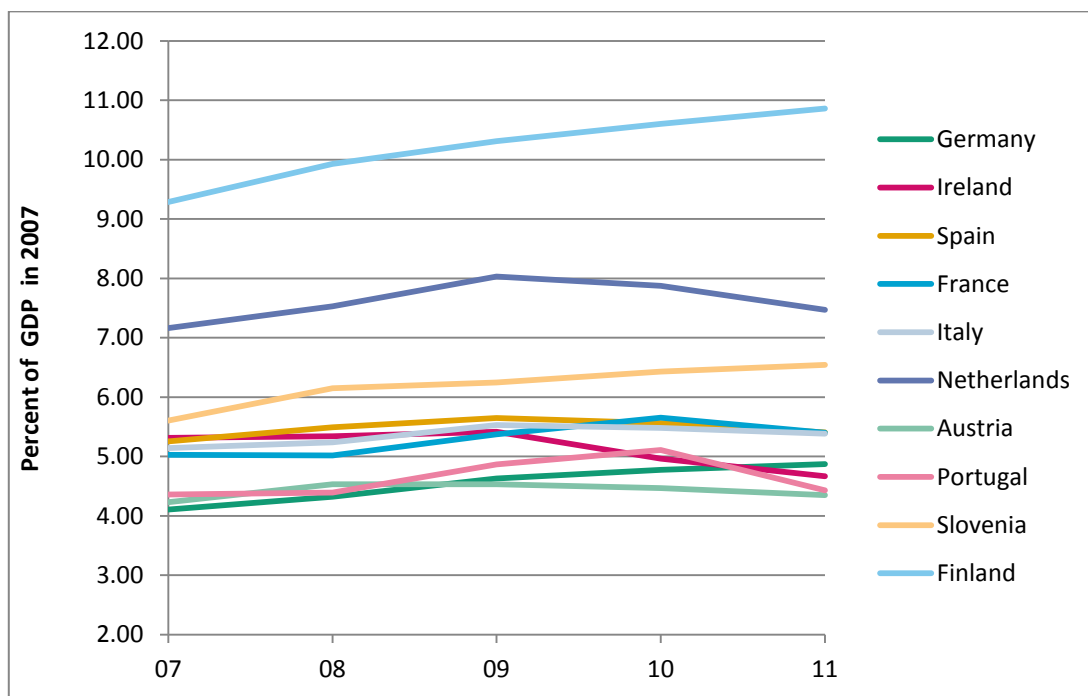


**Figure 3.6: Changes in expenditures on compensation of employees**

*Source:* Eurostat (2013b, c, d)

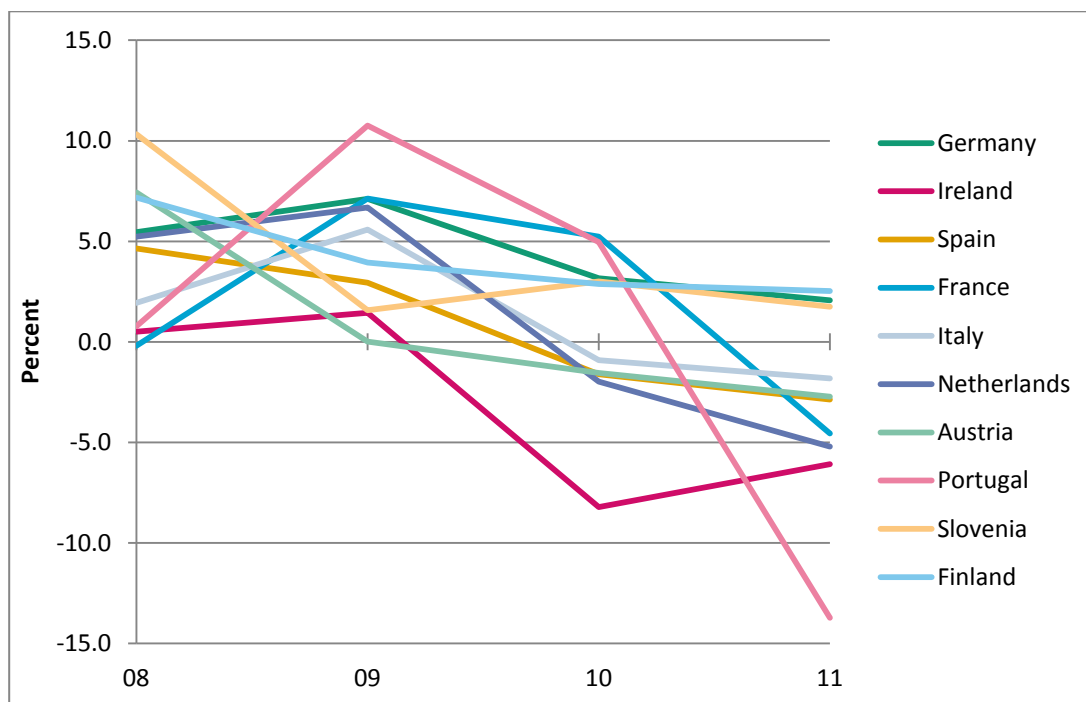
The intermediate consumption, depicted in Figure 3.7, has been the third largest government expenditure proportionally to 2007 GDP, and in most of the countries was around 5 percent of GDP in 2011. The largest proportion of expenditures to GDP has been present in Finland (10.7 percent), which was twice as much as the median value of all countries. Netherlands had also a significantly larger proportion of intermediate consumption to GDP than other countries. Concerning the change in compensation of employee's expenditures, depicted in Figure 3.8, some countries started to reduce their ration of expenditures to GDP in 2010 and almost all countries were reducing it in 2011, except for Slovenia, Germany and Finland.





**Figure 3.7: Expenditures on intermediate consumption**

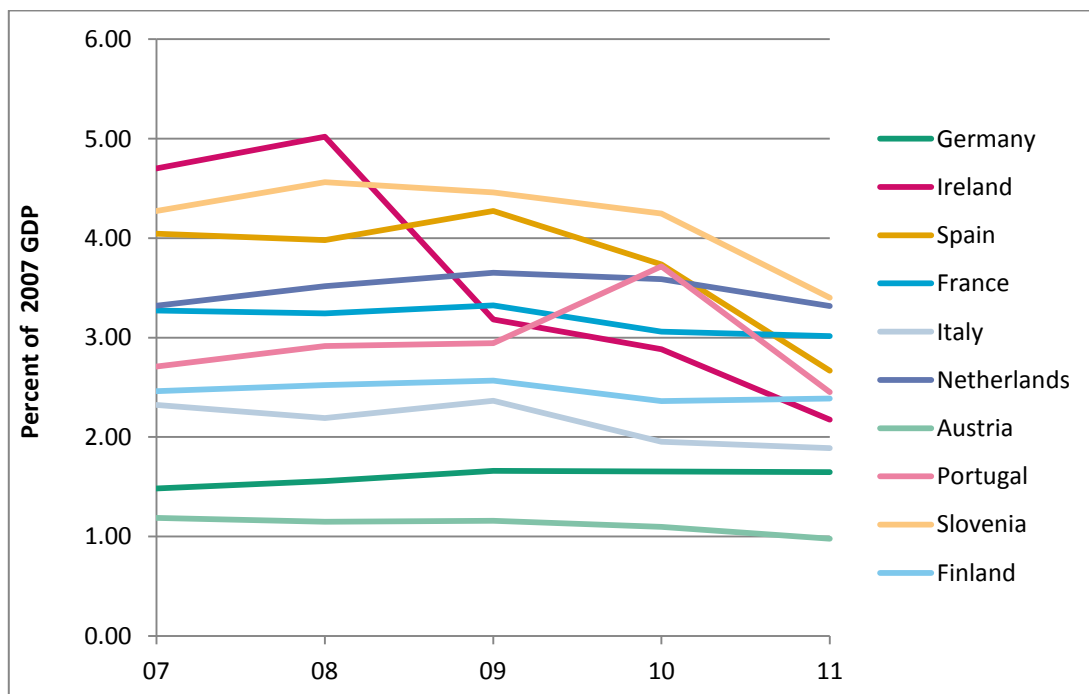
Source: Eurostat (2013b, c, d)



**Figure 3.8: Changes in expenditure on intermediate consumption**

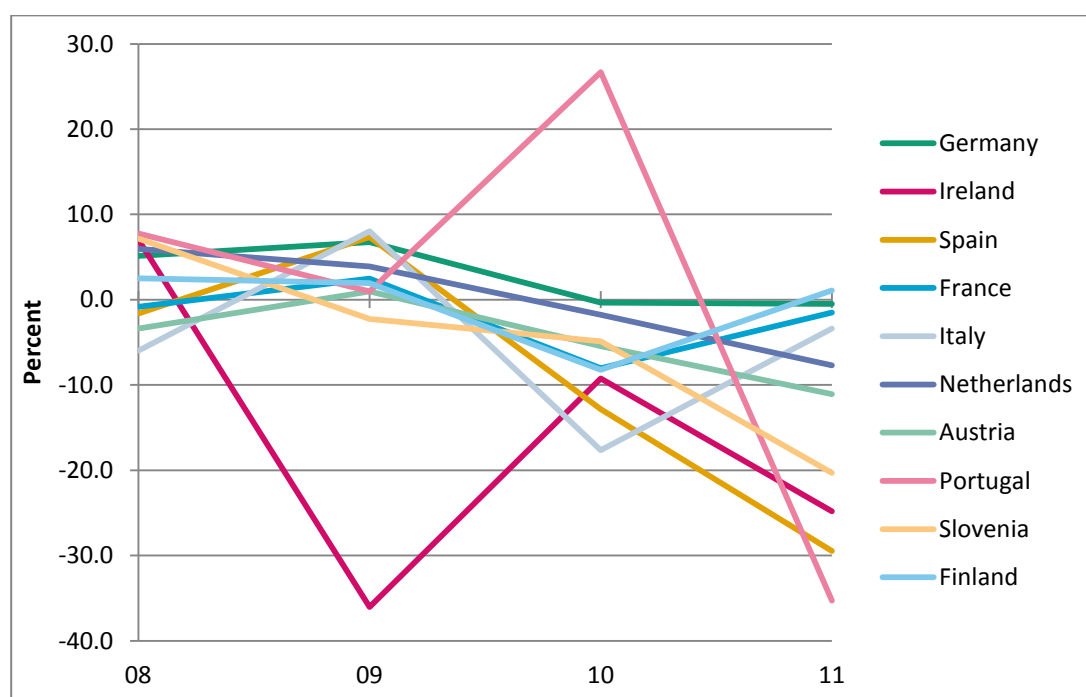
Source: Eurostat (2013b, c, d)

Intermediate consumption that we can observe in Figure 3.9 represents the next category of expenditures according to their magnitude in proportion to 2007 GDP. The country with the lowest proportion in 2011 was Austria, with only 1 percent of GDP. Slovenia had, on the contrary, the largest proportion of expenditures equal to 3.4 percent of GDP. In the Figure 3.10, which represents the changes of level of expenditures on gross capital formation, we can identify two patterns of evolution. The first group of countries (AT, DE, FI, FR and NL) sustained a nearly constant level of gross capital formation during the crisis and started to reduce it slightly only after 2009. On the contrary, the second group of countries, represented by IR, ES, IT, PT and SI, reduced their proportion of gross capital investment expenditures significantly during the period from 2007 to 2011 in comparison to the pre-crisis level.



**Figure 3.9: Expenditures on gross capital formation**

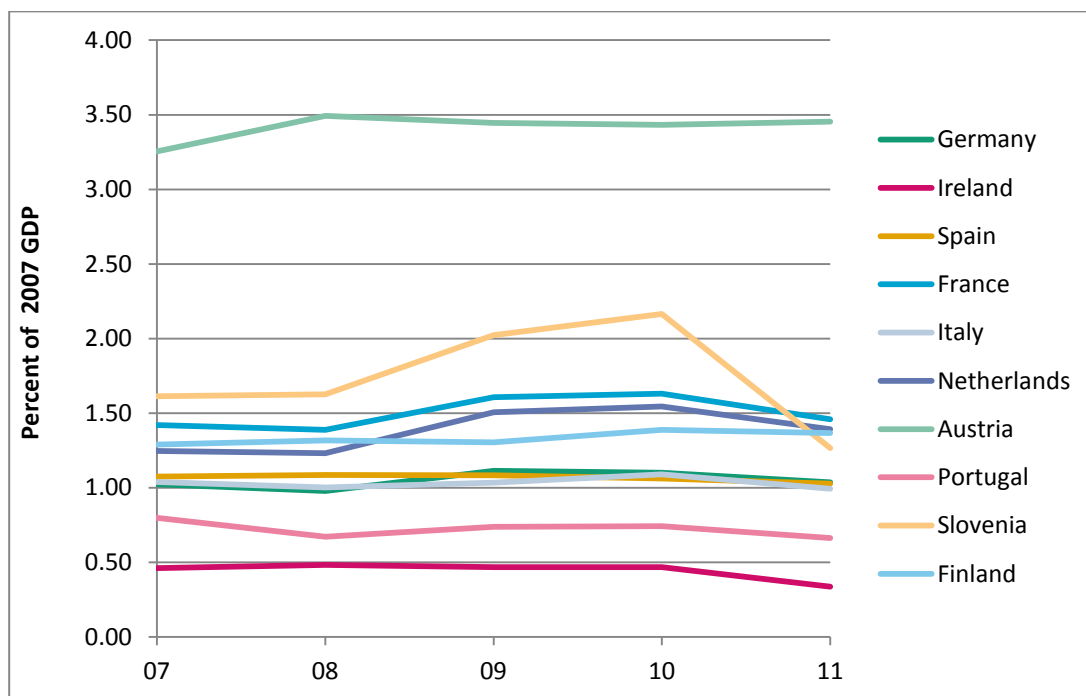
Source: Eurostat (2013b, c, d)



**Figure 3.10: Changes in expenditure on gross capital formation**

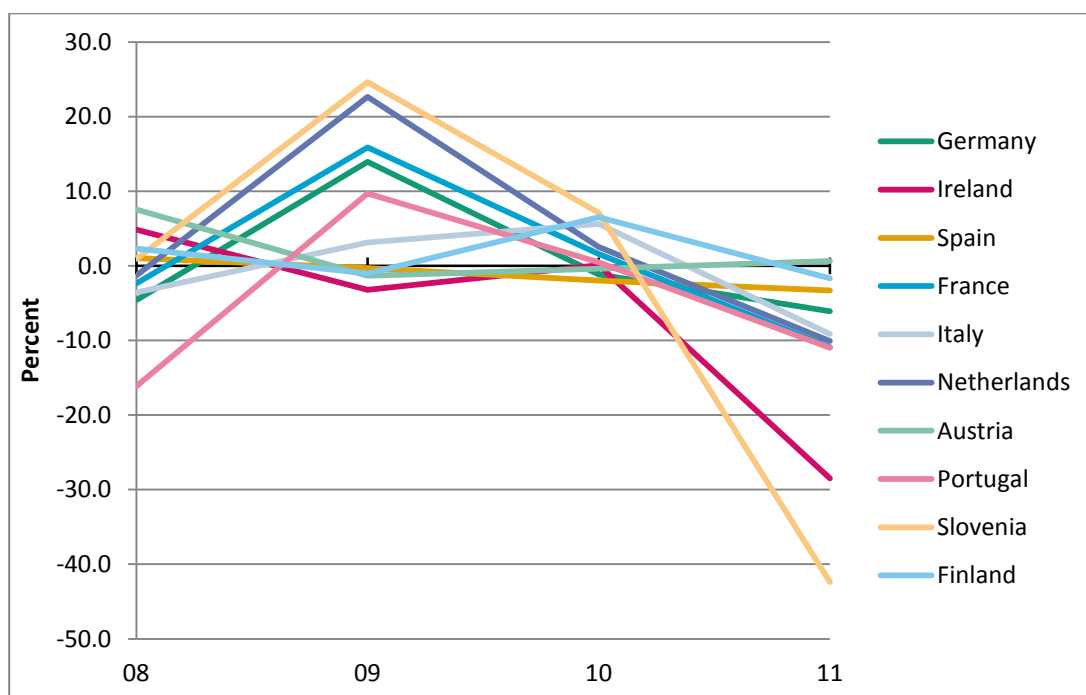
Source: Eurostat (2013b, c, d)

The smallest proportion of government expenditures to 2007 GDP has been represented by subsidies, equal to 1.3 percent of GDP in 2011 on average. From Figure 3.11 we can see that most of the countries' expenditures ranged from 0.3 percent of GDP in Ireland to 1.5 percent of GDP in France. However, Austria spent 3.4 percent of 2007 GDP on subsidies, which was in 2011 two-and-half times more than the average proportion of expenditures in other countries. Figure 3.12 shows clearly a decline in proportion of expenditures on subsidies in all of the countries in 2011 but Austria.



**Figure 3.11: Expenditures on subsidies**

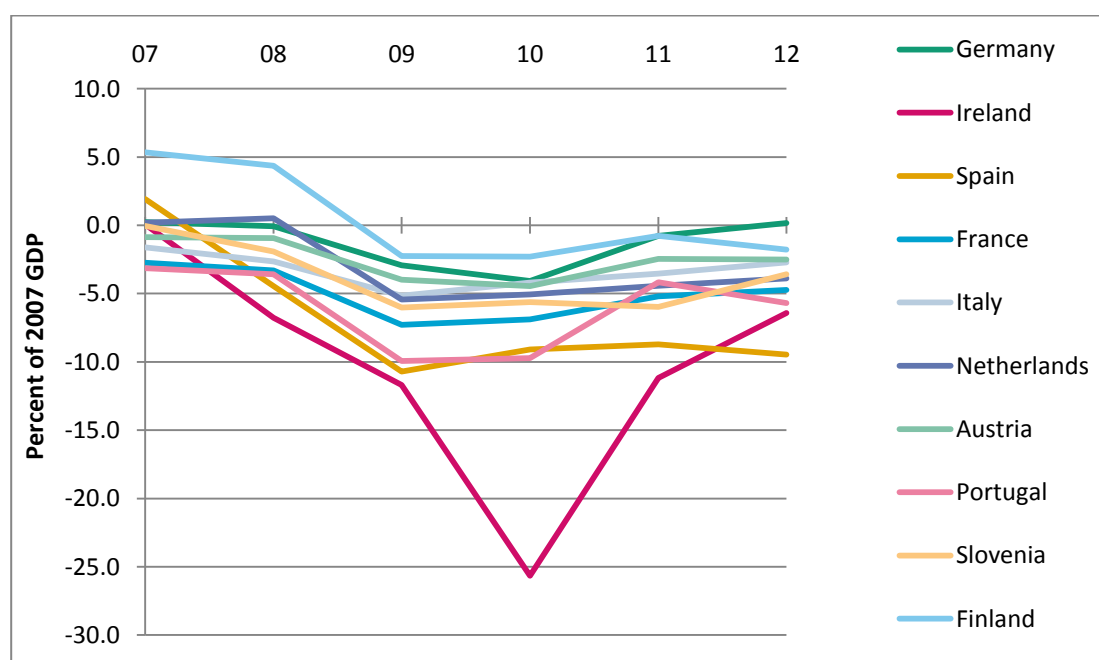
Source: Eurostat (2013b, c, d)



**Figure 3.12: Changes in expenditure on subsidies**

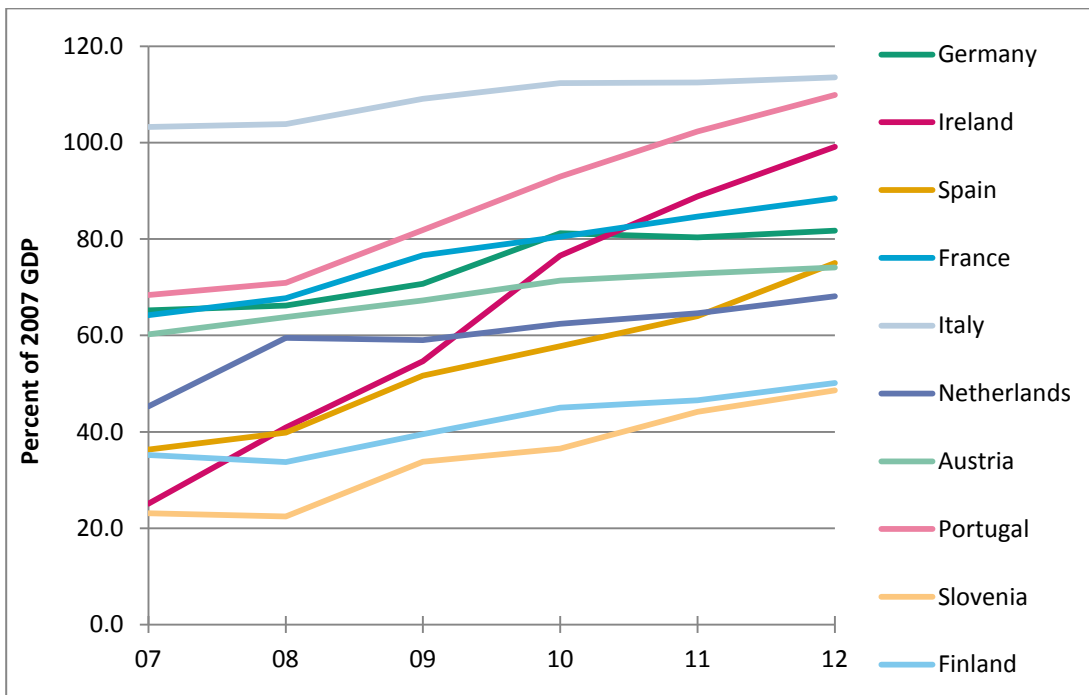
Source: Eurostat (2013b, c, d)

We observed that governments decreased their expenditures in almost all analyzed categories of expenditures. Nevertheless, their deficits remained between 2 and 4 percent of 2007 GDP as we can see in the Figure 3.13. The country with the highest deficit was Spain (-9.5 pg) and the only country that achieved a surplus was Germany (0.2 pg) in 2012. Consequently, the debt continued to increase as we can see in the Figure 3.14. The highest level of debt to GDP in 2012 was in Italy (113.6 pg), nevertheless, Portugal and Ireland have been approaching this level too. From our observed sample of countries only Finland and Slovenia were below a level of 60 percent of GDP. However it may have seemed in 2010 that the growth has resumed already, from the Figure 3.15 we can see that many from the observed countries are on the way to return to the levels of growth in the most recessionary year 2009. On top of that, we observe a continuously increasing level of unemployment, as can be seen from the Figure 3.16. In spite of that, there have been countries that managed to reduce their level of unemployment such as Netherlands, Austria, Germany, or Finland.



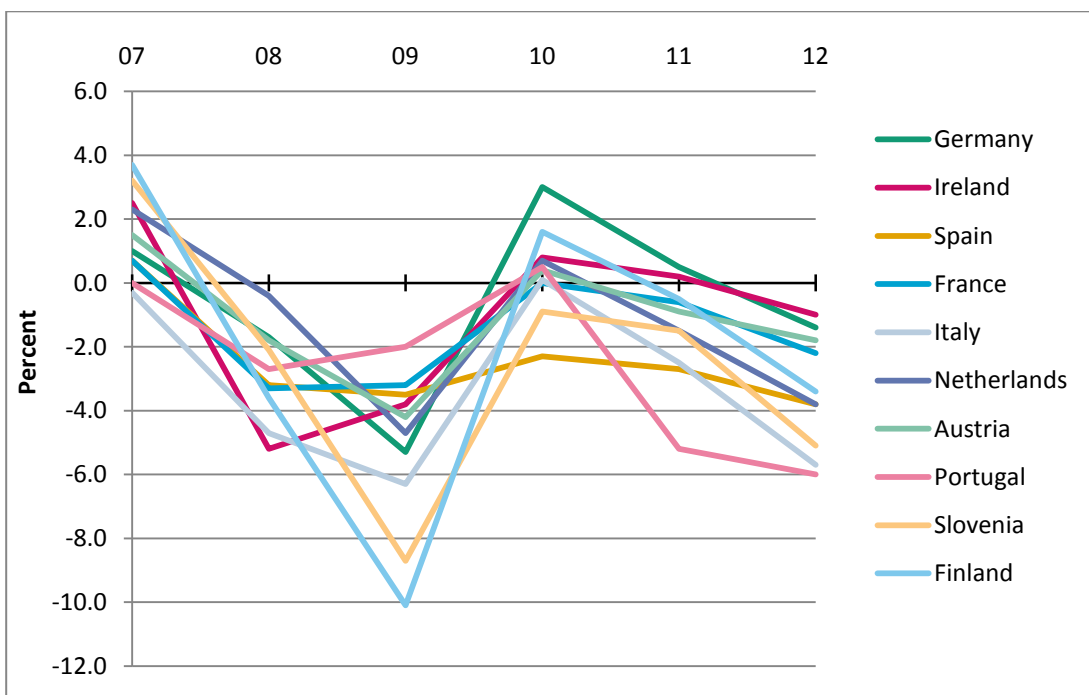
**Figure 3.13: Deficit**

Source: Eurostat (2013g)



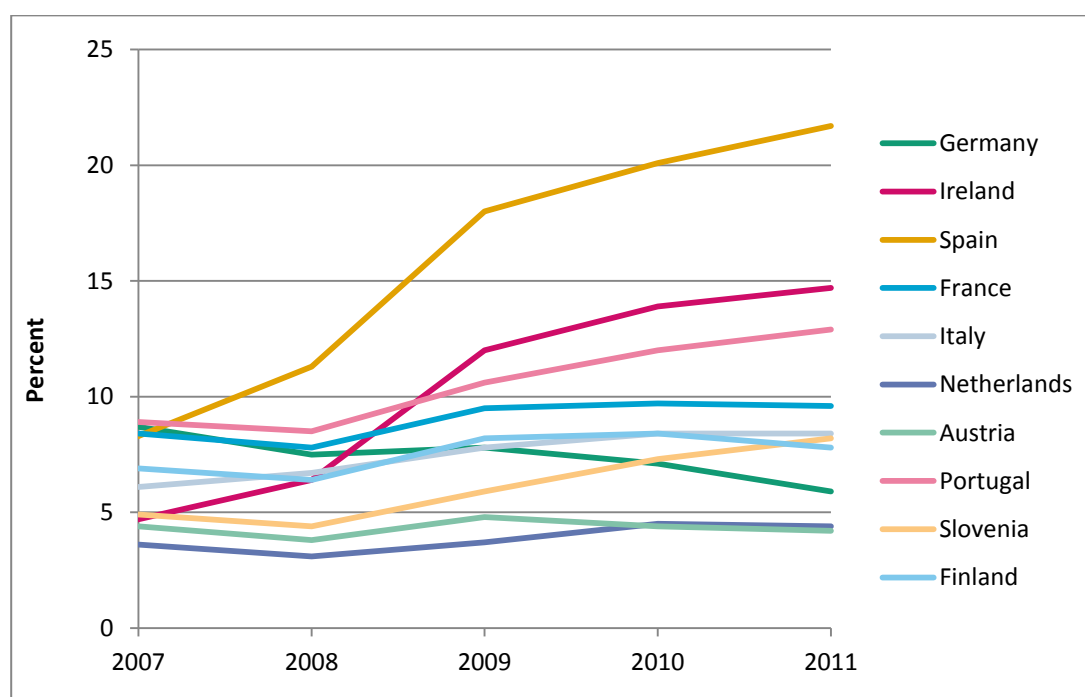
**Figure 3.14: Government consolidated gross debt**

Source: Eurostat (2013g)



**Figure 3.15: GDP growth**

Source: Eurostat (2013f)



**Figure 3.16: Unemployment**

Source: Eurostat (2013e)

## 3.2 Comparison of expenditures based on COFOG

In this section we are going to compare composition of government expenditures and discuss how it has evolved during the crisis. For each division of COFOG I we are going to compare level and evolution of expenditures relative to GDP in 2007<sup>6</sup> for the period from 2007 to 2011. We will break down and analyse divisions of COFOG I in larger detail based on the COFOG II level data, however, we will report only changes in expenditure that can be attributed either to fiscal expansion, or to fiscal consolidation.

We will use a following type of abbreviations in our analysis: (0.5 pg), (PT, -0.3 pg).

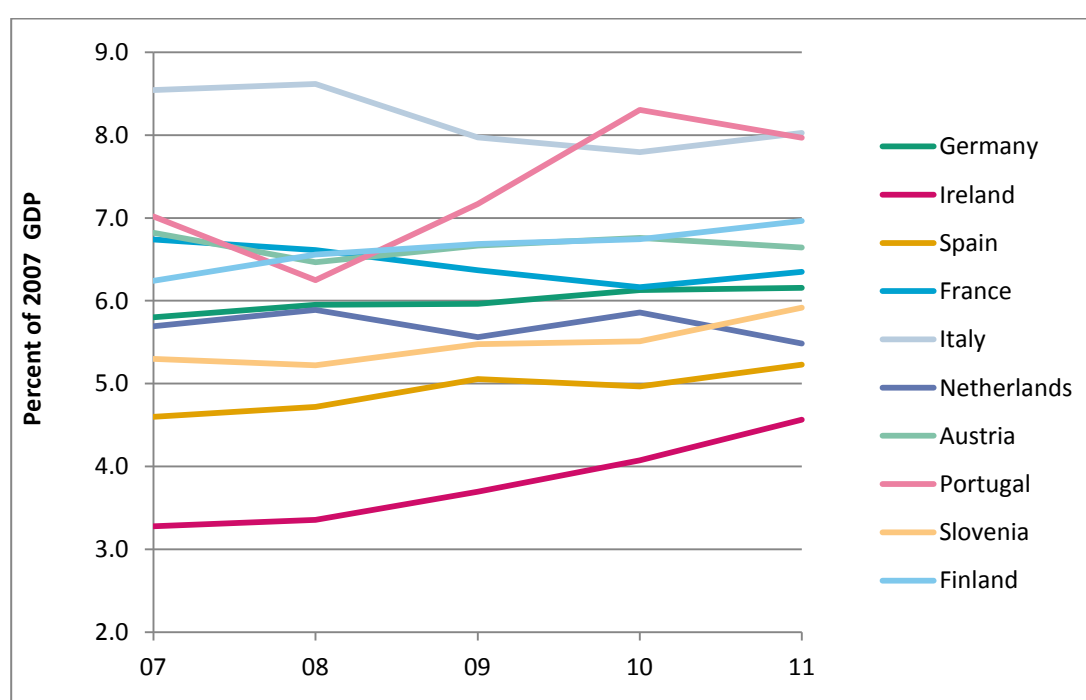
The first means an increase in a selected indicator for a particular country by 0.5 percent of 2007 GDP from level in 2007 to 2011. The second means a 0.3 percent of 2007 GDP decline in a selected indicator in Portugal from 2007 to 2011. While interpreting figures that represent percentage changes in level of expenditures, we should be careful, since the values represent only the change over the previous period level.

<sup>6</sup> The method of analysis is the same as in the part 3.1.

### 3.2.1 General public services

From Figure 3.17 we can see that in 2011 Portugal had the highest proportion of public expenditures (8.0 pg) between analysed countries, closely followed by Italy with 7.6 percent of GDP. The lowest proportion of public services expenditures on GDP was, on the other hand, present in Ireland, where it attained the level of 4.0 percent of GDP in 2011. In Figure 3.18 we can distinguish several groups of countries. In the first group (Ireland, Slovenia, Spain and Finland), countries were increasing their expenditures on average throughout the whole period from 2009 to 2011. Italy and France also consolidated first, but after 2010 increased their expenditures. Ireland and Netherlands started to consolidate only after 2011.

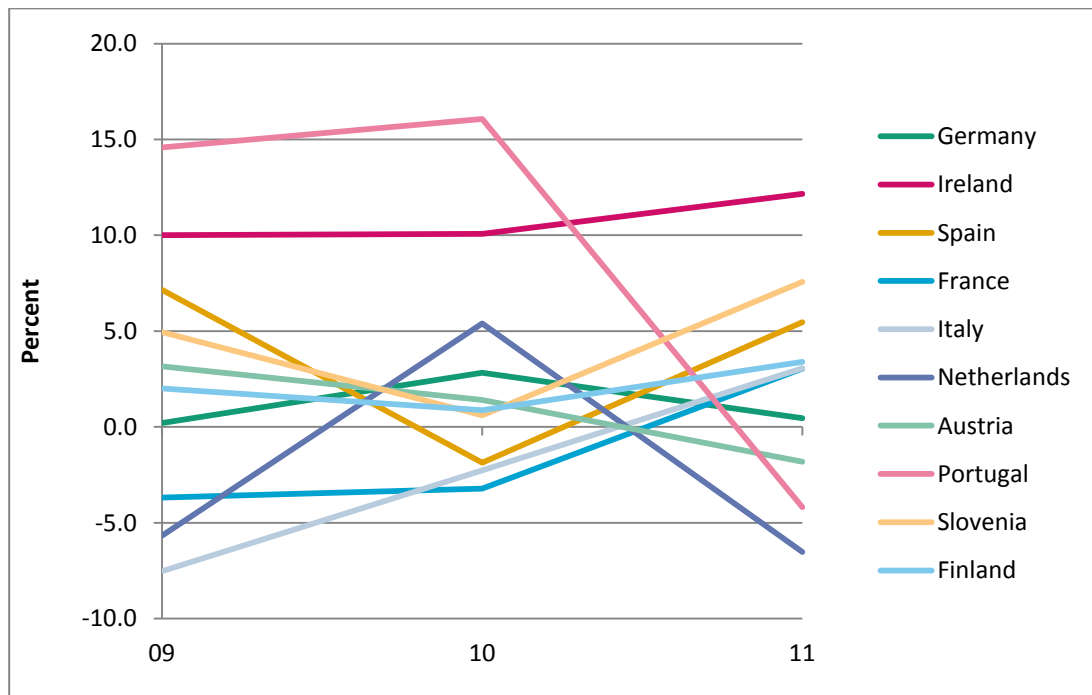
Concerning the areas of stimulus, we identify that Germany had increased its proportion of expenditures on foreign economic aid by 0.2 pg. Slovenia and Finland supported research in general public services by (0.2 pg) and (0.1 pg), respectively. On the contrary, concerning the areas of consolidation, France decreased its proportion of spending on executive and legislative organs by -0.4 percent of 2007 GDP. France, Ireland, and Italy decreased level of expenditures on general services by -0.1 pg; and Netherlands, Portugal, and Ireland decreased proportion of their spending on foreign economic aid by -0.1 pg.



**Figure 3.17: Expenditures on general public services**

Source: Eurostat (2013c)



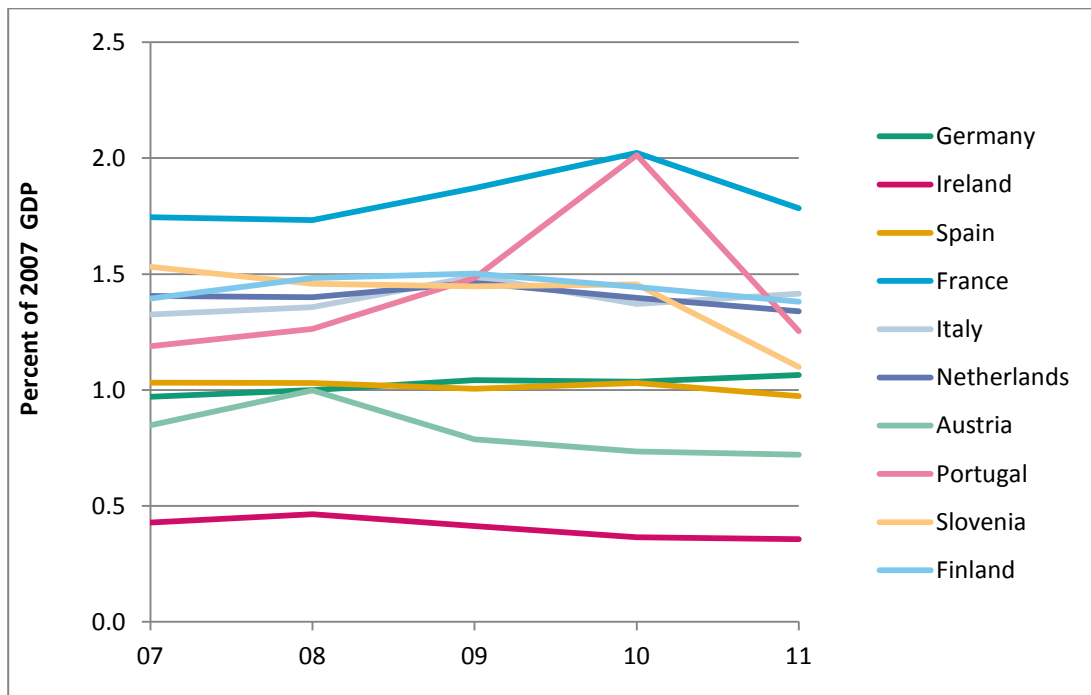


**Figure 3.18: Changes in expenditure on general public services**

Source: Eurostat (2013b, c, d)

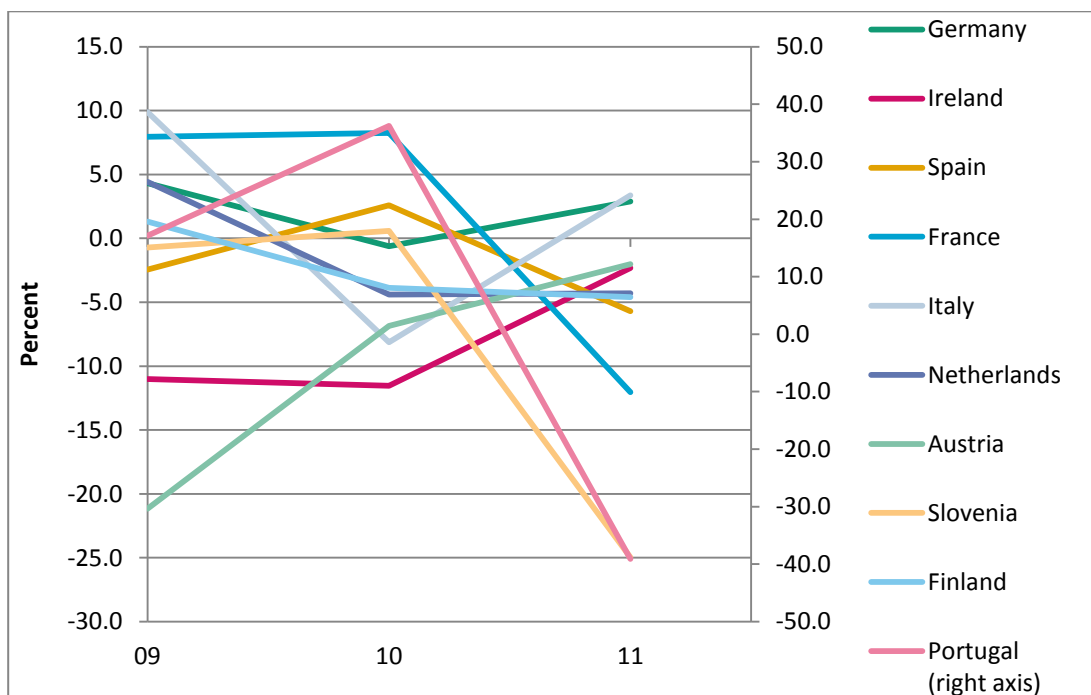
### 3.2.2 Defence

From Figure 3.19 we can see that the level of expenditures on defence in most of the countries was between 1 and 1.5 percent of GDP during the period from 2009 to 2011. France had the highest proportion of spending on defence (2.0 pg), while Ireland with 0.4 percent of GDP was the country with the lowest proportion of expenditures. Figure 3.20 shows that all governments decreased the proportion of defence spending during 2011. The only exceptions were Italy and Germany that slightly increased the expenditure. Slovenia decreased the proportion of spending on military defence the most (-0.3 pg).



**Figure 3.19: Expenditures on defence**

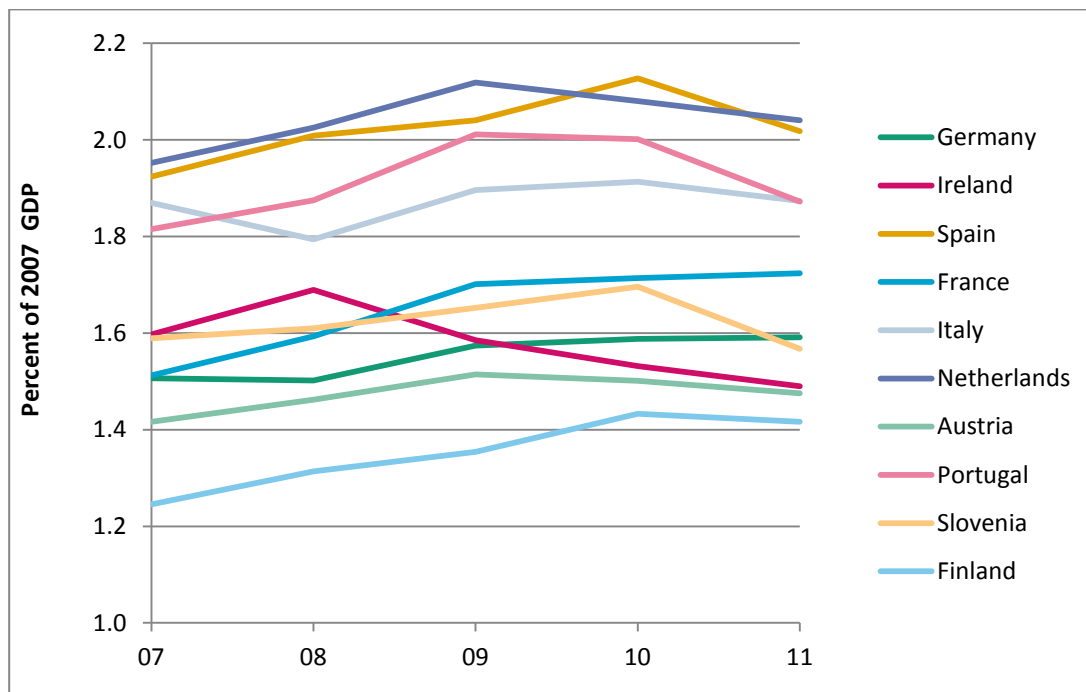
Source: Eurostat (2013c)



**Figure 3.20: Changes in expenditure on defence**

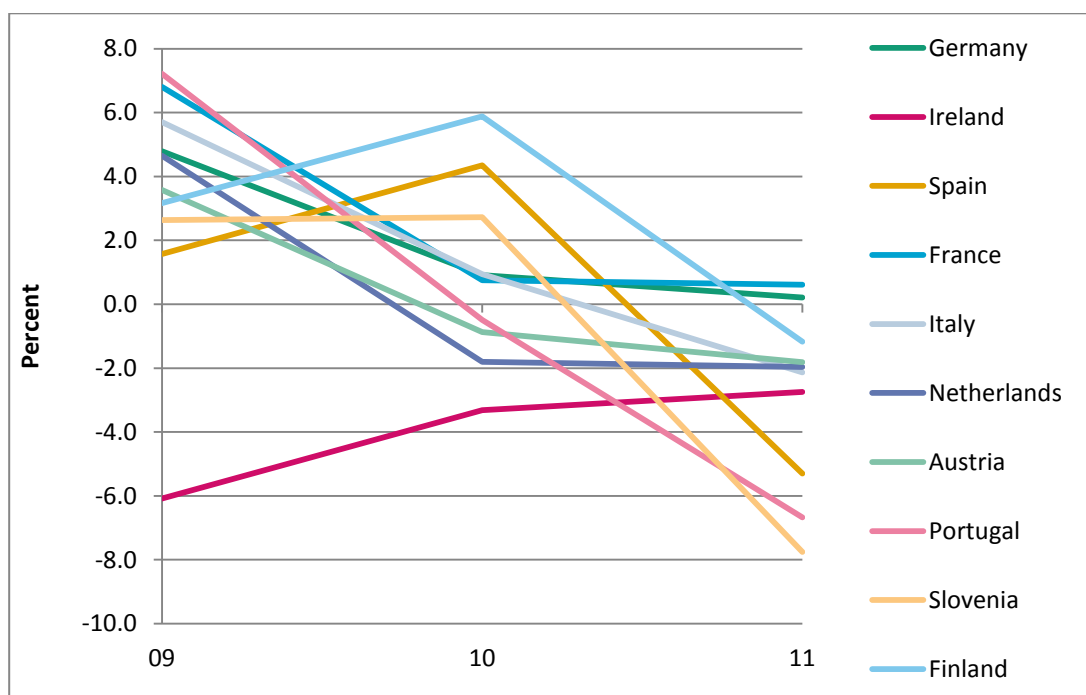
Source: Eurostat (2013b, c, d)

### 3.2.3 Public order and safety



**Figure 3.21: Expenditures on public order and safety**

Source: Eurostat (2013c)



**Figure 3.22: Changes in expenditure on public order and safety**

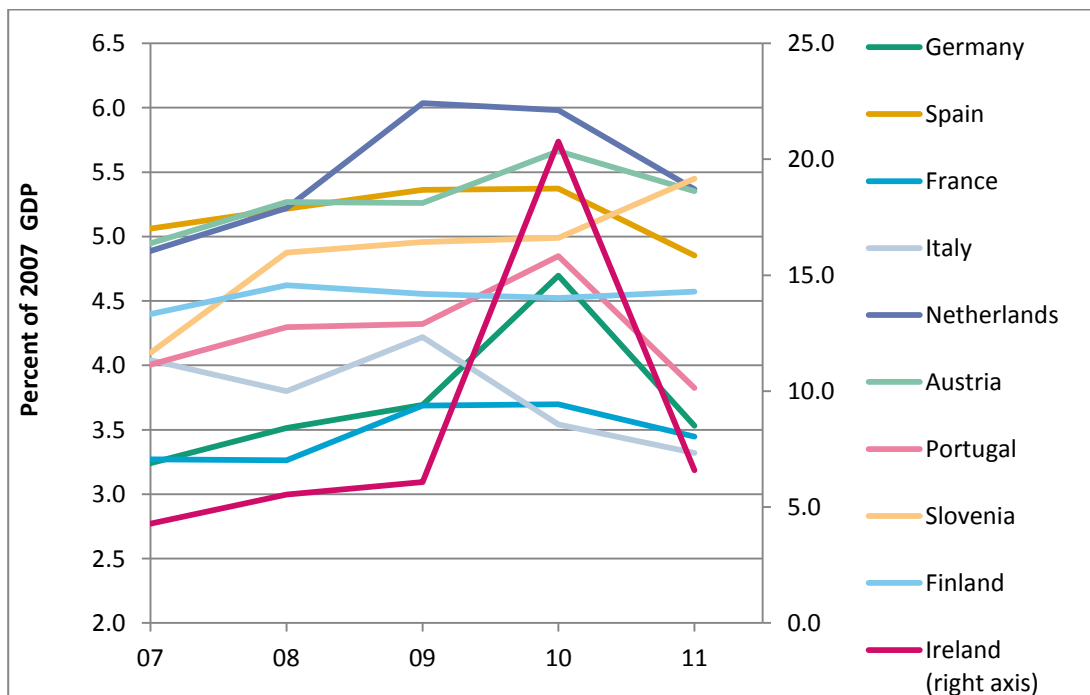
Source: Eurostat (2013b, c, d)

From Figure 3.22 we can see that Germany and France kept their proportion of expenditures on public order and safety increasing (FI, FR, 0.2 pg). Overall, during the crisis a majority of countries increased their proportion of expenditures to 2007 GDP in this sector.

### 3.2.4 Economic affairs

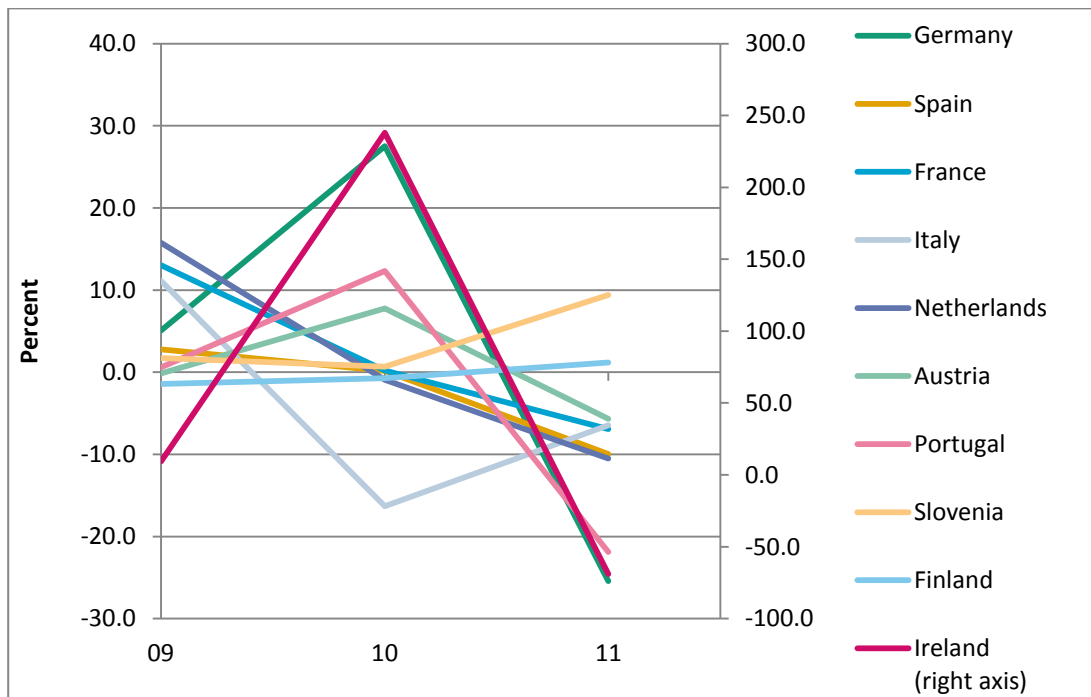
Based on Figure 3.23 we can say that in all countries the proportion of economic affairs expenditures on GDP was increasing until 2010 when it reached a peak and started to decline again. Ireland (6.6 pg) and Spain (5.5 pg) had the highest proportion on spending and Italy had the lowest of all countries with proportion of expenditures equal to 3.3 percent of 2007 GDP.

As we can see from Figure 3.24, Slovenia increased substantially its proportion of spending on transport (0.5 pg) as well as did Finland (0.2 pg). Other stimulus policies were identified in Netherlands in mining, manufacturing and construction (MMC) (0.1 pg). Research and development (R&D) in this division of expenditures was supported in three countries (FI, FR, NL, 0.1 pg). We identified cuts in spending on forestry and agriculture: (IR, SI, -0.2 pg), (FI, IT, -0.1 pg). Italy also cut spending on MMC and transport (-0.2 pg).



**Figure 3.23: Expenditures on economic affairs**

Source: Eurostat (2013c)

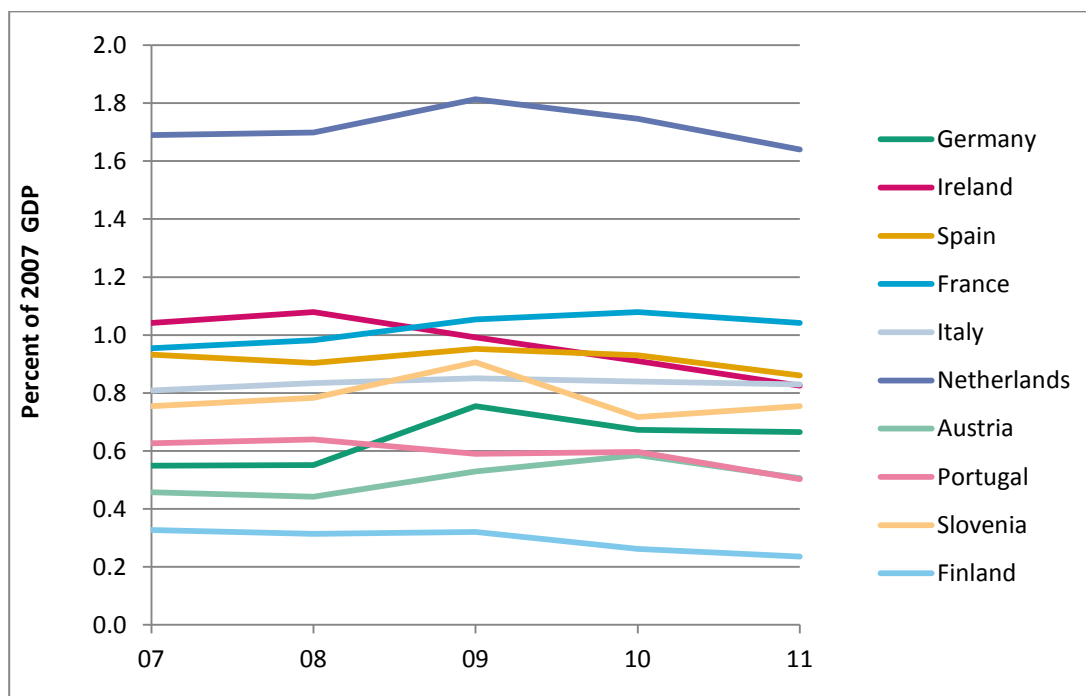


**Figure 3.24: Changes in expenditure on economic affairs**

Source: Eurostat (2013b, c, d)

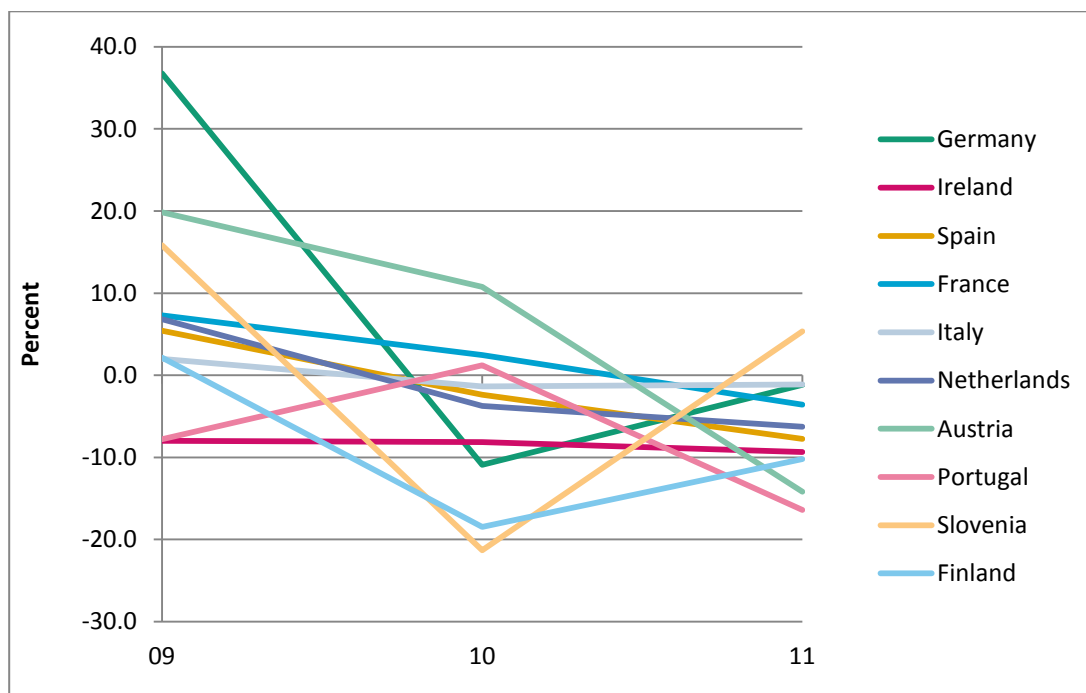
### 3.2.5 Environmental protection

We can notice in Figure 3.25 that proportion of expenditures on environmental protection was by far the largest in Netherlands (1.6 pg). The rest of countries' proportions were roughly in the range from 0.5 to 1 percent of 2007 GDP. The lowest share of environment protection expenditures on GDP in 2011 was in Finland (0.2 pg). In Figure 3.26 we can see that most of the countries have decreased their spending on environment from 2010 further.



**Figure 3.25: Expenditures on environmental protection**

Source: Eurostat (2013c)



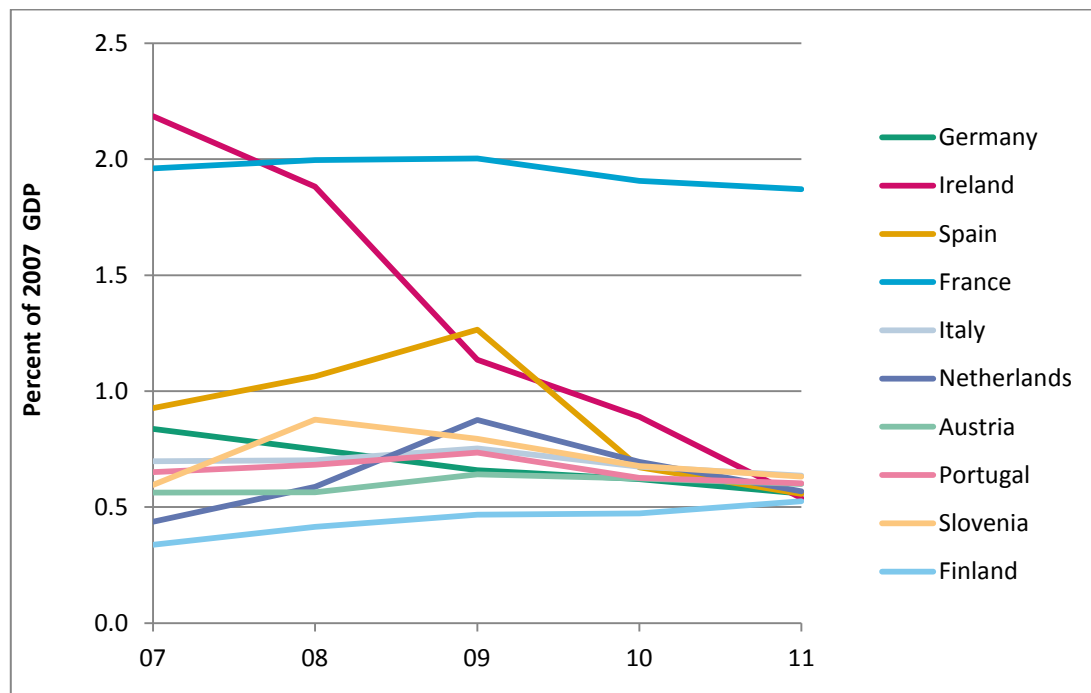
**Figure 3.26: Changes in expenditure on environmental protection**

Source: Eurostat (2013b, c, d)

### 3.2.6 Housing and community amenities

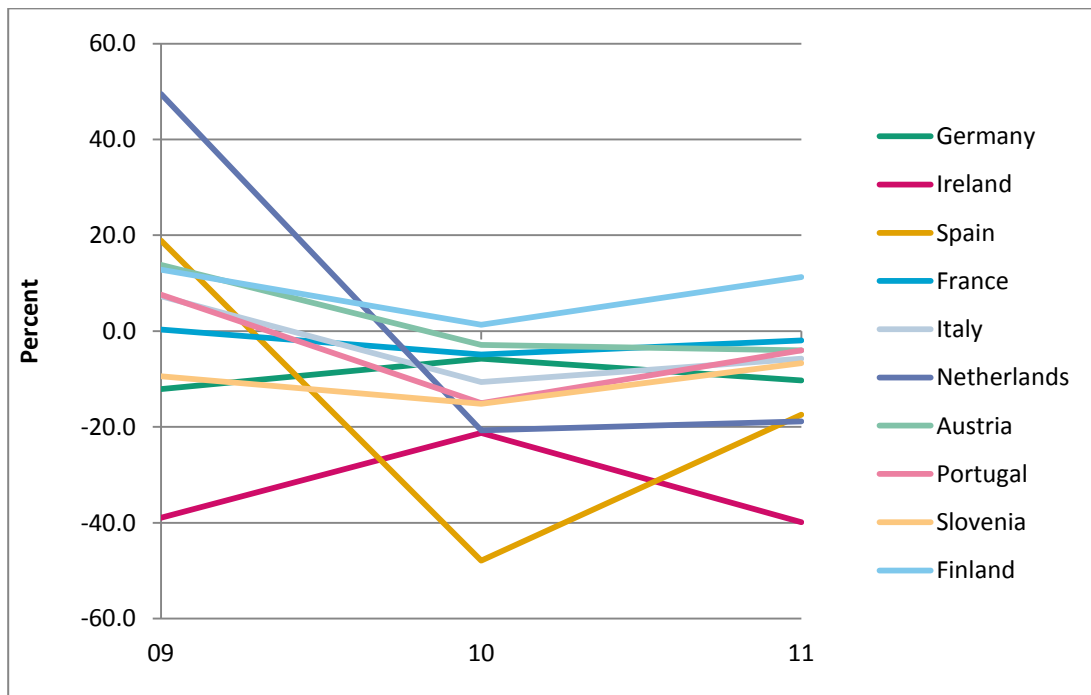
In Figure 3.27 we can observe that the proportion of expenditures on housing converged in majority of the countries to a value slightly above 0.5 percent of GDP. France spent the most relatively to GDP (1.9 pg) in 2011 – three times more than other countries did. The lowest relative spending was on the contrary in Finland (0.5 pg).

From Figure 3.28 we can see that almost all countries corrected their previously increased expenditures relative to GDP. Overall, the largest corrections were observed in the sector of housing development. Other corrections took place in France and Italy that cut their relative expenditures on community development (-0.1 pg) and in Portugal and Ireland that cut the relative water supply expenditures by -0.1 percent of 2007 GDP.



**Figure 3.27: Expenditures on housing and community amenities**

Source: Eurostat (2013c)



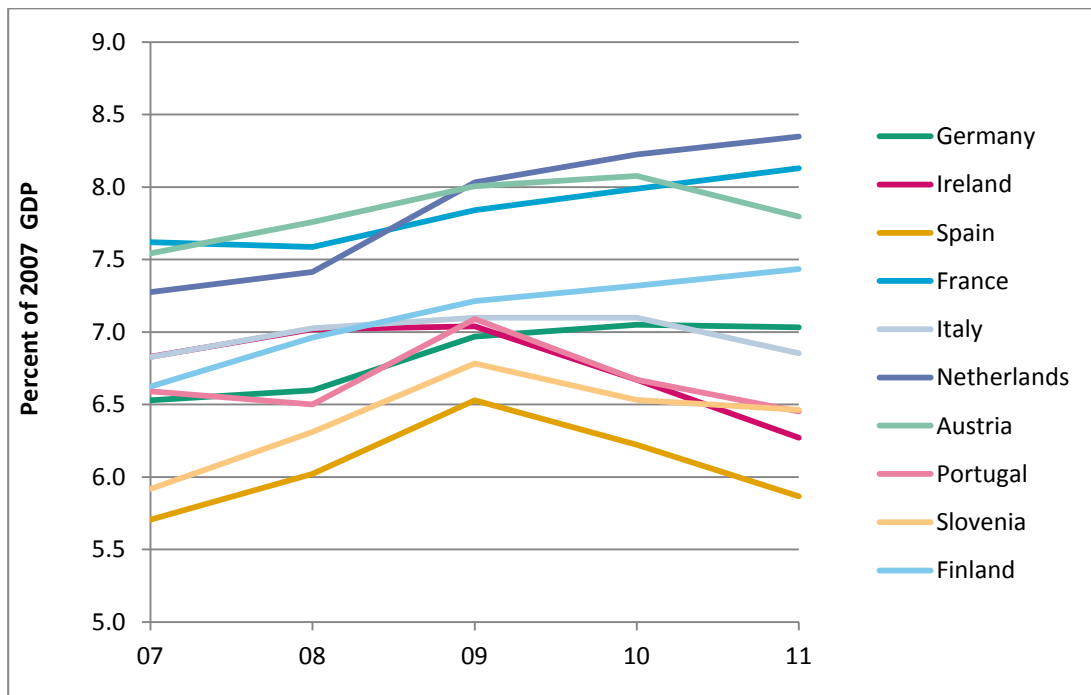
**Figure 3.28: Changes in expenditure on housing and community amenities**

Source: Eurostat (2013b, c, d)

### 3.2.7 Health

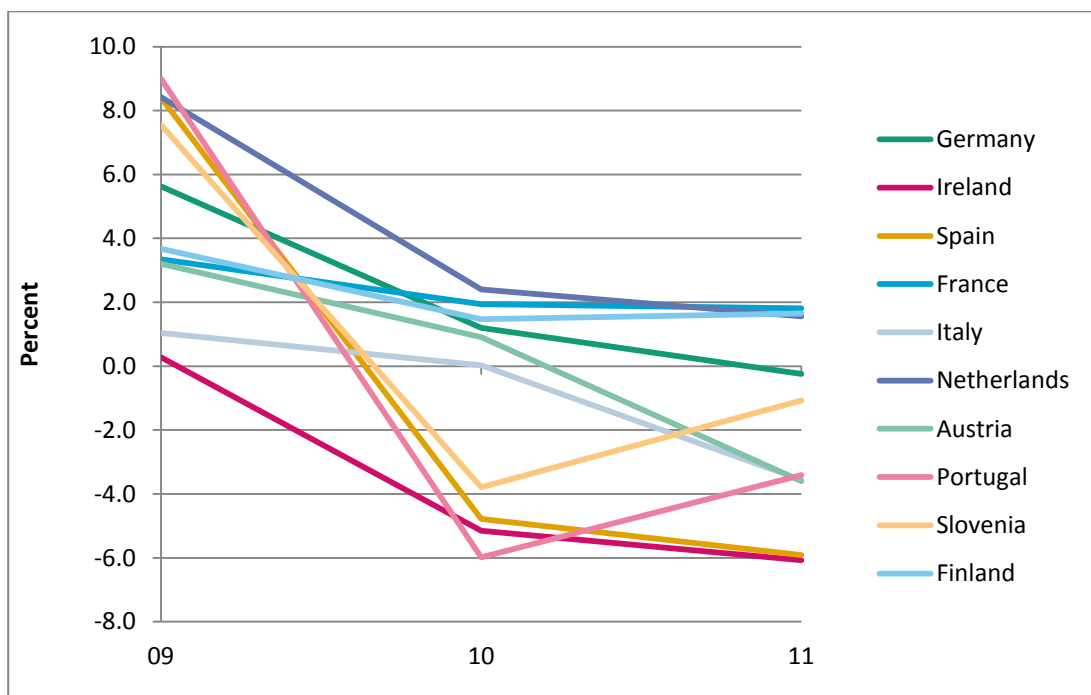
Figure 3.29 shows that in 2011 Netherlands and France spent the largest proportion of GDP on health (8.3 and 8.1 percent, respectively). On the contrary, Spain spent the least relative to its 2007 GDP (5.9 percent). In both Figure 3.29 and Figure 3.30 we can distinguish two principal groups of countries. The first group –majority of countries – increased its proportion of expenditures on health in 2009; nevertheless, it decreased it in 2011 again. On the contrary, the second group countries (FR, FI and IT) remained increasing the proportion of GDP spent on health in 2011. The largest spending cut was observed in Ireland that decreased expenditures relative to GDP by -0.6 percent. On the contrary, the largest growth in proportion of GDP spent on health was observed in Netherlands that increased the expenditures by 1.1 percent of GDP.





**Figure 3.29: Expenditures on health**

Source: Eurostat (2013c)



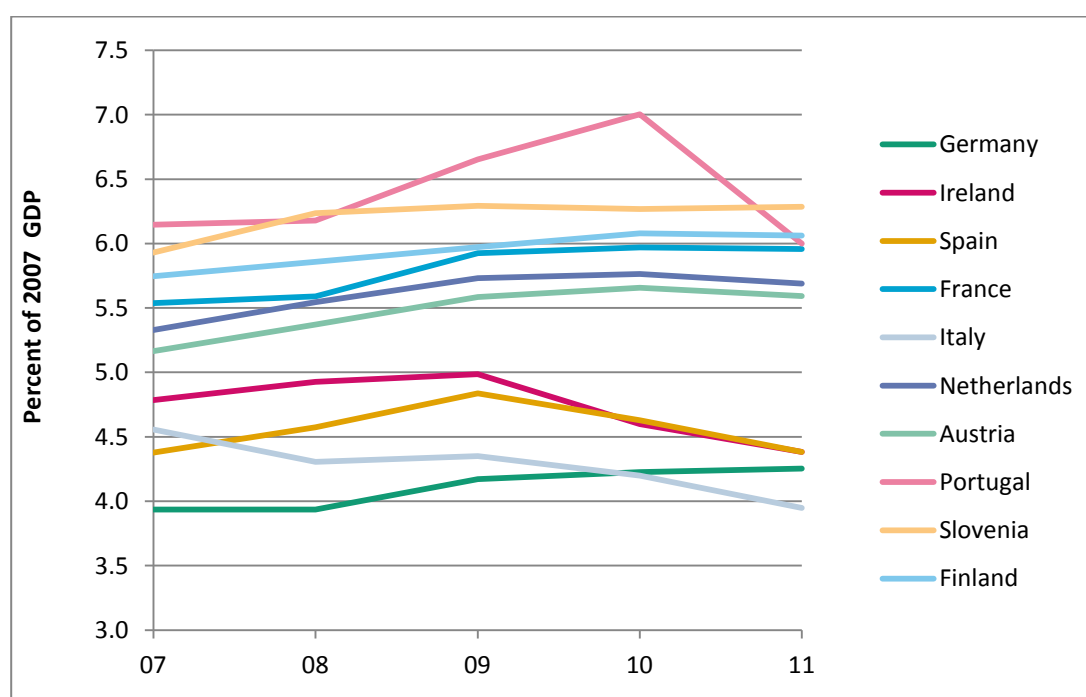
**Figure 3.30: Changes in expenditure on health**

Source: Eurostat (2013b, c, d)

### 3.2.8 Education

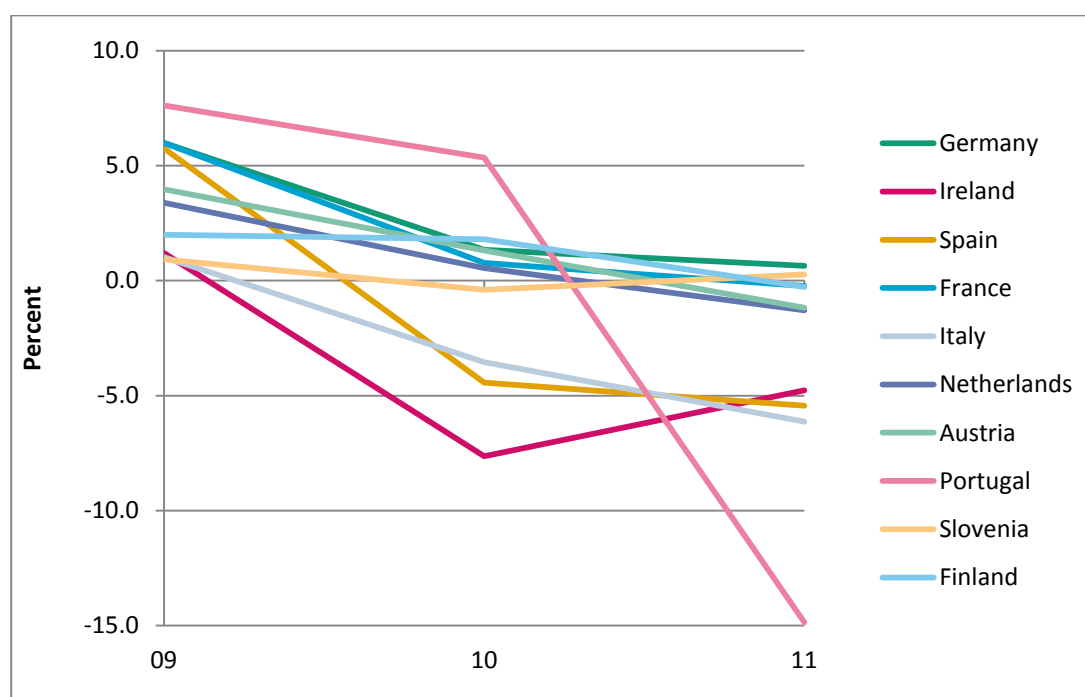
From Figure 3.31 and Figure 3.32 we can see that almost all countries increased their expenditures on education in 2009. Afterwards they decreased the expenditures relative to 2007 GDP slightly but kept them still above the 2007 level. On the contrary, PT, IR, IT, and ES decreased their proportion of expenditures on education below the pre-crisis level. The highest expenditures on education relative to GDP were in Slovenia (6.3 percent), whereas the lowest were in Italy (3.9 percent).

Almost all the countries increased primary and pre-primary education expenditures (PPE). However, Italy decreased the spending on PPE (-0.2, pg) and Portugal reallocated it towards secondary education. Concerning secondary education, the only country that reduced its relative expenditures was Italy (-0.3, pg). Tertiary education expenditures relative to GDP were decreased in Italy, Portugal, and Ireland by -0.1 percent. Countries that supported all the three sectors were SP, FR, NL, SI and FI. Overall, the largest stimulus took place in secondary education, lower in primary and the lowest in tertiary education.



**Figure 3.31: Expenditures on education**

Source: Eurostat (2013c)



**Figure 3.32: Changes in expenditure on education**

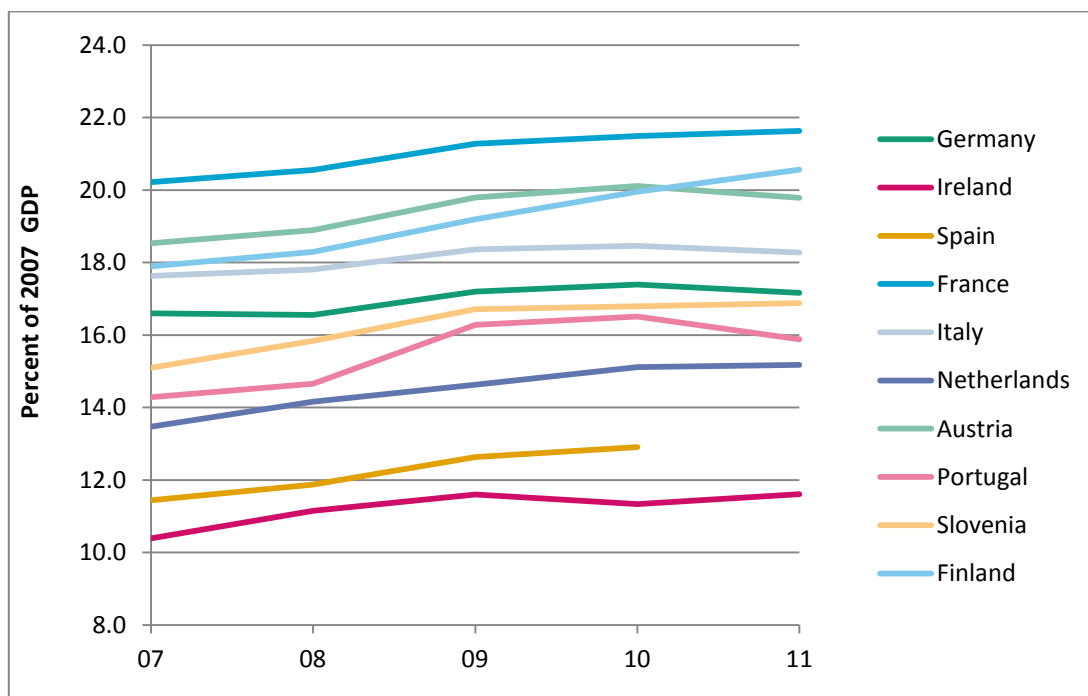
Source: Eurostat (2013b, c, d)

### 3.2.9 Social protection

Figure 3.33 depicts social protection expenditures adjusted for spending on unemployment. The largest expenditures in 2011 were observed in France (21.6 pg), Austria (19.8 pg) and Germany (17.2 pg) – countries with traditionally high expenditures on social benefits due to demographic features of their population. The lowest social protection was observed in Ireland (11.6 pg).

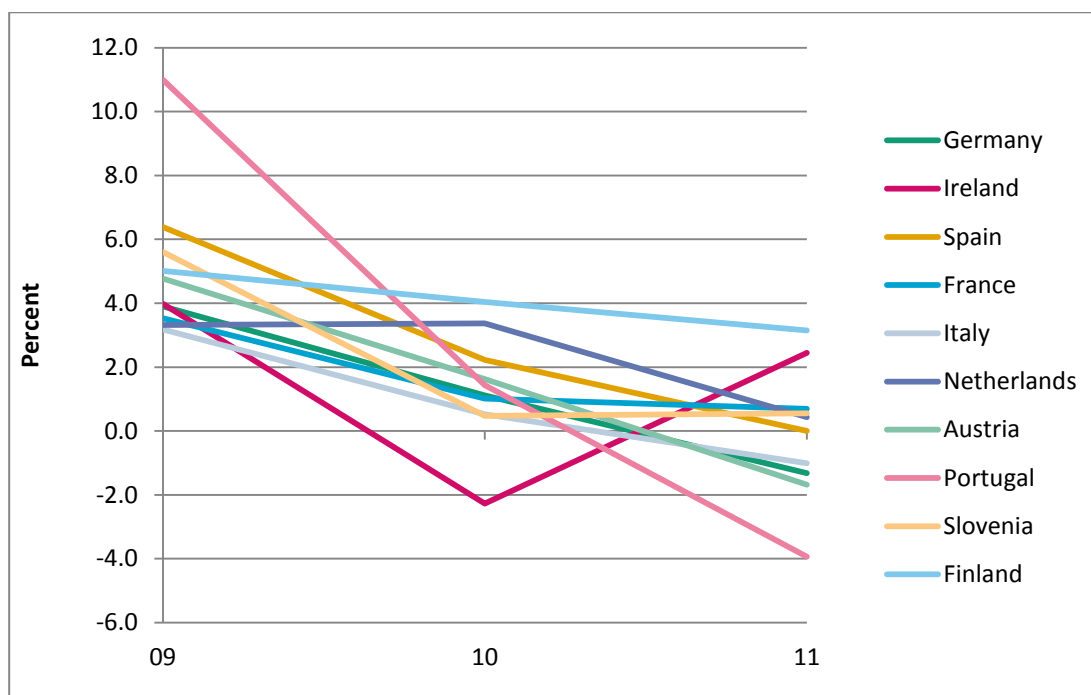
From Figure 3.34 we can see that almost all countries already withdrew from further increasing expenditures on social protection. However, this expenditure was in 2011 still above the level of year 2007. Increases in the proportion of spending on social protection represented the largest change in government expenditures between all the analysed divisions of expenditures.

France was the only country that decreased expenditures of sickness and disabilities relative to 2007 GDP (-0.3 percent). All countries except for Germany increased their relative expenditures on support of old people by 1.0 pg on average. Slovenia increased its spending on support for family and children by 0.5 pg and Netherlands and Finland by 0.2 pg each. Only Ireland decreased the proportion of spending on families by -0.2 pg. On the contrary, Netherlands was the only country that increased significantly expenditures on social exclusion (0.4 pg).



**Figure 3.33: Expenditures on social protection**

Source: Eurostat (2013c)



**Figure 3.34: Changes in expenditure on social protection<sup>7</sup>**

Source: Eurostat (2013b, c, d)

<sup>7</sup> The observation from 2011 in Spain was missing.

## 4 Model

In this chapter we are going to estimate the relationship between government structural balance and key economic variables in order to evaluate the conditions that influence governments' decisions about economic policy. First we are going to describe the variables of our model. Second, we will comment on the method used and we will discuss the assumptions of the model. Third, we are going to discuss the data and the empirical results. Finally, we will test the robustness of our model.

### 4.1 Regression model

The regression equation is:

$$\begin{aligned} strbal = & \beta_1 ggdp_{it} + \beta_2 ggdp_{it-1} + \beta_3 unempl_{it} + \beta_4 empl_{it} + \beta_5 govrev_{it} \\ & + \beta_6 cabal_{it} + \beta_7 lgdpcap_{it} + \beta_8 outgap_{it-1} + \beta_9 debt_{it-1} \\ & + a_i + u_{it} \end{aligned} \quad (1)$$

In our model we use as a dependent variable the general government structural balance in percent of potential GDP estimated by IMF (2013). Structural balance is a budget balance that is adjusted for effects of the economic cycle and therefore can be used as an indicator of the discretionary expansionary or consolidation policies carried out by governments. For explanatory variables we chose the key indicators that describe the economic situation in a country. We use the GDP growth that shows the development of an economy and determines the amount of money available to government through its revenue. We also use the lagged GDP growth, since the government may plan discretionary policies based on last year economic performance. Then we use the level of employment and unemployment, which reflects the situation on the labour market. After that, we include other variables that indicate other characteristics of the economy. First, we include the level of government revenue as a percentage of GDP, which consists mainly of taxes and social contributions, and therefore can be used as a measure of the level of redistribution within a country. Second, we include the level of government current account balance that we use as an indicator of the competitiveness of the economy. Third, we use the level of GDP per capita, which indicates the country's wealth. It is taken in the logarithmic form as this is a tradition according to Hessami (2010). After that, we include the level of the output gap in percent of potential GDP, which

indicates to what extent the country lags behind its potential economic performance. Finally, we include the level of the general government gross debt in percent of GDP as this may influence the government decisions about policies. We use this variable lagging by one period because the structural balance is reflected in the level of debt in the same period. We provide an overview of all variables in Table B.1 and their definitions according to IMF (2013) in Table B.3 in the Appendix B.

## 4.2 Estimation method used

We use the unobserved effects model because we believe that time-constant country-specific effects are present that should be controlled. However, it is not certain whether the unobserved effect of each country is correlated with the explanatory variables. We assume that the specificities of each country are correlated with the explanatory variables, which suggest that we use the fixed effects (FE) method of estimation. Also, fixed effect is generally perceived to be “...more convincing tool for estimating *ceteris paribus* effects” than the random effects (Wooldridge, 2009, p. 493). Wooldridge also suggests using the method of fixed effects for analysis of large geographical units and he claims that: “Fixed effect is almost always much more convincing than random effects (RE) for policy analysis using aggregated data.” (Wooldridge, 2009, p. 493). In order to be able to make a decision based on our data we carried out the Hausmann test of serial correlation between  $a_i$  and explanatory variables. In the baseline model (1), as well as in its later modification, we cannot reject the null hypothesis of no serial correlation between  $a_i$  and  $x_{it}$ , which suggest that we use the random effects method of estimation. Since there are two opposing suggestions on which method to chose, we will use and report results of both FE and RE methods.

## 4.3 Discussion of assumptions

The assumption that all variables change over time is satisfied and there is no perfect linear relationship among the explanatory variables. We assume that explanatory variables are strictly exogenous. However, there remains a concern about the omitted factors that change over time that may be correlated with key predictors. This would have an important effect on the analysis, because it would cause the estimators to be biased and inconsistent. It would be less strict to assume contemporaneous endogeneity, under which the estimators would be at least consistent. Overall, using the unobserved effect models is possible. However, the assumption of random sample from the cross section is violated. We cannot think of our sample as a random sample, neither can we claim that it is from a large population. Therefore, we should

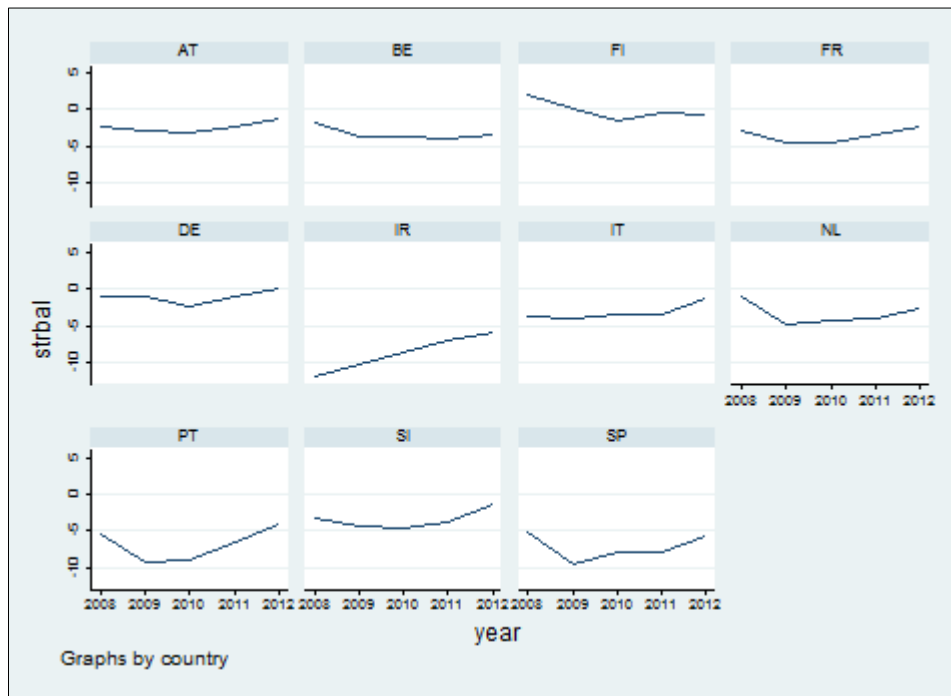
be very careful while interpreting the coefficients as they can contain some bias. A test for autocorrelation shows that we cannot reject the null hypothesis that there is no serial autocorrelation at the 5% level of significance. Therefore, we do not correct for serial correlation. To test for presence of heteroskedasticity we use a modified Wald test. We reject the null hypothesis of homoskedasticity at 5% significance level, and therefore we use the heteroskedasticity robust standard errors.

## 4.4 Data

We consider a sample of 10 European countries from the chapter 3: (Germany (DE), Ireland (IE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), Austria (AT), Portugal (PT), Slovenia (SI) and Finland (FI)) and we also include Belgium, which has been excluded previously. The reason for this choice of countries is the same as in the part 3.1. We use annual data registered for the period from 2008 to 2012 by the World Economic Outlook Database (IMF, 2013). Approximately 40% percent of the data in the year 2012 are projections, which, however, should not be a problem since the projections are precise and may change only in small units that would not influence our analysis much.

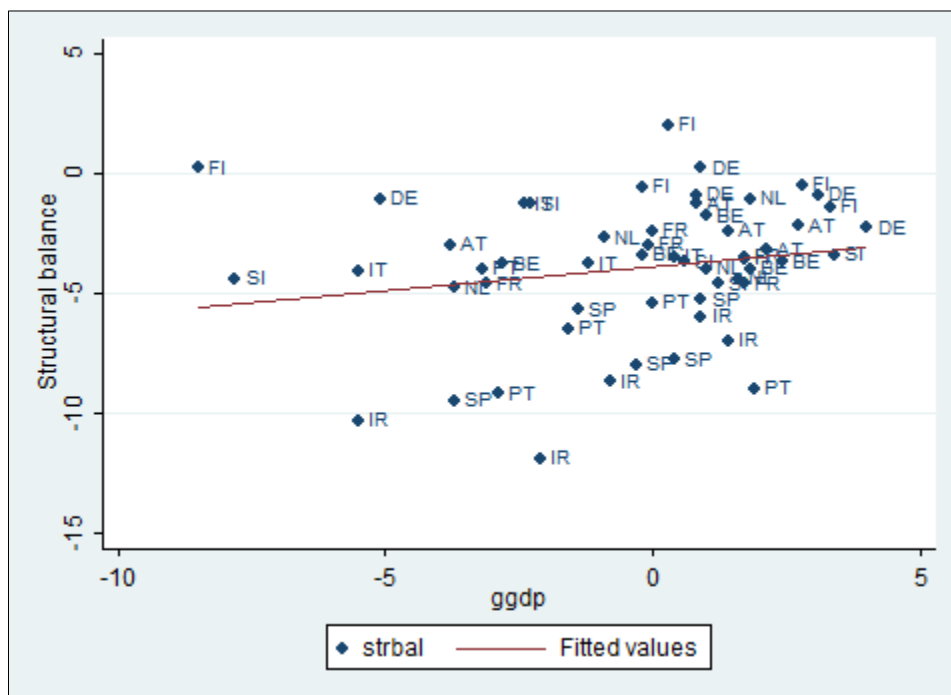
As we can see from Figure 4.1, the structural balance in most of the countries first declined (from 2008 to 2010) and then rebounded again. The only exceptions were Ireland, where the structural balance was increasing during the whole period, and Finland, where the structural balance showed an overall downward trend. Overall, the structural balance in 2012 was negative in all countries.

Figure 4.2 to Figure 4.5 show the distribution of data within the sample. Data in Figure 4.1 are the most scattered since the level of GDP growth has been changed significantly throughout the crisis. From Figure 4.2 we can see that the current account was the lowest in IR, PT, and ES. However it is not clear what countries should be considered outliers. Figure 4.3 depicts the current account balance and shows the outlying position of IR, PT, and ES. In Figure 4.4 we can see clearly that ES, PT, and IR are the only outlying observations. In Figure 4.5, again, it is very hard to comment on outlying values. Nevertheless, the most outlying except for ES, PT, and IR are Slovenia and Finland. We provide descriptive statistics of variables in Table B.2 in the Appendix B.



**Figure 4.1: General government structural balance**

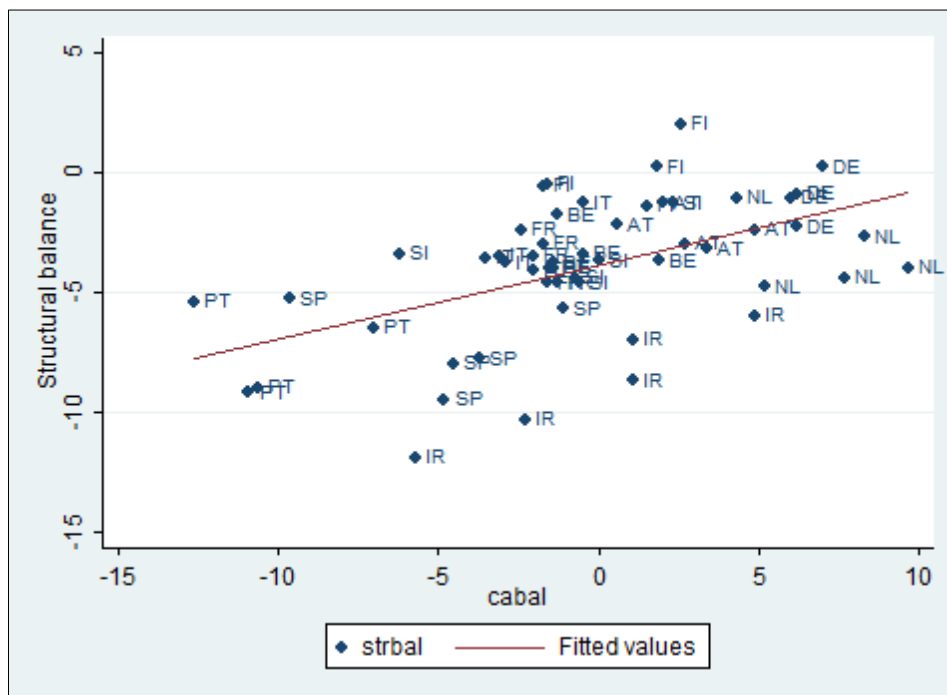
Source: IMF (2013)



**Figure 4.2: GDP growth**

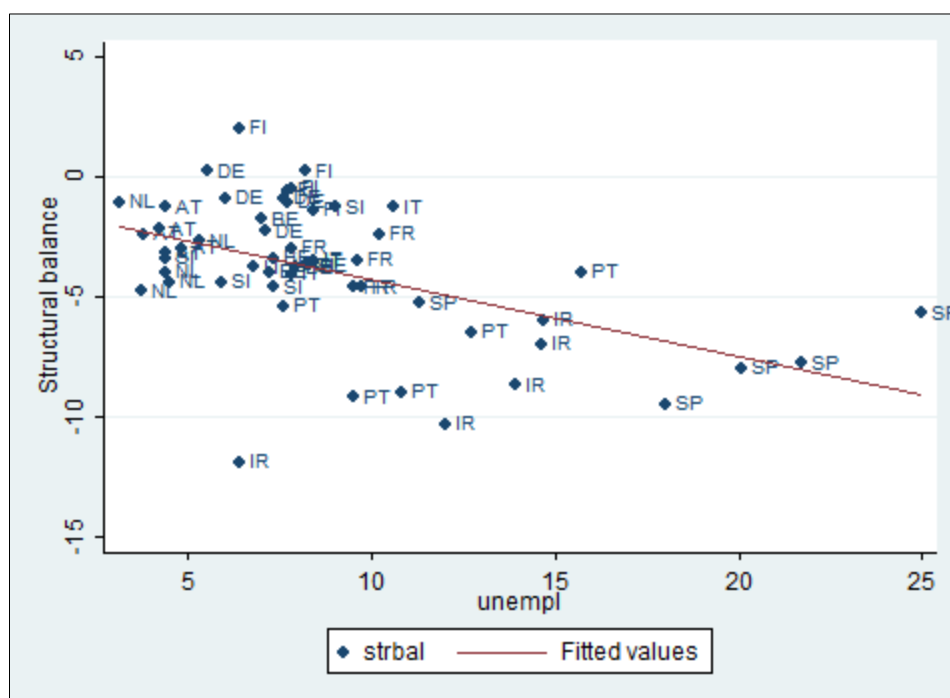
Source: IMF (2013)





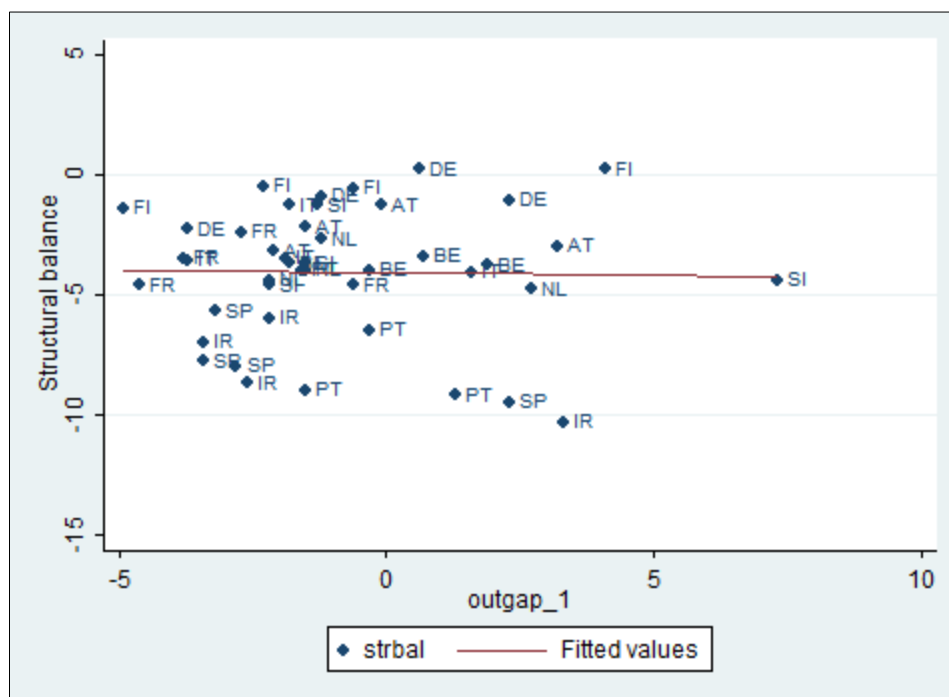
**Figure 4.3: Current account balance**

Source: IMF (2013)



**Figure 4.4: Unemployment**

Source: IMF (2013)



**Figure 4.5: Output gap**

Source: IMF (2013)

## 4.5 Empirical Results

In Table 4.1 we present the coefficients of our estimation. Equation (1) corresponds to the baseline model, while equation (2) corresponds to a restricted model. In the right part of the table we present the results of estimation on the sample adjusted for outlying observations. We present results of all estimations in a single table for the sake of easier comparison. The modifications to the baseline model and to the data are going to be discussed in the next part.

First we are going to discuss the estimation of our baseline model (1) and compare the FE and RE coefficients. Under the FE method of estimation, all estimates are statistically significant at less than 1 percent level of significance except of *govrev*, which is not significant and *cabal* that is marginally statistically significant<sup>8</sup>. On the contrary, under the RE estimation, only *govrev*, *cabal*, *lgdpcap*, and *ggdp\_1* are statistically significant. In the model (1) under FE a 1 pp increase in growth of GDP suggests a -0.31 pp decrease in level of structural balance. This indicates that when the GDP growth is higher, governments tend to spend more. This might be because government believes that it will face lower costs of debt financing in the future. The

<sup>8</sup> Significant at a lower level than 10 percent level of significance.

coefficient under RE is less economically significant (-0.12), however, it is not statistically significant. The growth of GDP in a t-1 period is strongly statistically significant<sup>9</sup> and a 1 pp increase in growth of GDP at t-1 suggests an increase in the structural balance of 0.2 pp (in both FE and RE). Coefficients of both GDP growth variables can be understood, since the coefficients represent a ceteris paribus effect. When the difference in GDP growth between period t-1 and period t increases, government extends its expenditure. On the contrary, when the difference reduces (in the case of increased lagged GDP growth and unchanged level of GDP growth at time t), governments decrease their structural expenditures.

**Table 4.1: Estimation coefficients**

*Dependent variable: Structural balance (strbal)*

Sample Equation Method	Full				Without outliers			
	(1)		(2)		(1)		(2)	
	FE	RE	FE	RE	FE	RE	FE	RE
ggdp	-0.31 (0.086)	-0.12 (0.115)	0.09 (0.034)	0.06 (0.033)	-0.41 (0.149)	0.17 (0.352)	0.10 (0.053)	0.07 (0.043)
ggdp_1	0.20 (0.037)	0.20 (0.045)	0.24 (0.033)	0.18 (0.026)	0.17 (0.085)	0.16 (0.074)	0.24 (0.049)	0.19 (0.031)
unempl	0.30 (0.078)	0.00 (0.093)	0.28 (0.112)	0.15 (0.051)	0.19 (0.17)	-0.11 (0.402)	0.17 (0.203)	0.13 (0.154)
empl	0.82 (0.219)	-0.02 (0.118)	— —	— —	0.96 (0.302)	0.08 (0.113)	— —	— —
govrev	0.14 (0.104)	0.35 (0.078)	0.21 (0.122)	0.39 (0.09)	0.33 (0.171)	0.70 (0.222)	0.33 (0.205)	0.45 (0.152)
cabal	0.13 (0.065)	0.36 (0.071)	0.22 (0.069)	0.37 (0.067)	0.14 (0.082)	0.39 (0.126)	0.18 (0.096)	0.28 (0.082)
lgdpcap	-7.49 (2.828)	-3.30 (1.185)	-11.69 (2.657)	-3.99 (1.285)	-3.71 (6.219)	-9.53 (3.107)	-12.88 (4.906)	-6.11 (2.013)
outgap_1	-0.43 (0.106)	-0.25 (0.184)	— —	— —	-0.54 (0.204)	0.15 (0.502)	— —	— —
debt_1	0.06 (0.015)	0.01 (0.011)	— —	— —	0.07 (0.046)	0.02 (0.019)	— —	— —
_cons	24.51 (34.491)	15.39 (14.924)	107.21 (27.871)	19.27 (11.345)	-29.13 (77.611)	60.61 (23.966)	116.70 (55.848)	39.20 (17.432)

Source: Authors computations

<sup>9</sup> Significant at a lower than 1 percent level of significance.

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Concerning the situation on the labour market, under FE estimation a 1 pp increase in unemployment implies a 0.3 pp increase in structural balance. This may indicate that government increases expenditures on policies to fight unemployment. A 1 pp higher employment implies 0.82 pp higher structural balance, which suggests that governments are in a better situation and do not spend that much when a larger proportion of people work. On the other hand, under a RE estimation both coefficients of employment and unemployment are equal to zero and are statistically insignificant. The coefficient on *govrev* is statistically significant only in the RE estimation where 1 pp higher government revenues are connected with 0.35 higher structural balance. This implies that government that is larger in size (collects more on taxes and social benefits in percent of GDP) does support the economy more. The coefficient on current account balance is marginally statistically significant in FE estimation and strongly statistically significant in RE estimation, where a 1 pp higher current account balance implies a 0.36 pp higher structural balance. This relationship is straightforward and in line with our expectations since countries that are more competitive have a better financial position. The level of GDP per capita is strongly statistically significant in both FE and RE estimation. In RE a 1 percent increase in GDP per capita indicates a -0.075 pp decrease in structural balance, which suggests that wealthier countries in terms of GDP per capita spend more. It is, however, extremely complex to infer anything about the causality. Nevertheless, the economical significance of this variable is small and in FE estimation the coefficient is even twice less economically significant. Concerning the last two variables, lagged output gap and debt to GDP are both strongly statistically significant in FE estimation but insignificant in RE estimation. Under FE a 1 pp higher output gap implies -0.43 pp decrease in structural balance, which indicates that governments spend more when the economy in the country is further from its potential. Finally, the coefficient on debt is close to zero in both FE and RE, which suggests that fiscal policies of government do not depend significantly on the level country's debt.

## 4.6 Robustness

We do a robustness analysis in order to see how the results of our estimation are sensitive to changes in data and in the model. First, we estimate the same model on sample without outliers that were identified in the part of data description. We do not include IR, ES and PT that represented the most outlying observations. Also FI and SI have outlying values in some variables. However, our sample is small and we cannot get rid of more than 3 countries to still fulfil the minimal statistical requirement for a sample size of 30 observations. Second, we estimate the baseline

model without three variables to test whether the estimation results are largely dependent on some of the variables.

The regression equation:

$$\begin{aligned} strbal = & \beta_1 ggdp_{it} + \beta_2 ggdp_{it-1} + \beta_3 unempl_{it} + \beta_4 govrev_{it} + \beta_5 cabal_{it} \\ & + \beta_6 lgdpcap_{it} + a_i + u_{it} \end{aligned} \quad (2)$$

In the estimation on the dataset without outliers, the coefficients of *unempl*, *cabal*, *lgdpcap* and *debt\_1* become insignificant. Under the FE estimation the magnitude of most estimates increases only slightly. A large change occurs for coefficient on *govrev* that increases from 0.14 to 0.33, and coefficient on *ggdp* declines from -0.31 to -0.41. On the other hand, under the RE estimation the coefficients change greatly. The coefficient of *ggdp* and *outgap\_1* increases in magnitude and changes sign from -0.12 to 0.17 in case of *ggdp*, and from -0.25 to 0.15 in case of *outgap\_1*. Furthermore, we do not observe any larger change in significance of variables. To sum up, there are much less changes to FE estimates than to RE under the adjusted sample, and the differences between the two methods are higher compared to estimation on full sample.

Next, we estimate the model (2) and observe the differences in coefficient of variables present in both models. As we can see from Table 4.1, the coefficients increase slightly in their magnitude on average in model (2). In case of the full sample the largest change is in coefficient on *ggdp* that decreased in magnitude and switched in sign (from -0.31 to 0.09 in FE and from -0.12 to 0.06 in RE). In the model (2) the coefficient on *ggdp* lost its economic significance and indicates that higher GDP growth is correlated with lower government expenditure. In case of the adjusted sample the largest change was observed also in *ggdp* coefficient (from -0.41 to 0.1 under FE and from 0.17 to 0.07 under RE). A second large change is in the coefficient on unemployment that switched in sign from -0.11 to 0.13 under the RE estimation. Overall, it seems that the model using FE method of estimation is more robust to change in the sample as well as to the change in the variables included. However, the coefficient on *ggdp* was susceptible significantly to both types of changes.

Concerning the discussion of variables, we tried to estimate a model including inflation, but it showed insignificant. The same was true for time dummies that were insignificant and when we included them, other variables became insignificant too. Possibly, some more variables could be added to the model. However, in case of our

analysis we are limited by a small sample size which does not enable addition of too many variables. Furthermore, the statistical database of IMF (2013), which was the only one that contained estimates of the structural balance for selected countries, did not list many more indicators that could be added to the model.

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## 5 Conclusion

The aim of this thesis was to provide an insight into the discussion on optimal design of fiscal policy that should be used to exit the current economic crisis and to support economic growth. Since there has been no broadly accepted view on what the optimal composition of fiscal policy should be, it is interesting to compare how different countries have approached the situation, and in which way they have attempted to support growth and thus mitigate the crisis.

In order to evaluate the different approaches to policies we provided an overview of the most current literature on this topic. We tried to increase understanding of the theory by dividing the current literature into six main categories: literature promoting fiscal stimulus, literature in support of expansionary fiscal consolidation, criticism of the expansionary consolidation literature, discussion on the optimal composition of consolidation, criticism of consolidation as such, and suggestions on which policies governments should implement. We analyzed a group of ten Eurozone countries (Germany (DE), Ireland (IE), Spain (ES), France (FR), Italy (IT), Netherlands (NL), Austria (AT), Portugal (PT), Slovenia (SI), and Finland (FI)) and their expenditures during the period from 2008 to 2011. We provided an overview of the diversity of policies for which we used a COFOG framework that breaks down the government expenditures into 10 divisions and 69 detailed groups. We compared the percentage changes in the development of expenditure levels and compared their relative sizes in normalized units of percent of 2007 GDP. Finally, we identified how the key economic variables are related to the level of government structural balance. We designed a model and estimated the effects of variables on government structural balance on the data for 11 Eurozone countries in years 2008–2012.

In our literature review, we found that DeLong and Summers (2012) are the main proponents of fiscal stimulus. They point out that a hysteresis effect has a significant negative impact on the potential output of an economy. They also suggest, that under specific conditions, fiscal stimulus can even be self-financing. Padoan (2009) observes that the main drivers behind the hysteresis effect are the loss in productivity of workers, reduced efficiency in using capital, and reduced investment. Padoan warns that any estimates of fiscal multipliers should be interpreted with caution, since in a deep recession economic agents respond to policies differently. Padoan also points to the increased effect a stimulus can have when it is implemented

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simultaneously in multiple countries. Trimborn and Holger (2013) argue, on the contrary, that fiscal stimulus crowds out private investment and therefore reduces the potential output. Corsetti et al. (2010) point out that the way a stimulus policy is reversed is crucial for its outcomes. The main proponents of expansionary fiscal consolidation – Alesina, Favero and Giavazzi (2012) – find that government expenditure cuts were historically associated with mild recessions or no recession at all. They argue that decreased government expenditure increases the wealth of the private sector and therefore increases investment. At the same time, the authors stress that the perception of a consolidation as being either permanent or temporary is crucial for its effects. The main opponents of the findings of Alesina et al. are IMF (2010) and Gravelle and Hungerford (2013). They criticise the method of analysis and point out that the cases of successful consolidation happened under accompanying favourable conditions. IMF (2010) argues that fiscal consolidation reduces output and raises unemployment in the short term. Chowdhury and Islam (2012) are also against consolidation and they argue that there is insufficient evidence for all the rationales behind the proposals to cut expenditures and reduce debts. Both the proponents and opponents of fiscal consolidation agree that its effects depend on the accompanying structural policies and that a tax-based fiscal consolidation is more costly than the expenditure-based one. Some of the policy recommendations we identified in the literature suggested implementation of long-term projects with high externalities that will have to be carried out in the future anyway. Governments are also recommended to spend on projects that increase the potential output and are warned against any distortionary policies. Overall, we identified that there is a general agreement on a need for timely fiscal consolidation. However, there has not been any consensus on the most beneficial timing.

In the comparison of expenditures according to their functions (compensation of employees, gross capital formation, social benefits, subsidies and intermediate consumption) we found that almost all countries kept increasing expenditures during 2008 – 2010, and then decreased them again in 2011. Concerning the COFOG divisions, most of the countries increased expenditures in 2008. Then in 2010 governments reduced spending on housing and environmental protection. In 2011 expenditures on defence, public order and safety, and social protection were cut. In other COFOG divisions the evolution of expenditures was more diverse. We studied the COFOG II groups and reported that the largest expenditure increases and expenditure cuts from 2007 to 2011 were in following cases: Ireland reduced its spending on foreign economic aid (-0.1 pg), agriculture (-0.2 pg), health (-0.6 pg), tertiary education (-0.1 pg) and spending on family and children (-0.2 pg). France decreased expenditures on executive and legislative bodies (-0.4 pg), general



government services (-0.1 pg)<sup>10</sup> and sickness and disability (-0.3 pg). On the other hand, it increased the most from all countries expenditures on R&D in economic affairs (0.1 pg). Italy reduced expenditures on general government services (-0.1 pg), agriculture (-0.2 pg), MMC (-0.2 pg), community development (-0.1 pg), secondary education (-0.3 pg), and tertiary education (-0.1 pg). Netherlands increased its expenditure the most in MMC (0.1 pg), R&D in economic affairs (0.1 pg), health (1.1 pg), and social exclusion (0.4 pg). Portugal decreased expenditure the most on foreign economic aid (-0.1 pg) and tertiary education (-0.1 pg). Slovenia implemented the most policies of all countries. It increased expenditure the most on transport (0.5 pg) and family (0.5 pg), and decreased the most on defence (-0.3 pg) and agriculture (-0.3 pg). Overall, we identified that the countries with largest expenditure stimulus were Netherlands and Slovenia. On the other hand, the countries with largest expenditure cuts were Ireland, France, Italy and Portugal. Even though we found some similar patterns in the adjustments to government expenditure, specific areas of policy focus were diverse.

In our econometric model we used both the fixed and random effects method of estimation, and compared their results. We found that the most statistically significant was the estimation of the baseline model by method of fixed effects. The largest positive effect on structural balance had a 1 pp increase in lagged level of GDP (0.2 pp), unemployment (0.3 pp), and employment (0.82 pp). On the other hand, the largest negative effect was identified as lagged output gap (-0.43 pp) and growth of GDP (-0.31). However, this coefficient changed the most with the method of estimation used. Finally, the level of debt as a percentage of GDP was shown to be statistically insignificant for the level of government structural balance.

The limitation of our analysis was that COFOG level II is not at all a perfect framework to evaluate country-specific expenditure. Even after a breakdown into COFOG level III (further breakdown of COFOG level II into classes), some classes of expenditure remain extremely broad in scope and it is not possible to trace the particular area of focus of government expenditures from them. We should also point out that the changes in expenditure which we analyzed did not express anything regarding expenditure per capita, and are not adjusted by the concept of purchasing power parity. Therefore, we should be careful in interpreting the results. The analysis could be further improved by comparing policies from different perspectives, by discussing country-specific conditions in larger detail, and by finding other variables

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<sup>10</sup> The highest expenditure together with Italy.

that could better explain the structural balance of governments. As a subject of further analysis we suggest to evaluate the impacts that the individual policies will have.

From the literature review we conclude that there is no single dominant view on the optimal design of fiscal policy, which we confirm via the comparison of countries' expenditures.

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## Appendix A: Comparison

**Table A.1: Definitions of functions of government**

<b>Function</b>	<b>Definition</b>
<b>Total general government expenditure</b>	<p>All the money that a government spends. Defined according to Regulation 1500/2000 of 10 July 2000 on general government expenditure and revenue. It comprises the following categories of the European System of Accounts 1995 (ESA 95):</p> <ul style="list-style-type: none"> <li>▪ intermediate consumption</li> <li>▪ gross capital formation</li> <li>▪ compensation of employees</li> <li>▪ other taxes on production</li> <li>▪ subsidies payable</li> <li>▪ property income</li> <li>▪ current taxes on income, wealth, etc.</li> <li>▪ social benefits other than social transfers in kind</li> <li>▪ social transfers in kind related to expenditure on products supplied to households via market producers</li> <li>▪ other current transfers</li> <li>▪ adjustment for the change in net equity of households in pension fund reserves</li> <li>▪ capital transfers payable</li> <li>▪ acquisitions less disposals of non-financial non-produced assets</li> </ul>
<b>Gross capital formation</b>	In national accounts is measured by the total value of the gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector.
<b>Intermediate consumption</b>	An accounting concept which measures the value of the goods and services consumed as inputs by a process of production. It excludes fixed assets whose consumption is recorded as consumption of fixed capital. The goods and services may be either transformed or used up by the production process.
<b>Social benefits</b>	<p>Social benefits other than social transfers in kind are transfers made in cash to households to relieve them of the financial burden of certain risks or needs, for example, pensions, family and child allowances, and disabled persons' allowances.</p> <p>Social benefits are paid out by social security funds, other government units, non-profit institutions serving households (NPISHs), employers administering unfunded social insurance schemes, insurance enterprises or other institutional units administering privately funded social insurance schemes.</p>
<b>Compensation</b>	Refers to gross wages, salaries and other benefits earned by individuals in economies other than those in which they are

<b>of employees</b>	resident, for work performed and paid for by residents of those economies. Compensation of employees includes salaries paid to seasonal and other short-term workers (less than one year), to the employees of embassies and of other territorial enclaves that are not considered part of the national economy and to cross-border workers (Balance of Payments Manual, 5th edition, 1993, p.70). The European Institutions (like the embassies) are considered as enclaves not belonging to the national economies where they are located, while their employees are considered to be resident in the country where they live. The salaries that the European Institutions pay to their employees are therefore recorded among the flows of compensation of employees.
<b>Subsidies</b>	Subsidies are current payments by the general government or European Union institutions to resident producers that are not required to be reimbursed. The overriding goal is to influence levels of production or prices, or to compensate producers for production costs.
<b>General government sector</b>	By convention includes all the public corporations that are not able to cover at least 50 % of their costs by sales, and, therefore, are considered non-market producers.

Source: Eurostat (2013h)

**Table A.1: Overview of COFOG level II**

<b>01 - General public services</b>
01.1 - Executive and legislative organs, financial and fiscal affairs, external affairs 01.2 - Foreign economic aid 01.3 - General services 01.4 - Basic research 01.5 - R&D General public services 01.6 - General public services n.e.c. 01.7 - Public debt transactions 01.8 - Transfers of a general character between different levels of government
<b>02 - Defence</b>
02.1 - Military defence 02.2 - Civil defence 02.3 - Foreign military aid 02.4 - R&D Defence 02.5 - Defence n.e.c.
<b>03 - Public order and safety</b>
03.1 - Police services 03.3 - Law courts 03.5 - R&D Public order and safety
<b>04 - Economic affairs</b>
04.2 - Agriculture, forestry, fishing and hunting 04.4 - Mining, manufacturing and construction 04.5 - Transport 04.6 - Communication 04.7 - Other industries 04.8 - R&D Economic affairs 04.9 - Economic affairs n.e.c.
<b>05 - Environmental protection</b>
05.1 - Waste management 05.2 - Waste water management 05.3 - Pollution abatement 05.4 - Protection of biodiversity and landscape 05.5 - R&D Environmental protection 05.6 - Environmental protection n.e.c.
<b>06 - Housing and community amenities</b>
06.1 - Housing development 06.2 - Community development 06.3 - Water supply 06.4 - Street lighting



06.5 - R&D Housing and community amenities 06.6 - Housing and community amenities n.e.c.
<b>07 - Health</b>
07.1 - Medical products, appliances and equipment 07.2 - Outpatient services 07.3 - Hospital services 07.5 - R&D Health 07.6 - Health n.e.c.
<b>09 - Education</b>
09.1 - Pre-primary and primary education 09.2 - Secondary education 09.3 - Post-secondary non-tertiary education 09.4 - Tertiary education 09.5 - Education not definable by level 09.6 - Subsidiary services to education 09.7 - R&D Education 09.8 - Education n.e.c.
<b>10 - Social protection</b>
10.1 - Sickness and disability 10.2 - Old age 10.3 - Survivors 10.4 - Family and children 10.5 - Unemployment 10.6 - Housing 10.7 - Social exclusion n.e.c. 10.8 - R&D Social protection 10.9 - Social protection n.e.c.

Source: UNSD (2013)

## Appendix B: Model

**Table B.1: Overview of variables**

Variable	Unit	Name
strbal	Percent of GDP	General government structural balance
ggdp	Percentage point	Gross domestic product, constant prices
gdpcap	U.S. Dollars	Gross domestic product per capita, current prices
unempl	Percentage points	Unemployment rate
empl	Percentage points	Employment rate
outgap	Percentage point	Output gap in percent of potential GDP
govrev	Percent of GDP	General government revenue
nbal	Percent of GDP	General government net lending/borrowing
ndebt	Percent of GDP	General government net debt
cabal	Percent of GDP	Current account balance

Source: IMF (2013)

**Table B.2: Descriptive statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
year	55	2010	1.427248	2008	2012
ggdp	55	-0.38364	2.785529	-8.5	4
gdpcap	55	39720.24	9807.942	20179	58697
unempl	55	8.914545	4.556535	3.1	25
empl	55	44.02182	4.252567	37.4	51.3
govrev	55	44.64727	5.73181	33.8	53.8
cabal	55	-0.23818	4.889766	-12.6	9.7
strbal	55	-3.94909	2.875302	-11.9	2
lgdpcap	55	10.55407	0.281532	9.912397	10.98014
ggdp_1	44	-0.29773	3.037708	-8.5	4
outgap	55	-1.14727	2.450688	-4.9	7.3
outgap_1	44	-0.84545	2.551557	-4.9	7.3
debt	55	75.75455	25.29974	22	127
infl	55	2.060673	1.437655	-1.706	5.658
debt_1	44	72.54773	24.39699	22	120.8

Source: Authors computations

**Table B.3: Description of variables**

<b>Subject Notes</b>
<b>Gross domestic product, constant prices</b>
Annual percentages of constant price GDP are year-on-year changes; the base year is country-specific . Expenditure-based GDP is total final expenditures at purchasers' prices (including the f.o.b. value of exports of goods and services), less the f.o.b. value of imports of goods and services. [SNA 1993]
<b>Gross domestic product per capita, current prices</b>
GDP is expressed in current U.S. dollars per person. Data are derived by first converting GDP in national currency to U.S. dollars and then dividing it by total population.
<b>Unemployment rate</b>
Unemployment rate can be defined by either the national definition, the ILO harmonized definition, or the OECD harmonized definition. The OECD harmonized unemployment rate gives the number of unemployed persons as a percentage of the labor force (the total number of people employed plus unemployed). [OECD Main Economic Indicators, OECD, monthly] As defined by the International Labour Organization, unemployed workers are those who are currently not working but are willing and able to work for pay, currently available to work, and have actively searched for work. [ILO, <a href="http://www.ilo.org/public/english/bureau/stat/res/index.htm">http://www.ilo.org/public/english/bureau/stat/res/index.htm</a> ]
<b>Employment rate</b>
We used data for employment and population and calculated the employment rate. Employment can be defined by either the national definition, the ILO harmonized definition, or the OECD harmonized definition. Persons who during a specified brief period such as one week or one day, (a) performed some work for wage or salary in cash or in kind, (b) had a formal attachment to their job but were temporarily not at work during the reference period, (c) performed some work for profit or family gain in cash or in kind, (d) were with an enterprise such as a business, farm or service but who were temporarily not at work during the reference period for any specific reason. [Current International Recommendations on Labour Statistics, 1988 Edition, ILO, Geneva, page 47] For census purposes, the total population of the country consists of all persons falling within the scope of the census. In the broadest sense, the total may comprise either all usual residents of the country or all persons present in the country at the time of the census. [Principles and Recommendations for Population and Housing Censuses, Revision 1, paragraph 2.42]
<b>General government revenue</b>
Revenue consists of taxes, social contributions, grants receivable, and other revenue. Revenue increases government's net worth, which is the difference between its assets and liabilities (GFSM 2001, paragraph 4.20). Note: Transactions that merely change the composition of the balance sheet do not

change the net worth position, for example, proceeds from sales of nonfinancial and financial assets or incurrence of liabilities.
<b>General government net lending/borrowing</b>
Net lending (+)/ borrowing (–) is calculated as revenue minus total expenditure. This is a core GFS balance that measures the extent to which general government is either putting financial resources at the disposal of other sectors in the economy and nonresidents (net lending), or utilizing the financial resources generated by other sectors and nonresidents (net borrowing). This balance may be viewed as an indicator of the financial impact of general government activity on the rest of the economy and nonresidents (GFSM 2001, paragraph 4.17). Note: Net lending (+)/borrowing (–) is also equal to net acquisition of financial assets minus net incurrence of liabilities.
<b>General government net debt</b>
Net debt is calculated as gross debt minus financial assets corresponding to debt instruments. These financial assets are: monetary gold and SDRs, currency and deposits, debt securities, loans, insurance, pension, and standardized guarantee schemes, and other accounts receivable.
<b>Current account balance</b>
Current account is all transactions other than those in financial and capital items. The major classifications are goods and services, income and current transfers. The focus of the BOP is on transactions (between an economy and the rest of the world) in goods, services, and income.
<b>General government structural balance</b>
The structural budget balance refers to the general government cyclically adjusted balance adjusted for nonstructural elements beyond the economic cycle. These include temporary financial sector and asset price movements as well as one-off, or temporary, revenue or expenditure items. The cyclically adjusted balance is the fiscal balance adjusted for the effects of the economic cycle; see, for example, A. Fedelino. A. Ivanova and M. Horton “Computing Cyclically Adjusted Balances and Automatic Stabilizers” IMF Technical Guidance Note No. 5, <a href="http://www.imf.org/external/pubs/ft/tnm/2009/tnm0905.pdf">http://www.imf.org/external/pubs/ft/tnm/2009/tnm0905.pdf</a> .
<b>Output gap</b>
Output gaps for advanced economies are calculated as actual GDP less potential GDP as a percent of potential GDP. Estimates of output gaps are subject to a significant margin of uncertainty. For a discussion of approaches to calculating potential output, see Paula R. De Masi, IMF Estimates of Potential Output: Theory and Practice, in Staff Studies for the World Economic Outlook (Washington: IMF, December 1997), pp. 40-46.
<b>General government gross debt</b>
Gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future. This includes debt liabilities in the form of SDRs, currency and

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deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable. Thus, all liabilities in the GFSM 2001 system are debt, except for equity and investment fund shares and financial derivatives and employee stock options. Debt can be valued at current market, nominal, or face values (GFSM 2001, paragraph 7.110).
<b>Inflation, average consumer prices</b>
Annual percentages of average consumer prices are year-on-year changes.

*Source:* IMF (2013)