Abschlussbericht zu Forschungsvorhaben fe 5/14:

“Automatic stabilizers in the Eurozone: Analysis of their effectiveness at the member state and euro area level and in international comparison”

Mannheim, 26. November 2014

ZEW

Zentrum für Europäische Wirtschaftsforschung GmbH

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Abschlussbericht zu Forschungsvorhaben fe 5/14: "Automatic stabilizers in the Eurozone: Analysis of their effectiveness at the member state and euro area level and in international comparison"*

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November 26, 2014

Abstract

We analyze the effectiveness of fiscal policy in general and automatic stabilizers in particular to stabilize output in Eurozone member states under the current institutional framework of fiscal governance. First, a descriptive analysis based on macro data is conducted for the period 2007-2014, both for ex-post as well as real-time data. In the second step, we analyze the potential of automatic stabilizers for output stabilization in steady state, i.e., when member states have achieved balanced budgets, using micro data and microsimulation tools for Europe and the United States.

JEL Classification: H2, H30, E32, E62

Keywords: Automatic Stabilization, Stability and Growth Pact

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Zusammenfassung

Die Nachwirkungen der jüngsten Finanz-und Wirtschaftskrise und der darauffolgenden Staatsschuldenkrise in Europa führten zu intensiven Diskussionen über die Rolle aktiver Fiskalpolitik zur Stabilisierung der Konjunktur. Ein häufig geäußerter Kritikpunkt am Stabilitäts- und Wachstumspakt (SWP) ist, dass er verschuldeten Mitgliedsstaaten nicht genügend Spielraum für anti-zyklische Konjunkturmaßnahmen lässt, begleitet von der Forderung nach stärkerer fiskalischer Integration auf europäischer Ebene. Diese Studie untersucht, inwiefern der modifizierte SWP antizyklische Fiskalpolitik allgemein sowie automatische fiskalische Stabilisierung im Speziellen zulässt. Dieser Fragestellung wird in zwei Analyseschritten nachgegangen. Der erste Abschnitt beruht auf einer Analyse von zyklischen und strukturellen Defiziten in den vergangenen Jahren. Die Ergebnisse dieser Analyse zeigen, welchen fiskalischen Spielraum die Mitgliedsstaaten während der Krise zur Verfügung hatten. Im zweiten Abschnitt werden Umfang und Wirkung automatischer fiskalischer Stabilisierung im Gleichgewichtszustand analysiert, d.h. in einer Situation, in der die Mitgliedsstaaten ausgeglichene Haushalte vorweisen.

Die Ergebnisse der Studie sind wie folgt: Anhand der Haushaltsdefizite sowie derer zyklischer und struktureller Komponenten wird für die Eurozone sowie die Mitgliedsstaaten Frankreich, Italien und Spanien gezeigt, dass Fiskalpolitik im Jahr 2009 antizyklisch wirkte. Trotz der 2009 durch den Europäischen Rat eingeleiteten Verfahren aufgrund übermäßiger Defizite (Excessive Deficit Procedure, EDP) gegen Frankreich, Italien und Spanien spielte automatische fiskalische Stabilisierung eine wichtige konjunkturstabilisierende Rolle in diesen drei Volkswirtschaften. Die dämpfende Wirkung der automatischen Stabilisatoren im Falle makroökonomischer Schocks liegt bei 20-40%. Die Rezession im Jahr 2009 wäre in der Eurozone ohne automatische Stabilisatoren erheblich stärker gewesen: Statt eines Rückgangs von 4.4 Prozent wäre das Bruttoinlandsprodukt um 5.1-5.9 Prozent geschrumpft.

Eine weitergehende Untersuchung von Fiskalpolitik in Echtzeit für die betrachteten Mitgliedsstaaten deutet darüber hinaus auf eine Tendenz hin, die zyklische Komponente des Budgets in Echtzeit höher anzusetzen und den zyklisch bereinigten Saldo damit geringer auszuweisen. Daraus folgt, dass diskretionäre Fiskalpolitik in Echtzeit relativ zu ex-post unveränderten Schätzungen der Outputlücke mehr Spielraum besitzt. Das zentrale Ergebnis des ersten Analyseabschnitts ist, dass die automatischen Stabilisatoren in Frankreich, Italien, Spanien und der Eurozone

insgesamt über Zeitraum 2007-2014 signifikant zur Konjunkturstabilisierung beigetragen haben und dass der SWP das Wirken der automatischen Stabilisatoren nicht eingeschränkt hat.

Im zweiten Abschnitt zeigt unsere Analyse von automatischen Stabilisatoren im Gleichgewicht, dass Staatshaushalte im Euroraum und in Frankreich wesentlich stärker auf die Konjunktur reagieren als in den USA. Um die Wirkung von makroökonomischen Schocks auf die fiskalische Situation abzubilden, simulieren wir verschiedene Schocks, die sowohl der 2008/09-Krise als auch historischen Durchschnitten entsprechen. Steuer- und Transfersysteme (Gesetzesstand 2013) in der Eurozone und in Frankreich federn 47% bzw. 43% der Schocks ab, in den USA dagegen nur 30%.

Aus den Ergebnissen dieser Studie folgen wichtige Implikationen für die Diskussion über die Notwendigkeit tiefergehender fiskalischer Integration in Europa. Neben den Bedenken vieler Beobachter, dass ein antizyklischer Mechanismus für die Eurozone wie zum Beispiel eine gemeinsame Arbeitslosenversicherung bedeutende Fragen aufwirft, etwa das Risiko permanenter Transfers zwischen Mitgliedsstaaten und Moral Hazard, ist bei der Beurteilung zusätzlicher stabilisierender Effekte von antizyklischen Fiskalmechanismen auf Eurozonen-Ebene den Ergebnissen dieser Studie Rechnung zu tragen. Vor dem Hintergrund um die Diskussion antizyklischer Mechanismen auf europäischer Ebene zeigt die vorliegende Untersuchung, dass der SWP der Finanzpolitik erheblichen Spielraum lässt, um stabilisierend auf den Konjunkturzyklus zu wirken.

1 Non-technical summary

In the aftermath of the recent financial and economic crisis and the resulting sovereign debt crisis in Europe, an intensive policy debate about the role of active fiscal policy to stabilize the economy emerged. It has been argued frequently that the European Stability and Growth Pact (SGP) does not give indebted member states sufficient room for countercyclical fiscal policy resulting in calls for larger fiscal integration of the Eurozone. In this report, we analyze to what extent fiscal policy in general and automatic stabilizers in particular are able to stabilize output in the Eurozone member states under the current framework of fiscal governance. The analysis proceeds in two steps. First, a descriptive analysis based on macro data is conducted. The results of this step shed light on the question whether fiscal policy had enough leverage during the crisis to stabilize the economy. In the second step, we analyze the size and effectiveness of automatic stabilizers in steady state, i.e., when member states have achieved balanced budgets.

The key results of our study are as follows. Analyzing (changes in) net borrowing and its components over the period 2007-2014 for the euro area average, France, Italy and Spain, we show that the overall fiscal stance was expansionary when the crisis hit the Eurozone in 2009. Despite the Council decisions in 2009 to initiate excessive deficit procedures against France, Italy and Spain, automatic fiscal stabilizers played an important role to stabilize the economy in these member states. We estimate that the potential for automatic stabilization to cushion macroeconomic shocks has been between 20-40%. Hence, GDP growth in the absence of automatic stabilizers would have been substantially lower in recent years: The 2009 drop in Eurozone GDP would have amounted to 5.1-5.9 per cent rather than 4.4 per cent without the cushioning effect of automatic stabilizers.

Focussing on fiscal policy in real-time, our results suggest that the overall tendency in the countries under analysis has been to estimate a higher cyclical component of net borrowing in real-time and hence a lower cyclically-adjusted component. This implies that member states did have more room for discretionary fiscal policy in real-time relative to a situation with ex-post unchanged estimates of the output gap. A key conclusion of this part of the study is that automatic stabilizers played a quantitatively important role for the stabilization of the overall economy over the period 2007-2014 and that the SGP has not put a break on the workings of automatic stabilizers.

Our analysis on automatic stabilizers in steady state reveals that the cyclical reaction of the budget to the cycle is much more pronounced in the euro area than in the US. Simulating different types of shocks which replicate the recent financial and economic crisis as well as historical averages, we find that current tax and transfer systems - based on legislation from 2013 - absorb roughly 47% of these shocks in the Eurozone, 43% in France and only 30% in the US.

Our results have important implications for the debate on further fiscal integration in Europe. Besides the concern of many observers that a cyclical shock absorber for the Eurozone such as a common unemployment insurance system raises several issues, e.g. the risk of permanent transfers across member states and moral hazard, the findings of this study need to be taken into account for an assessment of potential additional stabilization effects. Our analysis shows that the SGP does indeed leave room for fiscal policy to stabilize the business cycle.

2 Introduction

In the aftermath of the recent financial and economic crisis and the resulting sovereign debt crisis in Europe, an intensive policy debate about the role of active fiscal policy to stabilize the economy emerged. It has been argued frequently that the European Stability and Growth Pact (SGP) does not give indebted member states sufficient room for countercyclical fiscal policy. Against this backdrop, many observers and policymakers call for larger fiscal integration of the Eurozone (Dullien (2013), Enderlein et al. (2013), IMF (2013), Gros (2014)). One reason for this is the reduced potential for active fiscal policy due to rapidly increasing debt levels as a result of the crisis. Therefore, the role of automatic stabilizers - which are relatively high in Eurozone countries (Dolls et al. (2012)) - is key. It has been argued that these important automatic mechanisms were muted during the recent crisis due to financing problems of member states. The aim of this report is to investigate this question.

In this report, we analyze to what extent fiscal policy in general and automatic stabilizers in particular are able to stabilize output in the Eurozone member states under the current framework of fiscal governance. The analysis proceeds in two steps. First, a descriptive analysis based on macro data is conducted. In this step, 2013 estimates of budget semi-elasticities (Girouard and André (2005), updated by Mourre et al. (2013)) are applied to assess the effectiveness of fiscal policy and automatic stabilizers during the crisis. In addition, we make use of the most recent semi-elasticity estimates released in August 2014. The analysis is conducted both for ex-post as well as real-time data. The results of this step shall shed light on the question whether fiscal policy had enough leverage during the crisis to stabilize the economy. In the second step, we analyze the size and effectiveness of automatic stabilizers in steady state, i.e., when member states have achieved balanced budgets, using micro data and microsimulation tools for Europe and the United States. We simulate different shock scenarios and additionally analyze the effects on the government budget.

The key results of our study are as follows. Analyzing (changes in) net borrowing and its components over the period 2007-2014 for the euro area average, France, Italy and Spain, we show that the overall fiscal stance was expansionary when the crisis hit the Eurozone in 2009. Despite the Council decisions in 2009 to initiate excessive deficit procedures against France, Italy and Spain, automatic fiscal stabilizers played

an important role to stabilize the economy in these member states also after 2009. We estimate that the potential for automatic stabilization to cushion macroeconomic shocks has been between 20-40%, depending on the size of the fiscal multiplier (0.4-0.8). In 2009 and 2013, the two years with the most negative output gaps in the Eurozone within our sample period, output has been stabilized by 0.7-1.4% due to the cyclical reaction of the budget. Given negative output gaps in Spain which were above the euro area average in recent years, automatic stabilizers have been even more important in Spain providing output stabilization of up to 3%. Hence, GDP growth in the absence of automatic stabilizers would have been substantially lower in recent years. For example, the 2009 drop in Eurozone GDP would have amounted to 5.1-5.9 per cent rather than 4.4 per cent without the cushioning effect of automatic stabilizers.

Focussing on fiscal policy in real-time, our results suggest that the overall tendency in the euro area, France, Italy and, to some extent also Spain, has been to estimate a higher cyclical component of net borrowing in real-time and hence a lower cyclically-adjusted component. This implies that member states did have more room for discretionary fiscal policy in real-time relative to a situation with ex-post unchanged estimates of the output gap. A key conclusion of this part of the study is that the SGP has not put a break on the workings of automatic stabilizers in recent years.

Our analysis on automatic stabilizers in steady state reveals that the cyclical reaction of the budget to the cycle is much more pronounced in the euro area than in the US. Simulating different types of shocks which replicate the recent financial and economic crisis (large shock) as well as historical averages (small shock), we find that current tax and transfer systems - based on legislation from 2013 - absorb roughly 47% of these shocks in the Eurozone, 43% in France and only 30% in the US. A large fraction of the stabilization gap is due to social insurance contributions and benefits which are less generous in the US. Due to lower stabilization, the budgetary impact is lower in the US than in France and the overall Eurozone. In case of the large (small) shock, the US would experience a budget deficit of 1.14% (0.23%) of GDP, whereas the values for the Eurozone and France are 1.7% (0.35%) and 1.35% (0.28%), respectively. Relating our steady-state estimates of automatic stabilizers to the recent crisis period, we show that with US-level automatic stabilizers output stabilization in the Eurozone would have amounted to only 0.4-0.8 per cent in 2009 rather than to 0.7-1.4 per cent.

The remainder of this report is structured as follows. Section 3 provides a short overview of previous research with respect to automatic stabilization. Section 4 summarizes the institutional framework of the SGP. Sections 5 and 6 describe the backward and forward-looking approach to assess the role of automatic stabilizers during the recent crisis and in steady state. Results are presented in section 7. Section 8 concludes.

3 Previous research

In the recent economic crisis, the workings of automatic stabilizers have been widely recognized to play a key role in providing income insurance for households and hence in stabilizing demand and output. Automatic stabilizers are usually defined as those elements of fiscal policy which mitigate output fluctuations without discretionary government action. Despite the importance of automatic stabilizers for stabilizing the economy, "*very little work has been done on automatic stabilization [...] in the last 20 years*" (Blanchard (2006)). However, especially for the recent severe crisis and in light of the discussion about potential insurance effects of fiscal risk sharing through a fiscal capacity at the Eurozone level, it is important to assess the contribution of (national) automatic stabilizers to overall fiscal expansion and to compare their magnitude across countries.

In the empirical literature[1] on the analysis and measurement of automatic fiscal stabilizers, two types of studies prevail: macro data studies and micro data approaches.[2] Simple macro indicators such as revenue and expenditure to GDP ratios are used by IMF (2009) as a measure of automatic stabilization. More sophisticated

[1] A theoretical analysis of automatic stabilizers in a real business cycle (RBC) model can be found in Galí (1994). One issue of standard RBC models is that they are not able to explain the stylized fact that the size of government (as a proxy for automatic stabilizers) is negatively correlated with the volatility of business cycles. In fact, under some reasonable assumptions, a standard RBC model produces a positive correlation (Andrés et al. (2008)). In addition, such models are not able to explain evidence that consumption responds positively to increases in government spending (Blanchard and Perotti (2002), Fatàs and Mihov (2002) or Perotti (2002)). These facts, however, can be easily explained by a simple textbook IS-LM model as well as by large-scale macroeconometric models (van den Noord (2000), Buti and van den Noord (2004)). Galí et al. (2007) and Andrés et al. (2008) show that both facts can only be explained in a RBC model by adding Keynesian features like nominal and real rigidities in combination with rule-of-thumb consumers to the analysis.

[2] Early estimates on the responsiveness of the tax system to income fluctuations are discussed in the Appendix of Goode (1976). More recent contributions include Fatàs and Mihov (2001), Blanchard and Perotti (2002), Mélitz and Zumer (2002).

approaches measure the cyclical elasticity of different budget components such as the income tax, social security contributions, the corporate tax, indirect taxes or unemployment benefits. Different empirical strategies have been proposed, for example regressing changes in fiscal variables on the growth rate of GDP or estimating elasticities on the basis of macro-econometric models.[3] Sachs and Sala-i Martin (1992) and Bayoumi and Masson (1995) use time series data and find values of 30%-40% for disposable income stabilization in the US. However, these approaches raise several issues, in particular the challenge of separating discretionary actions from automatic stabilizers in combination with identification problems resulting from endogenous regressors. Related to the literature on macro estimations of automatic stabilization are studies that focus on the relationship between output volatility, public sector size and openness of the economy (Cameron (1978), Galí (1994), Rodrik (1998), Fatàs and Mihov (2001), Auerbach and Hassett (2002)).

Much less work has been done on the measurement of automatic stabilizers with micro data. Kniesner and Ziliak (2002) analyze (ex-post) the impact of the US tax reforms of the 1980s on automatic stabilization of consumption and find a reduction in consumption stability of about 50% induced by ERTA81 and TRA86. Auerbach and Feenberg (2000) use the NBER's microsimulation model TAXSIM to estimate the automatic stabilization for the US from 1962-95 and find values for the stabilization of disposable income ranging between 25%-35%. Auerbach (2009) has updated this analysis and finds a value of around 25% for more recent years. Mabbett and Schelkle (2007) conduct a similar analysis for 15 Western European countries in 1998 and find higher stabilization effects than in the US, with results ranging from 32%-58%.[4] How does this smoothing of disposable income affect household demand? To the best of our knowledge, Auerbach and Feenberg (2000) is the only simulation study which estimates the demand effect taking into account liquidity constraints. They use the method suggested by Zeldes (1989) and find that approximately two thirds of all households are likely to be liquidity constrained. Given this, the contribution of automatic stabilizers to demand smoothing is reduced to approximately 15% of the initial income shock.

Dolls et al. (2012) analyze the impact of automatic stabilizers using microsimula-

[3] Cf. van den Noord (2000) or Girouard and André (2005).

[4] Mabbett and Schelkle (2007) rely for their analysis (which is a more recent version of Mabbett (2004)) on the results from an inflation scenario taken from Immvervoll et al. (2006) who use the microsimulation model EUROMOD to increase earnings by 10% in order to simulate the sensitivity of poverty indicators with respect to macro level changes.

tion models for 19 European countries (EUROMOD) and the US (TAXSIM). They find that in the case of a proportional income shock approximately 38% (32%) of the shock would be absorbed by automatic stabilizers in the EU (US). Within the EU, there is considerable heterogeneity, and results for overall stabilization of disposable income range from a value of 25% for Estonia to 56% for Denmark. In the case of an idiosyncratic unemployment shock, the stabilization gap between the EU and the US is larger. EU automatic stabilizers absorb 47% of the shock whereas the stabilization effect in the US is only 34%. Again, there is considerable heterogeneity within the EU. However, if demand stabilization can only be achieved for liquidity constrained households, the picture changes significantly. Here, the results are sensitive with respect to the method used for estimating liquidity constraints. For the income (unemployment) shock, the cushioning effect of automatic stabilizers is now in the range of 4-22% (13-30%) in the EU and between 6-17% (7-20%) in the US. These results suggest that social transfers, in particular the rather generous systems of unemployment insurance in Europe, play a key role for demand stabilization and explain an important part of the difference in automatic stabilizers between Europe and the US.

All these studies assess the effectiveness of automatic stabilizers inherent in tax and transfer systems before the recent crisis period. In recent years, some member states of the Eurozone lost access to capital markets due to high levels of public debt. As a consequence, fiscal consolidation measures have been implemented which might affect the workings of automatic stabilizers in the long run. Therefore, it is important to evaluate, both from an academic and a policy perspective, to what extent automatic stabilizers provided macroeconomic stabilization during the crisis and how effective they are in the long-run under the assumption that there is enough fiscal space to let them work. The aim of this study is to provide empirical evidence for the role of automatic stabilizers both in the backward and forward-looking perspective.

4 Institutional background

In this section, we provide a short description of significant reforms of the Stability and Growth Pact in recent years (see European Commission (2013) and Micossi and Peirce (2014) for further recent overviews). We also discuss if and to what extent

the SGP constrains expansionary fiscal policy in economic downturns.

When the SGP was enacted in 1997, the 'preventive arm' of the SGP was introduced to ensure compliance with the Treaty's fiscal rules while the 'corrective arm' was designed to implement the excessive deficit procedure. The former included a medium-term objective (MTO) "close to balance or in surplus", the latter had the objective to correct excess over the 3% of GDP deficit limit and the 60% of GDP debt limit. The first modication of the SGP was in 2005. The MTO became country-specific and was formulated in structural terms (cyclically-adjusted and net of one-off and temporary measures). An adjustment path towards the MTO was specificied with a benchmark of a 0.5% of GDP improvement in terms of the structural deficit. Member states were allowed to deviate from the adjustment path in case of 'major' structural reforms with short-term budgetary costs under the condition that they improve long-term public finance sustainability, and in case of unexpected adverse economic circumstances with a significant impact on public finances. Furthermore, the MTO was meant to take into account the member states' (gross) public debt level and fiscal sustainability with respect to ageing

The difficulties of EU governments to conduct sustainable fiscal policy under acute economic stress during the crisis led to the enactment of the revised SGP in 2011. To improve the effectiveness of preventive and corrective action as an instrument of fiscal policy coordination, the SGP was amended with the so-called Six Pack legislation. Within the preventive arm, the revised SGP commits member states with debt levels above 60% or considerable risks of debt sustainability to an annual improvement of more than 0.5% in their structural balance. A procedure for correcting significant deviations was established which prevail if a member state deviates by 0.5% in one year or cumulatively over two years from the MTO or the adjustment path towards it. Furthermore, a new expenditure benchmark was introduced which postulates that expenditure growth net of discretionary revenue measures shall not exceed the medium-term rate of potential GDP growth. Within the corrective arm, a new operational criterion for the evaluation of public debt reduction towards the 60% of GDP threshold was established. In 2013, the so-called Two Pack and the Fiscal Compact were adopted. Among other specifications, the new rules contain an ex-ante monitoring of (Eurozone) member states' budgetary policies, the possibility for the Commission to require a revised draft budget in case of non-compliance with the SGP and a commitment of member states to adopt balanced budget rules in national law.

To what extent does the SGP constrain expansionary fiscal policy? When a member state has not achieved its MTO, automatic stabilizers can work along the consolidation path. Compliance with the minimum benchmark which postulates a lower limit for the structural deficit ensures that the 3% deficit limit is not violated under normal cyclical conditions. As soon as the MTO is reached, the SGP does not put any constraints on automatic stabilizers. Moreover, it allows for discretionary fiscal policy to be conducted without breaching the 3% of GDP threshold for the budget deficit. For a country that is subject to the corrective arm of the SGP, the legal framework identifies a priority of fiscal consolidation over expansionary fiscal policy. Nevertheless, automatic stabilizers can work along the adjustment path.

5 Macro data analysis of automatic stabilization

In section 5.1, we describe how the automatic reaction of the government budget to the economic cycle can be derived, along the lines of the EU-standard concept for calculating the cyclical (CC) and cyclically-adjusted budget (CAB) (Girouard and André (2005), updated by Mourre et al. (2013)). In addition, the framework used in this study for estimating automatic stabilization effects on economic activity is presented. Section 5.2 describes the different types of data used in our backward-looking analysis and their sources.

5.1 Theoretical framework

As stated above, the cyclical and cyclically-adjusted budget are common measures for discretionary fiscal policy and automatic stabilization. The cyclically-adjusted budget can be derived from the following expression:

$$CAB = (B/Y) - CC \tag{1}$$

where CC stands for the extent to which budgetary revenues and expenditures react to the economic cycle, B denotes net borrowing and Y is output. CC can be written as $\varepsilon * OG$, where ε stands for the semi-elasticity of the overall budget with respect to changes in output[5], and $OG = \frac{Y-Y^p}{Y^p}$ denotes the output gap. ε can be

[5]Note that semi-elasticities are estimated for specific time-periods and are assumed to be time-invariant over this period. A discussion of estimation issues related to semi-elasticities can be found in Koester and Priesmeier (2014).

split up into a revenue and an expenditure part:

$$\varepsilon = \varepsilon_R - \varepsilon_G \tag{2}$$

and can be further separated into the respective budgetary components. For the expenditure part, unemployment benefits are assumed to be the only expenditure item that reacts (significantly) to the economic cycle.[6] For the revenue part, the main subcomponents that are affected by reductions in output are personal income taxes, corporate income taxes, indirect taxes, social security contributions and non-tax revenue (Mourre et al. (2013)). These six subcomponents need to be weighted according to their share in expenditures and revenues, which leads to the following presentation:

$$\varepsilon_R - \varepsilon_G = \left(\sum_{i=1}^{5} \eta_{R,i} \frac{R_i}{R} - 1 \right) \frac{R}{Y} - (\eta_{G_u} \frac{G_u}{G} - 1) \frac{G}{Y} \tag{3}$$

where $\eta_{R,i}$ and η_{G_u} denote the elasticities of the individual revenue and expenditure components.[7] The terms $\frac{R_i}{R}$ and $\frac{G_u}{G}$ denote the respective weights of the cyclically sensitive revenue and expenditure items.

To finally estimate the automatic stabilization effect on economic activity (AS), we multiply the cyclical component of net borrowing with a fiscal multiplier (FM):

$$AS = OG * \varepsilon * FM \tag{4}$$

5.2 Data sources

For a timely assessment of national budgetary plans in the context of the fiscal surveillance framework in the euro area, it is necessary to rely on real-time data. However, it is well-known that real-time data can be subject to significant revisions when new information about the state of the economy becomes available. Therefore, for any (ex-post) evaluation of fiscal policy, it is interesting to contrast results based on real-time and ex-post data. We obtain the latter from the AMECO data-base provided by the European Commission, and the data set obtained covers the time

[6] Darby and Melitz (2008) provide empirical evidence for OECD countries that also age- and health-related social expenditure as well as incapacity and sick benefits increase in economic downturns.

[7] As unemployment benefits are assumed to be the only cyclically sensitive expenditure component of the budget, G_u is denoted with the index u.

range from 2006 until 2014. Our sample includes France, Italy and Spain as well as the Eurozone aggregate. Real-time data are based on the European Commission reports on 'Cyclical Adjustment of Budget Balances', published every six months (spring and autumn), and span the time period from autumn 2005 until spring 2014. To analyze patterns in the revisions in a chronological way, real-time data for year t are presented as follows:

$t-1$ spring $\rightarrow$ $t-1$ autumn $\rightarrow$ t spring $\rightarrow$ t autumn $\rightarrow$ $t+1$ spring $\rightarrow$ $t+1$ autumn $\rightarrow$ ex-post (spring 2014).

6 Micro data analysis of automatic stabilization

The microsimulation approach allows us to investigate the causal effects of different types of shocks on household disposable income, holding everything else constant (see Bourguignon and Spadaro (2006)). Thus we can single out the role of automatic stabilization and avoid endogeneity problems inherent in ex-post evaluations. Our forward-looking simulation analysis is based on the assumption that countries are in steady state, i.e., they have achieved their medium-term objectives and hence have sufficient fiscal space both for automatic stabilizers and discretionary fiscal policy. It therefore complements our backward-looking analysis based on macro data.

6.1 Theoretical framework

The extent to which automatic stabilizers mitigate the impact of income shocks on household demand essentially depends on two factors. First, the tax and transfer system determines the way in which a given shock to gross income translates into a change in disposable income. For instance, in the presence of a proportional income tax with a tax rate of 40%, a shock on gross income of one hundred Euros leads to a decline in disposable income of 60 Euros. In this case, the tax absorbs 40% of the shock to gross income. A progressive tax, in turn, would have a stronger stabilizing effect. The second factor is the link between current disposable income and current demand for goods and services. If the income shock is perceived as transitory and current demand depends on some concept of permanent income, and if households can borrow or use accumulated savings, their demand will not change. In this case, the impact of automatic stabilizers on current demand would be equal to zero. Things are different, though, if some households are liquidity constrained

or acting as "*rule-of-thumb*" consumers (Campbell and Mankiw (1989)). In this case, their current expenditures do depend on disposable income so that automatic stabilizers play a role. In this report, we will focus on income stabilization which is a good predictor for overall stabilization (Auerbach and Feenberg (2000), Dolls et al. (2012)).

A common measure for estimating automatic stabilization is the "*normalized tax change*" used by Auerbach and Feenberg (2000) which can be interpreted as "*the tax system's built-in flexibility*" (Pechman (1973, 1987)). It shows how changes in market income translate into changes in disposable income through changes in personal income tax payments. We extend the concept of normalized tax change to include other taxes as well as social insurance contributions and transfers such as unemployment benefits. We take into account personal income taxes (at all government levels), social insurance contributions as well as payroll taxes and transfers to private households.

Market income Y_i^M of individual i is defined as the sum of all incomes from market activities:

$$Y_i^M = E_i + Q_i + I_i + P_i + O_i \tag{5}$$

where E_i is labour income, Q_i business income, I_i capital income, P_i property income, and O_i other income. Disposable income Y_i^D is defined as market income minus net government intervention $G_i = T_i + S_i - B_i$:

$$Y_i^D = Y_i^M - G_i = Y_i^M - (T_i + S_i - B_i) \tag{6}$$

where T_i are direct taxes, S_i employee social insurance contributions, and B_i are social cash benefits (i.e. negative taxes).

We analyze the impact of automatic stabilizers by measuring to what extent a shock on gross income is cushioned by the tax and transfer systems, i.e., to what extent disposable income is stabilized. Throughout the rest of the study, we refer to our measure of this effect as the *income stabilization coefficient* τ^I. We derive τ^I from a general functional relationship between disposable income and market income:

$$\tau^I = \tau^I(Y^M, T, S, B). \tag{7}$$

The derivation can be either done at the macro or at the micro level. On the

macro level, the aggregate change in market income (ΔY^M) is transmitted via τ^I into an aggregate change in disposable income (ΔY^D):

$$\Delta Y^D = \left(1 - \tau^I\right) \Delta Y^M \tag{8}$$

However, one issue when computing τ^I based on the change of macro level aggregates is that macro data changes include behavioral and general equilibrium effects as well as discretionary policy measures. Therefore, a measure of automatic stabilization based on macro data changes captures all these effects. Thus, it is not possible to disentangle the automatic stabilization from stabilization through discretionary policies or changes in behavior because of endogeneity and identification problems.

In order to isolate the impact of automatic stabilization from other effects, we compute τ^I using arithmetic changes (Δ) in total disposable income ($\sum_i \Delta Y_i^D$) and market income ($\sum_i \Delta Y_i^M$) based on micro data information[8]:

$$\begin{aligned} \sum_i \Delta Y_i^D &= (1 - \tau^I) \sum_i \Delta Y_i^M \\ \tau^I &= 1 - \frac{\sum_i \Delta Y_i^D}{\sum_i \Delta Y_i^M} = \frac{\sum_i \left(\Delta Y_i^M - \Delta Y_i^D\right)}{\sum_i \Delta Y_i^M} = \frac{\sum_i \Delta G_i}{\sum_i \Delta Y_i^M} \end{aligned} \tag{9}$$

where τ^I measures the sensitivity of disposable income, Y_i^D, with respect to market income, Y_i^M. The higher τ^I, the stronger the stabilization effect. For example, $\tau^I = 0.4$ implies that 40% of the income shock is absorbed by the tax-benefit system. Thus, τ^I can be interpreted as a measure of income insurance provided by the government, $(1 - \tau^I)$ as a measure of vulnerability to income shocks. Note that the income stabilization coefficient is not only determined by the size of government (e.g. measured as expenditure or revenue in percent of GDP) but also depends on the structure of the tax benefit system and the design of the different components.

Another advantage of the micro data based approach is that it enables us to explore the extent to which different individual components of the tax transfer system

[8]Note that a potential drawback of this approach is that we neglect general equilibrium effects as well as behavioral adjustments as a response to an income shock. This, however, is done on purpose, as we do not aim at quantifying the overall adjustment to a shock but to single out the size of automatic stabilizers, which - by definition - automatically smooth incomes without taking into account the effects of discretionary policy action or behavioral responses.

contribute to automatic stabilization. Comparing tax benefit systems in the Eurozone and the US, we are interested in the weight of each component in the respective country. We therefore decompose the coefficient into its components which include taxes, social insurance contributions and benefits:

$$\tau^I = \sum_f \tau_f^I = \tau_T^I + \tau_S^I + \tau_B^I = \frac{\sum_i \Delta T_i}{\sum_i \Delta Y_i^M} + \frac{\sum_i \Delta S_i}{\sum_i \Delta Y_i^M} - \frac{\sum_i \Delta B_i}{\sum_i \Delta Y_i^M} = \frac{\sum_i (\Delta T_i + \Delta S_i - \Delta B_i)}{\sum_i \Delta Y_i^M} \tag{10}$$

6.2 Microsimulation using TAXSIM and EUROMOD

We use microsimulation techniques to simulate taxes, benefits and disposable income under different scenarios for a representative micro-data sample of households. Simulation analysis allows conducting a controlled experiment by changing the parameters of interest while holding everything else constant (cf. Bourguignon and Spadaro (2006)). We therefore do not have to deal with endogeneity problems when identifying the effects of the policy reform under consideration.

Simulations are carried out using TAXSIM - the NBER's microsimulation model for calculating liabilities under US Federal and State income tax laws from individual data - and EUROMOD, a static tax-benefit model for 27 EU countries, which was designed for comparative analysis.[9] The models can simulate direct taxes and most benefits (on all levels of government). Both models assume full benefit take-up and tax compliance, focusing on the intended effects of tax-benefit systems. The main stages of the simulations are the following: First, a micro-data sample and tax-benefit rules are read into the model. Then, for each tax and benefit instrument, the model constructs corresponding assessment units, ascertains which are eligible for that instrument and determines the amount of benefit or tax liability for each member of the unit. Finally, after all taxes and benefits in question are simulated, disposable income is calculated.

[9] For more information on TAXSIM see Feenberg and Coutts (1993) or visit http://www.nber.org/taxsim/. For further information on EUROMOD see Sutherland and Figari (2013). There are also country reports available with detailed information on the input data, the modeling and validation of each tax benefit system, see http://www.iser.essex.ac.uk/research/euromod. The tax-benefit systems included in the model have been validated against aggregated administrative statistics as well as national tax-benefit models (where available), and the robustness checked through numerous applications (see, e.g., Bargain (2006)).

6.3 Scenarios

Dolls et al. (2012) simulated two scenarios: a 5% uniform decrease in incomes and an idiosyncratic increase of the unemployment rate. In this report, we combine both scenarios. First, some individuals are made unemployed and therefore lose all their labor earnings (unemployment shock). Second, all remaining gross incomes are proportionally reduced for all households (income shock). We choose two different scenarios. A large shock comparable to the recent crisis and a smaller shock comparable to previous recessions. In the former (latter) case, the unemployment rate increases by 5 (1) percentage points and incomes are decreased by 5 (1)% (see Reinhart and Rogoff (2009) for an analysis of previous financial crises).

The increase of the unemployment rate is modeled through reweighting of our samples.[10] The weights of the unemployed are increased which implies that the socio-demographic characteristics of the unemployed are assumed to remain constant, while those of the employed are decreased, i.e., in effect, a fraction of employed households is made unemployed.

7 Results

The backward-looking analysis of automatic stabilizers is presented in subsections 7.1-7.2. Subsection 7.1 is based on ex-post data, while subsection 7.2 focuses on fiscal policy in real-time. The forward-looking analysis of automatic stabilizers in steady-state is presented in subsection 7.3.

7.1 Fiscal policy analysis based on ex-post data

7.1.1 Net borrowing, cyclical and cyclically-adjusted components

We start our analysis by looking at net borrowing and its cyclical and cyclically-adjusted components from 2007 to 2014 for the Eurozone as a whole as well as for France, Italy and Spain. In order to compute the cyclical and the cyclically-adjusted components, we use the semi-elasticities provided by the OECD (Girouard and André (2005)) and updated by Mourre et al. (2013). The semi-elasticities for

[10] For the reweighting procedure, we follow the approach of Immvervoll et al. (2006), who have also simulated an increase in unemployment through reweighting of the sample. Their analysis focuses on changes in absolute and relative poverty rates after changes in the income distribution and the employment rate.

the member states of interest as well as for the overall Eurozone are: EA18: 0.54, FR: 0.55, IT: 0.55, SP: 0.48. In addition, we make use of the most recent estimates for semi-elasticities released in November 2014 (Mourre et al. (2014)). The updated semi-elasticities are 0.56 for the EA18, 0.60 for FR, 0.54 for IT and 0.54 for SP. Results based on these updated semi-elasticities are presented in the Appendix. Importantly, our results do not change much when we use the most recent estimates of the semi-elasticities for the calculation of cyclical balances. In case they affect the interpretation of our results, this is highlighted in the text.

Figure 1 presents the results for the Eurozone aggregate. The dashed horizontal line indicates the 3% deficit limit of the SGP. We observe a budget deficit for the period 2007-2014 for the Eurozone as a whole which exceeded the 3% limit from 2009-2013. The output gap was positive in 2007 and 2008 implying a negative cyclical component (in terms of net borrowing). From 2009 onwards, the output gap has been negative and hence the cyclical component positive. Importantly, the cyclical component did not exceed the 3% threshold even in those years when the output gap was at its trough (2009 and 2013) indicating that the SGP leaves room for budgetary manoeuvre even in severe recessions. In contrast, the cyclically-adjusted component exceeded the 3% threshold from 2008-2011.

Figure 1: Net borrowing, cyclical and cyclically-adjusted components: EA18

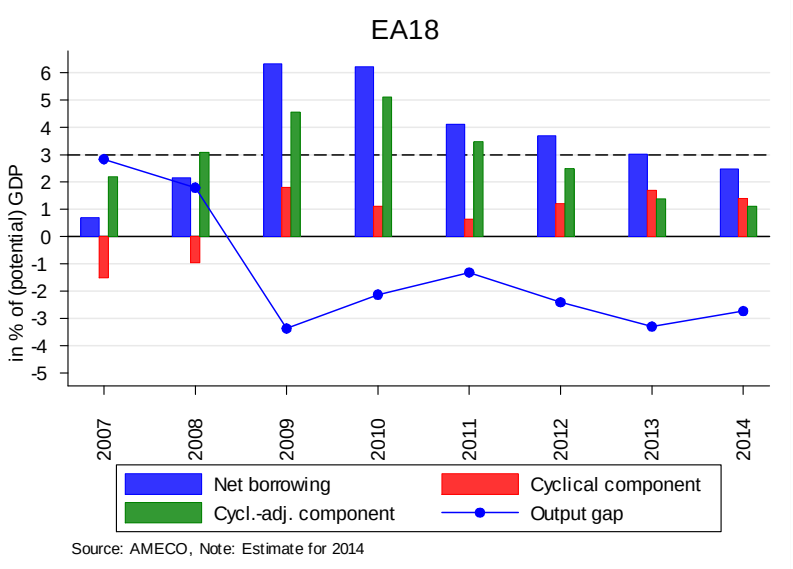


Figure 2 shows the results for France. Compared with the euro area average,

budget deficits have been larger and above the 3% limit of the SGP already from 2008 onwards. It is noteworthy that the large budget deficits observed in France have not been caused by a more severe downturn. Compared with the Eurozone average, the output gap was less negative in 2009 and of similar magnitude in the following years. The cyclical component did not exceed the 3% threshold in the period under consideration. The main reason for the large budget deficits observed in France in recent years are cyclically-adjusted deficits which were above the 3% threshold from 2007-2012. The excessive deficit procedure against France which was initiated in 2009 is still ongoing and postulates that the French government has to correct its deficit until 2015.

Figure 2: Net borrowing, cyclical and cyclically-adjusted components: France

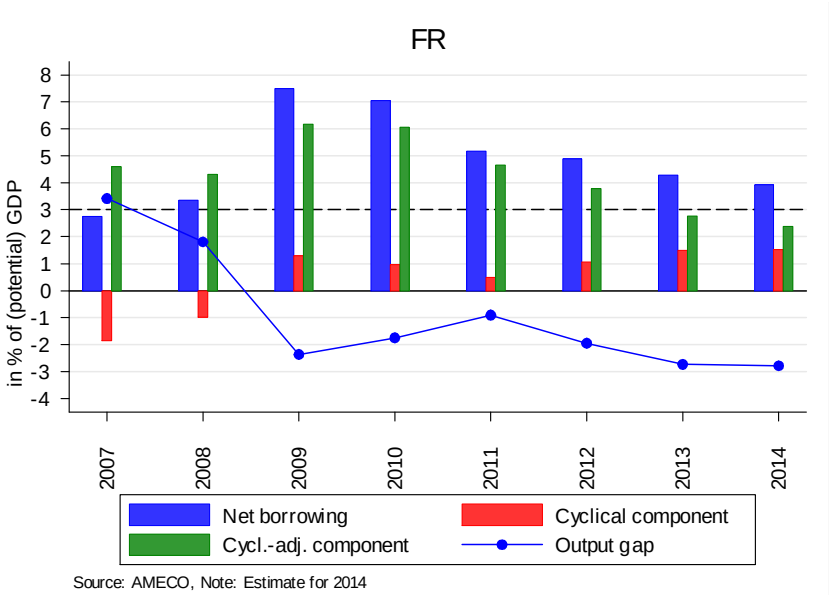
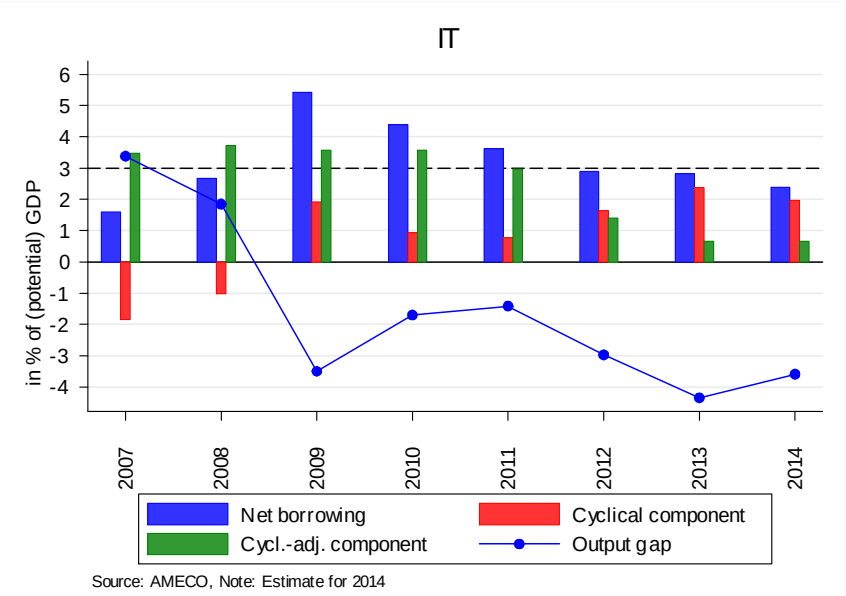


Figure 3 shows the results for Italy. The output gap follows the familiar pattern. Italy had budget deficits throughout the observation period which exceeded the 3% threshold from 2009-2011. Its cyclically-adjusted component was above the threshold from 2008-2010 while the cyclical deficit never exceeded the 3% limit. The excessive deficit procedure initiated in 2009 was closed in 2013.

Figure 4 shows the results for Spain. Again, the output gap was positive before 2009 and negative from 2009 onwards. Compared with France, Italy and the euro area average, the recession was much more severe in Spain with output being 8%

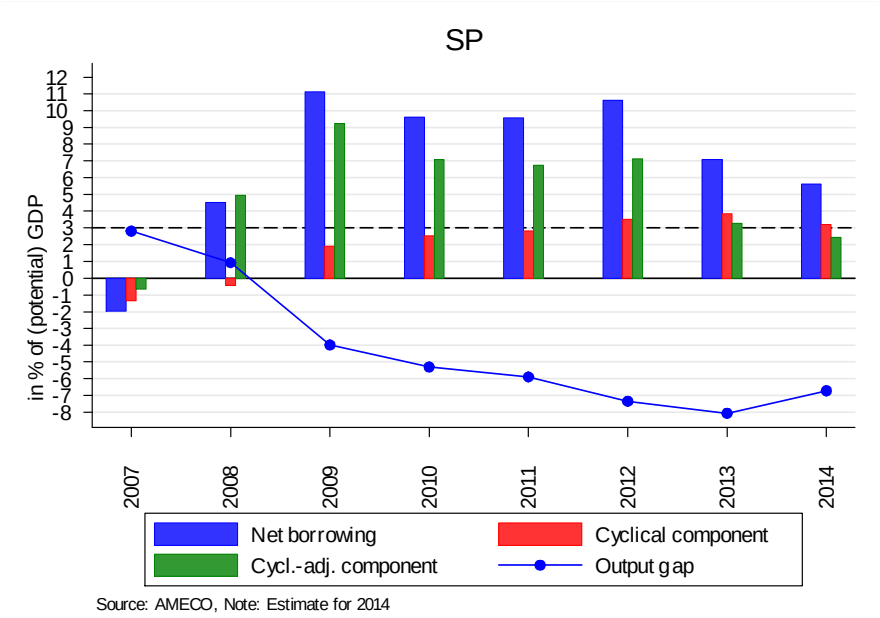
Figure 3: Net borrowing, cyclical and cyclically-adjusted components: Italy



below potential in 2013. The cyclical deficit was above 3% in 2012 and 2013 and is projected to remain at that level in 2014.[11] However, Spain has been running huge budget deficits well above the 3% threshold since 2008 even when accounting for the business cycle. The excessive deficit procedure initiated in 2009 imposes a deadline for correction of the deficit in 2016.

[11] Figure 36 in the Appendix shows that the cyclical deficit has been above the 3% threshold since 2011 when the calculation of the cyclical deficit is based on the most recent estimate of the semi-elasticity.

Figure 4: Net borrowing, cyclical and cyclically-adjusted components: Spain

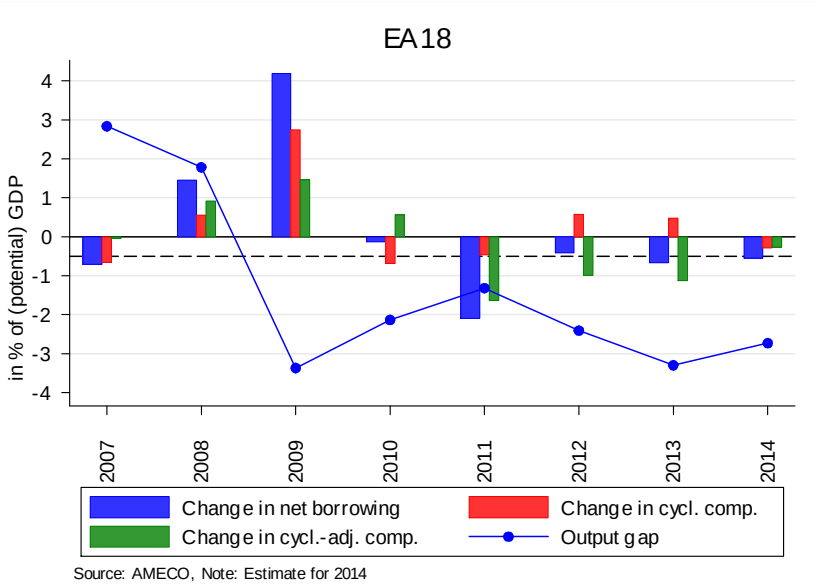


7.1.2 Changes in net borrowing, cyclical and cyclically-adjusted components

In the next step of our analysis, we investigate the change in net borrowing as well as its cyclical and cyclically-adjusted components. Results are presented in Figures 5-8. The dashed horizontal lines indicate the benchmark for the adjustment path (annual reduction in the structural deficit by 0.5% of GDP) in the preventive and corrective arm of the SGP. Note, however, that a consolidation of 0.5% of GDP per year in structural terms is a minimum requirement in the corrective arm of the SGP and that in many cases, a higher fiscal adjustment is necessary to ensure sustainable public finances. The results for the Eurozone as a whole are depicted in Figure 5. The impact of the crisis becomes clearly visible as the target was missed from 2008-2010. Since 2011, the Eurozone as a whole has been back on track but is projected to fall back again in 2014.

Figure 6 shows changes in budgetary deficits in France. As for the whole Eurozone, fiscal policy was expansionary in 2009, with rising cyclical and cyclically-adjusted deficits. Since 2011, France has been reducing its cyclically-adjusted deficit. However, fiscal consolidation measures have not been sufficient to reduce the deficit

Figure 5: Change in net borrowing and cyclical and cycl.-adj. components: EA18



to values below 3% (see Figure 2).

The results for Italy are shown in Figure 7. In Italy, it was mainly the cyclical component which was expansionary when the economy was in a deep recession while, except for 2008, the cyclically-adjusted deficit has been reduced over the sample period.

Figure 8 displays the results for Spain. Due to the crisis, Spain had a huge shock to its (cyclically-adjusted) deficit in 2008/09. Since then, it has reduced its cyclically-adjusted deficit, in particular in 2013. However, as in France the overall budget deficit is still above the 3% deficit limit (see Figure 4).

Figure 6: Change in net borrowing and cyclical and cycl.-adj. components: France

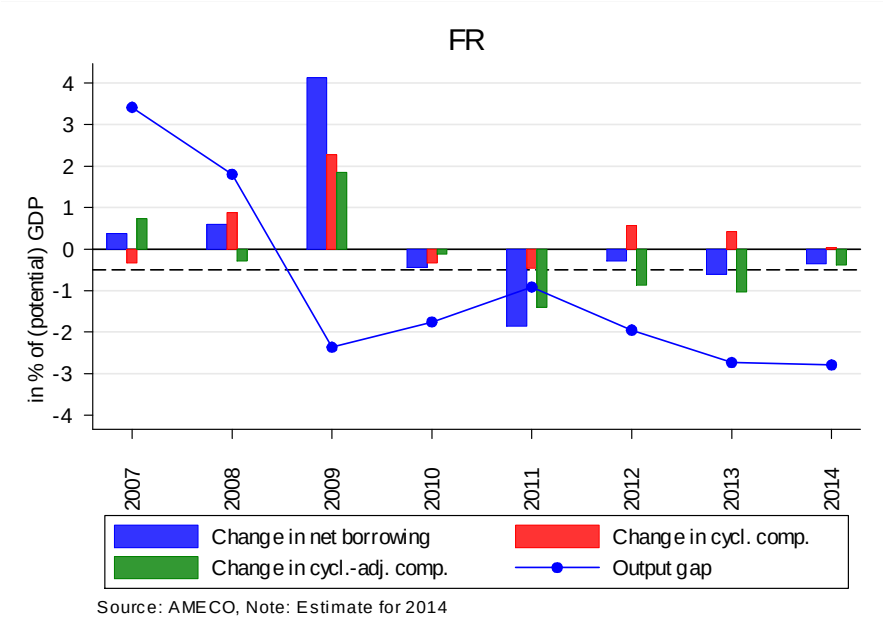


Figure 7: Change in net borrowing and cyclical and cycl.-adj. components: Italy

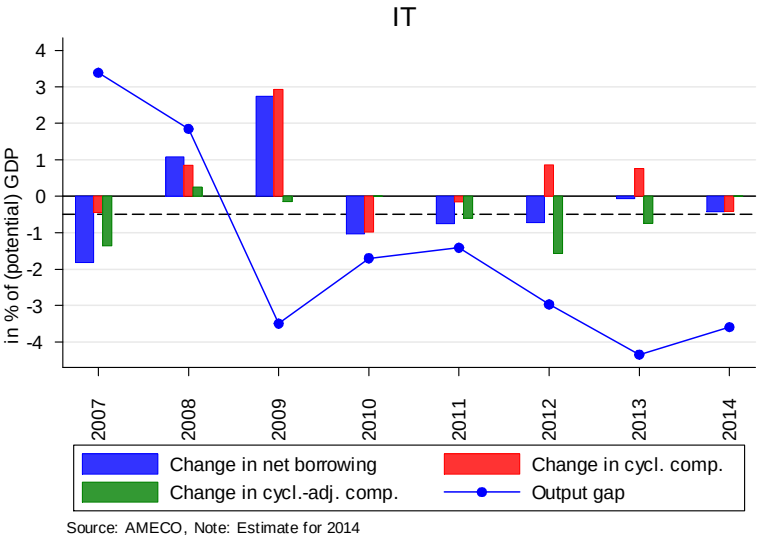
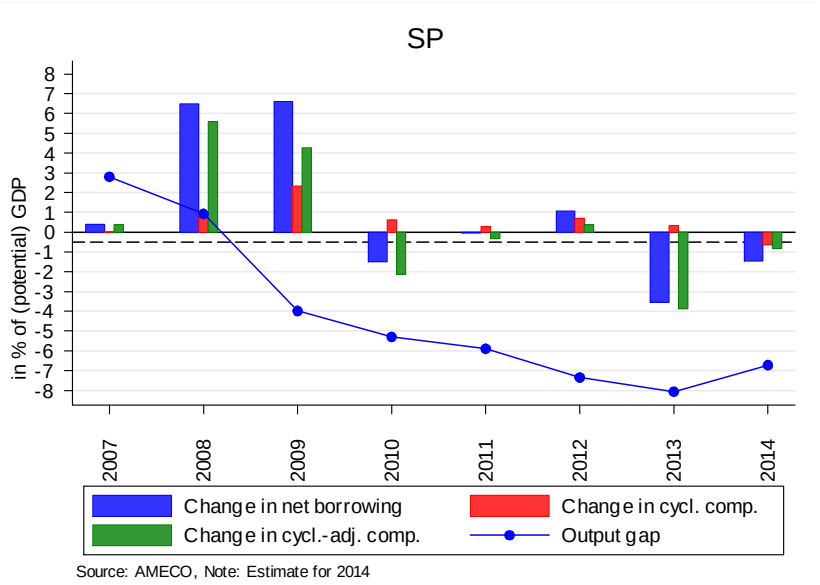


Figure 8: Change in net borrowing and cyclical and cycl.-adj. components: Spain

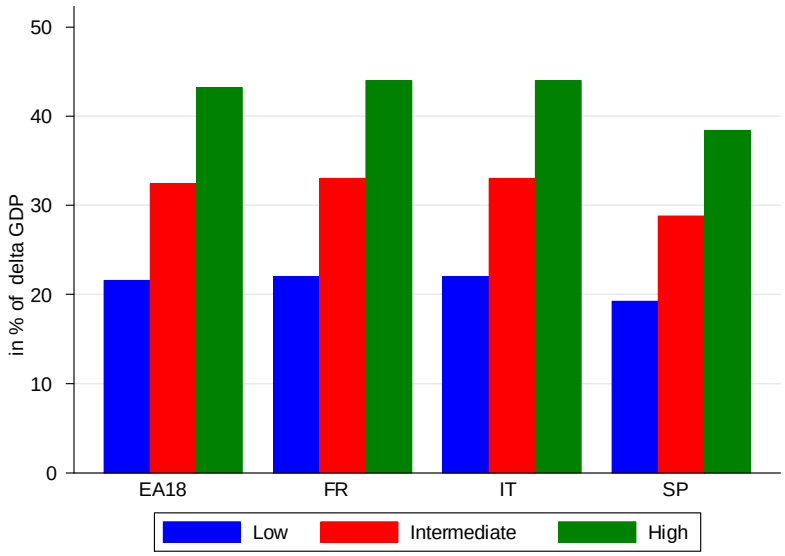


Source: AMECO, Note: Estimate for 2014

7.1.3 The role of automatic stabilizers during the crisis

In the next part of our analysis, we investigate the potential for automatic stabilization to cushion macroeconomic shocks. In order to do so, we multiply the semi-elasticity, i.e., the reaction of the budget balance-to-GDP ratio to a cyclical change in GDP, with a fiscal multiplier. In line with the literature (Boussard et al. (2012), European Central Bank (2012), Roeger and Veld (2010)), we choose three values: low (0.4), intermediate (0.6) and high (0.8). The results are shown in Figure 9. Given that the semi-elasticities for France, Italy and Spain as well as the Eurozone as a whole are rather similar, most of the variation is coming from the size of the fiscal multiplier. The potential for automatic stabilization varies between around 20% (low multiplier) over around 30% (medium case) to roughly 40% (high multiplier case). Figure 38 in the Appendix shows results for automatic stabilizers based on updated semi-elasticities. The cyclical reaction of the budget is somewhat stronger (weaker) in the euro area, France and Spain (Italy) when the new estimates are applied.

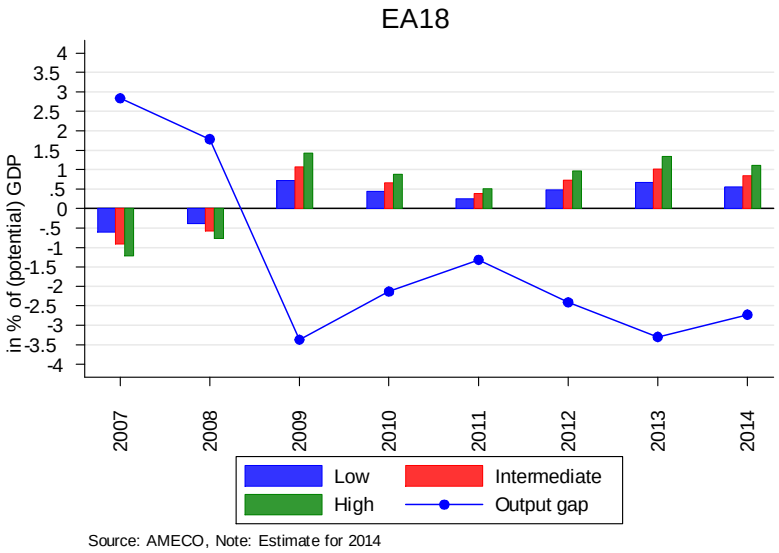
Figure 9: Automatic Stabilization: semi-elasticity times fiscal multiplier



Next, as another measure of macro stabilization over the period 2007-2014, we multiply the cyclical deficit, i.e., semi-elasticity times output gap, with the fiscal multiplier (again with three cases). The results for the Eurozone aggregate is dis-

played in Figure 10. It shows that relative to a counterfactual without automatic stabilizers, the economic upswing has been dampened in 2007 and 2008 while GDP has been stabilized from 2009 onwards. Strongest automatic stabilization effects were achieved in 2009 and 2013 when Eurozone GDP has been stabilized by 0.7-1.4%, depending on the size of the fiscal multiplier.

Figure 10: Automatic Stabilization from 2007-2014: EA18

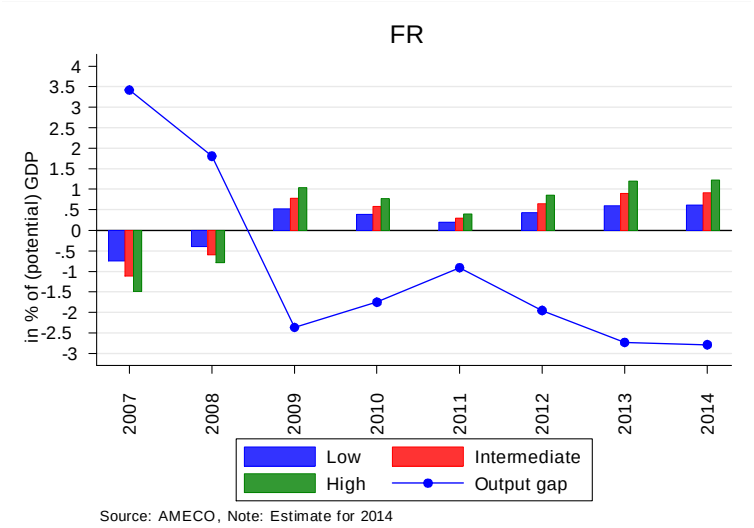


Similar results are obtained for France, Italy and Spain (Figures 11 - 13) where automatic stabilization effects peaked in 2013/2014. In France and Italy, output has been stabilized by 0.6-1.2% and 1.0-1.9%, respectively. Due to the large negative output gap in Spain in the more recent years of the crisis, automatic stabilizers played a more important role in Spain (output stabilization of 1.5-3.0%) than in France and Italy.[12]

The automatic stabilization effects presented above can next be used to calculate counterfactual growth rates of GDP. Figures 14 - 17 show observed (black bars) as well as counterfactual GDP growth rates in the absence of automatic stabilizers given a low, medium and high value for the fiscal multiplier (blue, red and green bars). Automatic stabilizers have had a growth-enhancing effect in the euro area,

[12] Figure 39 in the Appendix shows results based on updated semi-elasticities. For the Eurozone, we find stabilization effects up to 1.5%. Automatic stabilization effects increase up to 1.3% in France and up to 3.5% in Spain, but are slightly lower in Italy (up to 1.8%).

Figure 11: Automatic Stabilization from 2007-2014: France



France, Italy and Spain since 2009 due to negative output gaps. For instance, the 2009 drop in GDP would have amounted to 5.9 per cent in the euro area (upper bound estimate of the fiscal multiplier) compared with an observed reduction of 4.4 per cent. Our results suggest that counterfactual growth gaps in 2009 in France (-4.2 vs. -3.1 per cent), Italy (-7.0 vs. -5.5 per cent) and Spain (-5.4 vs. -3.8 per cent) are of similar magnitude.[13]

[13] See Figure 40 in the Appendix for results based on updated semi-elasticities.

Figure 12: Automatic Stabilization from 2007-2014: Italy

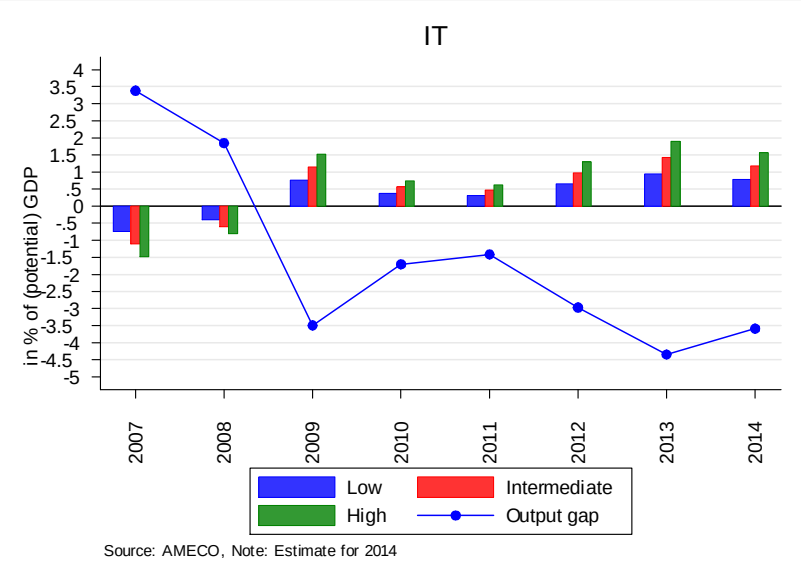


Figure 13: Automatic Stabilization from 2007-2014: Spain

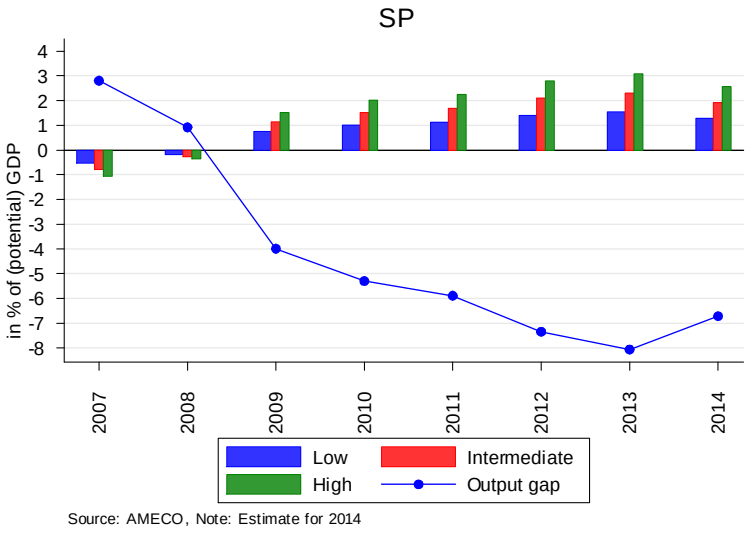


Figure 14: Counterfactual growth rates 2007-2014: EA18

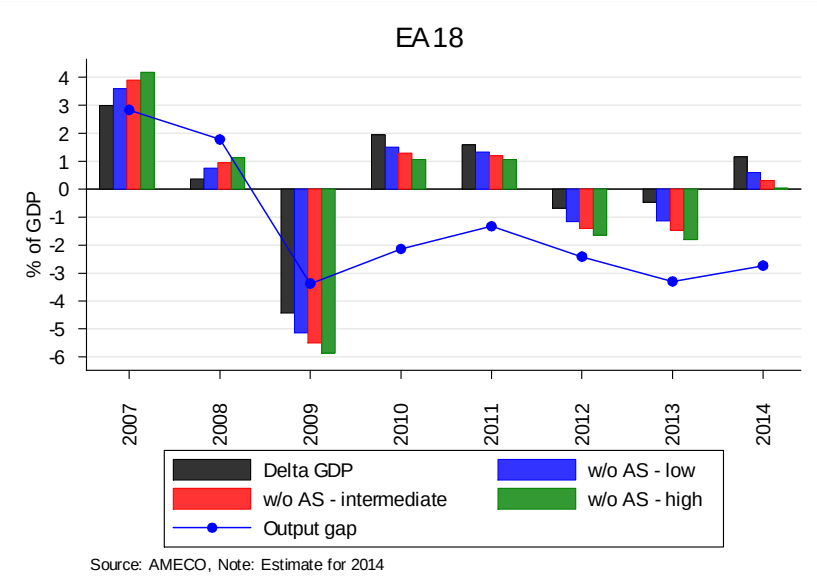


Figure 15: Counterfactual growth rates 2007-2014: FR

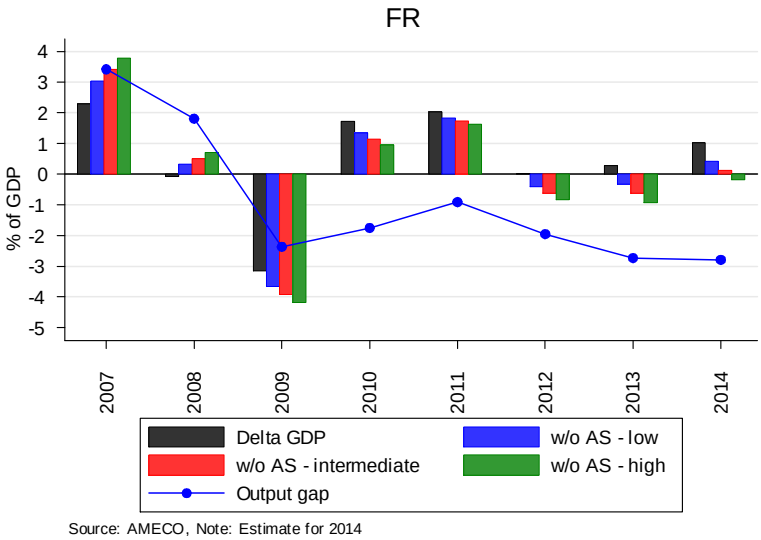


Figure 16: Counterfactual growth rates 2007-2014: IT

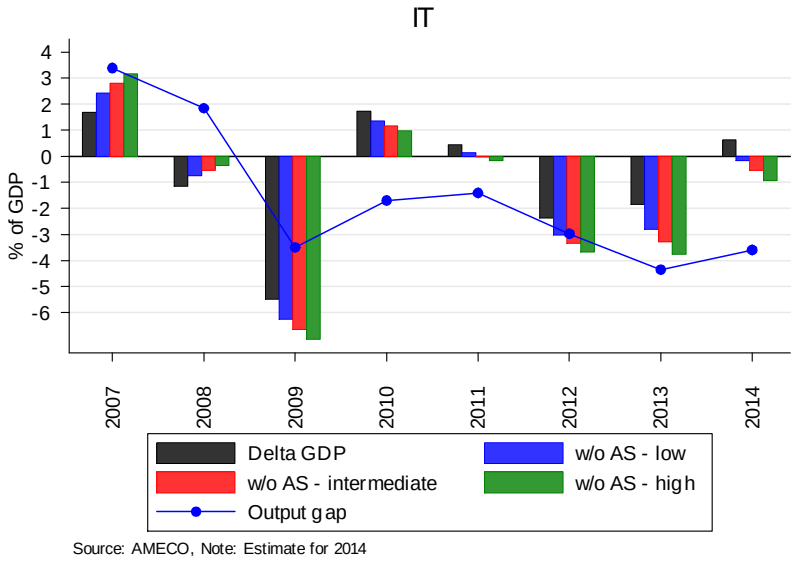
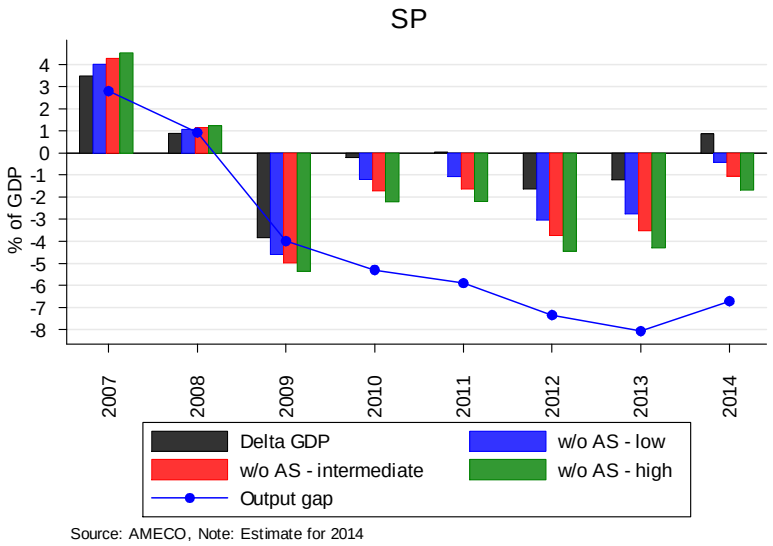


Figure 17: Counterfactual growth rates 2007-2014: SP



7.2 Fiscal policy in real-time

In the following, we examine the development of the output gap and several fiscal variables in real-time and compare these estimates with the most recent ex-post values. Our focus in this subsection is on the revisions in these variables, whether one can identify patterns in the way the real-time data are corrected in following periods, and on automatic stabilization effects in real-time.

7.2.1 Output gap and (components of) net borrowing

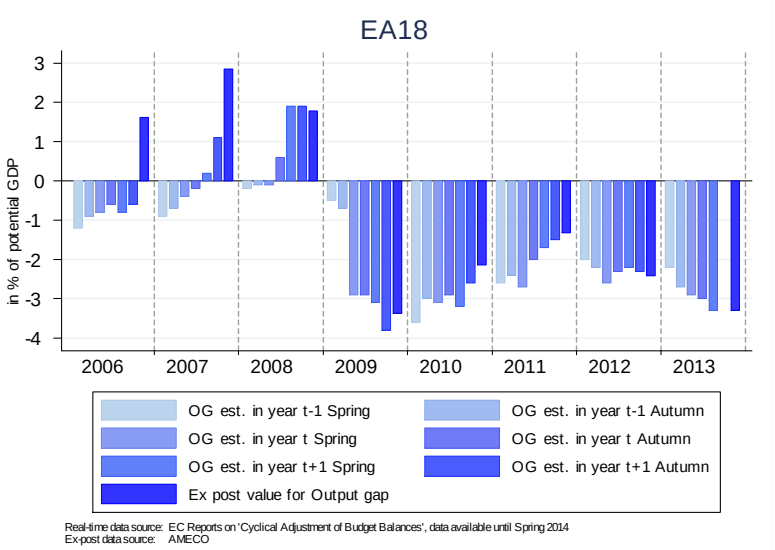
In section 5, we showed that both the cyclically-adjusted balance (CAB), which is a central feature of fiscal policy coordination in the euro area, and the cyclical component of the budget (CC), which we use as a proxy for automatic fiscal stabilization, depend on the deviation of output from its potential. Potential output and hence the output gap in real-time can be estimated either via a purely econometric approach utilizing e.g. a Hodrick-Prescott filter, or by estimating production functions. Real-time and ex-post data in this study are based on the latter approach.[14] Real-time data are collected from European Commission reports on 'Cyclical Adjustment of Budget Balances' published in spring and autumn of a given year. We compare ex-post values of the output gap (downloaded from the AMECO database and based on the spring report 2014) in a given year t with real-time data spanning the period from $t-1$ (spring report) to $t+1$ (autumn report). Hence, in total we have six real-time data points for a given year as well as the ex-post value.

Figures 18-21 plot estimated output gaps for the EA18, France, Italy and Spain over the period 2006-2013. Note that the real-time estimate from autumn 2014 for the output gap in 2013 has not been available at the time of writing of this report. Figure 18 shows that for the euro area as a whole, there was a tendency to estimate the output gap in real-time lower than from an ex-post perspective from 2006-2008. In 2009, real-time projections of the output gap were initially higher (estimates from spring 2008 until spring 2010), but finally lower than ex-post estimates (autumn 2010). For 2010 and 2011, we find that real-time estimates tend to be lower again, while no clear pattern emerges for 2012. For 2013, they tend to be higher than the ex-post estimate. We find similar deviations of real-time from ex-post estimates in France and Italy. In France, real-time data for the output gap tend to be lower

[14] In July 2002, the Ecofin council adopted a report from the Economic Policy Committee which advocated the use of a production function approach (see Economic Policy Committee (2004)).

also in 2012 and hence in 6 out of 8 years. Similar trends are found for Spain, but only for the period 2006-2009. From 2010-2013, real-time estimates of the output gap tend to be higher than ex-post estimates.[15] Some words of caution are in order with regard to our analysis of real-time and ex-post output gaps. First, our analysis includes only a small sample of member states which does not allow us to perform statistical tests. Second, it has to be empasized that ex-post estimates of the output gap are prone to revisions as well. The probability increases the closer the time gap between real-time and ex-post estimates. Third, it has to be taken into account that output gap projections (at least) in $t-1$ are endogenous as pessimistic forecasts can lead to (fiscal and monetary) policy responses with the aim to boost the economy.[16]

Figure 18: Output gap in real-time and ex-post: EA18



[15] The analysis of Kempkes (2012) for 15 EU countries for the period 1996-2011 suggests that real-time data output gaps tend to be downward biased.

[16] Note that comparisons between real-time and ex-post output gaps have also to be treated with caution because of methodological changes in the calculation of output gaps.

Figure 19: Output gap in real-time and ex-post: France

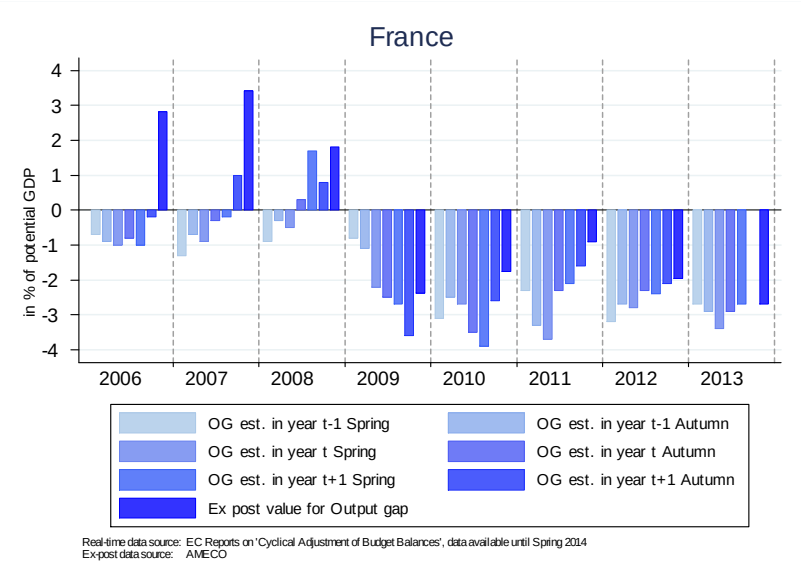


Figure 20: Output gap in real-time and ex-post: Italy

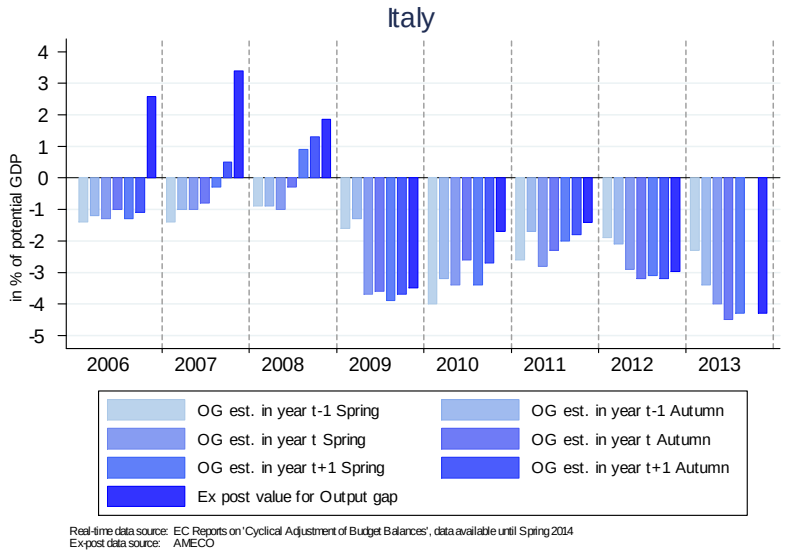
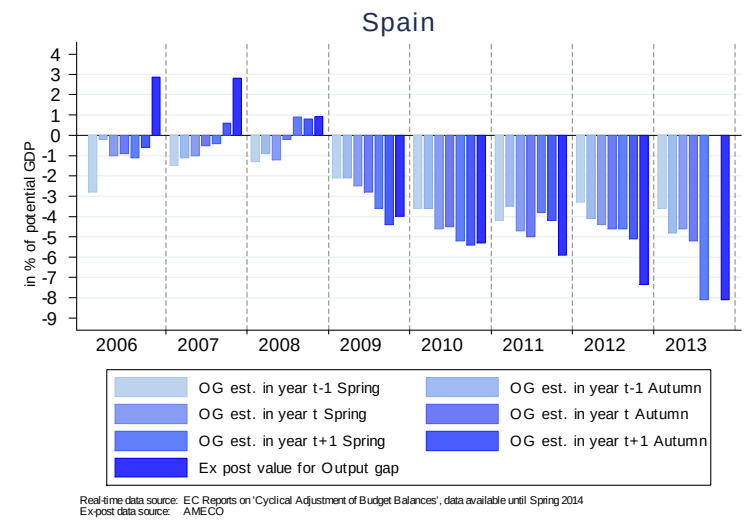


Figure 21: Output gap in real-time and ex-post: Spain



Revisions of real-time output gap estimates have important implications for the actual stance of fiscal policy. Real-time and ex-post values for net borrowing as well as its cyclical and cyclically-adjusted component are presented in Figures 22-25 (see Figure 41 for results based on new semi-elasticities). Note that as in section 7.1, the following graphs show estimates for net borrowing and its components, i.e., positive (negative) values indicate deficits (surplusses). Figures 22-25 show that the cyclical component of net borrowing is higher in real-time if real-time estimates of the output gap are lower than the ex-post estimate. As a consequence, the cyclically-adjusted component of net borrowing is lower in these years. The opposite is true if real-time estimates of the output gap are higher than the ex-post estimate. Our results suggest that the overall tendency in the euro area, France, Italy and, to some extent also Spain, has been to estimate the cyclical component of net borrowing in real-time higher than its realization from a backward-looking perspective.

Figure 22: Budget balance real-time and ex-post: EA18

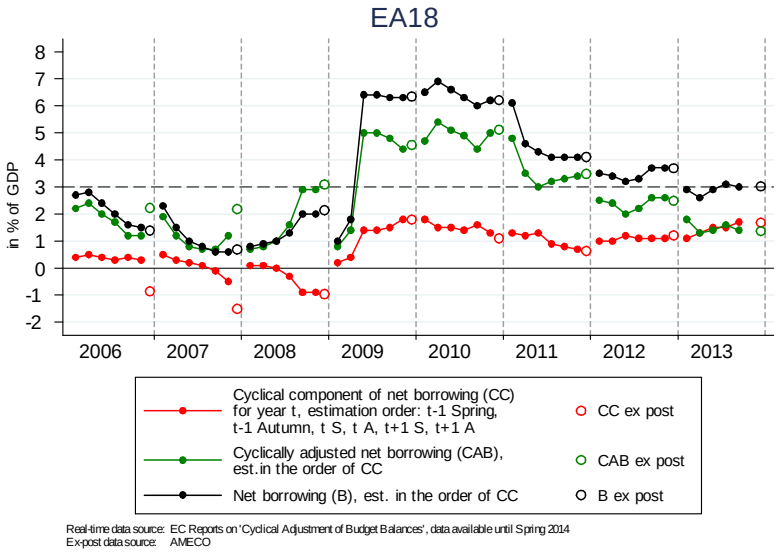


Figure 23: Budget balance real-time and ex-post: France

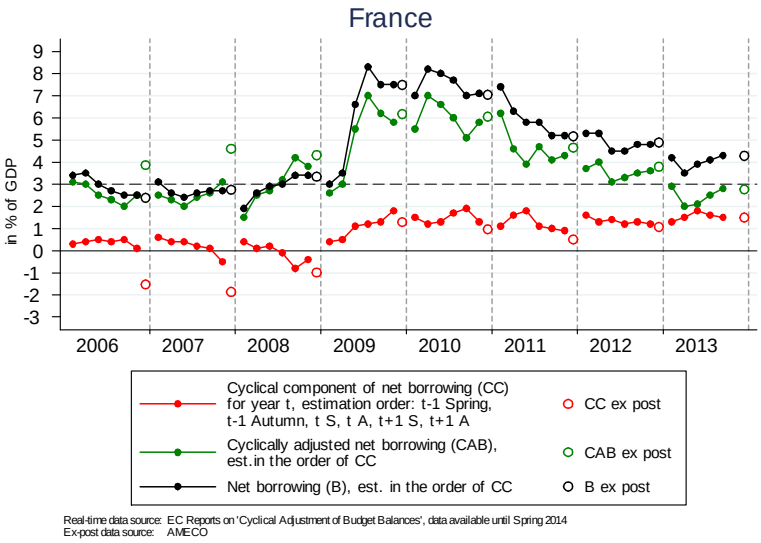


Figure 24: Budget balance real-time and ex-post: Italy

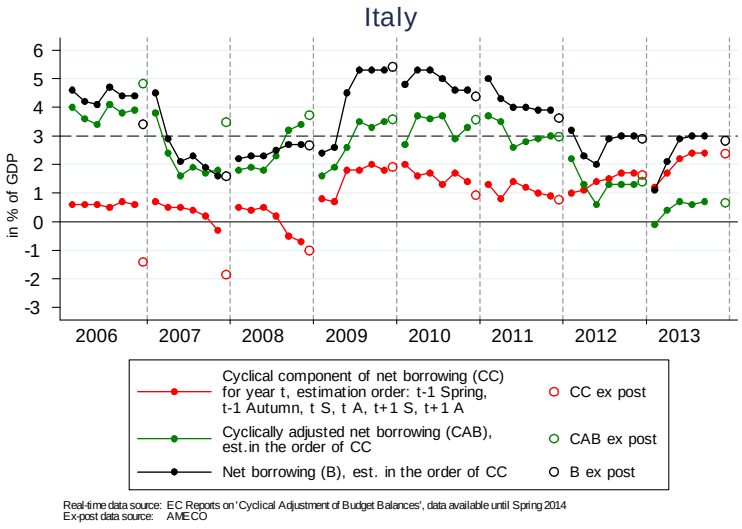
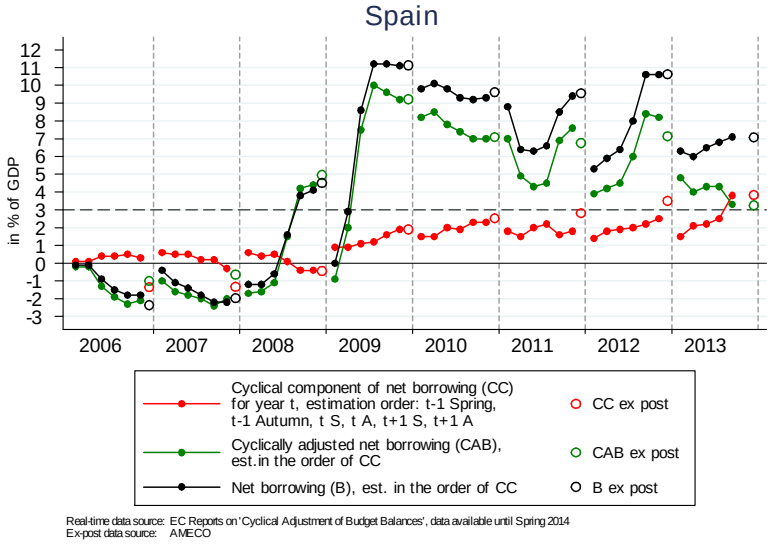


Figure 25: Budget balance real-time and ex-post: Spain



7.2.2 Automatic stabilizers and fiscal governance under the SGP

To measure the impact of automatic stabilizers on the economy for the period 2006 - 2013 in real-time, we rely on the framework presented in section 5 and applied in 7.1 based on ex-post data. Figures 26-29 (as well as Figure 42 in the Appendix based on new semi-elasticities) show automatic stabilization effects which are based on three different values for the fiscal multiplier: 0.4 (dark blue bars), 0.6 (intermediate) and 0.8 (light blue bars). These graphs confirm our previous finding that in most years of our sample period, real-time estimates for automatic stabilization tend to be higher than ex-post realizations. This implies that member states did have more room for discretionary fiscal policy in real-time relative to a situation with ex-post unchanged estimates of the output gap. A further important result of our analysis is that automatic stabilizers significantly contributed to the stabilization of the economy when the Eurozone was hit by the crisis in 2009. Relative to a counterfactual without automatic stabilizers, the output in 2009 was stabilized by roughly 0.7-1.4% in the Eurozone, 0.5-1% in France and by 0.8-1.5% in Italy and Spain. Importantly, automatic stabilizers were effective in stabilizing demand and output also in the following years when fiscal consolidation measures were implemented. In the period 2010-2013, output in the Eurozone has been stabilized by 0.5-1.5% per year depending on the year and the assumed value for the fiscal multiplier due to the cyclical reaction of the budget. Our analysis reveals even higher values for Italy and in particular Spain where automatic stabilizers stabilized annual output by up to 2-3% in recent years.

Our descriptive analysis has shown that automatic stabilizers played a quantitatively important role for the stabilization of the overall economy, irrespective if measured in real-time or ex-post. Without automatic stabilizers, output growth would have been substantially lower since 2009. For instance, the growth gap in 2009 would have amounted to approximately 1.5 percentage points assuming a fiscal multiplier of 0.8. Moreover, the workings of automatic stabilizers have not been restricted by the SGP. Even though France, Italy and Spain have reduced their budget deficits since 2010, automatic stabilizers did provide macroeconomic stabilization also in recent years as shown in Figures 26-29. Without the cyclical reaction of the budget to the cycle, the overall fiscal stance would have been much more restrictive in these member states.

Figure 26: Automatic Stabilization real-time and ex-post: EA18

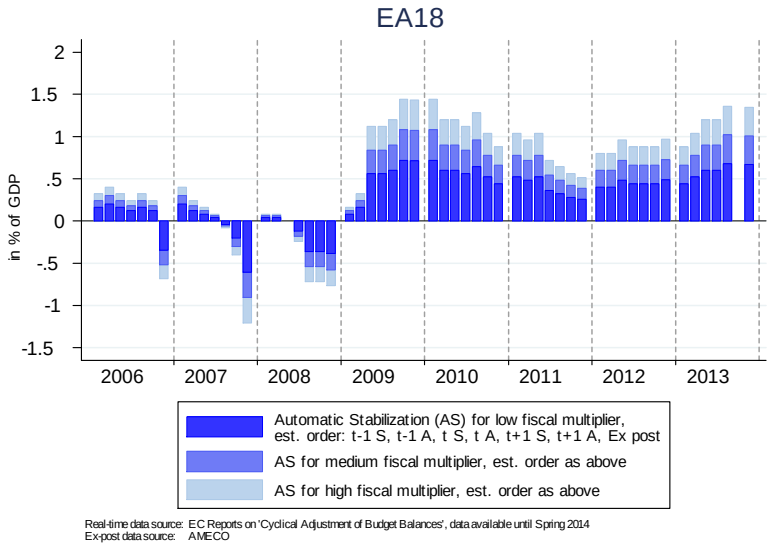


Figure 27: Automatic Stabilization real-time and ex-post: France

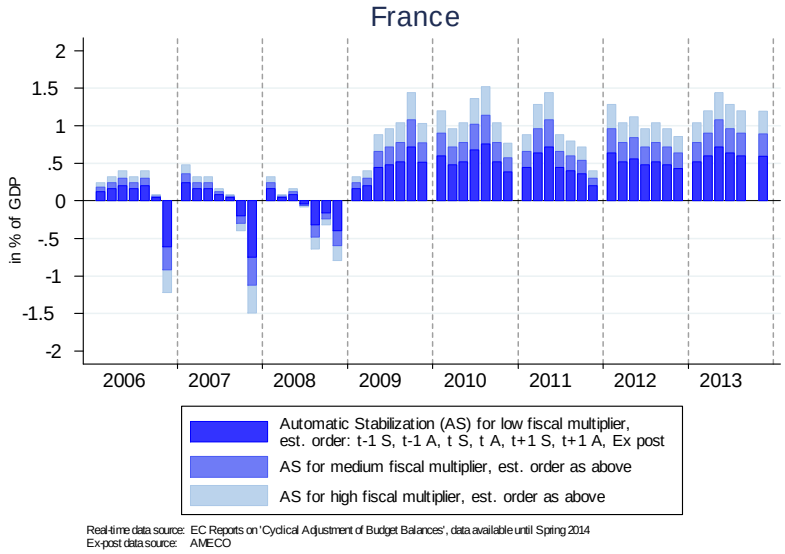


Figure 28: Automatic Stabilization real-time and ex-post: Italy

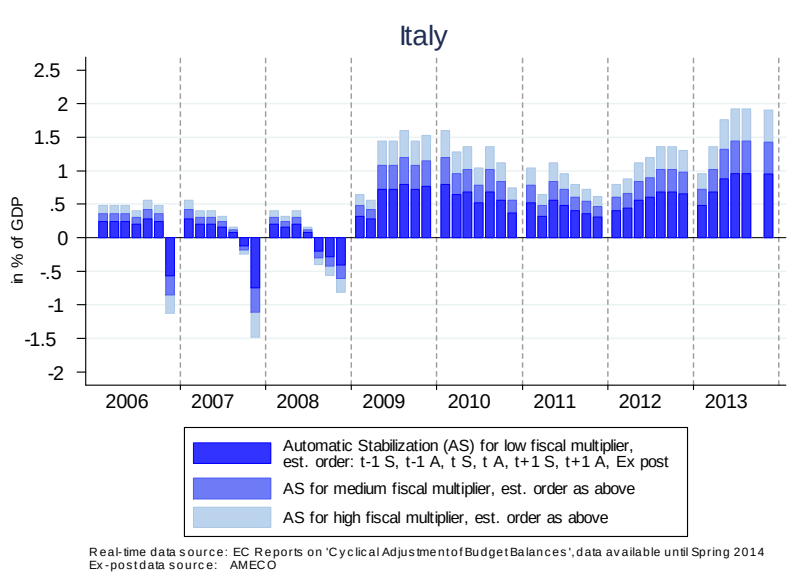
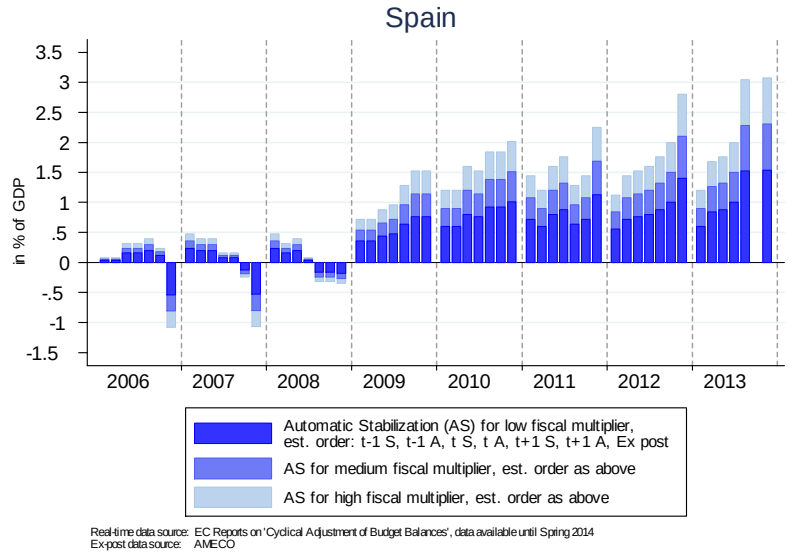


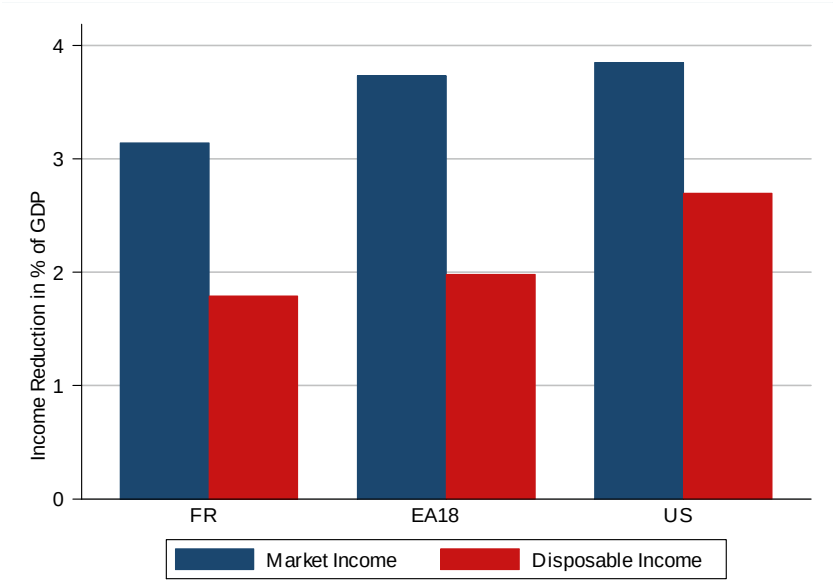
Figure 29: Automatic Stabilization real-time and ex-post: Spain



7.3 Automatic stabilizers in steady state

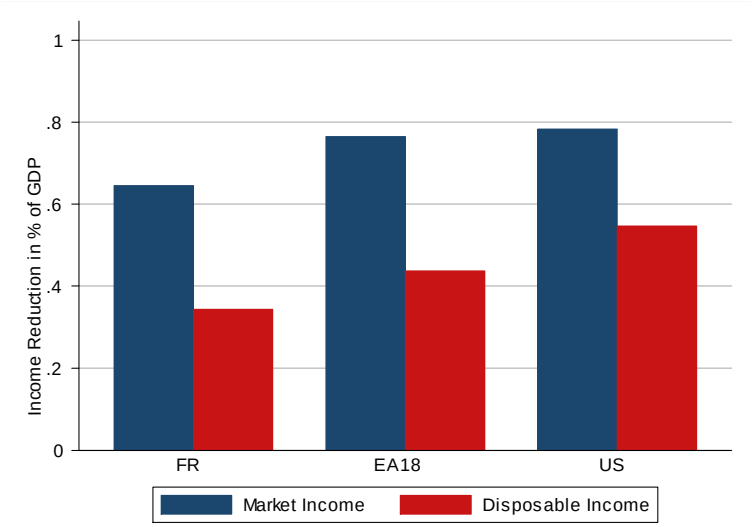
In this section, we present the results from the micro data analysis of automatic stabilizers in steady state. In the first step of our analysis, we look at the implied income reductions of our two shock scenarios. Figure 30 shows the reductions in market and disposable incomes for the large shock scenario comparable to the recent recession as a percentage of GDP. Recall that in this scenario, the unemployment rate increases by 5 percentage points and all remaining market incomes decrease by 5%. This translates to an overall reduction in market (disposable) incomes of 3.1% (1.8%) for France, 3.7% (1.9%) for the Eurozone on average and 3.9% (2.7%) for the US.

Figure 30: Income reduction - large shock



Obviously, the income reductions are smaller in case of the small shock scenario which is based on average historical recessions. Figure 31 displays the results. In this case, market (disposable) incomes are reduced by 0.6% (0.3%) in France, 0.8% (0.4%) in the Eurozone on average and 0.8% (0.6%) in the US. Interestingly, compared with the US, tax and transfer systems in the Eurozone (and also in France) absorb a larger share of the shock on gross income both in the large and small shock scenario. The difference between market and disposable income reductions is a measure for automatic stabilization which we analyze next.

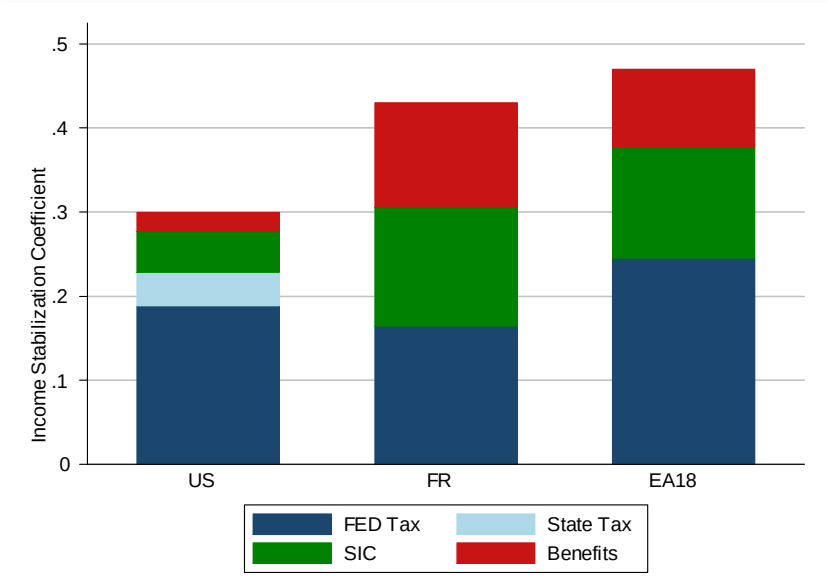
Figure 31: Income reduction - small shock



How do these income reductions translate into automatic stabilization? Figures 32 and 33 present the income stabilization coefficients for the large and small shock scenario, respectively. Both graphs show the coefficients for the US, the euro area 18 countries and France. The coefficients are decomposed into the contributions of income taxes (federal and state level for the US), social security contributions (payroll taxes) and benefits (see Tables 1 and 2 in the Appendix). Note that both the small and large shock scenario lead to almost identical results for the stabilization coefficients.

The income stabilization coefficient measures how much of a shock to gross incomes (through unemployment or the simulated proportional reduction) would be absorbed by automatic stabilizers in the tax and transfer system. We find a value of 47% for the Eurozone and 43% for France. In line with previous findings (Dolls et al. (2012)), income stabilization is lower in the US (30%) than in France and Eurozone countries on average. This difference can be explained with the importance of unemployment benefits (duration and generosity) which account for a larger part of stabilization in France and the euro area member states. Yet, taxes and social insurance contributions are the dominating factors which drive the stabilization coefficient. Typically, taxes have a stronger stabilizing role than social security contributions because of the progressivity of the income tax. France is an interesting

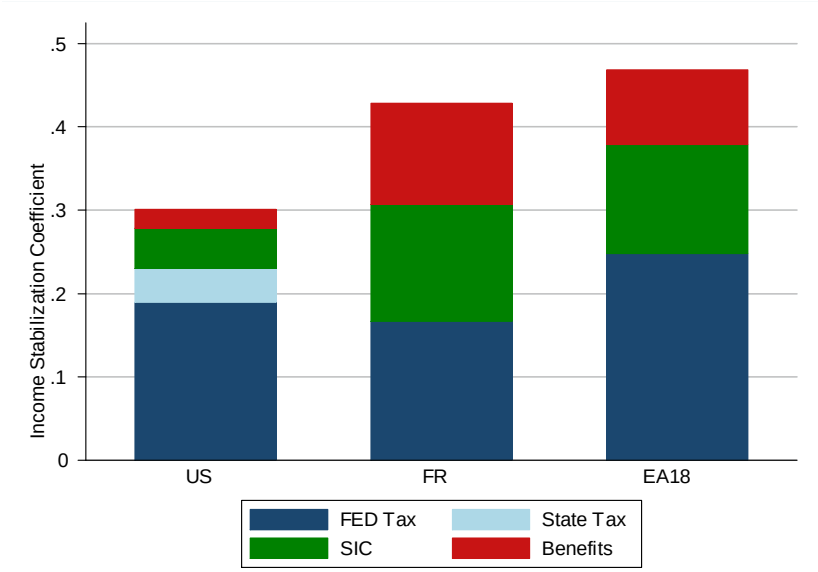
Figure 32: Income stabilization coefficient - large shock



case as it has a very progressive tax schedule which, however, is levied on a very narrow tax base. This leads to a rather low level of income stabilization through the income tax, whereas the stabilizing role of social security contributions is much more important in France.

When looking only at the personal income tax, it is noteworthy that the values for the US (federal and state level income tax combined) are higher than for France and almost as high as the Eurozone average. To some extent, this qualifies the widespread view that tax progressivity is higher in Europe (e.g., Alesina and Glaeser (2004) or Piketty and Saez (2007)). Of course, this can be partly explained by the considerable heterogeneity within Europe. But still, only a few Eurozone countries have higher income stabilization coming from the personal income tax.

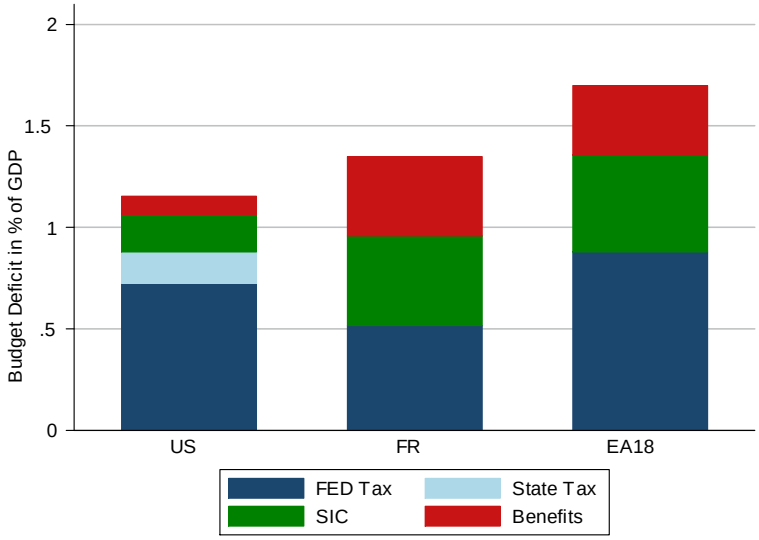
Figure 33: Income stabilization coefficient - small shock



In the next step of our analysis, we investigate the impact of the two shock scenarios on budget deficits. Note that these are contemporaneous effects occuring in the year of the shock so that budgetary implications with regard to the SGP can be derived. Here, the absolute values differ between the two scenarios whereas the relative differences between countries are basically unaffected. Due to lower stabilization, the budgetary impact is lower in the US than in the Eurozone. In case of the large shock (Figure 34), the US would experience a budget deficit of 1.14% of GDP, whereas the values for the Eurozone (France) are 1.7% (1.35%). Again, the largest share of the budget deficit is coming from losses in income tax revenues. For the smaller shock scenario (Figure 35), the budgetary effects are 0.23% for the US, 0.28% for France and 0.35% for the Eurozone.

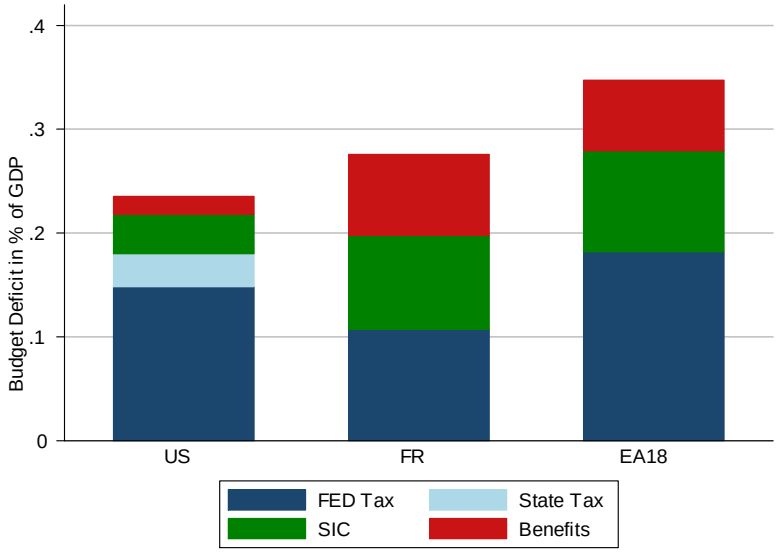
How do the results presented in this subsection relate to those in the backward-looking analysis in subsections 7.1-7.2? Dolls et al. (2012) have shown for a sample of 19 European Union member states and the US that the income stabilization coefficient is positively correlated with macro measures for automatic stabilization such as the semi-elasticity. Both the income stabilization coefficient and the semi-elasticity measure to what extent macroeconomic shocks are cushioned by the cyclical reaction of the budget and hence, are conceptually related. This allows us to estimate

Figure 34: Budgetary effects - large shock



(counterfactual) automatic stabilization effects in the Eurozone if the Eurozone had US-level automatic stabilizers. Figure 43 in the Appendix shows that automatic stabilization effects during the crisis would have been significantly lower. With US-level automatic stabilizers, Eurozone GDP would have been stabilized by only 0.4-0.8% in 2009 rather than by 0.7-1.4% as documented in subsection 7.1. Stabilization gaps are of similar magnitude in the other years of our sample period.

Figure 35: Budgetary effects - small shock



8 Conclusions

The Great Recession and the resulting European debt crisis revived a debate about deeper fiscal integration in the EMU. Several observers argue that because some EMU member states lost access to private capital markets, they could not let their national automatic stabilizers work. Another argument is that the SGP does not give member states enough room to achieve macroeconomic stabilization through fiscal policy. Before the potential added value of any cyclical shock absorber at the euro area level can be assessed, it is of crucial importance to shed light on the stabilizing effects of national fiscal policy under the current framework of fiscal governance. This has been the purpose of this study. We have analyzed to what extent fiscal policy in general and automatic stabilizers in particular are able to stabilize output in the Eurozone member states, both for the recent crisis period as well as in steady state, i.e., when member states have achieved their medium-term objectives. A key result of our analysis is that automatic stabilizers significantly contributed to macroeconomic stabilization in the Eurozone as well as in France, Italy and Spain over the period 2007-2014. Relative to a situation without automatic stabilizers, output in the euro area has been stabilized by 0.7-1.4% due to the cyclical reaction of the budget. We find similar stabilization effects in France and Italy and even

higher values for Spain (up to 3%) due to large negative output gaps. Moreover, GDP growth in the absence of automatic stabilizers would have been substantially lower in recent years. For example, the 2009 drop in Eurozone GDP would have amounted to 5.1-5.9 per cent rather than 4.4 per cent without the cushioning effect of automatic stabilizers. A main conclusion of this part of the study is that the SGP does not put a break on the workings of automatic stabilizers.

In addition, we have compared the effectiveness of automatic stabilizers in the euro area, France and the US in steady state to provide macroeconomic stabilization. Our analysis reveals that the cyclical reaction of the budget to the cycle is much more pronounced in the euro area and in France than in the US. We find that current tax and transfer systems - based on legislation from 2013 - absorb roughly 47% of combined income and unemployment shocks in the Eurozone, 43% in France and only 30% in the US. Relating our steady-state estimates of automatic stabilizers to the recent crisis period, we show that with US-level automatic stabilizers output stabilization in the Eurozone would have amounted to only 0.4-0.8% in 2009 which is considerably lower than actual automatic stabilization (0.7-1.4%).

Our results have important implications for the debate on further fiscal integration in Europe. Besides the concern of many observers that a cyclical shock absorber for the Eurozone such as a common unemployment insurance system raises several issues, e.g., the risk of permanent transfers across member states and moral hazard (Dolls et al. (2014)), the findings of this study need to be taken into account for an assessment of potential additional stabilization effects. Our analysis has shown that the SGP does indeed leave room for fiscal policy to stabilize the business cycle.

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A Appendix:

Table 1: Income stabilization coefficients large shock

	TAU	FEDTAX	STTAX	SIC	BEN
FR	0.430	0.164	0	0.141	0.125
EA18	0.470	0.245	0	0.131	0.093
US	0.300	0.19	0.040	0.050	0.020

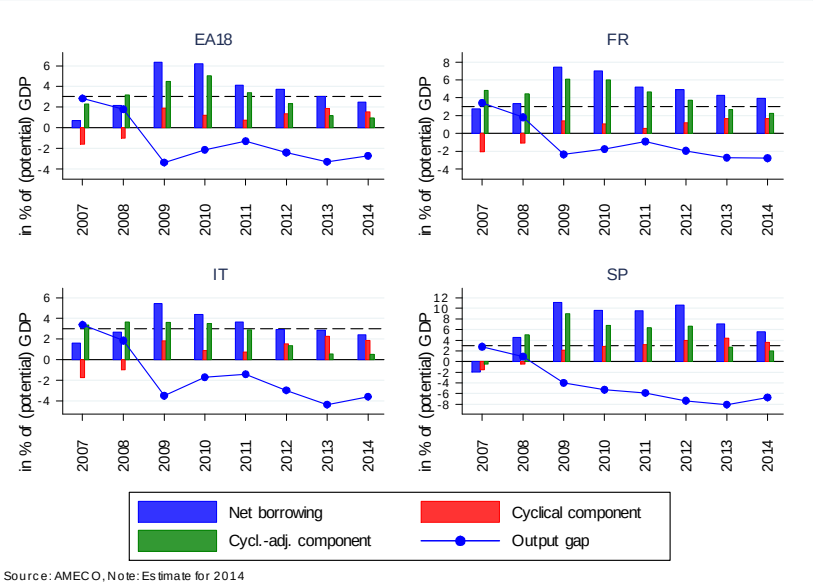
Note: TAU is the overall income stabilization coefficient which can be decomposed into its components FEDTAX, SSTTAX, SIC and BEN (federal and state level income tax, social insurance contributions (payroll taxes) and benefits. Source: Own calculations based on EUROMOD and TAXSIM

Table 2: Income stabilization coefficients small shock

	TAU	FEDTAX	STTAX	SIC	BEN
FR	0.428	0.166	0	0.141	0.121
EA18	0.469	0.248	0	0.131	0.090
US	0.300	0.19	0.040	0.050	0.020

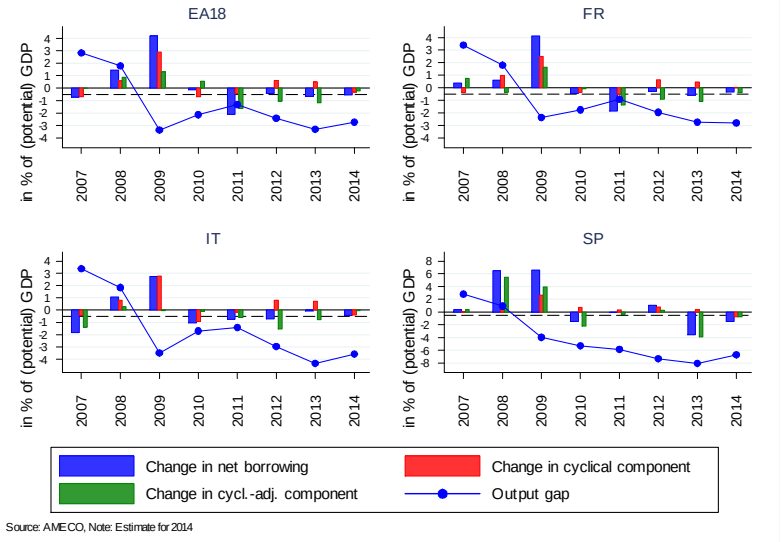
Note: TAU is the overall income stabilization coefficient which can be decomposed into its components FEDTAX, SSTTAX, SIC and BEN (federal and state level income tax, social insurance contributions (payroll taxes) and benefits. Source: Own calculations based on EUROMOD and TAXSIM

Figure 36: Net borrowing and its components - new semi-elasticities



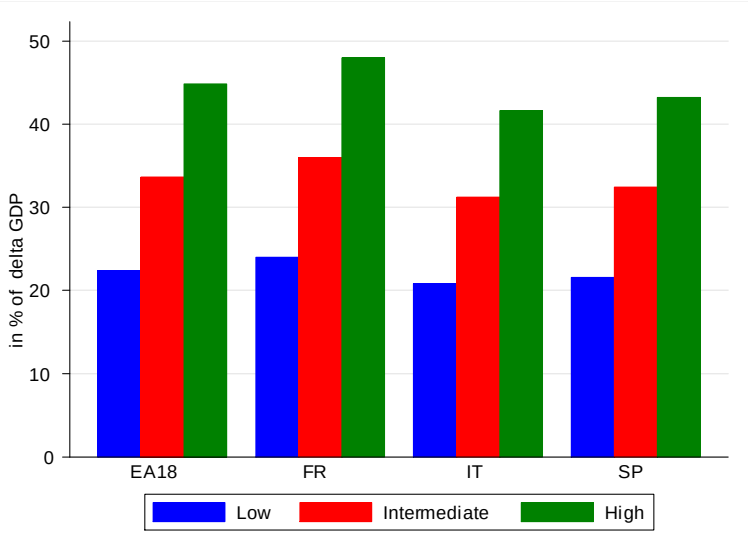
Note: New semi-elasticities based on Mourre et al. (2014).

Figure 37: Change in net borrowing and its components - new semi-elasticities



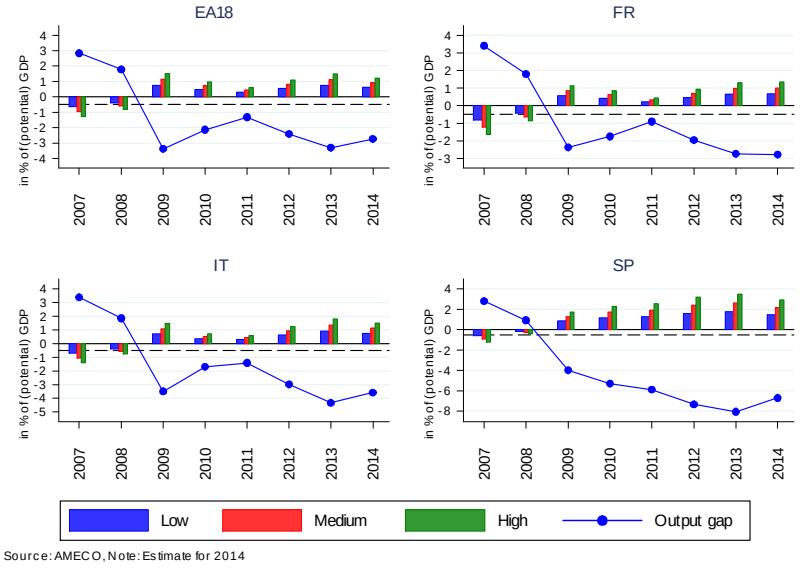
Note: New semi-elasticities based on Mourre et al. (2014).

Figure 38: Automatic Stabilization: new semi-elasticity times fiscal multiplier



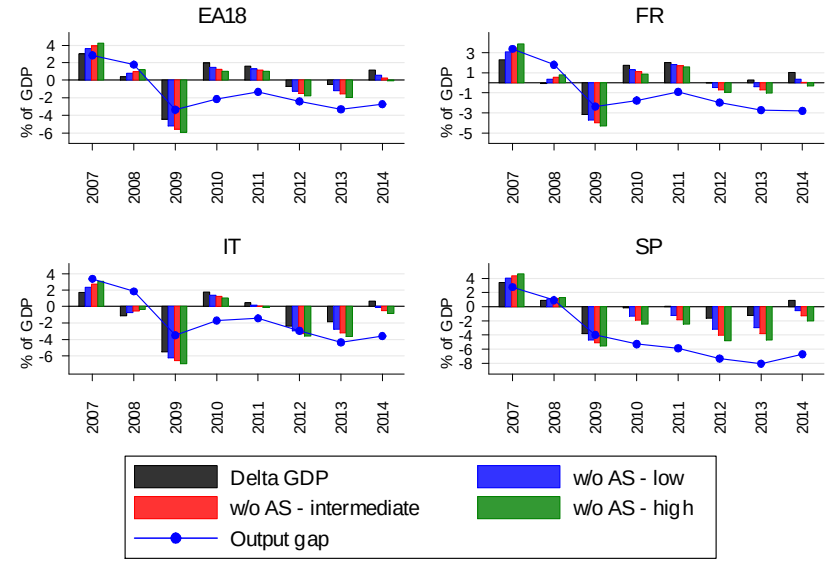
Note: New semi-elasticities based on Mourre et al. (2014).

Figure 39: Automatic Stabilization from 2007-2014 - new semi-elasticities



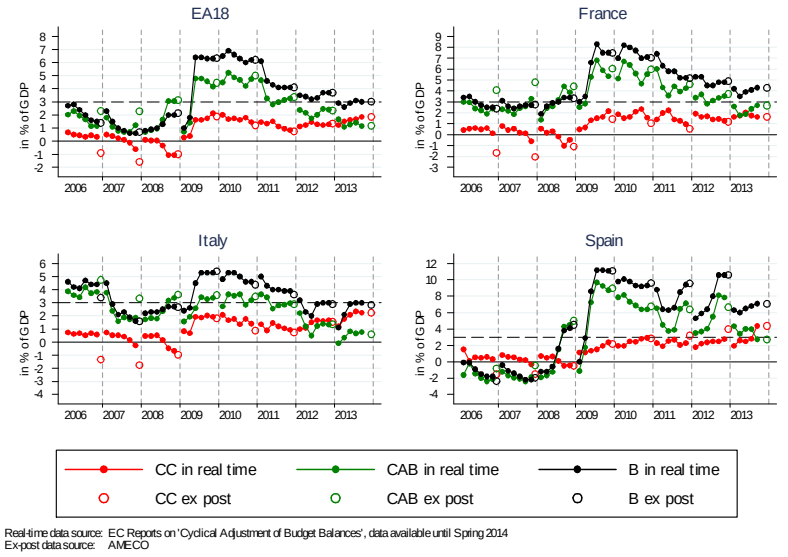
Note: New semi-elasticities based on Mourre et al. (2014).

Figure 40: Counterfactual growth rates 2007-2014 based on new semi-elasticities



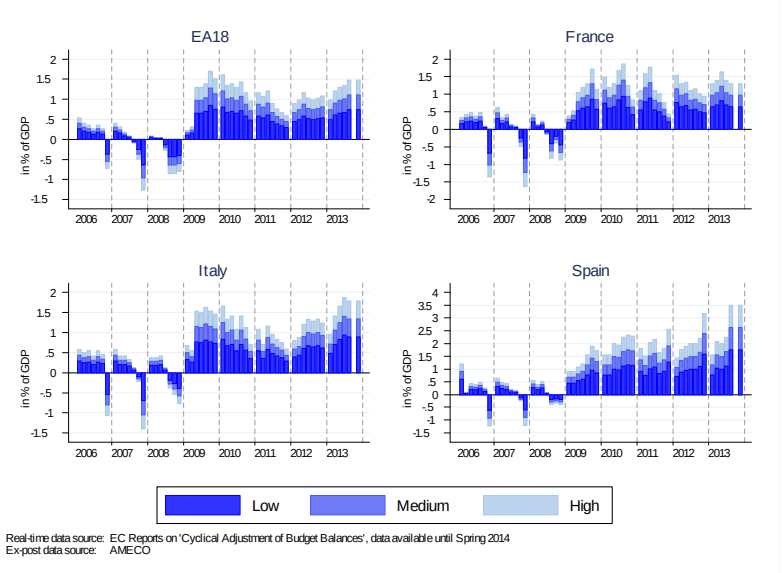
Note: New semi-elasticities based on Mourre et al. (2014).

Figure 41: Budget balance real-time and ex-post based on new semi-elasticities



Note: New semi-elasticities based on Mourre et al. (2014).

Figure 42: Automatic stabilization real-time and ex-post based on new semi-elasticities



Note: New semi-elasticities based on Mourre et al. (2014).

Figure 43: Counterfactual (automatic) output stabilization in the Eurozone with US-level automatic stabilizers