Crisis, Austerity and Automatic Stabilization

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Abstract

We analyze how reforms of tax-benefit systems in the period 2007-2013 have affected the automatic stabilization capacity for households as well as government budgets in the EU-27 based on harmonized European micro data and counterfactual simulation techniques. Factors like unemployment benefits or (progressive) income taxes can stabilize individual (and aggregate) income and smooth consumption demand in case of an income and unemployment shock. Our analysis allows to disentangle automatic changes in net government intervention from those that take place after explicit government legislature (discretionary changes) as well as changes in actual incomes and behavioral responses. We find automatic stabilizers to be generally heterogeneous across countries—both in levels and in terms of policy changes over the crisis. Stabilization coefficients vary from less than 25% in Eastern European countries to almost 60% in Belgium, Germany, and Denmark.

JEL classification: E63, E62, H31, H12
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Extended Abstract [For Conference Submissions]

The sovereign debt crisis in Europe led to consolidation measures in many EU countries. In some cases, fundamental changes in the structure of tax and transfer systems have taken place. Yet, very little is known how these reforms changed the (automatic) fiscal stabilization effects of national tax-benefit systems and in particular the degree to which households are protected in the event of shocks to gross income.

Automatic stabilization is mainly provided through two channels. First, factors like unemployment benefits or progressive income taxes can stabilize individual (and aggregate) income and smooth consumption demand in case of income and unemployment shocks (Auerbach and Feenberg 2000, Dolls et al. 2012). The second channel is due to the progressivity of the tax system. In progressive systems, negative income shocks can lead to lower marginal tax rates which may increase labor supply incentives. The resulting labor supply responses can thus have an additional stabilizing effect on income and consumption.

Based on harmonized European micro data and counterfactual simulation techniques, we analyze how reforms of tax-benefit systems in the period 2007-2013 have affected the automatic stabilization capacity for households in the EU-27. In particular, we combine 2007 pre-crisis micro data from the EU Statistics on Income and Living Conditions (EU-SILC) with the different tax-benefit rules in the period under investigation. This allows us to disentangle the effect of changes in the tax and transfer systems (i.e. the ‘policy effect’) from changes in actual incomes and demographics on the shock-absorption capacity of the tax and transfer systems and labor supply incentives. The use of the microsimulation model EUROMOD in combination with EU-SILC data offers a unified framework to analyze the effects of policy changes and derive comparable results at the household level. We complement these results with an analysis of macroeconomic data on government debt and the sensitivity of government budgets with respect to output fluctuations, and provide (counterfactual) growth rates that would have emerged in the absence of automatic stabilizers over the crisis.

Our paper also contributes to the literature on fiscal integration in Europe (see e.g. Bargain et al. 2013) by providing new micro-estimates for the cushioning effects of national tax-benefit systems in the European Union. These estimates are crucial for an ex-ante evaluation of the effectiveness of different forms of supranational automatic stabilizers as discussed in the current policy debate in Europe (European Commission 2012, Van Rompuy et al. 2012).

We find automatic stabilizers to be generally heterogeneous across countries—both in levels and in terms of policy changes over the crisis. The amount of a shock to gross income that is absorbed by the tax and transfer system varies from less than 25% in Eastern European countries to more than 50% in Belgium, Germany, and Denmark. Countries with stronger automatic stabilizers were relatively resilient during the crisis, while those with weak automatic stabilizers experienced major economic contractions and increases in unemployment. In most countries that changed their tax and benefit system, policy adjustments strengthened automatic stabilizers in the long-term perspective by fiscal consolidation measures such as tax increases which, however, can have destabilizing effects in the short term.
1 Introduction

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1.1 Motivation

A common critique of the European Stability and Growth Pact is that it does not leave enough scope for member states’ governments to take anti-cyclical fiscal policy measures. We assess the extent to which member states had room for fiscal policy by analyzing government deficits and their cyclical and cyclically-adjusted components with a focus on the role that automatic fiscal
stabilizers played. We then use microsimulation to assess the changes in automatic stabilizers provided by the tax and benefit system. The Great Financial Crisis of 2007 and the ensuing recession and sovereign debt crisis was accompanied by policy reforms that potentially affected automatic stabilizers in many EU countries. This paper analyzes the policy effect of changes in the tax system and unemployment benefits. We isolate this effect from discretionary fiscal policy measures as well as behavioral responses of households by holding constant pre-crisis household income data and demographic characteristics and combining it with the tax and benefit systems from 2007-2013.

This paper is a natural extension of our work (Dolls, Fuest and Peichl, 2012), where we calculated automatic stabilizers for the 19 EU countries (using EUROMOD) and the United States (using TAXSIM). We extend this analysis by using more recent data and a larger set of countries. It builds on work by Auerbach and Feenberg (2000) and Pechman (1973, 1987), using the measure of a tax system’s “built-in flexibility” as a measure of automatic stabilizers. Our paper also contributes to the literature on fiscal integration in Europe (see e.g. Bargain et al. 2013) by providing new micro-estimates for the cushioning effects of national tax-benefit systems in the European Union. These estimates are crucial for an ex-ante evaluation of the effectiveness of different forms of supranational automatic stabilizers as discussed in the current policy debate in Europe (European Commission 2012, Van Rompuy et al. 2012).

Figure 1: GDP Growth Rates

![GDP Growth Rates](image)

Source: AMECO database.

Figures 1 and 2, respectively, show the development of GDP growth rates and unemployment.
rates for the EU-27 countries from 2000 to 2014. The worst decline in GDP occurs in 2009, with the exception of Greece, which had GDP decline until 2011. Poland is also an exception in that it maintains positive GDP growth over the entire course of the crisis. In general, southern countries such as Greece, Spain and Portugal, and the baltics, saw the largest increase in unemployment rates and the largest drop in GDP.

These changes in the economies led to changes in government budgets, through an increase in unemployment benefits payments and a decline in government tax revenue. Using the measures defined by the European Commission (see Girouard and André (2005) and the updates by Mourre, Isbasoiu, Paternoster and Salto (2013); Mourre, Astarita and Princen (2014)), it can be seen that increases in government budget deficits increased over the crisis. In virtually all countries, it was the structural (cyclically adjusted) component of the deficit that increased, not the cyclical component.

1.2 Literature

Research that relies on micro data includes the studies by Auerbach and Feenberg (2000), Dolls et al. (2012) and Mabbett and Schelkle (2007). Kniesner and Ziliak (2002b) analyze changes in United States tax reforms to study the impact on the insurance against variability of disposable income and consumption. They find a stabilization of consumption through the income tax...
during the 1980s of around 15 percent of an initial shock to gross income. They stress that, in spite of there being efficiency gains (a reduction of the deadweight loss), there was also a “loss from the reduction in collective insurance” (Kniesner and Ziliak, 2002b, p. 609). Kniesner and Ziliak (2002a) find that the annual variation of consumption is decreased by 20 percent due to income smoothing.

On the theoretical side, Agell and Dillén (1994) develop a Keynesian model of how automatic stabilizers cushion economic fluctuations. Agents are monopolistic consumer-producers of imperfectly substitutable goods, and price adjustments are costly. Thus, there are two inefficiencies: First, output is too low because of the monopolistic competition and second, there is price stickiness. The first is an ordinary negative externality that can be cured by a Pigou-Tax. The second is more difficult, as it hinges on the labor supply elasticity of the agents. If households have a high labor supply elasticity, they are more likely to make quantity adjustments to fluctuations in aggregate demand instead of adjusting prices, thus exacerbating the externality caused by the price stickiness. Through a progressive tax system, the quantity adjustment can be “penalized” to encourage price adjustments and thus mitigate harmful (quantity) fluctuations. Mattesini and Rossi (2012) use a New-Keynesian model to study the relation of progressive taxation and output volatility in the context of monetary policy. In their model, there exists a trade-off between inflation stabilization and output stabilization, with economies that have a more progressive tax structure facing a larger trade-off (Mattesini and
Rossi, 2012, pp. 827–828). The model shows a negative correlation for various OECD countries of the standard deviation of output and labor hours with the degree of tax progressivity, respectively. Similarly, Galí (1994) shows that output fluctuations (measured as the standard deviations of output growth or detrended log GDP) are negatively correlated with government size (measured by the share of tax revenue of GDP). Fatás and Mihov (2001) find the same result. Dolls et al. (2012) find that government size is positively correlated with and a good predictor of automatic stabilizers measured as the income stabilization coefficient, but much less so for the demand stabilization coefficient. Grant, Koulovatianos, Michaelides and Padula (2010, p. 972) focus on consumption and income data for the US and find that a redistributive tax system decreases the cross-sectional variation (measured by the standard deviation) of consumption, and thus provides insurance to households. They check if there is a significant trade-off between insurance provision and distortionary effects of the tax system. While the first effect is substantial, they find a lesser impact of redistributive taxation on the mean log of consumption. They conclude that both channels are empirically relevant (Grant et al., 2010,
Kletzer (2006) develops a model of imperfect competition where progressive taxation can increase welfare and explores the relation of automatic stabilization provided by distortionary taxes when nominal wage rigidity is presents. Immervoll, Kleven, Kreiner and Saez (2007) compare in-work benefits and traditional benefits, along intensive and extensive margins.

Low (2005) studies the intertemporal choice of labor and consumption in a life-cycle model, in particular, how uncertainty affects the choice of working hours, consumption and savings over the life-cycle. He finds two channels: Labor supply adjustments can take place either before shocks are realized, so that the household has more income for self-insurance against shocks, or households react to shocks by adjusting their hours of work (Low, 2005, p. 946). While hours of work should track wages, induced by the elasticity of intertemporal substitution, this effect is offset by the uncertainty, which causes individuals to work more when they are young, even though the wages are low (Low, 2005, p. 972).

2 Data and Methodology

In this section we describe the methodological procedure to calculate automatic stabilizers, both from a macro and from a micro perspective.

2.1 Income Stabilization

Measuring the stabilization provided by a tax system requires some form of assessment of how a household’s tax payment (or benefit receipt) and thus, disposable income, varies with the gross income. As described by Auerbach and Feenberg (2000, pp. 40-41), one measure that comes to mind is the elasticity of the taxes with respect to income changes, a proportional tax system having an elasticity of one, and progressive taxes having an elasticity greater than one. The elasticity then serves as a measure of the progressivity of the tax system. The drawback of using it as an indicator of the stabilizing effect is its definition as a relative measure, relating the percent change of taxes to a one-percent change in income. As Auerbach and Feenberg (2000) point out, the elasticity neglects information on the share of income to be payed as taxes. This information, however, is important, as a large share of taxes of aggregate income means that taxes can serve as a more effective automatic stabilizer. Auerbach and Feenberg (2000) use an instrument proposed by Pechman (1973), namely, the ratio of changes in the disposable income to changes in market income, which they refer to as the normalized tax change.

The mechanism behind the stabilizers is simple. Consider a household that has to pay a proportional tax of 30 percent and faces a decline in gross income of 100 Euros. Then 30 percent of the shock would be absorbed by the proportional tax, leaving a decline of 70 Euros of disposable income. For a progressive tax system, as is in effect in the majority of the European countries, the stabilizing effect would be even larger (Dolls et al., 2012, p. 281). Let the aforementioned household be subject to progressive taxation, and after the initial shock, her marginal tax rate would drop to 25 percent. Then this provides an additional cushioning of the decline in disposable income. Automatic stabilizers of this kind have been estimated by Dolls et al. (2012) for 19 European countries and the United States.
They consider a five percent shock on market income, defined as

\[ Y^M_i = E_i + Q_i + I_i + P_i + O_i, \]  

where \( E_i, Q_i, I_i, P_i, O_i \) respectively denote labor income, business income, capital income, property income, and other income. The disposable income is equal to the market income minus net government intervention, which consists of direct taxes and social insurance contributions minus social benefits. Defining the net government intervention as \( G_i = T_i + S_i - B_i \), the disposable income is

\[ Y^D_i = Y^M_i - G_i = Y^M_i - (T_i + S_i - B_i). \]

The Income Stabilization Coefficient is denoted by \( \tau^I \) and measures how a shock on market income \( \Delta Y^M \) translates to a shock on households’ disposable income \( \Delta Y^D \):

\[ \Delta Y^D = \left(1 - \tau^I\right) \Delta Y^M \]

This calculation can be done at the individual (that is, household) level, that is, aggregating incomes over all households and then calculating the income changes as aggregates. This has the advantage of allowing to disentangle a tax system’s built-in stabilization from discretionary policy or behavioral effects, while general equilibrium effects will be neglected (Dolls et al., 2012, p. 282).

The stabilization coefficient can be written as

\[ \sum_i \Delta Y^D_i = (1 - \tau^I) \sum_i \Delta Y^M_i \]

\[ \Leftrightarrow \tau^I = 1 - \frac{\sum_i \Delta Y^D_i}{\sum_i \Delta Y^M_i}. \]

\( \tau^I \) can be interpreted as the fraction of a shock that is absorbed by the tax benefit system.

Using (2.2), it is possible to decompose the income stabilizer into the stabilizing effect provided by taxes, social insurance contributions and benefits. By definition, these three individual stabilizers add up to the overall income stabilizer

\[ \tau^I = \tau^T + \tau^S + \tau^B = \frac{\sum_i \Delta T_i}{\sum_i \Delta Y^M_i} + \frac{\sum_i \Delta S_i}{\sum_i \Delta Y^M_i} - \frac{\sum_i \Delta B_i}{\sum_i \Delta Y^M_i}. \]

So far, the Social Insurance Contributions (SIC) included those paid by the employees as well as SIC paid by the self-employed. Social insurance contributions paid by the employers are left out. This is ultimately an assumption of the incidence of the social insurance contributions. Throughout this paper, we make the assumption that the employers have to bear their share of the social insurance contribution and can not shift it to employees, so that it will not affect the employees’ wages. This assumption is somewhat strong as employers may well try to shift their share of the SIC to employees. Dolls et al. (2012, p. 286) compare income stabilization coefficients including social insurance contributions by employers and find that only in some countries the inclusion of the employers SIC substantially increases stabilizers. Results are not directly comparable as the shock is now simulated on the gross income, which they define as market income plus employers’ social insurance contributions.
There can be differences in the results, depending whether the changes in market incomes and tax-benefit payments are summed up over the population first, or whether a stabilizer is calculated individually for each household. It can happen that a household or individual finds itself on a kink or discontinuity of the tax schedule, where extreme values for the tax and benefit payments can occur. The results of this are very large stabilizers for some observations. If the individually calculated income stabilizers are later aggregated into a value for the whole country by calculating the population-weighted average over all observations, these outliers can substantially distort the results. A correction can be made by dropping the top and bottom percentile of income stabilizers from the sample. Still, the results differ. It is also possible, that in some cases the individual stabilizer becomes negative. Then it will “cancel out” the stabilizer of other observations, leading to a downward bias of estimated stabilizers.

2.2 Short Term Effects of Policy Adjustments

The income stabilization coefficient, or “built-in flexibility” measure, is constructed in a way that it measures the long-term, or steady state, stabilization capacity of a tax and transfer system. It does not take into account the additional effect on household disposable incomes that occurs when changes of the tax and transfer system come into effect, nor should it do so. Instead, it is a measure of a certain property of the tax and transfer system. In times of severe disruptions in household incomes, to focus exclusively on the measure of a long-term property would be incomplete: The introduction of, for example, tax increases can be de-stabilizing in the short run, adding to an already dramatic decline in household incomes, although it certainly increases our measure of an automatic stabilization coefficient. Hence we complement the income stabilization measure by a new measure that takes into account the additional burden to be borne by households on introduction of the new policy. The measure is constructed as follows. We now calculate the difference in disposable incomes for household $i$ when subject to tax policy in period $t$ and when subject to tax policy in period $t + 1$:  

\[
\theta_{it}^l = \frac{\Delta Y_{it}^M - (Y_{it}^D - Y_{i(t+1)}^D)}{\Delta Y_{it}^M} 
= 1 - \frac{[Y_{it}^M - (T_{it} + S_{it} - B_{it})] - [Y_{i(t+1)}^M - (T_{i(t+1)} + S_{i(t+1)} - B_{i(t+1)})]}{\Delta Y_{it}^M} 
= 1 - \frac{Y_{it}^M - Y_{i(t+1)}^M}{\Delta Y_{it}^M} + \frac{(T_{it} - T_{i(t+1)}) + (S_{it} - S_{i(t+1)}) - (B_{it} - B_{i(t+1)})}{\Delta Y_{it}^M}
\]

2.3 Macro Budget-Measures

In principle, discretionary and structural fiscal policy measures are not trivially observable. A common approach to single out discretionary and structural, or long-term, components of fiscal policy is to decompose government budgets into a cyclical and a cyclically-adjusted (structural) component (see Girouard and André (2005), and updates by Mourre et al. (2013) and Mourre et al. (2014)). Using this approach, the cyclically adjusted budget $CAB$ is the residual of the net
borrowing as a fraction of GDP \(B/Y\) and the cyclical component of the budget (CC):

\[
CAB = \frac{B}{Y} - CC
\]

As \(B/Y\) can be observed from government budget, finding a representation of the cyclical component allows the calculation of the structural balance as the residual. The EU method proposes that the cyclical component is the product of the economy’s deviation from potential GDP (output gap) and a measure of how the budget changes with respect to changes in GDP: \(CC = \varepsilon \cdot OG\), where \(OG = (Y - Y^p)/Y^p\) denotes the output gap, and \(\varepsilon\) denotes the semi-elasticity of the budget, measuring the change in the budget in percentage-points with respect to a percentage change in GDP. To finally derive a measure of the automatic stabilization effect on economic activity, some indicator of how GDP responds to government intervention is necessary: we call this the fiscal multiplier, \(FM\). The stabilizing effect on economic activity \((AS)\) can then be written as the product of the cyclical component of government budget and the fiscal multiplier:

\[
AS = OG \cdot \varepsilon \cdot FM
\]

(2.4)

It becomes apparent that the two key parameters in the calculations above are the budgetary semi-elasticity \(\varepsilon\), and the output gap \(OG\) (see Mourre et al., 2014, p. 9), so it is worth looking more into it. The semi-elasticity is defined as follows:

\[
\varepsilon = \frac{d \left( \frac{B}{Y} \right)}{dY} Y
\]

Further, it can be shown (see Mourre et al., 2014, p. 10) that

\[
CAB = \frac{B}{Y} - \varepsilon \cdot OG = \frac{B^p}{Y^p},
\]

that is, the cyclically-adjusted budget is defined as the budget balance when output is at its potential. The semi-elasticity, in contrast, is the percentage point change of actual net borrowing as a fraction of GDP with respect to a percentage change in GDP. It can be further broken down into a revenue and an expenditure component:

\[
\varepsilon = \frac{d \left( \frac{B}{Y} \right)}{dY} = \frac{d \left( \frac{R}{Y} \right)}{dY} - \frac{d \left( \frac{G}{Y} \right)}{dY}
\]

In other words, the budgetary semi-elasticity is the difference of the semi-elasticity of revenue and the semi-elasticity of expenditure. To fix ideas, consider the case of a recession. The economy is below potential GDP, and the growth rate of GDP \((dY/Y)\) is negative.\(^1\) We expect the semi-elasticity of the revenue-to-GDP ratio to be close to zero, as taxes usually follow the cyclical pattern of GDP. Total revenue as a fraction of GDP will hence remain roughly constant (Mourre et al., 2014). The semi-elasticity of expenditure, meanwhile, is negative. Only unemployment-related spending is cyclical, but it represents only a small amount out of total spending. Hence, spending does not change much over the business cycle\(^2\), while GDP does,

\(^1\)Note that growth rate and (deviation from) potential GDP are distinct concepts.

\(^2\)This may be different in severe recessions with austerity measures.
so the ratio of expenditures to GDP changes over the business cycle. In particular, this ratio increases in bad times and decreases in good times. The change of the ratio with respect to GDP growth rate is hence negative. In a recession, with negative GDP growth and GDP below potential, we would expect the expenditure elasticity to take on a positive sign. Assuming a zero revenue semi-elasticity, the overall budget elasticity has a negative sign. It can then be seen from equation (2.4) that, given a negative output gap and some (positive) fiscal multiplier, a stabilizing effect on economic activity occurs.

2.4 Scenarios

As a stylized "average crisis shock", we consider a combination of a proportional decrease in household incomes by 5% for all households and all countries, and an increase in the unemployment rate by 5 percentage points. We model the increase in the unemployment rate through reweighting. In particular, we increase the demographic weights of households already observed to be unemployed in the data. In other words, we implicitly assume that high productivity households are less likely to be affected by unemployment.

2.5 Data

We use the European microsimulation model EUROMOD, which comes with adjusted versions of the EU-SILC database for each country. The EU-SILC is a harmonized, cross-sectional dataset for the EU member states. For the macro measures, we rely on data from the AMECO Database.

2.6 EUROMOD

To calculate the disposable incomes from (modified) gross incomes the European microsimulation tool EUROMOD is used. It contains the tax and benefit rules for 27 countries of the European Union for several years and is able to apply them to a micro data set. Also, simulations are possible, in the sense that the existing policies can be changed to evaluate counterfactual reforms, for example, a change in the tax rate, tax schedule, or a change in certain benefits. Datasets are available for many years, and these can be combined with many of the different tax policies. One could, for example, apply the 2010 German tax system to the micro data set of year 2008. To make the nominal values of incomes and policy parameters from different years comparable, EUROMOD can use inflation data to uprate the values to the same base year. The uprating factors are country and income specific (Jara and Tumino, 2013, p. 32).

Furthermore, it is possible to introduce certain country-specific policies in another country ("policy swapping"), for example, introduce the Belgian pension system for the elderly in the UK. In the context of this thesis, however, EUROMOD is used as a simple tax-benefit calculator, and not primarily as a simulation tool.

3Since July 1st 2013, Croatia is also a member of the European Union. It is, however, not yet included in EUROMOD.
Gross incomes after the shock are simply calculated by multiplying observed household incomes by 0.95. EUROMOD will then calculate the corresponding disposable income, that is, apply the appropriate tax rules to calculate the after-tax income and then simulate social insurance contributions as well as benefits and pensions the individual may be eligible for (conditional on demographic characteristics and labor market characteristics, such as the income from a previous employment or duration of former job) and add those to the after-tax income. Sutherland and Figari (2013) provide an overview of the recent version of EUROMOD, including applications, such as Bargain, Dolls, Fuest, Neumann, Peichl, Pestel and Siegloch (2012) and more.

Table 1 provides an overview of datasets and policies used in this thesis for the simulation. EUROMOD comes with micro data sets for all countries. The data sets are usually based on the EU-SILC, which is a cross sectional survey of European households provided by Eurostat (2012). In Austria, Belgium, Bulgaria, the Czech Republic, Greece, Spain, Italy, Lithuania, Luxembourg, Poland and Slovakia the national versions of SILC, provided by the respective national statistics institute, is used, either directly or in addition to the EU-SILC version (Sutherland and Figari, 2013, p. 9). In the UK, the FRS dataset is used. The datasets come from the 2008 version of EU-SILC. The year refers to the year the survey is conducted (the data collection period). Participants are usually asked to report the incomes of the previous year (the income year; usually 2007). However, there are three exceptions. For France and Malta, the 2007 and 2009 EU-SILC versions are used, respectively. These datasets are chosen because, in the case of Malta, 2009 is the first micro-data set to be available, while for France, the 2007 version is “chosen to take advantage of good national SILC data for validation in this year” (Jara and Sutherland, 2013, p. 7). The FRS used for the UK is the 2008/2009 release, and incomes are reported for the current fiscal year (April until March).

Due to data limitations EUROMOD does not allow to use the 2008 dataset with all tax legislations from 2007 until 2013. If it is not possible to keep the 2007 dataset constant for all years, we switch to a more recent dataset. Table 1 gives an overview what dataset-policy combinations we use.

The recent economic downturn began to affect Europe by the end of 2008 (Sutherland and Figari, 2013, p. 16). As most data is of incomes in 2007 and the majority of the tax policies was already in effect in 2008, the data and simulations can be expected to be clear of endogeneity caused by policy responses that have occurred since the start of the crisis (Dolls et al., 2012, p. 280).

In the context of the tax and benefits simulation it is important to keep in mind that it is possible that the legal tax rules and regulations are not fully respected, or that households, in spite of being entitled to certain benefits, refrain from actually making use of them, for example due to a social stigma or some other form of costs for the households. Due to a lack of available data, EUROMOD does not explicitly model tax evasion or the non-take-up of benefits. This means that, in general, both a full benefits take-up as well as full tax compliance is assumed for most countries. The problem that can arise is that the amounts of taxes payments and received benefits is overestimated in the simulation, with the magnitude of the effect varying across countries (Sutherland and Figari, 2013; Jara and Tumino, 2013). When calculating income and

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4According to Sutherland and Figari (2013), the FRS will become the basis for the EU-SILC in the UK from 2013.
labor supply stabilizers, this could, in turn, lead to an overestimation of those stabilizers. The full take-up and tax-compliance assumptions is regularly interpreted as describing the intended effects of the tax and benefit system. Although not explicitly modeled, EUROMOD allows for a simple correction at household level of benefits non-take up and tax evasion. These corrections can be switched on and off or adjusted to suit the users needs (Sutherland and Figari, 2013, p. 12).

The non-take-up of benefits is calculated for Greece, Ireland, Belgium and the United Kingdom. Non-take-up is accounted for by assuming that only a certain proportion of households, selected randomly from the sample, takes up their entitlement. This correction applies to the whole household, and separately for each benefit. The fraction of non-take-up households is taken from external statistics (Sutherland and Figari, 2013, p. 11).

Tax evasion is accounted for in Bulgaria and Italy. The correction is done by splitting self-employment and employment incomes into components, with the first component being reported properly to the authorities, while the second component is evaded (Sutherland and Figari, 2013, p. 11).

Like other survey data, there are certain drawbacks to keep in mind when using EUROMOD. For example, financial incomes are not well covered in the data, affecting the simulation of capital taxes. Also, as SILC data are aggregated in annual terms, the necessary monthly-based means-tests of incomes and assets for certain benefits cannot be carried out as detailed as they should. Furthermore, the harmonization that is done (and that provides one of the great advantages of comparability over the countries) is problematic as the tax and transfer systems are very heterogeneous across countries. As benefits are aggregated according to their function (such as old age, unemployment etc.), individual payments have to be recovered using some kind of imputation procedure, which will reduce the precision of the estimates (Sutherland and Figari, 2013; Figari, Levy and Sutherland, 2007).

Several adjustments are made to bring the EU-SILC data sets in a format that is expected by EUROMOD. For instance, the EU-SILC variables are all in annual terms. To comply with EUROMOD, they are converted into monthly values. Also, many incomes and financial variables are first reported on household level in SILC and are then disaggregated to an individual level.
3 Results

Figure 5 shows the results of the automatic stabilization coefficient using the 2013 tax policy. The graph shows the calculations of equation (2.3), decomposed by component of the tax and transfer system. Stabilizers are heterogeneous across countries, ranging from a little over 0.2 in Eastern and Southern European countries (Bulgaria, Baltics, Malta, Cyprus) at the lower end to values around 0.5 in Western European and Nordic countries (Belgium, Germany, Denmark, Austria). Ireland is an exception, with the second highest coefficient over 0.5. Ireland has financed its budget consolidation after the crisis through tax increases, hence the increase in automatic stabilizers.

3.1 Automatic Stabilizer over Time

Figure 6 summarizes central results. Changes in income stabilization coefficients over the years are different across countries. Countries that have experienced major changes include Latvia (increase after 2009), France (decrease after 2010), Ireland (increase after 2008), Greece (increase after 2010), while other countries remain relatively constant. The evolution of stabilizers for the

---

5A non-take-up calculation procedure in the EUROMOD parameter sheet is possible for Germany, but has been switched off. If it is on, it improves the estimation of poverty and inequality, but will underestimate the number of recipients of unemployment assistance, means-tested old-age assistance as well as general social assistance (Jara and Sutherland, 2013, p. 40). As poverty and inequality is not the focus of this thesis, no correction was made.

6Details about these statistics can be found in Jara and Sutherland (2013, pp. 39–40).

7Newer versions of EUROMOD will include other “countries where tax evasion is a widespread phenomenon” (Sutherland and Figari, 2013, p. 11), such as Greece.
EU-27 and the Euro Area (EA-18) shows, that averages remain relatively stable over time. In 2010, a slight in Automatic Stabilizers can be seen. What is striking is that stabilizers are much higher in the EA-18 (average) than in the EU-27 countries (on average).

Figure 7 shows the change of the income stabilization coefficient in 2007 to 2013. The largest changes have occurred in Hungary (-0.16), which has since 2007 adopted a flat tax, and Ireland, which has increased taxes as a budget consolidation measure. Many of the countries that have been hit hard during the crisis, such as Estonia, Cyprus, Portugal, Greece, Spain, and to a lesser extent Italy, UK and France, have increased automatic stabilizers since 2007. Countries with relatively high stabilizers, such as Denmark, Germany and Sweden, have decreased stabilizers. Others, such as Belgium, Austria, Netherlands and Finland have changed stabilizers not at all or only moderately.

Graph 8 shows the first differences of \( \tau \) from year to year. If the country is plotted to the right (left) hand side of the vertical bar, it has increased (decreased) stabilizers from the previous year to the given year. It shows that shortly after the crisis (2007/2008, upper left panel), only few countries saw an increase in the stabilization coefficient. Instead, countries hit by the crisis (Spain, Baltics), saw a decrease in \( \tau \), due to tax reliefs in an attempt of stimulating the economy. Widespread consolidation policies seem to push countries towards higher automatic stabilizers from 2010/2011 (bottom left panel).

Figure 9 plots the changes in the stabilization coefficient attributed to social insurance
contributions, $\tau_{SIC}$.

There is a negative correlation between size of the SIC-based stabilizer and change in the SIC-based stabilizer from 2007 to 2013, that is, countries with a lower stabilizer have increased, while those with a higher stabilizer have decreased or left constant the stabilizers.
3.2 Macro-Measures: Automatic Stabilization and Austerity

The macro-based AS coefficient differs from the micro estimates, in that the micro estimates
represent “upper bounds” on the macro coefficient. The difference arises because the stabilizing effect of (direct) taxes measured in the micro context is larger than in the macro estimation. In the latter case, the revenue elasticity is close to zero (which measures the change in the tax receipts when GDP changes), while tax payments react a lot on household level.

Also, the macro elasticity measures includes other margins, such as labor supply adjustments, that we abstract from in our analysis.

Figure 11: EA-18: Output Gap and GDP Growth counterfactual

Source: Own calculations using EUROMOD. Calculated as the aggregate change in disposable income as a fraction of market income.

4 Conclusion

In this paper we analyze the changes in the tax and transfer system of the EU27 over the course of the crisis and its aftermath. Based on harmonized European micro data and counterfactual simulation techniques, we analyze how reforms of tax-benefit systems in the period 2007-2013 have affected the automatic stabilization capacity for households in the EU-27. We isolate this effect from discretionary fiscal policy measures as well as behavioral responses of households by holding constant pre-crisis household income data and demographic characteristics and combining it with the tax and benefit systems from 2007-2013.

We assess the extent to which member states had room for fiscal policy by analyzing government deficits and their cyclical and cyclically-adjusted components with a focus on the role that automatic fiscal stabilizers played. We complement these results with an analysis of macroeconomic data on government debt and the sensitivity of government budgets with
respect to output fluctuations, and provide (counterfactual) growth rates that would have emerged in the absence of automatic stabilizers over the crisis. We find automatic stabilizers to be generally heterogeneous across countries—both in levels and in terms of policy changes over the crisis. Stabilization coefficients vary from less than 25% in Eastern European countries to more than 50% in Belgium, Germany, and Denmark. Countries with stronger automatic stabilizers were relatively resilient during the crisis, while those with weak automatic stabilizers experienced major economic contractions and increases in unemployment. In most countries that changed their tax and benefit system, policy adjustments strengthened automatic stabilizers in the long-term perspective by fiscal consolidation measures such as tax increases which, however, can have destabilizing effects in the short term. Relative to a counterfactual without automatic stabilizers, the economic upswing has been dampened in 2007 and 2008, while there has been a mitigation of the decline in GDP from 2009 onwards. Since then, due to negative output gaps, automatic stabilizers have had a growth enhancing effect in the euro area.
References


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Source: Jara and Sutherland (2013).
Notes: Collection year also refers to the version of the dataset. Policy year indicates the EUROMOD tax policy that is applied. Tax evasion and Non Take-Up refer to the simple EUROMOD corrections for tax evasion and the only partial take-up of certain benefits. EUROMOD does not explicitly model either; see section 2.6 in the text for more details.