

ADEMU WORKING PAPER SERIES

An Unemployment Insurance Scheme for the Euro Area? A Comparison of Different Alternatives using Micro Data

Mathias Dolls*

Clemens Fuest

Dirk Neumann

Andreas Peichl

December 2016

WP 2016/048

www.ademu-project.eu/publications/working-papers

Abstract

This is the first paper that assesses the importance of different stabilization channels of an unemployment insurance system for the euro area (EA). We provide insights on the potential added value of common unemployment insurance (UI) as a fiscal risk sharing device which crucially hinges on its ability to provide interregional smoothing. Running counterfactual simulations based on micro data for the period 2000-13, we found that 10 percent of the income fluctuations due to transitions into and out of un-employment would have been cushioned through inter-regional smoothing at EA-level. Smoothing gains are unevenly distributed across countries, ranging from -5 percent in Malta to 22 percent in Latvia. Our results suggest that the inter-regional smoothing potential is as important as intertemporal smoothing through debt. We found that four member states would have been either a permanent net contributor or net recipient. Contingent benefits could limit the degree of cross-country redistribution, but might reduce desired insurance effects. We also study heterogeneous effects within countries and discuss moral hazard issues at the level of individuals, the administration and economic policy.

JEL Codes: F55, H23, J65

Keywords: European fiscal integration, unemployment insurance, automatic stabilizers

* Mathias Dolls (dolls@zew.de), ZEW, L 7, 1, 68161 Mannheim, Germany

Acknowledgments

Dolls is affiliated to ZEW and IZA, Fuest to ifo, University of Munich and CESifo, Neumann to OECD, ZEW and IZA, Peichl to ZEW, University of Mannheim, IZA and CESifo. Corresponding author: Mathias Dolls (dolls@zew.de), ZEW, L 7, 1, 68161 Mannheim, Germany. This paper uses EUROMOD version F6.0+. EUROMOD is maintained, developed and managed by the Institute for Social and Economic Research (ISER) at the University of Essex, in collaboration with national teams from the EU member states. EUROMOD is based on the EU-SILC database which is made available by EUROSTAT. We are indebted to all past and current members of the EUROMOD consortium for the construction and development of EUROMOD. We would like to thank the editor, Albert Solé-Ollé, two anonymous referees, Silvia Ardagna, Fabrizio Balassone, Olivier Bontout, Francesca Carta, Lars Feld, Georg Fischer, Juan F. Jimeno, Richard Lewney, Rody Manuelli, Massimo Morelli, Paolo Pasimeni, Apostolis Philippopoulos, Pierre Picard, as well as seminar and conference audiences in Berlin (BMF, CIBU), Bratislava (CBR), Brussels (DG ECFIN, DG EMPL), Canazei (IT9), Florence (ADEMU), Frankfurt (ECB), Freiburg, Halle (IWH), Hamburg (VfS), Louvain-la-Neuve, Lugano (IIPF), Luxembourg, Mannheim (EEA, MATAx, SEEK), Paris (Euroframe, OECD), Salzburg, Santa Fe (NTA), Trier, Tübingen, Venice (CESifo SI) and Vienna (OeNB) for valuable comments and suggestions. Nils Wehrhöfer provided excellent research assistance. Neumann acknowledges support from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013) / ERC grant agreement no. 269831. All results and their interpretation presented in this paper are the authors' responsibility.

This project is related to the research agenda of the ADEMU project, "A Dynamic Economic and Monetary Union." ADEMU is funded by the European Union's Horizon 2020 Program under grant agreement N° 649396 (ADEMU).

The ADEMU Working Paper Series is being supported by the European Commission Horizon 2020 European Union funding for Research & Innovation, grant agreement No 649396.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License Creative Commons Attribution 4.0 International, which permits unrestricted use, distribution and reproduction in any medium provided that the original work is properly attributed.



1 Introduction

The Great Recession and the resulting European debt crisis have revived the debate about deeper fiscal integration in the European Economic and Monetary Union (EMU). The EMU is an atypical monetary union because monetary policy is decided at the central (European) level while fiscal policy is carried out at the sub-central (member-state) level (Bordo et al. 2013).¹ Some observers argue that national automatic stabilizers provided insufficient income insurance during the crisis as some EMU member states lost access to private capital markets and conclude that common fiscal stabilization mechanisms are necessary to make EMU more sustainable and more resilient against asymmetric macroeconomic shocks (Bertola 2013, IMF 2013). The main concerns in this debate relate to the issues of permanent transfer flows within the currency union and moral hazard. In particular, national governments might neglect structural reforms or fiscal consolidation.

How could a fiscal risk sharing mechanism in the euro area be designed? In the so-called Four Presidents' Report published in 2012, the former President of the European Council, Herman van Rompuy, has suggested the following: *“An EMU fiscal capacity with a limited asymmetric shock absorption function could take the form of an insurance-type system between euro area countries. [...] The specific design of such a function could follow two broad approaches. The first would be a macroeconomic approach, where contributions and disbursements would be based on fluctuations in cyclical revenue and expenditure items [...]. The second could be based on a micro-economic approach, and be more directly linked to a specific public function sensitive to the economic cycle, such as unemployment insurance.”* (Van Rompuy 2012). The European Commission and more recently Jean-Claude Juncker in the Five Presidents' report built upon this initiative with own blueprints for the EMU (European Commission 2012, Juncker 2015).

Since then, the perspectives of a European fiscal union and different reform proposals along the lines of the Four Presidents' report have been analyzed in various studies.² For the 'macroeconomic approach', suggestions include a cyclical shock absorber based on output gaps (Enderlein et al. 2013) and a stabilization fund for the

¹In the following we equivalently use "EA", "EMU" and "Eurozone" to refer to the 18 member states of the European Currency Union that had introduced the euro in 2014.

²First analyses of potential insurance effects if the EMU were more fiscally integrated date back to the introduction of the euro (Fatás 1998 and Forni and Reichlin 1999), adding to the vast literature on insurance effects in existing fiscal federations such as the US (see e.g. Bayoumi and Masson 1995 and Asdrubali et al. 1996). More recent contributions include Bargain et al. (2013) who analyze the economic implications of a fully integrated European tax and transfer system and a fiscal equalization mechanism based on taxing capacity and expenditure needs for 11 founding members of the euro area, and Feyrer and Sacerdote (2013) who ask to what extent economic shocks would be absorbed by the center if the EU were as fiscally integrated as the US. The question of how to optimally design insurance mechanisms and the political economy of fiscal unions have also gained renewed interest in the more theoretical literature (cf. Evers 2012, Farhi and Werning 2014, Luque et al. 2014).

euro area (Furceri and Zdzienicka 2015). For the ‘microeconomic approach’, the discussion has focused on the idea of a common EMU-wide unemployment insurance system (henceforth EMU-UI) as proposed among others by Deinzer (2004), Dullien (2014) and Andor (2014).³

This is the first paper that assesses the importance of different stabilization channels of an EMU-UI system. We develop a decomposition framework that provides insights on the potential added value of an EMU-UI scheme. We argue that this value added crucially hinges on the ability of this scheme to provide interregional smoothing. Interregional smoothing is defined as follows. We decompose the effect of introducing an EMU-UI system into three steps. The first is to harmonize national systems, that is all member countries introduce an unemployment insurance scheme with common features, which will be discussed further below. The second step is to introduce a common EMU-UI scheme by pooling the contributions from all member states in every year and to finance unemployment benefits from this pool, using the same contribution rates in all countries. This step leads to *interregional* smoothing of unemployment shocks. The third step is to allow the EMU-UI system to run deficits or surpluses. This leads to *intertemporal* smoothing. The first and the third step do change the stabilizing effects of the unemployment insurance systems but these changes can be achieved, in principle, by countries acting alone. The key contribution of introducing an EMU-wide unemployment insurance scheme is to offer interregional smoothing, that is to offer insurance against unemployment shocks that affect the different member countries differently. Running counterfactual simulations for the period 2000–13, we isolate and quantify harmonization effects as well as interregional and intertemporal smoothing effects for euro area member states (EA-18). Methodologically, we rely on a micro data approach and simulate a sample of repeated cross-sections for each member state combining micro data from the EU Statistics on Income and Living Conditions (EU-SILC) and the EU Labor Force Survey (EU-LFS). We evaluate stabilizing and redistributive effects of various ‘basic’ EMU-UI schemes that cover short-term unemployment and partly replace national UI systems. We also explore the effects of experience rating, compare the basic EMU-UI scheme to a variant with ‘contingent’, i.e., trigger-based benefit payments, and study within-country heterogeneity.⁴ In addition to the empirical exercise, our paper provides a comprehensive and systematic analysis of a wide range of design options for an EMU-UI system. We discuss various

³See also IAB (2013), Centre for European Policy Studies (2014), Dullien et al. (2014) and Lellouch and Sode (2014). Claeys et al. (2014) provide an overview of policy challenges associated with an EMU-UI system.

⁴Brandolini et al. (2016) and Jara and Sutherland (2014) also use micro data to analyze an EMU-UI system. The focus of their analyses differs from ours as in contrast to this study, the former considers a notional EMU-UI system backing national UI systems and thus disregards EMU-UI transfers at the micro level, while the latter assumes EMU-UI benefits to top up national benefits if minimum requirements are not met by national UI systems. In addition, these papers cover shorter time periods and fewer countries than our paper.

concerns and potential adverse effects of an EMU-UI system, in particular the view that such a system would lead to a transfer union in Europe and moral hazard issues. Importantly, the aim of the paper is not to serve as a policy proposal but rather as a conceptual experiment, providing general insights into the effects of various design options for a basic EMU-UI.

Our main results are as follows. We find that a basic EMU-UI scheme with a replacement rate of 50 per cent, a maximum duration of benefit receipt of 12 months and a broad coverage of all new unemployed with previous employment income would have provided interregional smoothing gains by cushioning 10 per cent of the income fluctuations due to transitions into and out of unemployment at EA-level. Interregional smoothing effects are unevenly distributed across member states, ranging from -5 per cent in Malta to 22 per cent in Latvia. Overall, 17 out of 18 member states would have been stabilized through interregional smoothing. At the same time we find procyclical effects in some years for most countries. Our results suggest that the interregional smoothing potential is as effective as intertemporal smoothing through debt. The latter provides an additional cushioning effect of 9 per cent at EA-level. In terms of budgetary effects, the simulated basic EMU-UI scheme could be implemented with a relatively small annual budget. Over the period 2000–13, average benefits would have amounted to roughly 47 billion euro per year, financed by a uniform contribution rate across member states of 1.56 per cent on employment income. The scheme is not designed to give rise to permanent redistribution across countries because only short-term (rather than structural) unemployment is insured. Nevertheless our simulations reveal that a small number of member states would have been net contributors or net recipients in each year of our simulation period. Largest net contributors are Austria, Germany and the Netherlands with average yearly net contributions of 0.19-0.39 per cent of GDP. Latvia and Spain are the largest net recipients (average yearly net benefits of 0.36 and 0.54 per cent of GDP).

Turning next to within-country heterogeneity, we find the largest coverage and stabilization gains for the young and, perhaps surprisingly, also for high-skilled unemployed. The reason for the former is that the young often do not meet eligibility conditions of national UI while they are covered by the simulated EMU-UI. The result for the high-skilled is due to a higher proportion of short-term relative to long-term unemployed (who are not eligible to EMU-UI) among them.

Finally, we consider a contingent benefit scheme which is activated if the unemployment rate in a given member state is 1 percentage point higher than in one of the previous three years. Under this system no member state would have been in a permanent net contributing/receiving position. With 22 billion euro per year, the overall budget and thus the amount of cross-country redistribution would have been less than half as large as under the non-contingent scheme in the baseline.

The paper is structured as follows. In section 2, we discuss different alternatives how a common EMU-UI system could be designed. In addition, we present key features of the simulated EMU-UI schemes. Section 3 describes the empirical framework of the analysis. The decomposition approach and main results are presented in section 4. Alternative EMU-UI schemes with experience rating and contingent benefits are analyzed in section 5. Section 6 concludes.

2 Possible characteristics of an EMU-UI system

Design options. A common unemployment insurance system for the euro area could be designed in various ways. Three key options have been discussed in the literature and in the policy debate so far. A first option would be a common EMU-UI system that provides a basic level of insurance by partly replacing national unemployment insurance systems. Benefits from the euro area system could be topped up by additional payments from national unemployment insurance systems. Hence, there would be room for diversity across member states so that existing differences with regard to replacement rates and benefit duration could be preserved. The EMU-UI system would be financed by social insurance contributions with a contribution rate that could be uniform across Eurozone member states or country-specific and time-variant to restrict cross-country transfers. An important feature of such a scheme is that it would provide income insurance to the unemployed (under certain eligibility conditions) irrespective of the size of the unemployment shock in a given member state. As an alternative, a common scheme could provide income stabilization only in the event of large (unemployment) shocks. Such contingent unemployment benefits would be triggered if the level and/or change in overall unemployment has reached a pre-determined threshold in a given period.⁵ National unemployment insurance systems would still be in place in normal times. As a third option, the euro area unemployment insurance scheme could complement national systems by providing additional transfers which would either top up national benefits or kick in if national benefits expire. The payout rules of this scheme could be trigger-based as well. Such a system would be comparable to the US unemployment insurance system where regular state benefits can be complemented by two types of benefits extension programs which are at least partly provided by the federal government, the Extended Benefit program (EB) and emergency benefits.⁶

⁵Note that such an EMU-UI system with contingent benefits could also be designed as a reinsurance scheme where national UI systems stay in place and there are no direct transfers from the EMU-UI system to the unemployed, but financial flows between the European fund and national UI systems (Gros 2014 and Dolls et al. 2016). Alternative triggers for the activation of the scheme could be the short-term unemployment rate or the insured unemployment rate which is used in the US unemployment insurance system (besides the total unemployment rate) as a trigger for benefit extension programs (Nicholson et al. 2014).

⁶Cf. Congressional Budget Office (2012) and Nicholson et al. (2014). Note that in the US regular state benefits are paid for a period which usually lasts not longer than 6 months. The large extensions

Concerns. A major concern with an EMU-UI system is that it would lead to permanent transfers across euro area member states. How do the three variants for an EMU-UI system differ with regard to the risk of permanent redistribution? A basic EMU-UI scheme would not be designed to generate permanent redistribution because such a scheme conditions on *changes* in employment status rather than on unemployment *levels*. Differences in unemployment rates alone do not (necessarily) lead to permanent redistribution because benefits would be targeted to cyclical (short-time) unemployment and would expire after a certain time span. It may nevertheless happen that (net) transfers are unevenly distributed across member states if flows into unemployment diverge permanently or if there are permanent differences in the level of short-term unemployment.⁷ This risk could be reduced by claw-back mechanisms based on experience rating or if transfers were trigger-based as under the contingent benefit scheme. Clearly, redistributive effects of the former (latter) scheme would depend on the exact claw-back mechanism (choice of the trigger). The risk of permanent transfers would be high with an EMU-UI scheme that provides extended benefits after national unemployment benefits expire because such a scheme would be likely to cover not only cyclical, but also structural unemployment. Moreover, it could incentivize governments to cut national unemployment insurance benefits as the EMU-UI system would step in.

A further concern is related to various types of moral hazard. A common EMU-UI system could undermine incentives for national governments to address structural weaknesses of the labor market. One counterargument is that national governments would still bear the cost of long-term unemployment under a basic, contingent or non-contingent EMU-UI system. This argument is much weaker, however, with an extended benefit program which is likely to cover structural unemployment as well. Moreover, incentives to pursue policies that reduce short term unemployment such as public support for reduced working hour schemes during crises could be adversely affected by an EMU-UI system because the cost of short-term unemployment would be borne by the common pool.

Additional concerns relate to other moral hazard issues including administrative manipulation and adverse incentive effects at the individual level with regard to job search and labor supply. National administrations would have incentives to use their discretion to increase the number of benefit recipients. Incentives to manipulate would depend on the characteristics of the system, e.g. the required employment period or a waiting period for EMU-UI benefits. Increasing the length of these periods would make administrative manipulation more difficult, but longer periods would also reduce

of unemployment insurance provided by the US federal government in the 2009-12 period increased the benefit duration to 99 weeks in many US states. Unemployment benefits in the EMU are usually granted much longer than regular state benefits in the US (Esser et al. 2013).

⁷Economies where seasonal employment like in tourism plays an important role would be likely to have larger flows into and out of unemployment.

desired insurance effects. Moral hazard effects at the individual level depend on the overall benefit level (EMU plus national benefits) and duration relative to the status quo. The effect of a common EMU-UI system on migration responses in case of unemployment is ambiguous. Improved portability of unemployment benefit claims might increase the willingness to migrate and to search for a job in a member state with better labor market conditions. But if EMU-UI benefits are more generous than national benefits incentives for active job search could be diminished.

Key features of the simulated EMU-UI schemes. The current debate focuses on a basic EMU-UI system (contingent and non-contingent) as the risk of permanent transfers and moral hazard issues are perceived to be less severe compared to an extended benefit system. In the baseline scenario, we therefore focus on a basic, non-contingent EMU-UI scheme with a replacement rate of 50 per cent of previous gross earnings and a broad coverage of the short-term unemployed.⁸ Eligible to EMU-UI benefits are all short-term unemployed with previous employment income for a period of up to 12 months. The scheme is financed by social insurance contributions with a uniform contribution rate across member states. We simulate EMU-UI schemes that are calibrated to be revenue-neutral at the Eurozone-level (but not the member-state level) either in every year (no debt issuance) or over the simulation period (possibility of debt issuance). A comparison of these schemes indicates the intertemporal smoothing potential of the EMU-UI system (section 4.1). For the analysis of redistributive effects across member states, we simulate further schemes with different coverage rates and generosity levels. Additionally, we consider two alternative scenarios. In the first, we impose revenue-neutrality at the member-state level (experience rating) which is equivalent to harmonizing national UI systems. In the second, we make the EMU-UI scheme trigger-based (contingent benefits). The analysis of redistributive properties of these additional scenarios is an important extension to the previous literature because they are often assumed to alleviate the risk of permanent redistribution and moral hazard issues.

3 Data and methodology

Different methodological approaches for an analysis of the economic effects of an EMU-UI system are possible. While previous research has mainly used aggregate macro level

⁸The choice of the replacement rate is motivated by Esser et al. (2013) who show that the average gross replacement rate of Eurozone countries was roughly 50 per cent in 2010. This is on average equivalent to a replacement rate of 71 per cent of net income. To be precise, it corresponds to a replacement rate of 71.4 per cent applied to 70 per cent of gross income, i.e., taking into account the average share of income taxes and social insurance contributions in the euro area. A key advantage of applying the replacement rate to gross rather than net earnings is that in the former case the generosity of the scheme is not affected by the size (and progressivity) of national net taxes (income taxes, social insurance contributions and cash benefits) which vary considerably across euro area member states.

data, we rely on representative household micro data for the EA18 using EUROMOD, a static tax-benefit calculator for the European Union countries. EUROMOD is mainly based on cross-sectional micro data from the EU Statistics on Income and Living Conditions (EU-SILC) released by Eurostat (Eurostat 2012) which we combine with micro data from the EU Labor Force Survey (EU-LFS).⁹ The key advantage of our approach in the present context is that we exploit both detailed income distribution information contained in EUROMOD as well as information on changing labor market patterns over time contained in the LFS. We are thus able to account for heterogeneity in various characteristics of the populations in different countries which macro data approaches cannot capture.

In our simulation experiment, we introduce an unemployment insurance scheme for the EA18 member states and ask what would have happened if such a scheme had been introduced from the start of the euro in 1999. As there are neither panel data nor repeated cross-sectional data available containing both income distributions and labor market conditions for all EA member states over this period, we construct a series of reweighted cross-sections for the period of analysis which exactly replicates changes in labor market conditions (unemployment rate, share of short- and long-term unemployed, size and composition of the labor force) and average earnings over time.¹⁰ Our baseline input data is from EU-SILC 2008, the most recent data available with the version of EUROMOD used, including the EA18 member states. For each country, these data are first reweighted to reflect labor market conditions as observed in 1999 and then reweighted subsequently for each year of the analysis.

From the LFS, we impute changes in (un)employment rates, size of the labor force, shares of short- and long-term unemployment, and coverage rates of national UI systems for 18 gender-age-education strata (male/female, three age groups, three education levels) on an annual basis. We simulate (un)employment changes over time for each of the 18 socio-demographic subgroups so that our series of reweighted cross-sections precisely matches these dimensions both at the subgroup and aggregate level. Earnings growth is imputed from the AMECO-database in order to account for changes in the tax base of the EMU-UI and national UI systems. These imputations ensure that our reweighted micro data are consistent with aggregate statistics in each year of our simulation period (see Technical Appendix A.2 for further information). The analysis at the subgroup level allows us to examine individual heterogeneity within each member

⁹Sutherland and Figari (2013) provide more detailed information on EUROMOD, the underlying input data and validation. The EU-LFS, conducted by the national statistical institutes across Europe and processed by Eurostat, is a representative household survey covering the years from 1983 onwards. It is the most important source for labor market statistics in the EU. Cf. <http://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey> for further information.

¹⁰See Immervoll et al. (2006), Bargain et al. (2012) and Dolls et al. (2012) for further applications of the reweighting approach. Similar imputations from the LFS to EUROMOD input data have been conducted by Navicke et al. (2014) and Salgado et al. (2014).

state (section 4.4). In addition, we construct a national UI calculator that incorporates all important policy rules of national UI systems over the period 2000–13 and simulate national unemployment benefits in addition to EMU-UI benefits in case of dual insurance and in the benchmark scenario.¹¹

Our analysis is based on the following simplifying assumptions. First, we do not take into account general equilibrium effects of an EMU-UI system, i.e., our analysis remains in a partial equilibrium context. This implies that we abstract both from potential moral hazard of national governments and administrations which could have adverse labor market effects as well as from potential growth-enhancing effects of an EMU-UI scheme. Accounting for these macroeconomic feedback effects would require to link our micro data to a macro-econometric simulation model (Peichl 2009). Second, we do not simulate changes in government behavior or individual behavioral responses, e.g. potential migration responses, changes in hours worked or different patterns of entries and exits to the labor force which could follow the introduction of an EMU-UI.¹² In the light of these assumptions, our results should be interpreted as ‘first-round’ effects of an EMU-UI system. A further assumption relates to the interaction between EMU-UI and national UI systems given that a basic EMU-UI system analyzed in this paper would partly replace national UI systems. As elaborated in more detail in section 4.1, we assume that national UI systems top up the EMU-UI scheme if national UI systems have a more generous replacement rate, and are fully cut back otherwise. In effect, our simulations imply that no unemployed would be worse off after the introduction of an EMU-UI system. Finally, we run our simulations as if the EA18 had existed from 1999 onwards as it would complicate the interpretation of our results if we included new member states only after adoption of the euro.

4 Main results

4.1 Automatic fiscal stabilization

Automatic fiscal stabilization is associated with the ability of taxes and transfers to automatically stabilize disposable income and consequently consumption in the event of macroeconomic shocks. This relies on a simple mechanism: in the presence of a

¹¹Detailed policy rules of national UI systems are collected from country chapters of the OECD series "Benefits and Wages" (<http://www.oecd.org/social/benefits-and-wages.htm>) and from the EU's MISSOC-Comparative Tables Database (<http://ec.europa.eu/social/main.jsp?langId=en&catId=815>). Actual coverage rates are imputed from the EU-LFS.

¹²See Craig et al. (2016) for an analysis of state government behavior with regard to buffer-stock savings in the UI program in the US. Bargain et al. (2013) account for labor supply behavior after the introduction of a European tax and transfer system and find small labor supply responses. Whether distortions at the individual level change would depend on the change in overall benefits and contributions in case of dual insurance relative to the status quo.

negative shock to gross income, taxes decline and transfers increase, with the decline in disposable income being smaller than the shock to gross income (Auerbach and Feenberg 2000, Kniesner and Ziliak 2002, Dolls et al. 2012). Several components of government budgets are affected by the macroeconomic situation in ways that operate to smooth the business cycle, with progressive income taxes and unemployment benefits being the most prominent examples.¹³

There are three potential stabilization channels of an EMU-UI system. First, it could be designed to be more countercyclical than national UI systems, for example through higher replacement rates, longer benefit durations, less stringent eligibility conditions or cyclical variability of its rules. The first channel would stabilize household incomes of the unemployed in those countries whose national UI systems are less countercyclical than the EMU-UI system. At the same time, it would impose a financial burden on employers and employees who would need to finance more generous benefits. Second, the introduction of a common EMU-UI system effectively means that national UI systems are first harmonized such that they fulfill minimum requirements as defined by the conditions of the EMU-UI system and subsequently centralized. Centralization could give rise to *interregional* smoothing gains due to the (geographically) widened budget of the UI scheme. Third, an EMU-UI scheme that is allowed to issue debt might provide *intertemporal* smoothing gains in the presence of financing constraints at the national level. While the first and third stabilization channel do not require the introduction of a common EMU-UI system as improved counter-cyclicity or intertemporal smoothing can – in the absence of financing or institutional constraints – be achieved by national UI systems, the second channel points to the potential added value of a centralized EMU-UI system.

Decomposition. We provide a formal decomposition framework in order to disentangle the three stabilization channels by sequentially introducing different integration steps of the EMU-UI system (Table 1). As a benchmark, we simulate national UI systems representing actual national legislation and assume that they need to be balanced in every year, i.e., the contribution rate is set such that total contributions equal unemployment benefits paid in a given year. We employ a national UI calculator as described in section 3 that accounts for all relevant rules of national UI schemes. As a first reform scenario, we simulate harmonized national UI systems that fulfill the minimum conditions of the baseline EMU-UI scheme. If national rules are more generous than the minimum requirements imposed by harmonization, for example by having a replacement rate above 50 per cent, we assume that national rules are maintained so that no short-term unemployed is worse off after harmonization. The harmonized

¹³Automatic stabilization might not only have effects on disposable income and consumption but also on GDP itself (cf. Fatás and Mihov 2001). If fewer taxes are collected and more transfers are paid in a recession, this should support private incomes and dampen adverse movements in aggregate demand.

Table 1: Simulated UI schemes

1. National UI (no debt issuance):	$B_i^{\text{NAT}}, SIC_i^{\text{NAT}}$
2. Harmonized national UI (no debt issuance):	$B_i^{\text{NAT,harm.}}, SIC_i^{\text{NAT,harm.}}$
3. EMU-UI (no debt issuance):	$B_i^{\text{EMU,no-debt}}, SIC_i^{\text{EMU,no-debt}}$
4. EMU-UI (debt issuance):	$B_i^{\text{EMU,debt}}, SIC_i^{\text{EMU,debt}}$

Note: B_i stands for unemployment benefits paid to short-term unemployed i , SIC_i for social insurance contributions paid by employee or employer i . Our assumption that the initial benefit level (step 1) is maintained by national UI schemes topping-up benefits in schemes 2-4 – if they are less generous than in step 1 – implies that in any given country and year, it holds that

$$B_i^{\text{NAT}} \leq B_i^{\text{NAT,harm.}} = B_i^{\text{EMU,no-debt}} = B_i^{\text{EMU,debt}} \quad \text{and}$$

$$SIC_i^{\text{NAT}} \neq SIC_i^{\text{NAT,harm.}} \neq SIC_i^{\text{EMU,no-debt}} \neq SIC_i^{\text{EMU,debt}}.$$

national UI schemes cannot issue debt either and national contributions are set so that they finance national benefits in every year. The next step is to introduce a common EMU-UI system by pooling the harmonized national UI schemes. The EMU-UI scheme has a common budget covering EA-18 member states, with a uniform contribution rate (interregional smoothing). We continue to assume that the scheme cannot issue debt at this stage. No short-term unemployed is made worse off by moving from the harmonized to the centralized UI scheme as its replacement rate is topped up by national UI schemes if national replacement rates are higher than the replacement rate of the EMU-UI scheme.¹⁴ In a final step, the centralized EMU-UI scheme is allowed to issue debt and the contribution rate is set so that the budget is balanced over the period 2000–13 (intertemporal smoothing).

For each of the four UI schemes, we estimate automatic stabilization effects by calculating a stabilization coefficient τ (Auerbach and Feenberg 2000, Dolls et al. 2012) that shows to what extent (un)employment shocks are absorbed by changes in unemployment benefits and social insurance contributions. τ is computed using arithmetic changes (Δ) in benefit and contribution payments as well as changes in employment income in a given year t ($\sum_i \Delta B_i$, $\sum_i \Delta SIC_i$ and $\sum_i \Delta Y_i^{\text{EMPL}}$) which are aggregated across individuals i in each member state (subscript t suppressed for simplicity). Note that changes in employment income are calculated for employment changes along the extensive margin only in order to isolate the stabilizing effect in the event of (un)employment shocks from (intensive margin) income changes. The stabilization coefficient reads:

¹⁴If, for example, the replacement rate of national UI is 60 per cent of gross income and the replacement rate of EMU-UI 50 per cent, we assume that the replacement rate of EMU-UI is topped up by 10 percentage points by the national government such that the overall replacement rate is still 60 per cent.

$$\tau = \frac{\sum_i \Delta SIC_i - \sum_i \Delta B_i}{\sum_i \Delta Y_i^{EMPL}} = \tau_{SIC} + \tau_B. \quad (1)$$

The stabilization gain of moving from actual national UI schemes (scheme 1) to harmonized national UI schemes (scheme 2) follows from harmonization. Differences in stabilization effects between harmonized national UI schemes and the centralized EMU-UI scheme (scheme 3) are due to interregional smoothing, while intertemporal smoothing effects are singled out by comparing EMU-UI schemes without and with debt issuance (scheme 4). Formally, the total stabilization gain of moving from national UI schemes that cannot issue debt (step 1) to an EMU-UI scheme with debt issuance (step 4) is decomposed as follows:

$$\begin{aligned} \tau_{tot} &= \tau_{EMU-UI,debt} - \tau_{NAT-UI,no-debt} \\ &= \underbrace{\tau_{NAT-UI,harm.} - \tau_{NAT-UI}}_{\tau_{\text{Harmonization}}} \\ &\quad + \underbrace{\tau_{EMU-UI,no-debt} - \tau_{NAT-UI,harm.}}_{\tau_{\text{Interregional Smoothing}}} \\ &\quad + \underbrace{\tau_{EMU-UI,debt} - \tau_{EMU-UI,no-debt}}_{\tau_{\text{Intertemporal Smoothing}}} \end{aligned} \quad (2)$$

Using the fact that unemployment benefit payments do not differ between UI schemes 2 to 4 ($\sum_i \Delta B_i^{NAT} \leq \sum_i \Delta B_i^{NAT,harm.} = \sum_i \Delta B_i^{EMU,no-debt} = \sum_i \Delta B_i^{EMU,debt}$), while social insurance contributions vary across all four UI schemes ($\sum_i \Delta SIC_i^{NAT} \neq \sum_i \Delta SIC_i^{NAT,harm.} \neq \sum_i \Delta SIC_i^{EMU,no-debt} \neq \sum_i \Delta SIC_i^{EMU,debt}$), the decomposition can be written as:

$$\begin{aligned} \tau_{tot} &= \tau_{EMU-UI,debt} - \tau_{NAT-UI,no-debt} \\ &= \underbrace{\frac{\left(\sum_i \Delta SIC_i^{NAT,harm.} - \sum_i \Delta B_i^{NAT,harm.}\right) - \left(\sum_i \Delta SIC_i^{NAT} - \sum_i \Delta B_i^{NAT}\right)}{\sum_i \Delta Y_i^{EMPL}}}_{\tau_{\text{Harmonization}}} \\ &\quad + \underbrace{\frac{\left(\sum_i \Delta SIC_i^{EMU,no-debt} - \sum_i \Delta SIC_i^{NAT,harm.}\right)}{\sum_i \Delta Y_i^{EMPL}}}_{\tau_{\text{Interregional Smoothing}}} \\ &\quad + \underbrace{\frac{\left(\sum_i \Delta SIC_i^{EMU,debt} - \sum_i \Delta SIC_i^{EMU,no-debt}\right)}{\sum_i \Delta Y_i^{EMPL}}}_{\tau_{\text{Intertemporal Smoothing}}} \end{aligned} \quad (3)$$

Harmonization gains. We have assumed for the decomposition analysis that both national as well as harmonized national UI schemes cannot issue debt and hence need to balance their budget every year. This means that any increase (decrease) in unemployment benefit payments in a given year goes along with a corresponding increase (decrease) in social insurance contributions. The net effect of harmonization thus depends on how short-term unemployed as well as employers and employees who would have to bear the burden of rising contributions (due to the move from scheme 1 to scheme 2) differ in their propensity to consume, and on behavioural responses to the policy change.¹⁵ The combined stabilization effect of harmonized benefits and adjusted contributions to finance the changed benefits is neutral in our analysis. This is because the changes in both benefits and contributions are received and paid by employees and firms in the same country and we disregard subtleties like different propensities to spend out of current income. As shown in Figure 8 (Appendix), unemployment benefits have a countercyclical effect, i.e. they increase (decrease) when the number of short-term unemployed goes up (down), whereas social insurance contributions are always procyclical in schemes 1 and 2 ($\tau_B \geq 0, \tau_{SIC} \leq 0$). There is substantial heterogeneity between national UI schemes with regard to the degree of income insurance in case of unemployment. The cushioning effect of unemployment benefits ranges between an average of 1 per cent (Italy, Malta) and 14 per cent (Luxembourg), while harmonized unemployment benefits absorb on average 13–27 per cent of the changes in employment income.¹⁶ Consequently, the stabilization gain through harmonizing unemployment benefits differs across member states and over time ranging from an average of 7 per cent (Germany) to 20 per cent (Cyprus).

Smoothing gains. As shown in formula (3), the EMU-UI scheme has a countercyclical (and hence stabilizing) effect through interregional smoothing if – in the presence of rising unemployment ($\sum_i \Delta Y_i^{EMPL} < 0$) – the increase in contribution payments to the centralized EMU-UI scheme is smaller than to the harmonized national UI scheme ($\sum_i \Delta SIC_i^{EMU, no-debt} < \sum_i \Delta SIC_i^{NAT, harm.}$), and vice versa. Recall that debt issuance is ruled out to single out the effect of interregional smoothing. Debt will be used in the next step, to quantify intertemporal smoothing gains. These gains materialize if $\sum_i \Delta SIC_i^{EMU, debt} < \sum_i \Delta SIC_i^{EMU, no-debt}$ in case of a negative shock to employment income ($\sum_i \Delta Y_i^{EMPL} < 0$), and vice versa.

Figure 9 (Appendix) illustrates smoothing gains. Here, we focus on comparing the cases of Germany and Spain. In 2009, the year with the most significant surge in unemployment in the euro area, Spain’s income loss by far exceeded the average shock. The German labor market, in contrast, proved to be robust. The decline in income

¹⁵Jappelli and Pistaferri (2014), among others, show that the marginal propensity to consume differs substantially across the income distribution.

¹⁶Note that these estimates only capture income insurance for the short-term unemployed, i.e., they depend on both the design of the UI schemes and on the incidence of short-term unemployment.

due to unemployment was relatively small. Figure 9 shows that contributions to the harmonized UI scheme in Spain would have risen more than those to the pooled EMU-UI scheme (without debt). Therefore, a common EMU-UI budget would have had a stabilizing effect on Spain. Our results suggest that 20 per cent of Spain's income loss in 2009 would have been absorbed through interregional smoothing, a fiscal stimulus amounting to roughly 0.6 per cent of GDP (calculated as the difference between 'Delta SIC Harm. NAT-UI' and 'Delta SIC EMU-UI no debt' which are shown on the right-hand side y-axis). The opposite effect can be observed for Germany where a move from the harmonized to the centralized UI scheme would have had a destabilizing effect in 2009 amounting to almost 80 per cent of the income shock in that year, or 0.2 per cent of GDP. This procyclical effect could have been avoided only by letting the EMU-UI scheme issue debt as can be seen by the positive intertemporal smoothing effect.

Germany, in turn, experienced deteriorating labor market conditions in the early 2000s with largest income losses in 2003 and 2004. In these years, roughly 10 per cent of the losses would have been absorbed through interregional smoothing, corresponding to 0.06 per cent of GDP. If the EMU-UI scheme had been allowed to issue debt, UI contributions would have remained constant in spite of rising unemployment. This would have led to intertemporal smoothing gains in a similar order of magnitude as those through smoothing across countries.

How large is the overall smoothing effect? We use the following summary measures for stabilization effects achieved over the period 2000–13:¹⁷

$$\begin{aligned}\tau_{\text{Int-reg.}} &= \sum_t \left(\frac{|\sum_i \Delta Y_{it}^{\text{EMPL}}|}{\sum_t |\sum_i \Delta Y_{it}^{\text{EMPL}}|} \frac{\left(\sum_i \Delta \text{SIC}_{it}^{\text{EMU,no-debt}} - \sum_i \Delta \text{SIC}_{it}^{\text{NAT,harm.}} \right)}{\sum_i \Delta Y_{it}^{\text{EMPL}}} \right) \\ \tau_{\text{Int-tem.}} &= \sum_t \left(\frac{|\sum_i \Delta Y_{it}^{\text{EMPL}}|}{\sum_t |\sum_i \Delta Y_{it}^{\text{EMPL}}|} \frac{\left(\sum_i \Delta \text{SIC}_{it}^{\text{EMU,debt}} - \sum_i \Delta \text{SIC}_{it}^{\text{EMU,no-debt}} \right)}{\sum_i \Delta Y_{it}^{\text{EMPL}}} \right) \quad (4)\end{aligned}$$

Table 2 shows that the weighted average interregional smoothing effect is in a range between -5 per cent (Malta) and 22 per cent (Latvia). Our results suggest that the extent of synchronization of changes in short-term unemployment has been sufficiently low over the period 2000–13 to allow for interregional smoothing gains, but that these gains are unevenly distributed across countries. Overall, all member states except Malta would have been stabilized through the geographical widening of the budget, even though we find procyclical effects for most countries in some years. *Ceteris paribus* a move from harmonized UI schemes whose contributions are always

¹⁷Note that the stabilization effects are weighted with the relative size of the shocks. This is because without weighting stabilization coefficients can be very large in years with small shocks. This is due to the fact that τ goes to infinity when $\sum_i \Delta Y_{it}^{\text{EMPL}}$ converges to zero.

Table 2: Smoothing effects of baseline EMU-UI

	Interregional	Intertemporal	Overall
AT	5.8	18.2	24.0
BE	3.0	14.5	17.5
CY	17.7	7.3	25.0
EE	19.4	0.8	20.2
FI	2.4	22.5	25.0
FR	7.7	12.8	20.5
GE	11.0	5.8	16.8
GR	12.0	4.8	16.9
IE	15.7	5.9	21.6
IT	5.5	11.4	16.9
LU	7.1	18.0	25.1
LV	21.6	1.2	22.8
MT	-4.6	24.9	20.3
NL	8.3	13.9	22.2
PT	13.4	5.8	19.2
SI	5.6	13.5	19.1
SK	9.6	5.6	15.2
SP	17.8	5.3	23.0
EA18	9.9	9.3	19.2

Notes: Stabilization coefficients for interregional and intertemporal smoothing weighted by shock size over the period 2000-13. Smoothing coefficients at EA-18 level calculated as population-weighted average of member state's smoothing coefficients. The unweighted smoothing coefficients at EA-18 level are 10.0 for interregional smoothing and 10.7 for intertemporal smoothing. Country abbreviations: AT: Austria, BE: Belgium, CY: Cyprus, EE: Estonia, FI: Finland, FR: France, GE: Germany, GR: Greece, IE: Ireland, IT: Italy, LU: Luxembourg, LV: Latvia, MT: Malta, NL: Netherlands, PT: Portugal, SI: Slovenia, SK: Slovakia, SP: Spain, EA18: 18 member states that had introduced the euro in 2014. Lithuania that has adopted the euro in 2015 is not included due to data availability. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

procyclical to a centralized EMU-UI scheme would have made fiscal policy in the euro area as a whole more countercyclical. The average interregional smoothing effect at EA-level amounts to 10 per cent. Letting the EMU-UI scheme issue debt would have made contributions less volatile and thus would have contributed to macroeconomic stabilization. The average cushioning effect through intertemporal smoothing ranges between 1 per cent (Estonia) to 25 per cent (Malta). At EA-level, it amounts to 9 per cent being of similar magnitude as the interregional smoothing effect.

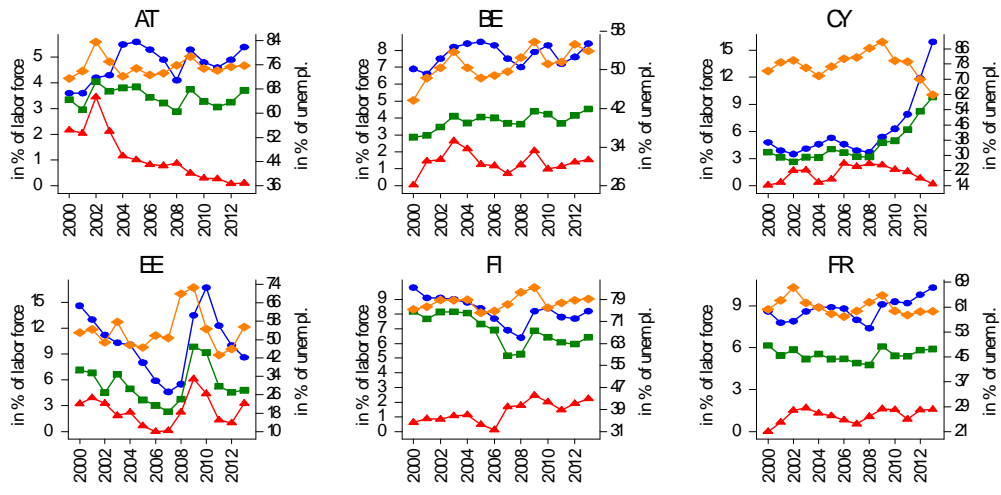
4.2 Coverage rates

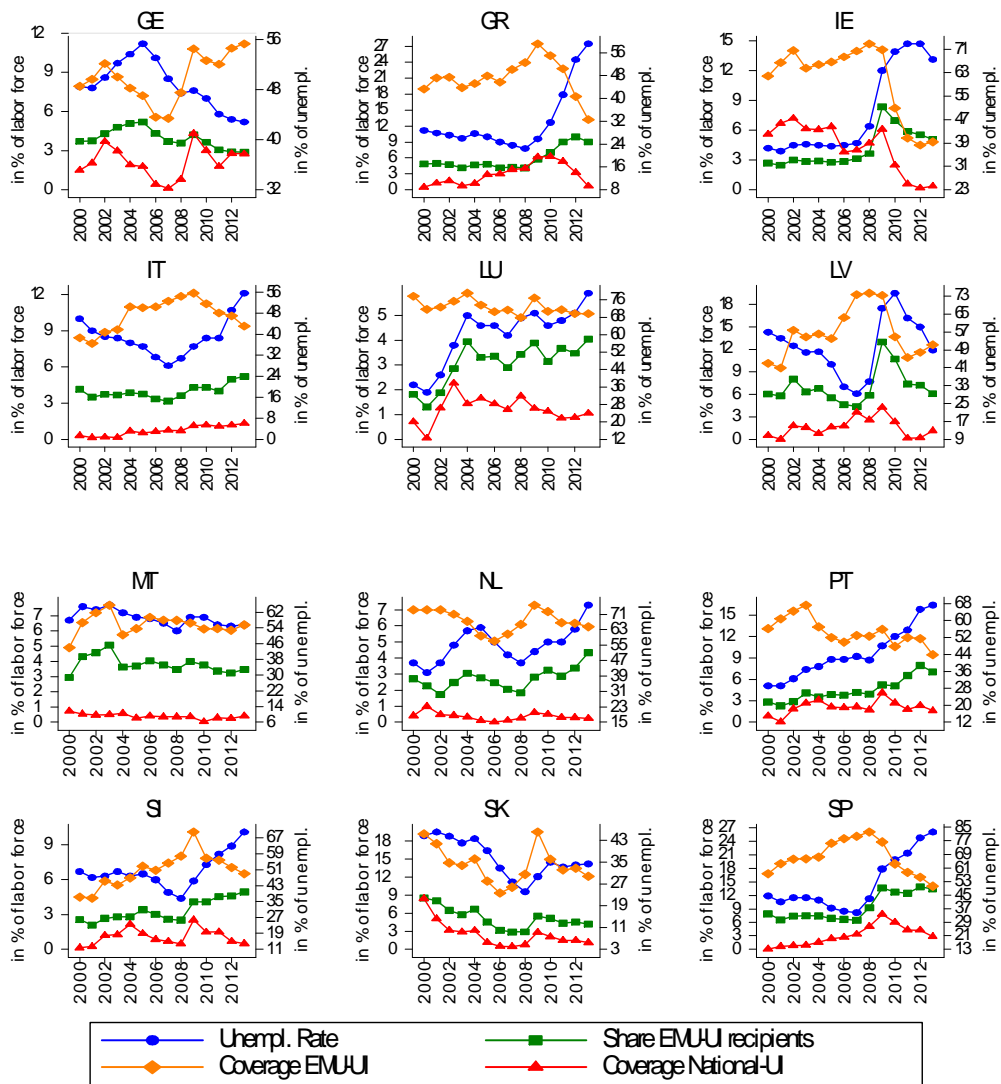
Figure 1 provides descriptive statistics on unemployment and (counterfactual) coverage rates of EMU-UI and national UI over the period 2000–13. It shows that the share of unemployed covered by EMU-UI measured relative to the total labor force (green line) follows closely trends in overall unemployment. However, coverage rates of EMU-

UI measured as the share of unemployed receiving EMU-UI benefits relative to all unemployed (orange line) diverge from unemployment rates in times of rising or falling unemployment as can be seen, for instance, for Germany in the early 2000s or for Greece, Ireland and Spain during the recent crisis period. The reason is that the share of non-eligible long-term unemployed usually goes up (down) in prolonged recessions (upswings).

Figure 1 shows further that coverage rates of EMU-UI differ substantially across EA countries ranging from an average of 34 per cent in Slovakia to 79 per cent in Finland which is due to differences in the share of short-term unemployment. Finally, it points to a significant coverage gap between our simulated EMU-UI scheme and national UI revealed by a comparison of the orange and red lines. Coverage of national UI is particularly low in some Southern and Eastern European member states such as Greece, Italy, Latvia, Malta or Slovakia, all with average coverage rates of the short-term unemployed over the period 2000–13 below 15 per cent.

Figure 1: Unemployment and coverage rates of EMU-UI and national UI





Note: Unemployment rate and share EMU-UI recipients measured in per cent of the labor force. Coverage EMU-UI and national UI calculated as number of short-term unemployed receiving UI benefits relative to total number of unemployed. Coverage national UI includes UI benefits and assistance. If coverage information is missing in the LFS for a given country in one year, it is imputed from the closest country-year cell available. Sources: LFS and own calculations based on EUROMOD.

4.3 Budgetary effects and financial flows

For the analysis of budgetary effects and financial flows across across member states, we consider an EMU-UI scheme that is allowed to issue debt (scheme 4 in Table 1). Based on simulated EMU-UI benefits and the overall tax base, we calculate the contribution rate that would have led to revenue-neutrality at the EA-level over the period 2000–13. It amounts to 1.56 per cent on employment income.¹⁸ Next, we simulate contribution payments to EMU-UI under the assumption that the scheme can run deficits and surpluses in single years. Figure 2 shows the evolution of contributions and benefits at EA18-level. While contributions would have almost constantly grown over the period due to growth in nominal earnings, benefit payments would have fluctuated to a much larger extent. On average, benefits and contributions amount to roughly 47 billion euro per year. The scheme would have run surpluses from 2000–03 and from 2005–08 and deficits in the remaining years, in particular during the recent financial and economic crisis.¹⁹

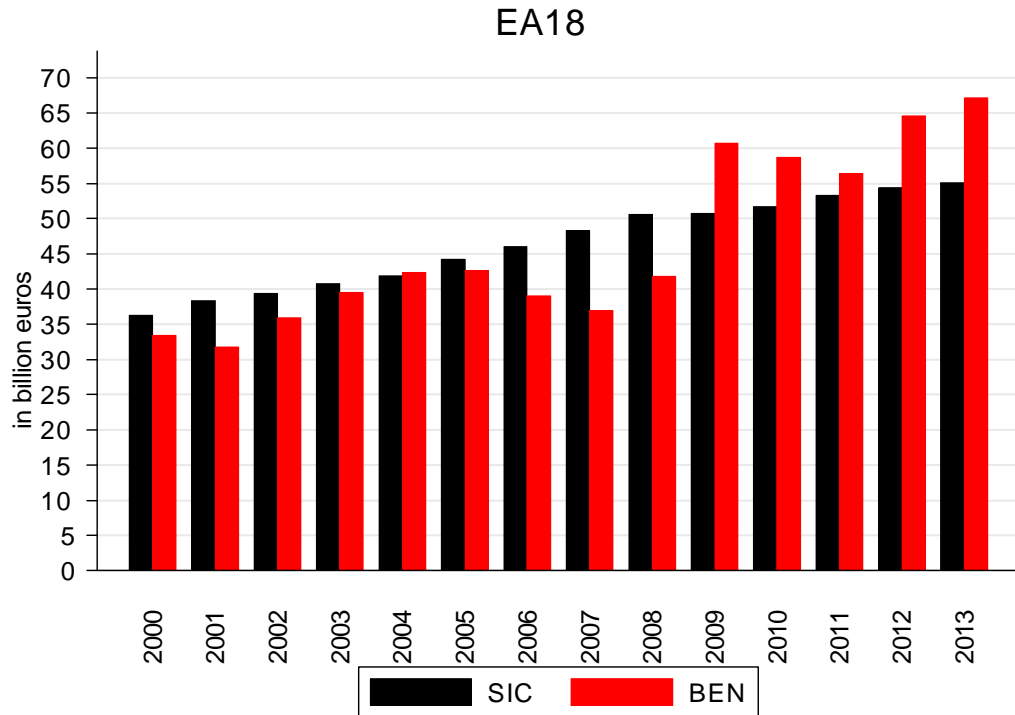
Figure 3 shows average yearly net contributions as well as minimum and maximum payments for the baseline scenario. Relative to GDP, Austria, Germany and the Netherlands would have been the largest net contributors with average net contributions of 0.19 per cent in Germany, 0.24 per cent in Austria and 0.39 per cent in the Netherlands. Latvia (-0.36 per cent) and Spain (-0.54 per cent) would have been the largest net recipients. Interestingly, the majority of member states would have been net contributors in some years and net recipients in other years. Notable exceptions are Austria, Luxembourg and the Netherlands (Spain). These countries would have been in a permanent net contributor (recipient) position.

Finally, we compare the baseline EMU-UI scheme with debt issuance (variant A) to variants with lower coverage and generosity levels (variants B–E). We introduce a waiting period of 2 months after job loss before eligibility to EMU-UI benefits begins in order to diminish the effect of seasonal unemployment and limit the maximum benefit to 50 per cent of median income (variant B). Variant C has a replacement rate of 35 per cent of gross income which is on average equivalent to a replacement rate of 50 per cent of net income. Benefits are capped at 50 per cent of median income, but there is no waiting period. Variant D combines variants B and C (maximum benefit amount of 50 per cent of median income, 35 per cent replacement rate, waiting period). Variant

¹⁸Social insurance contributions include employer and employee contributions. If self-employed were excluded from the scheme, the revenue-neutral contribution rate would be 1.7 per cent. Note that policy-makers would need to set the contribution rate *ex-ante* based on expected financial flows. This implies that in practice contributions might deviate from benefits *ex-post*. One option to minimize resulting deficits would be to regularly adjust the contribution rate or, alternatively, to require member states to make extra-payments to balance the budget. Surpluses could be used to build up reserves that would be available in bad times.

¹⁹In real terms at constant 2005 prices, contributions (benefits) would have risen from 41 (37) billion euro in 2000 to 47 (57) billion euro in 2013.

Figure 2: Overall contributions and benefits at Eurozone-level, 2000-13



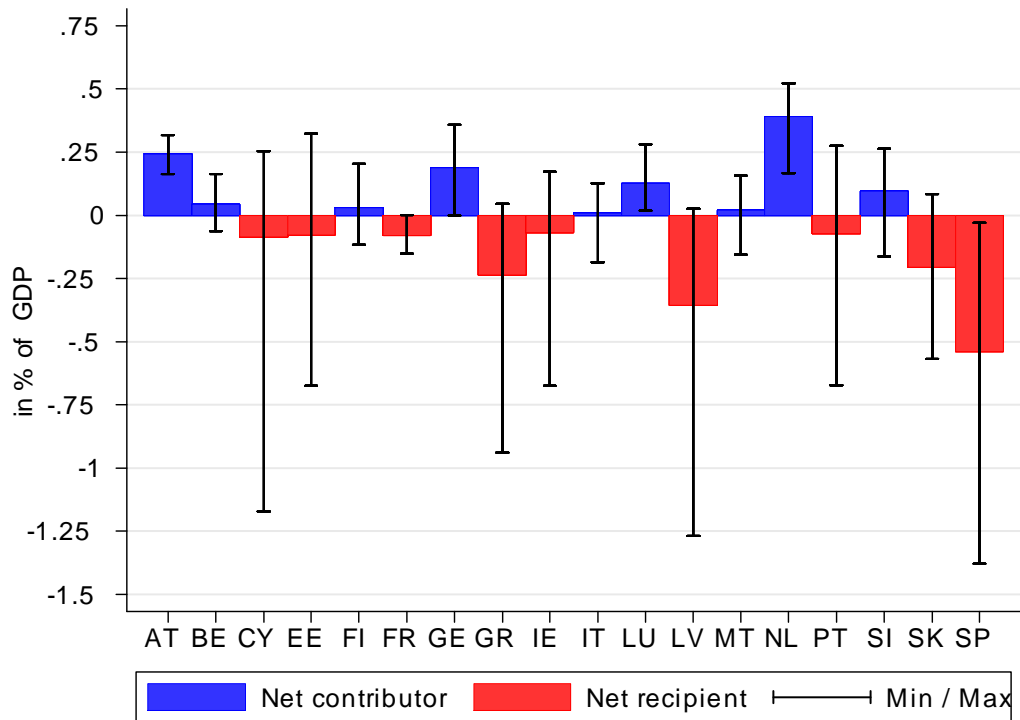
Note: Social insurance contributions (SIC) and benefits (BEN) at Eurozone-level in nominal terms. Contribution rate uniform across member states. Scheme is revenue-neutral over the simulation period. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

E is based on variant D, but only those short-term unemployed that receive national UI benefits are eligible to EMU-UI benefits. Results are presented in Figure 4 and Table 3. Figure 4 shows average yearly net contributions under variants A (blue bars), B (green bars) and D (red bars).²⁰ Average net contributions under variants B-E are usually smaller than in the baseline. France becomes a permanent net recipient under variants B-D, albeit with average net contributions below -0.1 per cent of GDP. In Estonia and Portugal, the average net position changes from recipient to contributor which is due to low median incomes in these member states.

Table 3 compares contribution rates for different variants of EMU-UI topped up by national UI (columns A-E) with contribution rates in the benchmark scenario of national UI alone (column NAT-UI). Columns A-E display the sum of the uniform EMU-UI and the country-specific national UI contribution rates required for topping up EMU-UI if applicable. Both contribution rates are calculated such that revenue-neutrality over the whole simulation period is ensured. Column NAT-UI shows revenue-

²⁰Country-year specific net contributions for all variants are available from the authors upon request.

Figure 3: Average yearly net contributions, 2000-13



Note: Net contributions (SIC - BEN) for baseline scheme. Contribution rate uniform across member states. Scheme is revenue-neutral over the simulation period. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

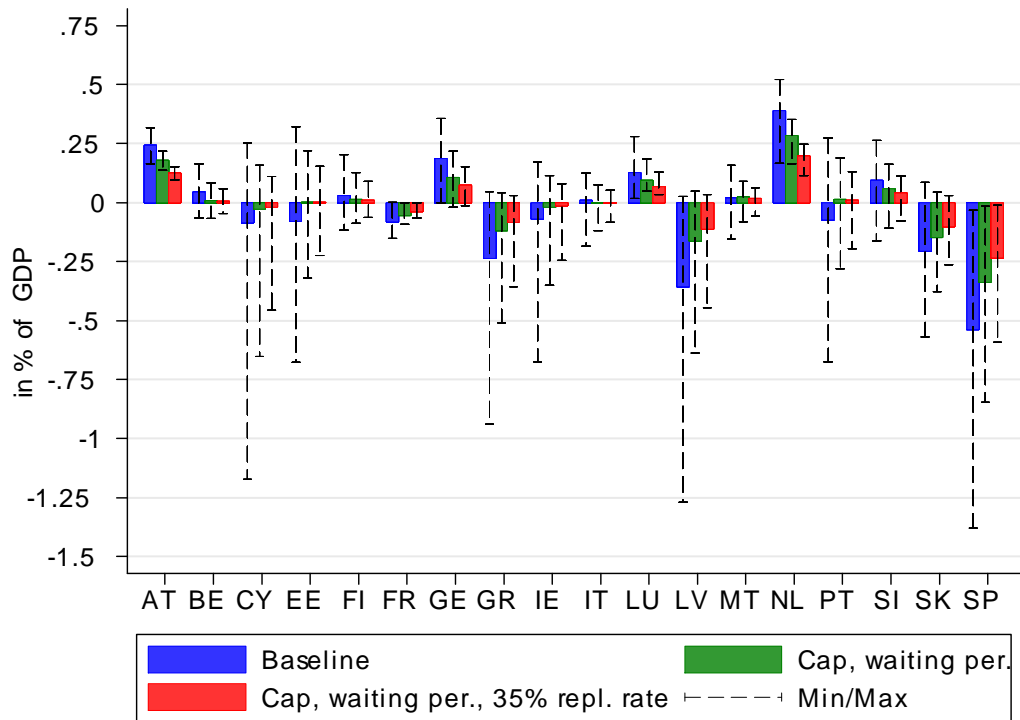
neutral contribution rates for national UI alone which are calculated under the assumption that national UI benefits were only paid to the short-term unemployed to make sure that contribution rates are indeed comparable. Table 3 reveals that contribution rates in case of dual insurance are usually higher than those in the benchmark case of national UI alone. This is mainly due to coverage gaps between EMU-UI and national UI (section 4.2). Only under variant E (EMU-UI with actual coverage rate of national UI systems), contribution rates under dual insurance would be lower in a few countries. Interestingly, both countries which are – on average – net contributors (Belgium, Germany) as well as net recipients (France, Ireland, Spain) belong to this group. The reason is that in a scenario of EMU-UI where national eligibility rules are applied, not only the evolution of the short-term unemployment rate in a given country vis-à-vis the rest of the EA would determine whether contribution rates under dual insurance are higher or lower than in the benchmark, but also the extent to which the unemployed are covered by national UI systems.

Table 3: Contribution rates in case of dual insurance vs. benchmark

	A	B	C	D	E	NAT-UI
AT	1.57	1.12	1.05	0.89	0.52	0.38
BE	1.68	1.32	1.28	1.18	0.81	0.90
CY	1.60	1.15	1.09	0.91	0.54	0.37
EE	1.57	1.17	1.10	0.95	0.58	0.51
FI	1.67	1.23	1.09	0.96	0.59	0.55
FR	1.74	1.49	1.46	1.35	0.98	1.04
GE	1.57	1.18	1.10	0.99	0.62	0.68
GR	1.60	1.14	1.01	0.86	0.49	0.42
IE	1.65	1.27	1.12	1.04	0.67	0.80
IT	1.56	1.04	0.98	0.76	0.39	0.10
LU	1.78	1.39	1.34	1.16	0.79	0.63
LV	1.56	1.21	1.14	0.98	0.61	0.50
MT	1.56	1.02	0.95	0.72	0.35	0.07
NL	1.69	1.25	1.20	0.99	0.62	0.40
PT	1.75	1.49	1.46	1.30	0.93	0.87
SI	1.69	1.28	1.25	1.07	0.70	0.58
SK	1.56	1.13	1.09	0.90	0.53	0.38
SP	1.98	1.83	1.81	1.76	1.39	1.61

Notes: Country-specific contribution rates (in % of employment income) in case of dual insurance (columns A-E) and in the benchmark (column NAT-UI). A: Baseline, all new unemployed with previous employment income covered. B: Max. EMU-UI benefit 50% of median income and waiting period of 2 months. C: Max. EMU-UI benefit 50% of median income and EMU-UI replacement rate of 35%. D: Max. EMU-UI benefit 50% of median income, EMU-UI repl. rate of 35%, waiting period of 2 months. E: D + EMU-UI with actual coverage of national UI. NAT-UI: national UI alone. Sources: EU-LFS and own calculations based on EUROMOD.

Figure 4: Average yearly net contributions - Other EMU-UI variants



Note: Net contributions (SIC - BEN) for variants A (Baseline), B (Cap, waiting period) and D (Cap, waiting period, 35% replacement rate). Contribution rate uniform across member states. Schemes are revenue-neutral over the simulation period. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

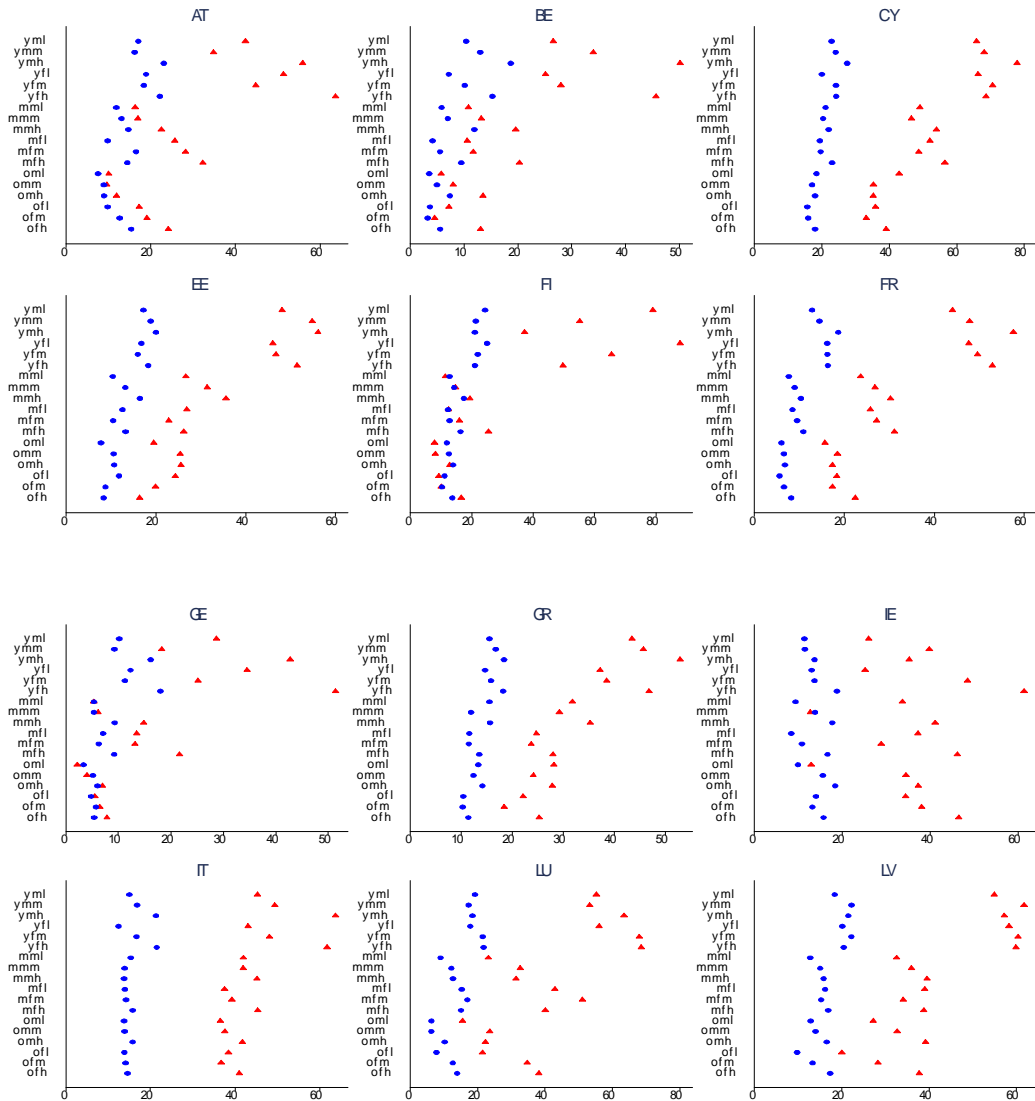
4.4 Within-country heterogeneity

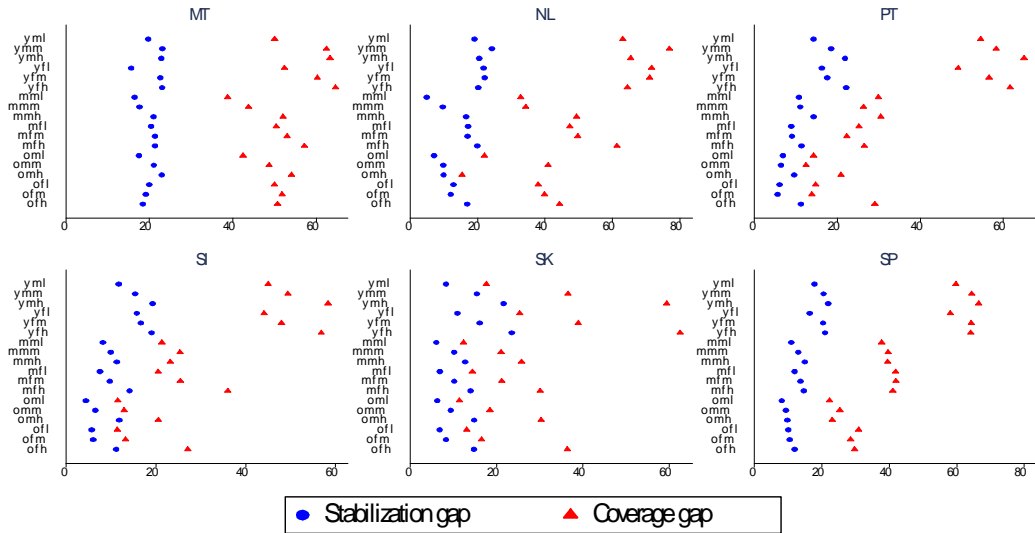
A further contribution of this paper is to explore the effects of an EMU-UI scheme at the micro level. While the previous sections were focusing on aggregate effects *across* countries, this section asks what impact dual insurance of EMU-UI and national UI systems would have on different individuals *within* each country. To answer this question, we split the labor force into 18 subgroups according to three socio-demographic characteristics, namely gender, age and education (cf. section 3). The groups solely comprise individuals who are part of the labor force, i.e. who are either employed or unemployed.

Figure 5 presents coverage and stabilization gains which are calculated as the difference in average coverage rates and stabilization coefficients τ_B under dual insurance (variant A) and the benchmark (national UI alone). Stabilization gains for the unemployed correspond to those presented in Figure 8 for the harmonization scenario, but are now disaggregated for 18 population subgroups. In several member states, largest coverage and stabilization gains are found for young unemployed who often do not meet eligibility conditions of national UI due to insufficient contribution periods.

Interestingly, high-skilled unemployed tend to face larger coverage and stabilization gains than the low- or medium-skilled. This can be explained by a higher proportion of short-term relative to long-term unemployed among the high-skilled. In other words, long-term unemployment which is not covered by EMU-UI is more prevalent among the low- and medium-skilled. Our results suggest that less stringent eligibility conditions could improve income insurance especially for the young, while more generous UI for the short-term unemployed might not be an effective policy to provide income protection for the low-skilled unemployed. However, as discussed above such policy changes could be achieved through harmonization of national UI systems and do not require the introduction of a centralized EMU-UI system.

Figure 5: Coverage and stabilization gains across socio-demographic groups





Note: First letter: age. y = young, m = middle-aged, o = old. Second letter: gender. m = male, f = female. Third letter: skill. l = low-skilled, m = medium-skilled, h = high-skilled. For example, y m l stands for "young/male/low-skilled". Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

5 Alternative scenarios

5.1 Experience rating

Until now, we have analyzed an EMU-UI system with a uniform contribution rate across member states that is revenue-neutral at the EA-level. The analysis in the previous section has shown that under EMU-UI variant A, four member states would have been either a permanent net contributor (Austria, Luxembourg and the Netherlands) or net recipient (Spain). Therefore, an interesting analytical exercise is to calculate country-specific contribution rates that balance the EMU-UI budget in each member state which is equivalent to harmonizing national UI schemes such that their eligibility rules and replacement rates correspond to the EMU-UI system (c.f. section 4.1).

Table 4 presents country-specific contribution rates for the different variants of EMU-UI that would have led to revenue-neutrality over the period 2000–13. The last row of Table 4 shows uniform contribution rates that balance the budget at the EA, but *not* the member-state level. Given the differences in net contributions across member states presented in the previous section, it is not surprising that country-specific contribution rates differ significantly ranging from 0.75 per cent in the Netherlands to 3.29 per cent in Spain under variant A. Less generous schemes (columns B-E) require lower contribution rates for revenue-neutrality.

Figure 6 presents average country-specific contribution rates for EMU-UI that balance national budgets in each year as well as maximum and minimum contribution rates over the period. In Austria, Luxembourg and the Netherlands, the three member

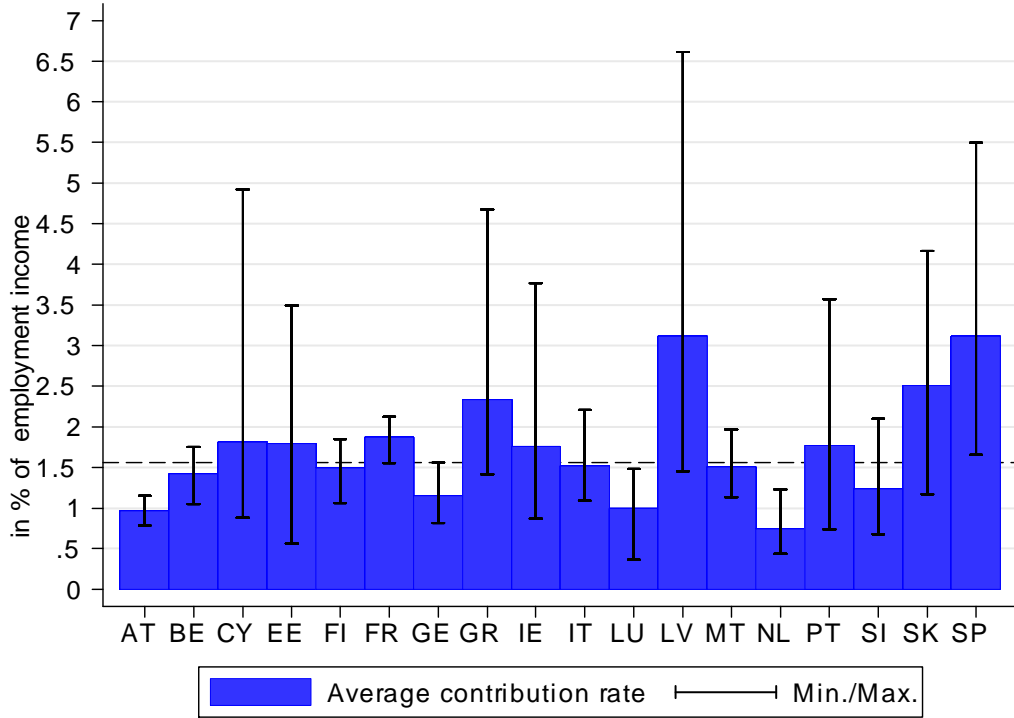
Table 4: Contribution rates for EMU-UI variants

	A	B	C	D	E
AT	0.97	0.57	0.54	0.40	0.24
BE	1.44	0.99	0.93	0.69	0.43
CY	1.91	1.14	1.07	0.80	0.22
EE	1.74	0.96	0.90	0.67	0.26
FI	1.46	0.95	0.92	0.66	0.37
FR	1.88	1.21	1.15	0.85	0.39
GE	1.14	0.76	0.71	0.53	0.40
GR	2.31	1.38	1.28	0.96	0.29
IE	1.86	1.09	1.02	0.77	0.48
IT	1.53	1.01	0.95	0.71	0.06
LU	1.05	0.61	0.58	0.43	0.17
LV	3.18	1.74	1.62	1.22	0.33
MT	1.46	0.92	0.87	0.64	0.14
NL	0.75	0.42	0.39	0.29	0.11
PT	1.82	0.98	0.91	0.69	0.27
SI	1.29	0.84	0.78	0.59	0.21
SK	2.25	1.51	1.37	1.06	0.25
SP	3.29	2.08	1.96	1.45	0.55
EA18	1.56	1.00	0.94	0.70	0.33

Notes: Country-specific contribution rates (in % of employment income) that balance the EMU-UI budget in each member state over the period 2000-13. Last row: uniform contribution rates that balance the overall EMU-UI budget at Eurozone-level (but not in each single member state). A: Baseline, all new unemployed with previous employment income covered. B: Max. EMU-UI benefit 50% of median income and waiting period of 2 months. C: Max. EMU-UI benefit 50% of median income and EMU-UI replacement rate of 35%. D: Max. EMU-UI benefit 50% of median income, EMU-UI repl. rate of 35%, waiting period of 2 months. E: D + EMU-UI with actual coverage of national UI. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

states that would have been permanent net contributors, revenue-neutral contribution rates are always below the uniform (Eurozone-wide) contribution rate of 1.56 per cent (dashed horizontal line), while the opposite is true for Spain, the only permanent net recipient throughout the simulation period in the baseline scenario (variant A).

Figure 6: Country-specific contribution rates: Annual balanced budget



Note: Dashed horizontal line: Revenue-neutral uniform contribution rate (1.56 per cent) at EA-level for the period 2000-13. Blue bars: Average country-specific contribution rates that balance the budget in each single year. Black vertical lines: Maximum/Minimum country-specific contribution rates that balance the budget in each single year. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

5.2 Contingent transfers

As a further variant, we simulate an EMU-UI scheme with contingent benefits which are activated once certain triggers are reached and analyze its budgetary and redistributive effects, in particular whether such a scheme reduces cross-country transfers. Our choice of the trigger is guided by the US Extended Benefit (EB) program which permits states to use either the insured or the total unemployment rate to qualify for extended unemployment benefits (Nicholson et al. 2014). We choose the total unemployment rate as a trigger so that activation of contingent transfers is independent from eligibility conditions of national unemployment insurance systems. Precisely, benefits from the EMU-UI system are triggered if the unemployment rate in year t is at least 1 percentage

point higher than the unemployment rate in i) year $t-1$, ii) years $t-1$ or $t-2$, iii) years $t-1$ or $t-2$ or $t-3$. Longer look-back periods ensure that EMU-UI benefits can remain activated in sustained periods of high unemployment.²¹ In all other dimensions (payout rules, uniform contribution rate across member states), the contingent benefit schemes i-iii are identical to the baseline scheme (variant A) which implies that by construction member states are net contributors in those years when contingent benefits are not triggered.

Table 5 in the Appendix shows that while with a three-year look-back period, contingent benefits would have been triggered in all member states at least once, they would not have been activated in Malta (Belgium and Malta) in any year with a two-year (one-year) look-back period. The divergence in unemployment across countries since the start of the euro in 1999 becomes evident by a comparison of activation periods. While the short-term unemployed in Germany or Luxembourg, for instance, would have received EMU-UI benefits only in the period 2003-05 (and in 2013 in Luxembourg under variant iii), transfers would have been activated in Greece, Ireland, Italy and Spain only from 2008/09 onwards (with the exception of Greece under variant iii in 2000). Not surprisingly, with average yearly benefit and contribution payments of 13, 19 and 22 billion euro at the Eurozone-level, the overall budget of the contingent benefit schemes i-iii is significantly lower than in our baseline scenario with non-contingent benefits (47 billion per year). Consequently, revenue-neutral contribution rates are less than half as large as in the baseline (0.42, 0.64 and 0.72 rather than 1.56 per cent).

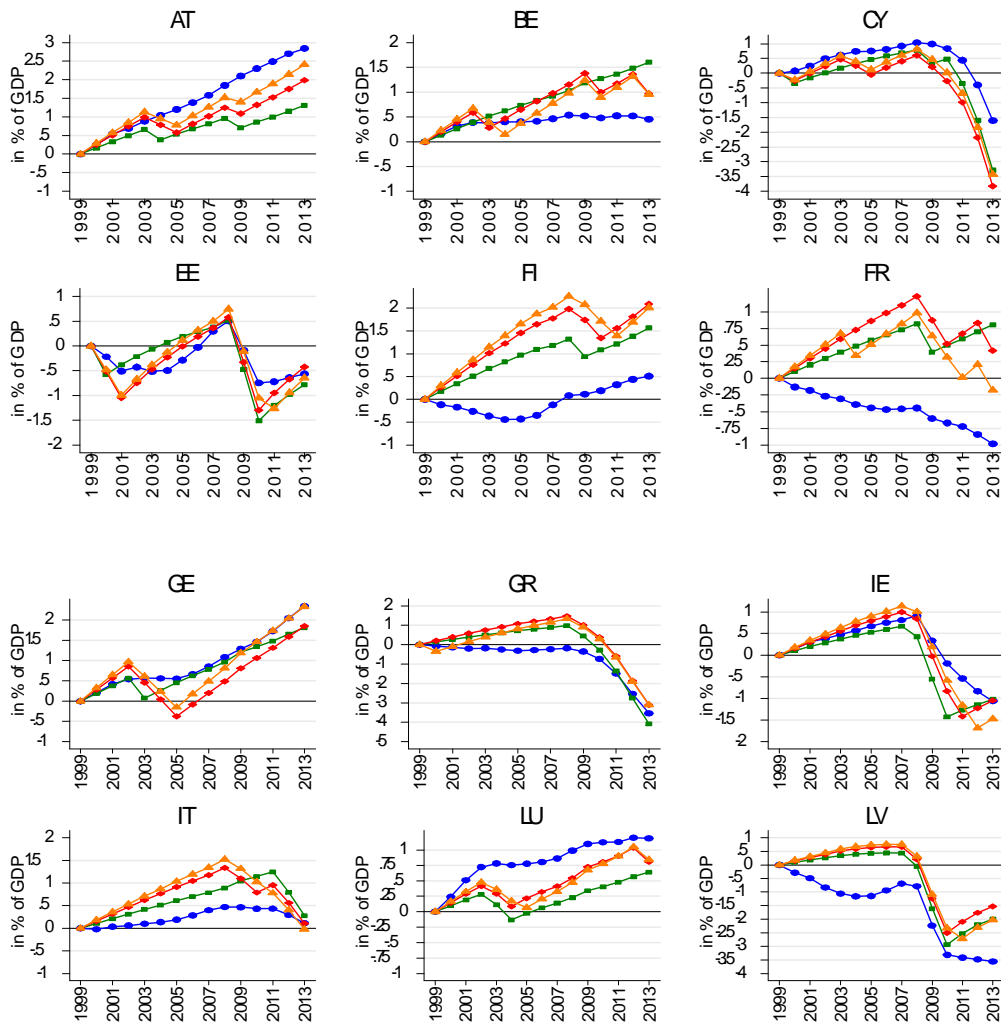
Figure 7 compares cumulative net contributions under the contingent benefit schemes to the baseline (variant A). A key finding is that a few member states change their net contributing position in terms of accumulated net contributions at the end of the simulation period (France, Slovenia). Austria, Luxembourg and the Netherlands, the three member states that would have been net contributors in each year in the baseline, are now net receivers in some years. In the Netherlands, accumulated net contributions are reduced by more than 50 per cent by the end of the simulation period relative to the baseline. Spain, a net recipient in the baseline throughout the simulation period, is a net contributor until 2007 and a net recipient in the remaining years. These results show that an EMU-UI system with contingent benefits could indeed provide more targeted transfers to member states which see their labor market conditions significantly deteriorating.

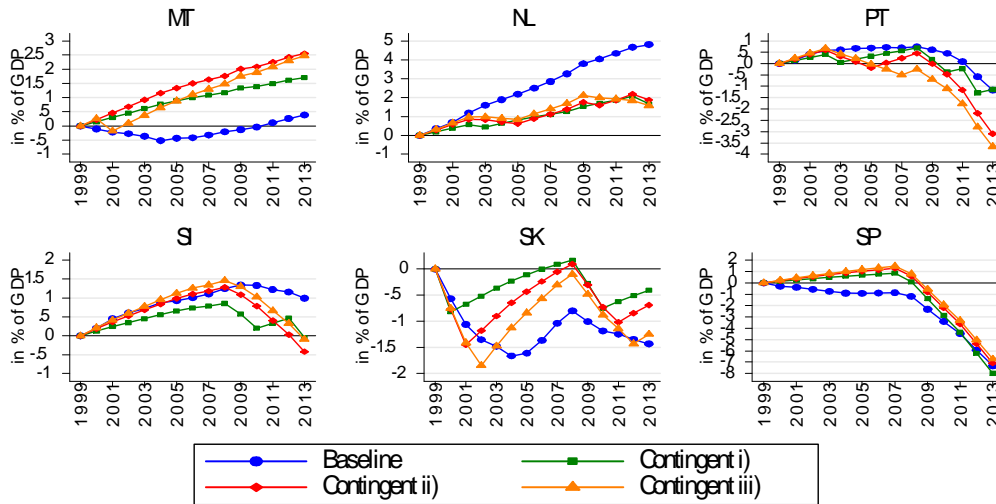
What are the automatic stabilization effects of such a scheme? Given that the contingent benefit schemes considered here correspond to the non-contingent baseline scheme in all dimensions besides the activation of the scheme, UI benefits paid to the short-term unemployed are the same once EMU-UI benefits are triggered. However,

²¹In the US the Tax Relief Act changed the look-back period in the EB program from a two-year to a three-year period in the recent recession to increase its stabilization impact (Nicholson and Needels 2011).

it must be taken into account that countries that have not reached the trigger (but might well be in a recession) could be worse off compared to a situation with a non-contingent EMU-UI system as they wouldn't benefit from interregional smoothing. The link between contribution and benefit payments would be broken and households in these member states would need to finance both their national unemployment insurance system as well as the EMU-UI system. This potential destabilizing effect could be prevented by suspending contribution payments to the EMU-UI system under certain circumstances such as rising unemployment rates.

Figure 7: Cumulative net contributions - Contingent benefits





Note: Baseline and contingent benefits. Contingent scheme i): Benefits are paid if unemployment rate in a given member state in year t is at least 1 percentage point higher than in $t-1$ (one-year look-back period). Contingent scheme ii): 2-year look-back period, i.e., benefits are triggered if unemployment rate in year t is at least 1 percentage point higher than in $t-1$ OR $t-2$. Contingent scheme iii): 3-year look-back period, i.e., benefits are triggered if unemployment rate in year t is at least 1 percentage point higher than in $t-1$ OR $t-2$ OR $t-3$. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

6 Conclusion

The economic crisis in the Eurozone has revived the debate about deeper fiscal integration and has brought this topic to the top of the European policy agenda. A common unemployment insurance system is one widely discussed reform proposal. Such a system could serve as a fiscal risk sharing mechanism in the EA. Supporters of this idea argue that a centralized EMU-UI system would cushion asymmetric shocks in the Eurozone and provide income insurance to those households which are most vulnerable. It would thus not only improve the economic resilience of EMU and make its institutional architecture more sustainable, but also strengthen the social dimension of European policy-making. However, main concerns include the risk of permanent transfer flows across member states and moral hazard for national economic policies, administrations and individuals. These moral hazard effects would lead to more, rather than less unemployment.

The aim of this paper has been to provide insights on the potential added value of an EMU-UI. This added value depends on its ability to provide interregional smoothing. We have developed a decomposition framework that disentangles interregional smoothing effects from other stabilization channels such as improved counter-cyclicality of national UI schemes and intertemporal smoothing through debt. In our empirical analysis, we have used counterfactual simulation techniques based on harmonized European micro data to quantify the importance of each stabilization channel and to assess redistributive effects. We have also discussed how different design options would

affect moral hazard issues.

Our main results can be summarized as follows. A basic scheme, partly replacing national unemployment insurance systems, with a replacement rate of 50 per cent, a maximum benefit duration of 12 months and a broad coverage of all new unemployed with previous employment income would have provided interregional smoothing gains by cushioning on average 10 per cent of the income fluctuations due to transitions into and out of unemployment at EA-level. For individual member states, average interregional smoothing effects range from -5 per cent (Malta) to 22 per cent (Latvia). Overall, 17 out of 18 member states would have benefited from interregional smoothing. However, for most countries, we also find procyclical effects in some years. Our results suggest that the interregional smoothing potential is as important as intertemporal smoothing through debt. The latter provides an additional cushioning effect of 9 per cent at EA-level. On average, the annual budget would have amounted to 47 billion euro per year at the Eurozone-level, financed by a contribution rate of 1.56 per cent on employment income. We find that 4 out of 18 member states would have been either net contributors or net recipients in each year of our simulation period. This happens although the scheme is not designed to generate permanent redistribution across countries.

In terms of within-country heterogeneity, we find that in particular the young unemployed would benefit from broader UI coverage while the employed would face higher social insurance contributions. Finally, our analysis shows that a common EMU-UI system with contingent benefits would lead to less cross-country redistribution than the baseline system as it would provide more targeted transfers to member states with deteriorating labor market conditions. However, contingent benefits can have undesirable side effects such as a broken link between contribution and benefit payments if benefits are not activated.

One should note that the simulations of the fiscally most integrated EMU-UI scheme assume revenue-neutrality over the entire time span considered (2000–13), but not in each period. This raises the issue of whether the EMU-UI would be allowed to issue debt. In our calculations the EMU-UI would have produced a surplus in its early phase, so that reserves would have been available to finance higher benefits in the crisis. While reserves would provide a buffer in the next recession, there is a concern that political pressures would build up to prevent the accumulation of surpluses and, instead, let the EMU-UI incur more and more debt until it needs to be 'bailed out' by the member states. Clearly, even though a balanced budget in each period would limit the ability of the system to act as a fiscal stabilizer, an effective debt limitation would be needed.

We should emphasize that our analysis has a number of limitations which should be taken into account in the interpretation of the results. Most importantly, it is not the objective of this paper to establish whether or not the introduction of an EMU-UI

scheme is desirable in terms of overall welfare. Our analysis focuses on the financial flows implied by different unemployment insurance schemes and the ability of these flows to act as an automatic stabilizer. In so far our analysis is purely positive, rather than normative. In addition, we take economic behavior as given. If EMU-UI had the desired stabilizing effects, the financial flows in the system would differ from those calculated here; the redistributive effects would probably be smaller. However, if the moral hazard effects dominated, the financial flows from contributors to recipients could also be larger. Adding behavioral effects to the analysis is a promising subject for future research.

References

- Andor, L. (2014). Basic European Unemployment Insurance - The best way forward in strengthening the EMU's resilience and Europe's recovery, *Intereconomics* **Vol. 49 (4)**: 184–189.
- Asdrubali, P., Sorensen, P. and Yosha, O. (1996). Channels of interstate risk-sharing: United States 1963-1990, *Quarterly Journal of Economics* **111**: 1081–1110.
- Auerbach, A. and Feenberg, D. (2000). The significance of federal taxes as automatic stabilizers, *Journal of Economic Perspectives* **14**: 37–56.
- Bargain, O., Dolls, M., Fuest, C., Neumann, D., Peichl, A., Pestel, N. and Siegloch, S. (2013). Fiscal Union in Europe? Redistributive and Stabilizing Effects of a European Tax Benefit System and Fiscal Equalization Mechanism, *Economic Policy* **July 2013**: 375–422.
- Bargain, O., Immervoll, H., Peichl, A. and Siegloch, S. (2012). Distributional consequences of labor-demand shocks: the 2008 - 2009 recession in Germany, *International Tax and Public Finance* **19 (1)**: 118–138.
- Bayoumi, T. and Masson, P. (1995). Fiscal flows in the United States and Canada: Lessons for monetary union in Europe, *European Economic Review* **39**: 253–274.
- Bertola, G. (2013). Policy coordination, convergence, and the rise and crisis of EMU imbalances, European Commission DG Economic and Financial Affairs: European Economy - Economic Papers No. 490.
- Bordo, M., Jonung, L. and Markiewicz, A. (2013). A Fiscal Union for the Euro: Some Lessons from History, *CESifo Economic Studies* **59 (3)**: 449–488.
- Brandolini, A., Carta, F. and D'Amuri, F. (2016). A feasible unemployment-based shock absorber for the euro area, *Journal of Common Market Studies* **DOI: 10.1111/jcms.12398**.

- Centre for European Policy Studies (2014). Simulation exercise for an Unemployment Insurance Scheme for the euro area, Cost of Non-Europe Report 3/2014.
- Claeys, G., Darvas, Z. and Wolff, G. (2014). Benefits and drawbacks of European unemployment insurance, Bruegel Policy Brief 2014/06.
- Congressional Budget Office (2012). Unemployment insurance in the wake of the recent recession, Pub. No. 4525.
- Craig, S., Hemissi, W., Mukherjee, S. and Sørensen, B. (2016). How do politicians save? Buffer-stock management of unemployment insurance finance, *Journal of Urban Economics* **93**: 18–29.
- Deinzer, R. (2004). Konvergenz- und Stabilisierungswirkungen einer europäischen Arbeitslosenversicherung, Berlin: Duncker & Humblot.
- Dolls, M., Fuest, C., Heinemann, F. and Peichl, A. (2016). Reconciling Insurance with Market Discipline: a Blueprint for a European Fiscal Union, *CESifo Economic Studies* **62 (2)**: 210–231.
- Dolls, M., Fuest, C. and Peichl, A. (2012). Automatic Stabilizers and Economic Crisis: US vs. Europe, *Journal of Public Economics* **96**: 279–294.
- Dullien, S. (2014). A European Unemployment Benefit Scheme. How to provide for more Stability in the Euro Zone, Gütersloh: Bertelsmann-Stiftung.
- Dullien, S., Fichtner, F., Haan, P., Jaeger, L., Jansen, M., Ochman, R. and Tomasch, E. (2014). Eine Arbeitslosenversicherung für den Euroraum als automatischer Stabilisator - Grenzen und Möglichkeiten, DIW Berlin: Politikberatung kompakt 86.
- Enderlein, H., Guttenberg, L. and Spiess, J. (2013). Blueprint for a cyclical shock insurance in the euro area, Project EU & Differentiated Integration.
- Esser, I., Ferrarini, T., Nelson, K., Palme, J. and Sjöberg, O. (2013). Unemployment benefits in EU Member States, report prepared for the use of the European Commission, DG Employment, Social Affairs and Inclusion.
- European Commission (2012). A blueprint for a deep and genuine economic and monetary union - Launching a European Debate, Communication from the Commission, 777 final/2.
- Eurostat (2012). Task 5.1.1. - Working paper with the description of the Income and living conditions dataset.
- Evers, M. (2012). Federal fiscal transfer rules in monetary unions, *European Economic Review* **56**: 507–252.

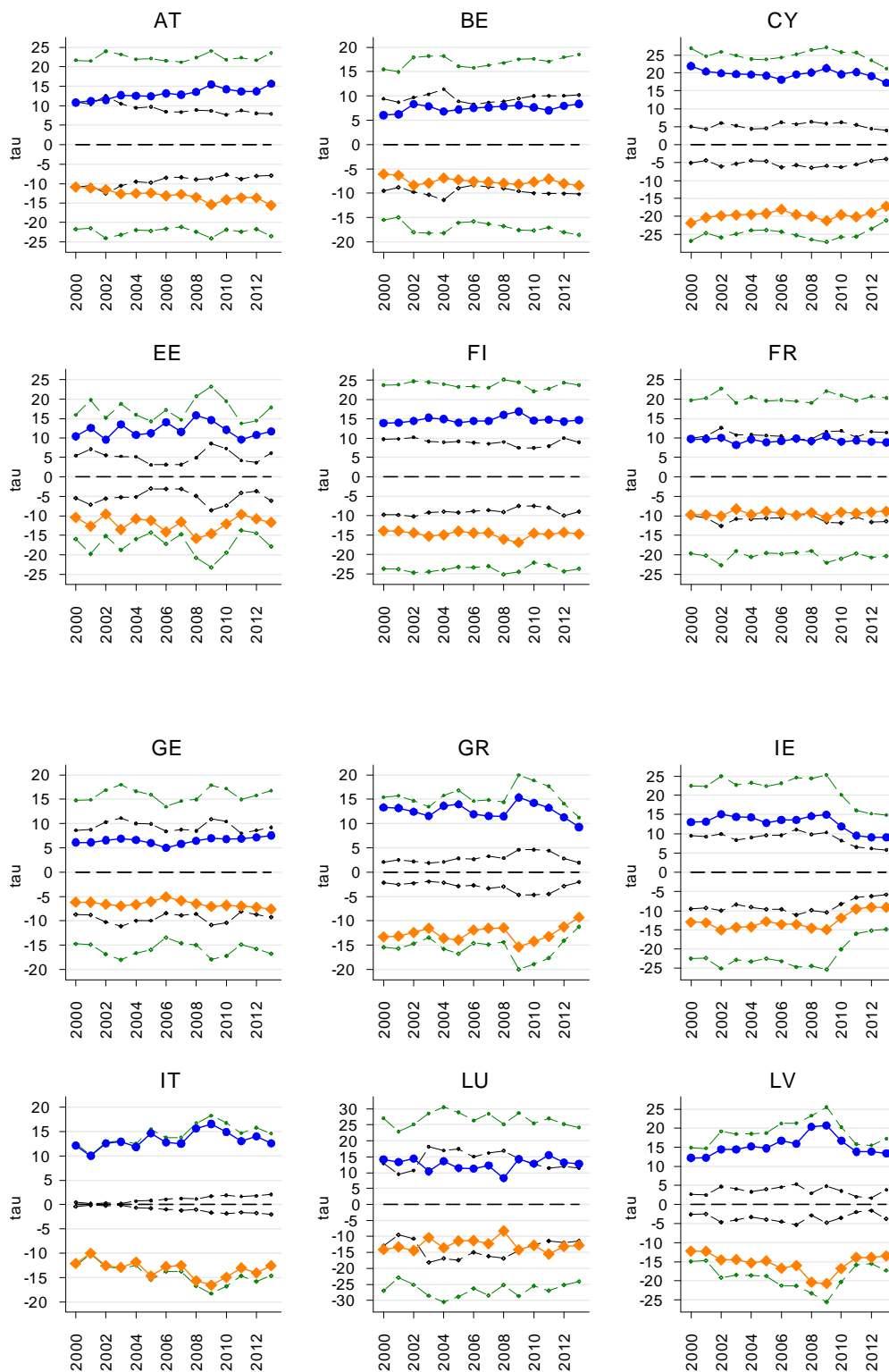
- Farhi, E. and Werning, I. (2014). Fiscal Unions, revised version of NBER Working Paper No. 18280, Issued in August 2012.
- Fatás, A. (1998). Does EMU need a fiscal federation?, *Economic Policy* **13**: 163–203.
- Fatás, A. and Mihov, I. (2001). Government size and automatic stabilizers: international and intranational evidence, *Journal of International Economics* **55**: 3–28.
- Feyrer, J. and Sacerdote, B. (2013). How much would US style fiscal integration buffer European unemployment and income shocks, *American Economic Review: Papers & Proceedings* **103(3)**: 125–128.
- Forni, M. and Reichlin, L. (1999). Risk and potential insurance in Europe, *European Economic Review* **43**: 1237–1256.
- Furceri, D. and Zdzienicka, A. (2015). The Euro Area Crisis: Need for a Supranational Fiscal Risk Sharing Mechanism?, *Open Economies Review* **26 (4)**: 683–710.
- Gros, D. (2014). A fiscal shock absorber for the Eurozone? Insurance with Deductible, *Intereconomics* **Vol. 49 (4)**: 199–203.
- IAB (2013). Verteilungswirkungen einer europäischen Arbeitslosenversicherung - Simulationsrechnungen, Institut für Arbeitsmarkt- und Berufsforschung, Aktuelle Berichte.
- IMF (2013). Toward a Fiscal Union for the Euro Area, IMF Staff Discussion Note, SDN/13/09.
- Immervoll, H., Levy, H., Lietz, C., Mantovani, D. and Sutherland, H. (2006). The sensitivity of poverty rates to macro-level changes in the European Union, *Cambridge Journal of Economics* **30**: 181–199.
- Jappelli, T. and Pistaferri, L. (2014). Fiscal Policy and MPC Heterogeneity, *American Economic Journal: Macroeconomics* **6(4)**: 107–36.
- Jara, H. X. and Sutherland, H. (2014). The implications of an EMU unemployment insurance scheme for supporting incomes, EUROMOD Working Paper Series EM5/14.
- Juncker, J.-C. (2015). Completing Europe’s Economic and Monetary Union, in close collaboration with D. Tusk, J. Dijsselbloem, M. Draghi and M. Schulz.
- Kniesner, T. and Ziliak, J. (2002). Tax Reform and Automatic Stabilization, *American Economic Review* **92(3)**: 590–612.
- Lellouch, T. and Sode, A. (2014). An unemployment insurance scheme for the euro area, Trésor-Economics No. 132.

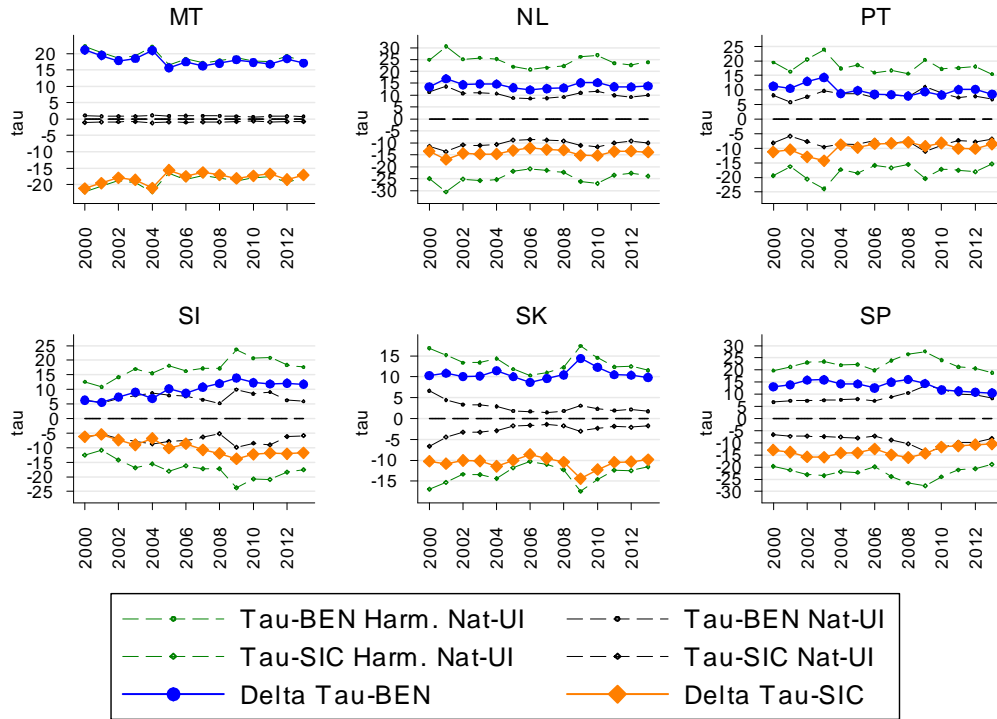
- Luque, J., Morelli, M. and Tavares, J. (2014). A volatility-based theory of fiscal union desirability, *Journal of Public Economics* **112**: 1–11.
- Navicke, J., Rastrigina, O. and Sutherland, H. (2014). Nowcasting indicators of poverty risk in the European Union: A microsimulation approach, *Social Indicators Research* **119 (1)**: 101–119.
- Nicholson, W. and Needels, K. (2011). The EUC08 Program in Theoretical and Historical Perspective, Mathematica Policy Research report submitted to U.S. Department of Labor.
- Nicholson, W., Needels, K. and Hock, H. (2014). Unemployment Compensation During the Great Recession: Theory and Evidence, *National Tax Journal* **67(1)**: 187–218.
- Peichl, A. (2009). The benefits and problems of linking micro and macro models - Evidence from a flat tax analysis, *Journal of Applied Economics* **XII (2)**: 301–329.
- Salgado, M., Figari, F., Sutherland, H. and Tumino, A. (2014). Welfare compensation for unemployment in the Great Recession, *Review of Income and Wealth* **60**: 177–204.
- Sutherland, H. and Figari, F. (2013). EUROMOD: the European Union tax-benefit microsimulation model, *International Journal of Microsimulation* **6(1)**: 4–24.
- Van Rompuy, H. (2012). Towards a genuine Economic and Monetary Union, Report to the European Council Meeting, December, 13.-14., 2012, in close collaboration with J.M. Barroso, J.-C. Juncker and M. Draghi.

A Appendix:

A.1 Additional results

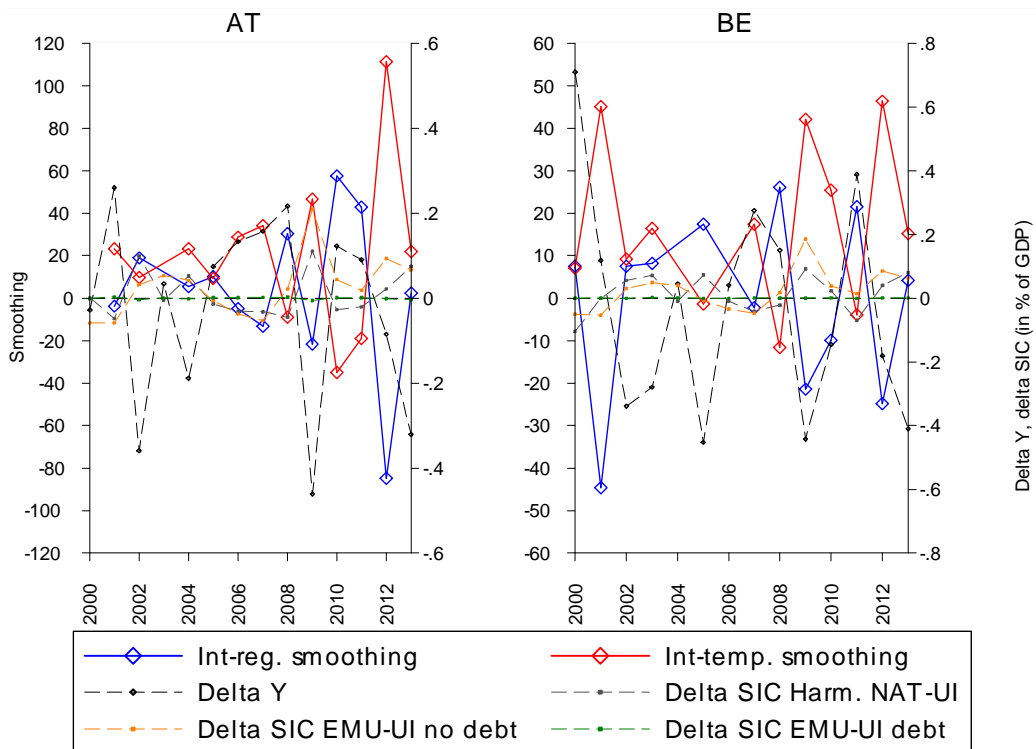
Figure 8: Stabilization effects due to harmonization

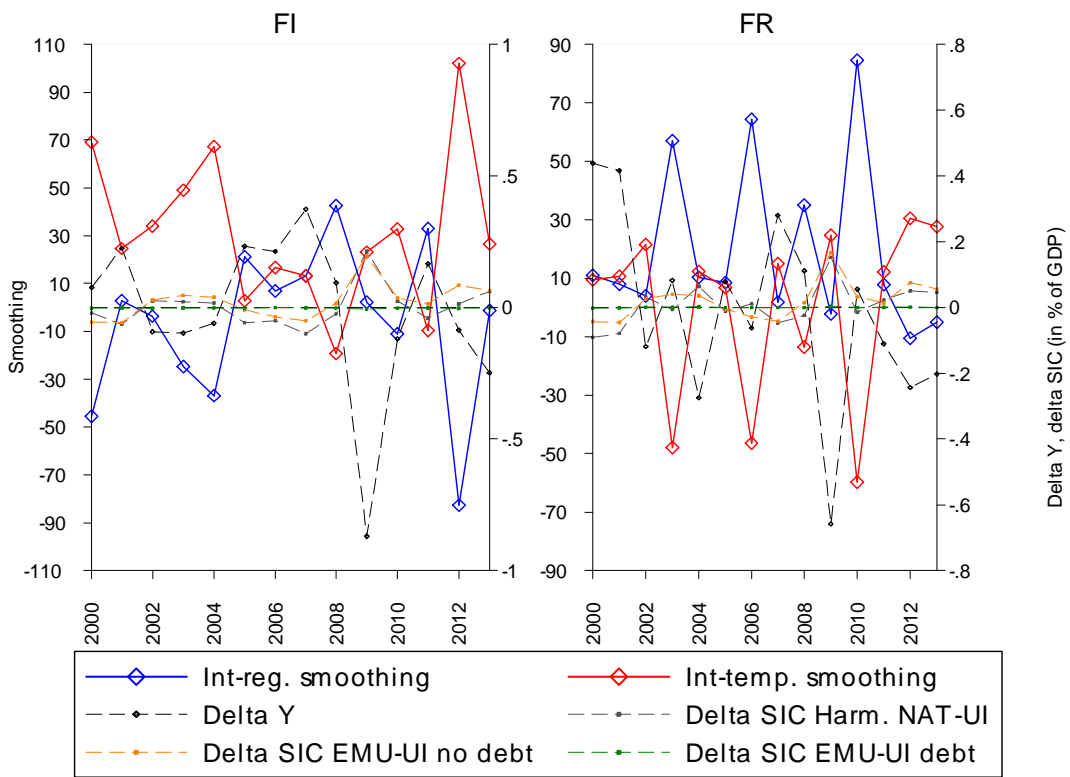
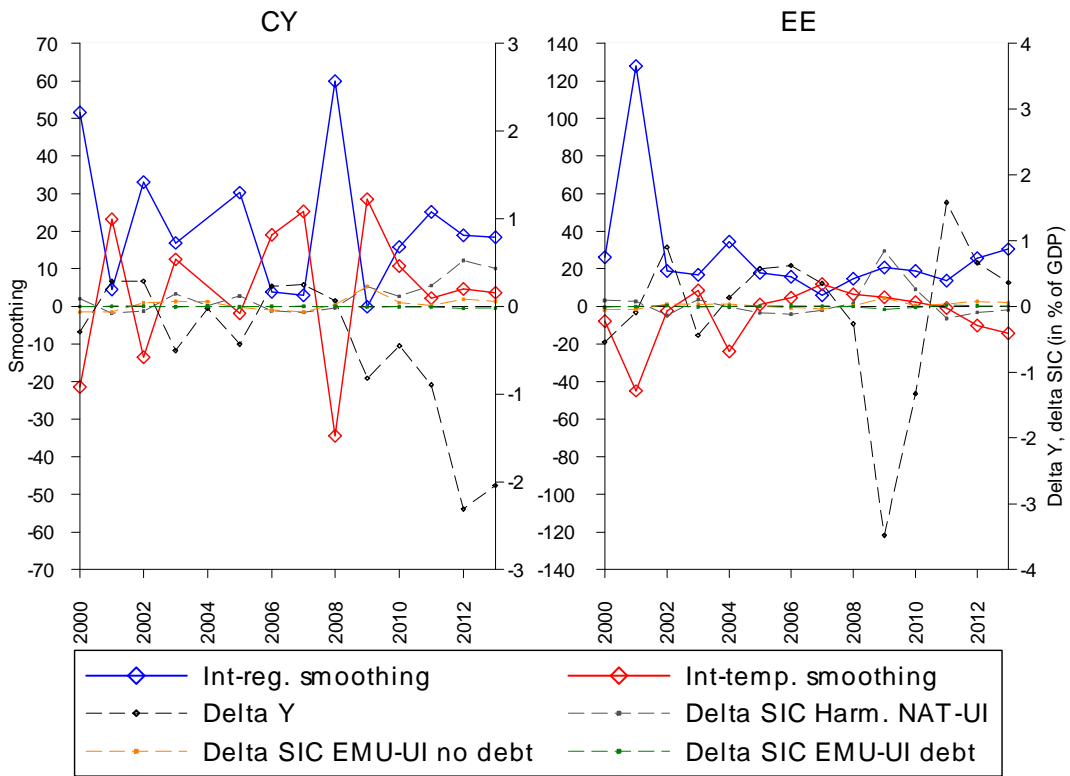


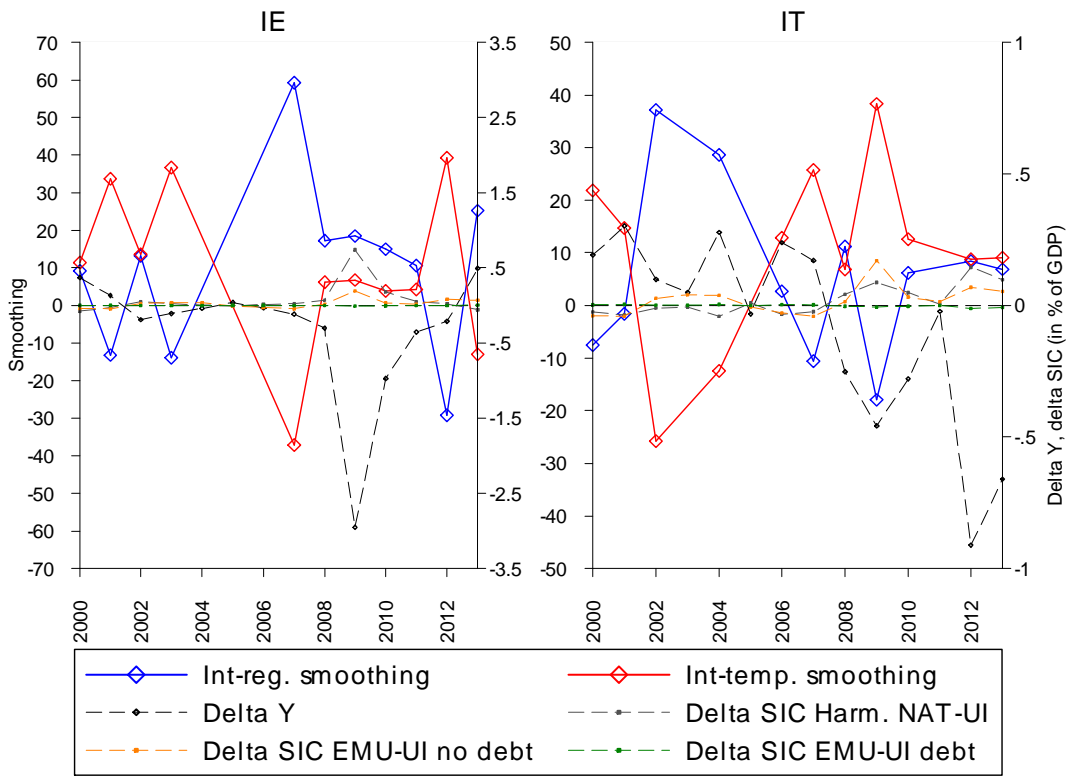
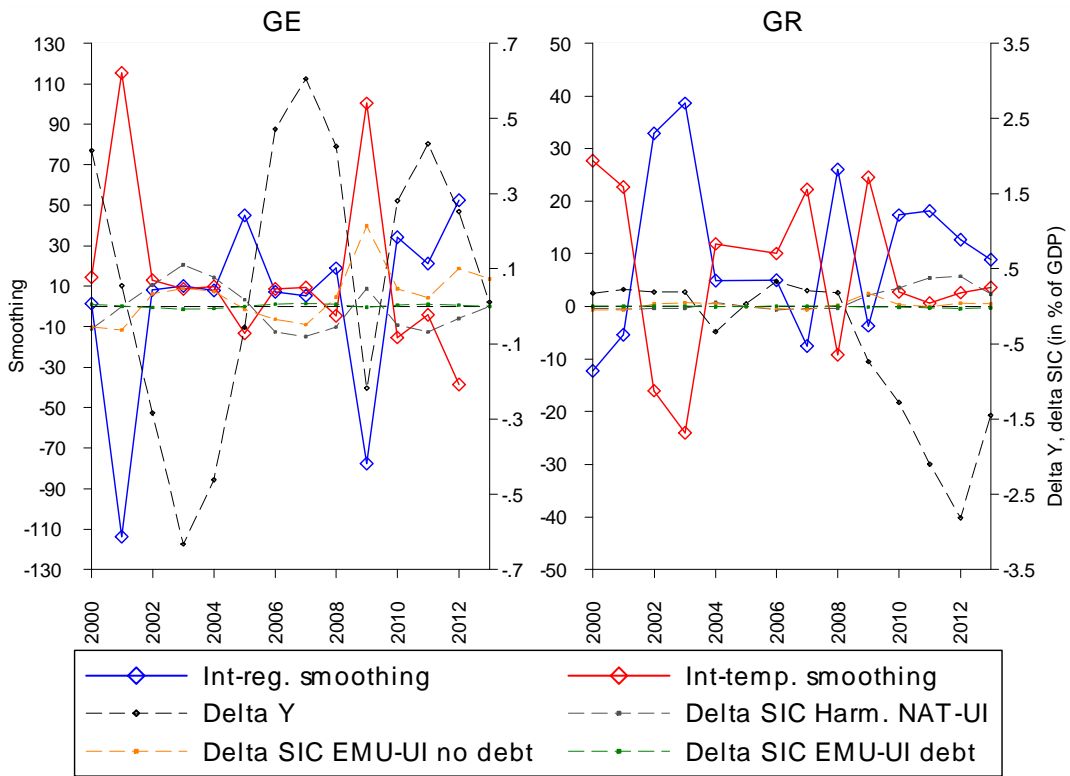


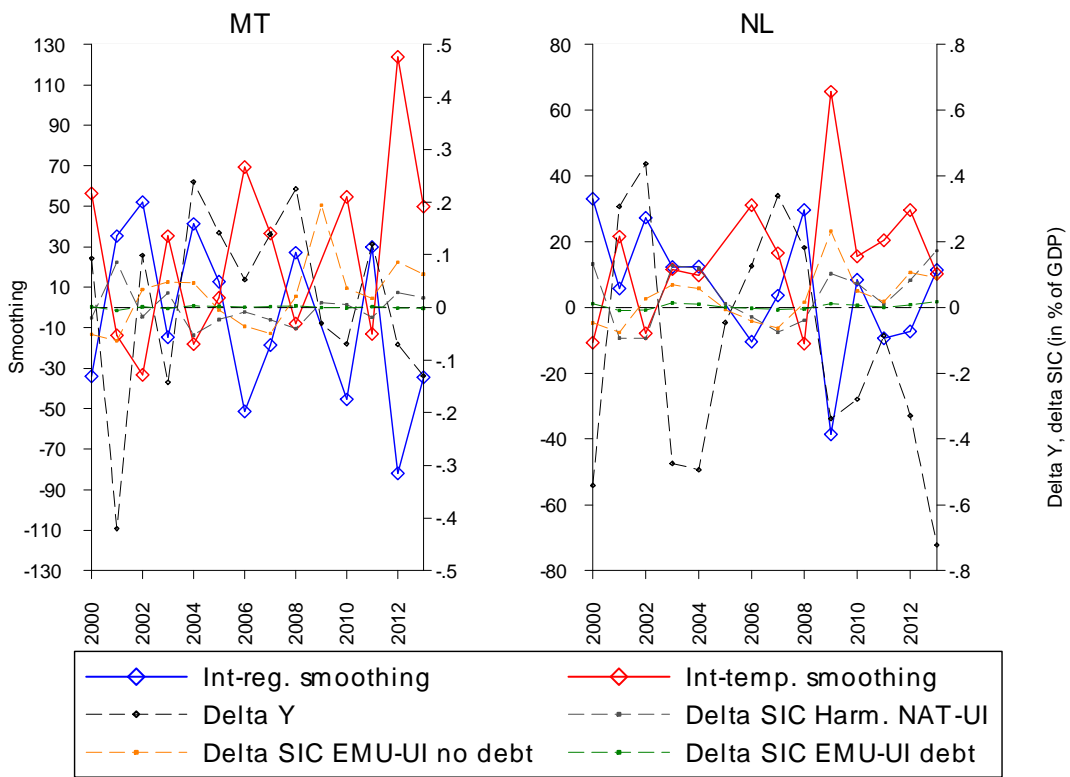
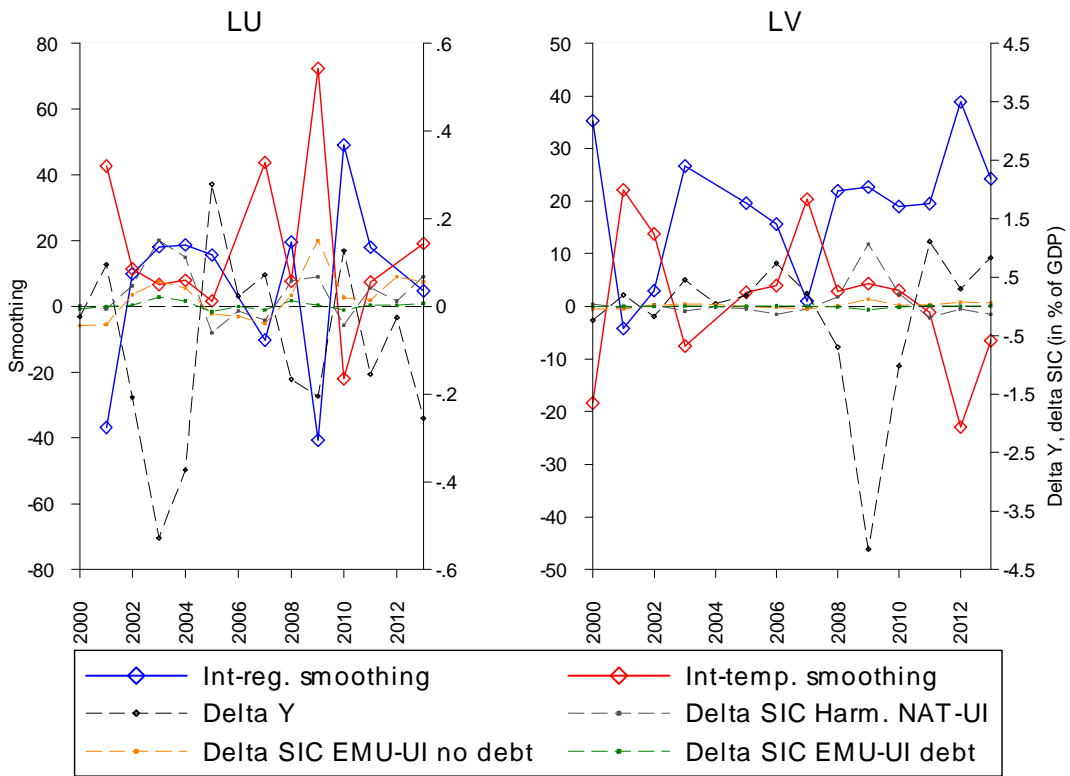
Note: Delta Tau-BEN = Tau-BEN Harmonized National UI - Tau-BEN National UI. Delta Tau-SIC = Tau-SIC Harmonized National UI - Tau-SIC National UI. Sources: AMECO, EU-LFS and own calculations based on EUROMOD.

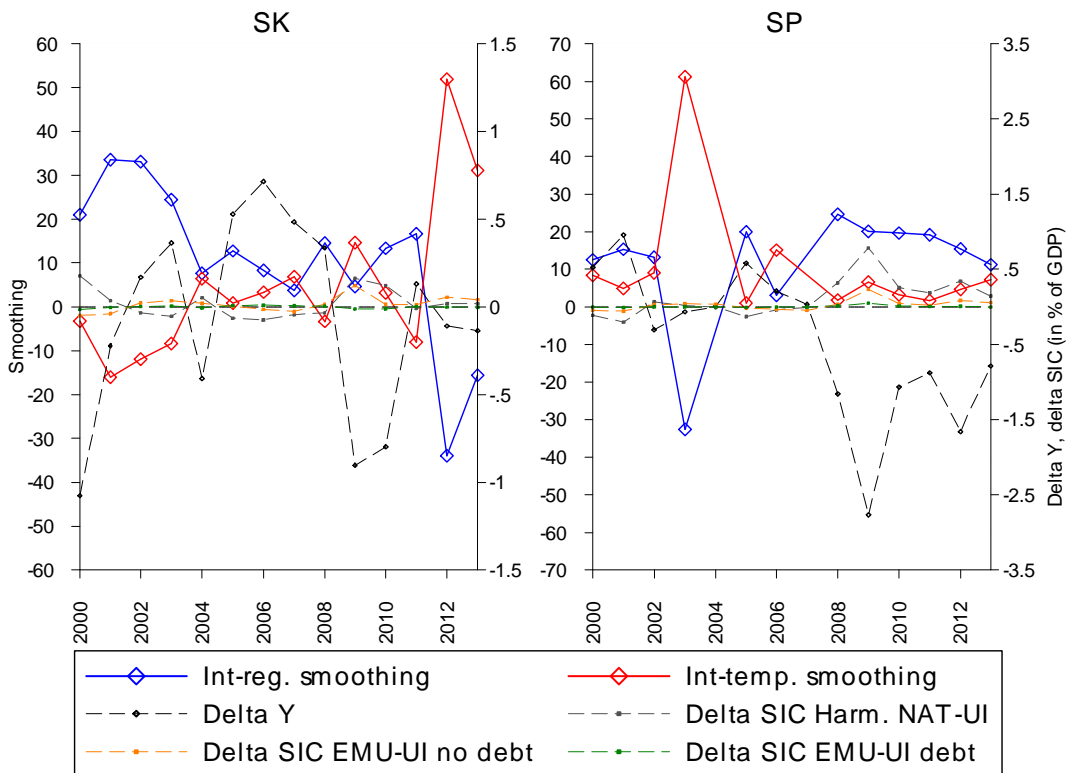
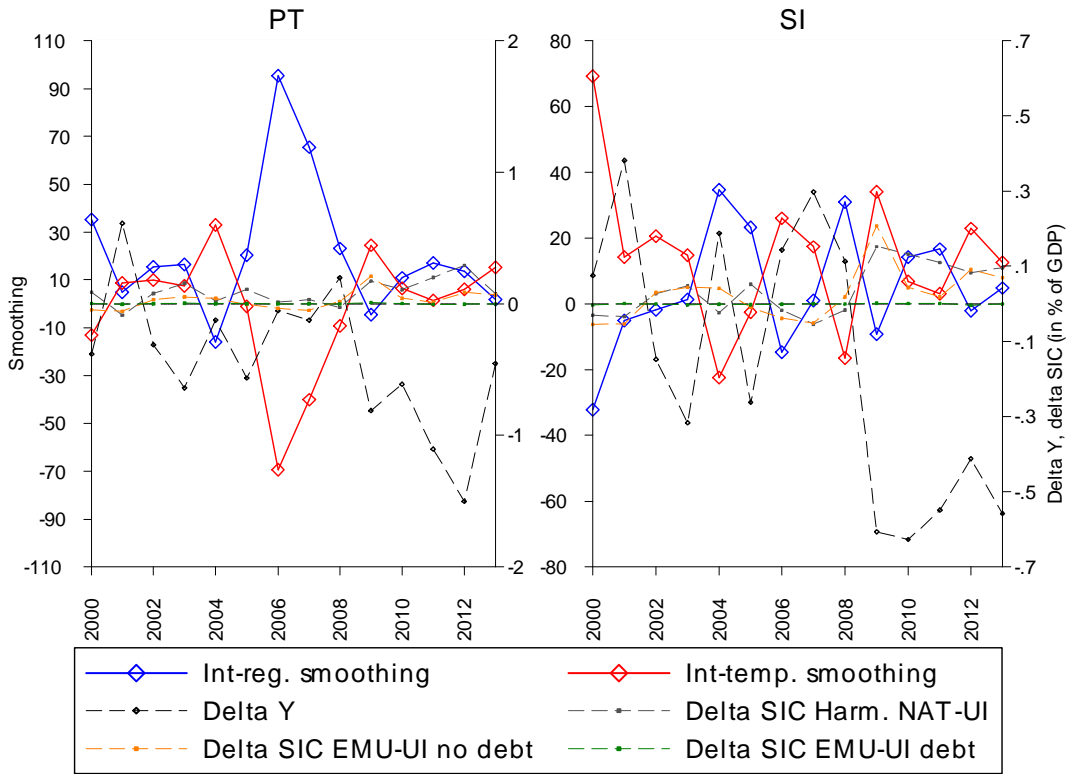
Figure 9: Stabilization effects due to interregional and intertemporal smoothing











Sources: AMECO, EU-LFS and own calculations based on EUROMOD. Note: Left y-axis shows interregional and intertemporal smoothing in per cent of the change in employment income (see formula 3 in section 4.1). Smoothing coefficients are assigned a missing value in years with an absolute change in employment income smaller than 0.05 per cent of GDP as coefficients can be very large in those years. Right y-axis shows delta Y and delta SIC (in % of GDP). Interregional smoothing = $(\text{Delta SIC EMU-UI no debt} - \text{Delta SIC Harmonized national UI}) / \text{Delta Y}$. Intertemporal smoothing = $(\text{Delta SIC EMU-UI debt} - \text{Delta SIC EMU-UI no debt}) / \text{Delta Y}$.

Table 5: Trigger for contingent benefits

	2000			2001			2002			2003			2004			2005			2006		
	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii
AT	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0
BE	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0
CY	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
EE	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
GE	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0	0	0
GR	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LU	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0
LV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MT	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0	0	0
PT	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	1	0	0	1
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SK	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	2007			2008			2009			2010			2011			2012			2013		
	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii	i	ii	iii
AT	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
BE	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1
CY	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
EE	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0
FI	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0
FR	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0	1	1
GE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GR	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IE	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0
IT	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	1	1	1	1	1
LU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
LV	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	1	1	1
PT	0	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1
SI	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1
SK	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	0	1	0	0	0
SP	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Notes: Years in which contingent benefits are activated. Contingent scheme i): Benefits are paid if unemployment rate in a given member state in year t is at least 1 percentage point higher than in t-1 (one-year look-back period).

Contingent scheme ii): 2-year look-back period, i.e., benefits are triggered if unemployment rate in year t is at least 1 percentage point higher than in t-1 OR t-2. Contingent scheme iii): 3-year look-back period, i.e., benefits are triggered if unemployment rate in year t is at least 1 percentage point higher than in t-1 OR t-2 OR t-3. Source: AMECO.

A.2 Reweighting procedure for modeling (un)employment changes

In EUROMOD, the baseline household weights supplied with the national cross-sectional databases have been calculated to adjust for sample design and/or differential non-response. In our empirical analysis, we follow the approach taken by Immervoll et al. (2006), Bargain et al. (2012) and Dolls et al. (2012) and employ reweighting techniques to simulate a sample of repeated cross-sections for each EA member state over the period 2000-13. We impute various labor force characteristics from the LFS micro data based on 18 age-gender-education strata. For each subgroup-year cell, these are number of people in the labor force, unemployment rates, shares of short- and long-term unemployed as well as coverage rates of national UI systems.

The 18 subgroups are defined according to the following socio-demographic characteristics:

- gender
- age (<30, 30–50, >50)
- education (low: not completed primary, primary and lower secondary; middle: upper secondary and post secondary; high: tertiary).

(Un)employment changes over the period of analysis are modeled at the subgroup level. An increase (a decrease) of the group-specific unemployment rate is computed by increasing the weights of the unemployed (employed) in each subgroup while the weights of the employed (unemployed) are decreased correspondingly, i.e., in effect a fraction of employed (unemployed) individuals is made unemployed (employed). Hence, the size and composition of the labor force in each reweighted cross-section matches the labor force as reflected in the LFS both at the subgroup and aggregate level. Growth in average earnings along the intensive margin, modeled in order to account for changes in the tax base, is imputed from the AMECO-database.