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Mathias Dolls

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Abstract

This paper develops a decomposition framework to study the importance of different stabilization channels of an unemployment re-insurance scheme for the euro area. Running counterfactual simulations based on household micro data for the period 2000–16, the paper finds that the re-insurance would have cushioned on average 12% (8%) of income losses through interregional (intertemporal) smoothing. These results suggest that the smoothing effect of the re-insurance which is due to asymmetries in labor market shocks would have raised the income insurance of a typical unemployment insurance scheme in the euro area by more than 50%. The simulated re-insurance scheme would have been revenue-neutral at EA-19, but not at the member-state level. Average annual net contributions would have amounted to -0.1–0.1 per cent of GDP. The paper discusses how different variants of the re-insurance might affect the risk of moral hazard.

JEL-Codes: F550, H230, J650.

Keywords: European fiscal integration, unemployment re-insurance, automatic stabilizers, euro area reform.

Mathias Dolls
ifo Institute – Leibniz Institute for Economic Research
at the University of Munich
Poschingerstraße 7
Germany – 81679 Munich
dolls@ifo.de

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1 Introduction

It is often argued that the institutional architecture of the European Economic and Monetary Union (EMU) is still incomplete as it lacks a fully-fledged fiscal union including a centralized fiscal capacity aimed at cushioning asymmetric macroeconomic shocks.[1] One potential element of a more centralized fiscal union is an unemployment stabilization fund as proposed for example in the Meseberg declaration of the French and German government in June 2018 or in the EU Commission's work programme 2020.[2] The stabilization fund would act as a re-insurance for domestic unemployment insurance (UI) schemes in the euro area and support member states exposed to large labor market shocks, thereby strengthening the workings of national automatic stabilizers (Di Maggio and Kermani 2016; McKay and Reis 2016).[3]

While cross-country transfers in a currency union serve the purpose of smoothing consumption and providing macroeconomic stability (Farhi and Werning 2017), there is a concern that fiscal risk-sharing might lead to permanent transfers and adverse incentives for sound fiscal and economic policies.[4] Opposing views on the desirability of a fiscal stabilization scheme and its effectiveness have prevented a political agreement on the necessary instruments for a more sustainable institutional framework in the EMU in recent years (Lehner and Wasserfallen 2019). However, there is a broad consensus that evaluation studies are needed in order to be better able to weigh potential positive and negative effects of fiscal risk sharing devices (German Council of Economic Experts 2018).

This paper presents the first comprehensive positive (rather than normative) evaluation study of an unemployment re-insurance scheme assessing both its stabilizing and redistributive effects as well as moral hazard issues. It develops a decomposition framework to single out and quantify the importance of different stabilization channels of the re-insurance which are assessed in a counterfactual simulation experi-

[1] See contributions by the IMF (Allard et al. 2013; Arnold et al. 2018; Berger et al. 2019), by the European Fiscal Board (2018) or the recent EU Commission's "Reflection Paper on the deepening of the Economic and Monetary Union" as well as its roadmap for EMU reform published in December 2017 (European Commission 2017 a,b).

[2] https://archiv.bundesregierung.de/archiv-de/meta/startseite/meseberg-declaration-1140806 and European Commission (2020).

[3] Other proposals for a centralized fiscal capacity include an 'export-based stabilization capacity' which would disburse transfers after negative sectoral trade shocks (Beetsma et al. 2019), a rainy day fund with transfers triggered after negative shocks to gross national product (Furceri and Zdzienicka 2015), or an 'investment stabilization function' supporting public investment projects in economic downturns (European Commission 2018).

[4] A critical view on a euro-area fiscal capacity can be found in the 2018 annual report of the German Council of Economic Experts (German Council of Economic Experts 2018) or in columns by Heijdra et al. and Feld published as lead commentaries in the VoxEU Debate "Euro Area Reform" (https://voxeu.org/debates/euro-area-reform).

ment for euro-area member states over the period 2000–16. The effect of introducing the re-insurance is decomposed into two steps. In a first step, the re-insurance cannot issue debt and its budget has to be balanced in every year. Contributions from member states are pooled and used to finance transfers to member states hit by a shock. This first step gives rise to *interregional* smoothing. In a second step, the re-insurance can run surpluses and deficits in single years and revenue-neutrality is imposed over the simulation period. This step leads to *intertemporal* smoothing of the re-insurance.

Thereby, the paper provides insights on the potential added value of the re-insurance. While intertemporal smoothing can in principle be achieved by countries acting alone, interregional smoothing can only be achieved by pooling risks across countries. As demonstrated by Farhi and Werning (2017), the benefits of cross-country fiscal risk-sharing gain in importance the larger the asymmetries in macroeconomic shocks across countries. The decomposition analysis presented in this paper sheds light on the (relative) importance of the interregional smoothing channel – reflecting asymmetries in labor market cycles – by comparing smoothing gains of the re-insurance with the stabilization effect of an average UI scheme in the euro area. The latter will be referred to as the 'benchmark UI'.

In the empirical analysis, the paper conducts a thought experiment and asks to what extent an unemployment re-insurance scheme would have cushioned labor market shocks in the euro area over the period 2000–16. It runs counterfactual simulations based on household micro data from the EU Labor Force Survey (EU-LFS) and the EU Statistics on Income and Living Conditions (EU-SILC). A key advantage of the micro-data based approach is that national labor market cycles can be precisely modelled and smoothing effects of the re-insurance consistently compared with the benchmark UI which would not be feasible with more aggregated macro data.

The simulated re-insurance scheme has the following characteristics. Both its contribution and activation rule contain a double condition that needs to be met for contribution and transfer payments to be triggered (Carnot et al. 2017). Member states pay contributions into the scheme when unemployment is below its long-term average and falling. Conversely, a transfer is disbursed if unemployment is above its long-term average and the year-on-year increase in the unemployment rate exceeds one percentage point. In sensitivity analyses, the paper considers variants with a higher threshold value and a single condition in the activation rule. If activated in a given year t, a member states receives a one-time transfer from the re-insurance which amounts to the *additional* unemployment benefit expenditures the benchmark UI would disburse in the corresponding year. The re-insurance hence

provides support only in severe economic crises and covers only part of the costs of unemployment which is arguably important to preserve incentives.

The paper finds that the re-insurance would have absorbed on average 20% of the income losses originating from rising unemployment in deep recessions. This cushioning effect is composed of the interregional (12%) and the intertemporal (8%) smoothing component of the re-insurance. As a comparison, the average stabilization effect of the benchmark UI amounts to 22%. These results suggest that the overall smoothing effect of the re-insurance is economically as important as the stabilization effect of the benchmark UI scheme at national level. Put differently, due to asymmetries in labor market shocks across countries the re-insurance would have provided an additional stabilization effect amounting to slightly more than 50% of the smoothing effect of a typical UI scheme in the euro area. However, EA-19 member states would have benefited from interregional smoothing effects to a different degree, with smoothing gains ranging from 0% in Austria, Finland and France to 24% in Luxembourg.

The re-insurance would have disbursed the largest amount of transfers in 2009, in total EUR 14 billion. Average annual contributions paid into the re-insurance would have been below 0.1% of GDP. Over the whole simulation period, some member states would have been in a net contributor, others in a net recipient position vis-à-vis the re-insurance. The rules triggering contribution and transfer payments would have ensured, however, that no member state would have turned out as a permanent net contributor or permanent net recipient.

The remainder of the paper is structured as follows. In Section 2, recent proposals on unemployment stabilization funds as well as the characteristics of the simulated re-insurance scheme are presented. Section 3 introduces the decomposition framework and the empirical approach. Results are presented in Section 4. Section 5 concludes by discussing key design issues of the re-insurance and its implications for moral hazard.

2 Characteristics of the re-insurance

2.1 Recent proposals

Table 1 provides an overview of recent proposals on unemployment-based stabilization funds. As shown in column 1, most proposals rely on the unemployment rate as indicator variable triggering payouts from the stabilization fund (Arnold et al. 2018; Carnot et al. 2017; Claveres and Stráský 2018; Dullien et al. 2018). Other contributions have proposed alternatives such as the short-term unemployment rate

(Beblavý and Lenaerts 2017) or labor market variables capturing both intensive and extensive margin changes, in particular hours worked or the wage bill (Bénassy-Quére et al. 2018). Moving next to the activation rule, column 2 reveals that some form of automaticity of payouts is present in all proposals.[5] Payouts are triggered if the indicator variable in the activation rule is above its historical moving average (Arnold et al. 2018; Beblavý and Lenaerts 2017; Dullien et al. 2018), increasing (Bénassy-Quére et al. 2018), or only if both conditions are fulfilled (Carnot et al. 2017; Claveres and Stráský 2018). Threshold values define how large the labor market shock must be for a payout to be triggered.

Table 1: Recent proposals on unemployment-based stabilization funds

author	trigger variable (1)	activation rule (2)	pay-out rule (3)	contribution rule (4)	borrowing capacity (5)
Arnold et al. (2018)	unemployment rate	unemployment rate above its 7-years moving average	0.5% of GDP for every 1 percentage point deviation in the unemployment rate above its 7-years moving average; variants: higher/lower transfer rates	0.35% of GDP per year; variants: higher/lower contribution rates; experience rating	yes
Beblavý and Lenaerts (2017)	short-term unemployment rate	short-term unemployment rate above its 10-years moving average, thresholds: 0.1/1/2 p.p.	pay-out equals sum of unemployment benefits paid to the short-term unemployed according to the rules of a hypothetical genuine European Unemployment Benefit System	0.1% of GDP per year until 0.5 % of EU GDP is accumulated; some variants with experience rating/claw-back	yes (two out of four variants)
Bénassy-Quéré et al. (2018)	unemployment rate, employment or wage bill	year-on-year increase in unemployment rate / decline in employment by e.g. 2 p.p.	one-off transfer of a fixed percentage of GDP (0.25%) for each p.p. increase in unemployment/decline in employment beyond the specified threshold	0.1% of GDP per year; experience rating	no
Carnot et al. (2017)	unemployment rate	double condition: year-on-year increase in unemployment rate and unemployment above its 15-years moving average; variants: different thresholds for year-on-year increase	0.5% of GDP per percent increase in the unemployment rate, variants: higher pay-outs	double condition: year-on-year decrease in unemployment rate and unemployment below its 15-years moving average; variants: different thresholds for year-on-year decrease; 0.5% of GDP per percent decrease in unemployment; experience rating	yes
Claveres and Stráský (2018)	unemployment rate	double condition: year-on-year increase in unemployment rate and unemployment above its 10-years moving average	1% of GDP times the change in the unemployment rate	0.1 % of GDP per year when the fund's balance is below -0.5% of euro area GDP; for each time the trigger was activated over past 10 years, additional contribution of 0.05% of GDP	yes
Dullien et al. (2018)	unemployment rate	1) payment from national compartment: unemployment rate above its 5-years moving average, threshold: 0.2 p.p. 2) additional payment from common compartment ("stormy day fund"): threshold: 2 p.p.	1) national compartment: 25% of average wages paid per employee 2) common compartment: transfers becoming proportionally bigger the larger the increase in unemployment	0.1 % of GDP per year; 80 % into national compartment, 20% into common compartment; experience rating	yes

Notes: The table shows selected features of recent proposals on unemployment-based stabilization funds focusing on their key criteria.

Pay-out rules determine the financial amount that would be disbursed if the fund is activated. As shown in the third column, the magnitude of the transfer is typically linked to the size of the labor market shock. Conversely, the contribution rule (column 4) characterizes how contributions into the fund are specified. With the exception of Carnot et al. (2017), all studies propose that contributions are made on an annual basis and correspond to a fixed share of GDP. Finally, the existence of a borrowing capacity (column 5) indicates whether the fund can run temporary

[5] On the contrary, the European Fiscal Board (2018) emphasizes that economic judgement would be necessary to differentiate between temporary and permanent shocks as the latter should not be stabilized by a centralized fiscal capacity in order to avoid moral hazard.

deficits or not.

2.2 The simulated re-insurance

This section presents the key design features of the simulated re-insurance. In contrast to a genuine European Unemployment Benefit System (EUBS) which would replace at least part of domestic UI schemes, the introduction of the re-insurance would leave national social insurance systems unaffected.[6]

Trigger. This paper uses a double condition as proposed by Carnot et al. (2017) both in the contribution and the activation rule of the re-insurance. This implies that there is a financial flow between the re-insurance and member state j only in those years member state j meets one of the two double conditions. The unemployment rate serves as an indicator variable activating both contributions into and pay-outs from the re-insurance. Pay-outs are triggered if (i) the year-on-year increase in the unemployment rate in country j and year t exceeds a certain threshold and (ii) unemployment is above its seven-year moving average.[7] The baseline analysis is conducted for a threshold value of 1 percentage point for the required year-on-year increase in the unemployment rate.

Conversely, contributions into the fund are triggered if (i) there is a year-on-year decrease in the unemployment rate in country j and year t and (ii) unemployment is below its seven-year moving average. The threshold value for the required year-on-year decrease in the unemployment rate is set to zero which implies that a marginal decrease in the unemployment rate is sufficient to trigger a contribution payment, provided that unemployment is below its seven-year moving average.

The double condition considered in this paper is restrictive both in its activation and contribution rule. Stronger countercyclical effects might be achieved by focusing on the *change* in the unemployment rate only. However, there is a concern that transfers are paid to member states that are not in need of support. This concern is to some extent alleviated by adding the requirement that the *level* of the unemployment rate must be below/above its seven-year moving average. An alternative contribution rule would require member states to make annual contribution payments into the re-insurance. Such a contribution rule would lead to a faster building up of reserves, but might have pro-cyclical effects if member states were forced to make contribution payments in recessions that are not severe enough to

[6] See e.g. Beblavý and Lenaerts (2017), Brandolini et al. (2016), Dolls et al. (2018) and Koester and Sondermann (2018) for analyses on potential stabilizing and redistributive effects of a genuine EUBS.

[7] Arnold et al. (2018) propose a seven-year moving average which is motivated by the finding in Giannone et al. (2009) that euro-area business cycles range from six to nine years.

trigger a transfer from the re-insurance.

Overall, the double condition is intended to ensure that contributions (transfers) are only paid in upturns (downturns) so that pro-cyclical effects are to be avoided to the greatest possible extent. In sensitivity analyses, alternative specifications of the activation rule are examined. First, a higher threshold value of 2 percentage points is considered. Second, the double condition is relaxed and payouts are only conditioned on changes in the unemployment rate.

Calculation basis for transfers and contributions. In the empirical analysis, (hypothetical) transfers from a benchmark UI system are used as a calculation basis for the pay-out from the re-insurance. More precisely, conditional on meeting the double condition for pay-outs, the transfer paid to country j in year t corresponds to the *increase* in unemployment benefit payments that the benchmark UI system would disburse in the corresponding year. The benchmark UI scheme has a replacement rate of 50 per cent of previous gross earnings, a maximum benefit duration of 12 months and it covers all new unemployed with previous employment income. It thus broadly resembles an average UI scheme in the euro area.[8]

Contributions into the re-insurance depend on the rule determining over which period its budget has to be balanced. As shown in section 3.1, two scenarios are considered in the simulations. In a first scenario, the re-insurance has to be revenue-neutral in every year. In that case, the sum of the contributions (pay-ins) has to be equal to the sum of the transfers (pay-outs) across N euro-area member states in every year t:

$$\Sigma_{j=1}^{N} Pay - in_{j,t\,(triggered)} = \Sigma_{j=1}^{N} Pay - out_{j,t\,(triggered)} \tag{1}$$

The subscript *(triggered)* denotes that the two sums are calculated over those member states meeting the double conditions for pay-outs and pay-ins. The contribution rate s in year t is calculated as follows:

$$s_t = \frac{\Sigma_{j=1}^{N} Pay - out_{j,t\,(triggered)}}{\Sigma_{j=1}^{N} Y_{j,t\,(triggered)}} \tag{2}$$

where $Y_{j,t\,(triggered)}$ denotes total compensation of employees in member state j contributing to the re-insurance in year t. It follows that the contribution payment of member state j equals $Pay - in_{j,t} = 0$ if the double condition activating contributions

[8] According to Esser et al. (2013), in 2010 the average gross replacement rate among euro-area UI schemes was roughly 50 per cent. The average maximum benefit duration was above two years and the average coverage rate amounted to 75 per cent. Compared with these averages, the simulated benchmark UI scheme is somewhat less (more) generous with regard to the benefit duration (coverage).

is not met and $Pay - in_{j,t\,(triggered)} = s_t * Y_{j,t\,(triggered)}$ if the double condition is fulfilled.

In a second scenario, revenue-neutrality is imposed over the simulation period 2000–16, i.e., the accumulated sum of the pay-ins has to match the accumulated sum of pay-outs:

$$\Sigma_{t=2000}^{2016}\Sigma_{j=1}^{N} Pay - in_{j,t\,(triggered)} = \Sigma_{t=2000}^{2016}\Sigma_{j=1}^{N} Pay - out_{j,t\,(triggered)} \tag{3}$$

In this case, the contribution rate amounts to

$$s = \frac{\Sigma_{t=2000}^{2016}\Sigma_{j=1}^{N} Pay - out_{j,t\,(triggered)}}{\Sigma_{t=2000}^{2016}\Sigma_{j=1}^{N} Y_{j,t\,(triggered)}} \tag{4}$$

Note that in the second scenario, the contribution rate s is constant over time. As in the first scenario, the contribution payment of member state j equals $Pay - in_{j,t} = 0$ if the double condition in the contribution rule is not fulfilled and $Pay - in_{j,t\,(triggered)} = s * Y_{j,t\,(triggered)}$ if the double condition is met.

3 Decomposition and empirical approach

3.1 Decomposition framework

Building on and extending the methodology developed in Dolls et al. (2018), this paper provides a formal decomposition framework to disentangle and quantify the *interregional* and *intertemporal* smoothing potential of an unemployment re-insurance. This exercise is of crucial importance to identify the potential added value of the re-insurance relative to domestic unemployment benefit schemes. While intertemporal stabilization can in principle be achieved by the member states acting alone – by running surpluses in good times so that sufficient fiscal space is available in bad times – interregional smoothing arises by pooling contribution payments in the re-insurance and by paying transfers from the common budget in the corresponding year. The interregional smoothing potential thus depends on the degree of asymmetries in labor market shocks, or, put differently, on the extent labor market cycles are synchronized in the euro area.

Table 2 presents the decomposition framework consisting of four stylized scenarios. The benchmark UI system introduced in section 2.2 and broadly corresponding to the average UI scheme in the euro area serves as a reference system (scenario 1). The rationale is that interregional smoothing effects of the re-insurance should not be biased upwards or downwards, depending on the generosity of the respective

national UI scheme. If the smoothing effects of the re-insurance were compared against those of actual UI schemes, differences in smoothing effects across member states would depend on (i) the interregional smoothing potential of the re-insurance and (ii) on the stabilization effect of the respective national UI scheme.[9] As the aim of this paper is to identify the interregional smoothing effects in the EA-19 member states irrespective of differences in national UI regulations, the average UI system is used as a benchmark.[10]

Table 2: Decomposition framework

Scenarios	Minimum conditions	National borrowing	Pooling of contributions	EA borrowing
1. Benchmark UI (annually balanced budget)	yes	no	no	no
2. Benchmark UI (balanced budget 2000-16)	yes	yes	no	no
3. Scenario 2 + Re-insurance (annually balanced budget)	yes	yes	yes	no
4. Scenario 2 + Re-insurance (balanced budget 2000-16)	yes	yes	yes	yes

Notes: The table shows the stylized scenarios in the decomposition analysis. In scenario 3, the benchmark UI has a balanced budget (at national level) over the period 2000-16, while the re-insurance has a balanced budget (at euro-area level) in every single year. In scenario 4, the benchmark UI (re-insurance) has a balanced budget at national level (euro-area level) over the period 2000-16.

In the baseline scenario, the benchmark UI scheme has a balanced budget rule which has to be met in every year. The next step is to allow the benchmark UI scheme to run deficits and surpluses in single years such that its budget is balanced over the entire simulation period 2000–16 (scenario 2). This step gives rise to intertemporal smoothing at the national level. The effect of introducing the re-insurance is decomposed into two steps. The first step is to introduce a re-insurance with an annually balanced budget which complements the benchmark UI system introduced in scenario 2. Contributions from member states that meet the double condition in the contribution rule in a given year are pooled and used to finance transfers to member states that meet the double condition in the activation rule in

[9] As shown by Dolls et al. (2012), UI schemes in the euro area differ substantially in their ability to cushion unemployment shocks.

[10] Note that if unemployment benefit payments of national UI schemes were used as a calculation basis for the pay-out of the re-insurance, the re-insurance probably had a regressive effect, provided that UI generosity is positively correlated with per-capita income. Countries with more generous UI schemes would receive higher transfers than those with less generous UI schemes.

the corresponding year (scenario 3). A comparison of the stabilization effects in scenarios 2 and 3 reveals the interregional smoothing potential of the re-insurance. The second step is to allow the re-insurance to run deficits or surpluses in single years (scenario 4). In scenario 4, both the benchmark UI scheme and the re-insurance are calibrated such that contributions and pay-outs match over the simulation period 2000–16, respectively. While for the former, revenue-neutrality is imposed at national level, the latter is revenue-neutral at euro-area level. This second step leads to intertemporal smoothing through the re-insurance.

For each of the scenarios shown in Table 2, a stabilization coefficient $\tau_{j,t}$ is calculated that measures which fraction of a given unemployment shock is absorbed by the benchmark UI (Auerbach and Feenberg 2000; Dolls et al. 2012). The stabilization coefficient relates changes in employment income due to transitions into and out of unemployment (ΔY) in member state j and year t to changes in unemployment benefits (ΔB) from and social insurance contributions (ΔC) to the benchmark UI.[11] Arithmetic changes ($\Delta C_{j,t}, \Delta B_{j,t}, \Delta Y_{j,t}$) are derived and consistently aggregated from the household micro-data simulations described in section 3.2. The stabilization coefficient reads:

$$\tau_{j,t} = \frac{\Delta C_{j,t} - \Delta B_{j,t}}{\Delta Y_{j,t}} \tag{5}$$

The total stabilization gain of moving from the benchmark UI without debt issuance to a scenario where the benchmark UI is complemented by a re-insurance and both can run deficits and surpluses can then be decomposed as follows[12]:

$$\begin{aligned}
\tau_{tot} &= \tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,without-debt} \\
&= \underbrace{\left(\tau_{Re-insurance,with-debt} - \tau_{Re-insurance,without-debt}\right)}_{\tau_{Intertemporal-Smoothing(EA-level)}} \\
&+ \underbrace{\left(\tau_{Re-insurance,without-debt} - \tau_{Benchmark-UI,with-debt}\right)}_{\tau_{Interregional-Smoothing}} \\
&+ \underbrace{\left(\tau_{Benchmark-UI,with-debt} - \tau_{Benchmark-UI,without-debt}\right)}_{\tau_{Intertemporal-Smoothing(National-level)}}
\end{aligned} \tag{6}$$

In the empirical analysis, interregional and intertemporal smoothing coeffi-

[11] Changes in employment income are calculated for employment changes along the extensive margin only in order to isolate the stabilizing effects in the event of (un)employment shocks from (intensive margin) income changes.

[12] Note that $\tau_{Re-insurance,with-debt}$ and $\tau_{Re-insurance,without-debt}$ depict the stabilization effect of the benchmark UI being complemented by the re-insurance, not the isolated stabilization effect of the re-insurance.

cients are calculated for each member state and year, respectively.[13] In all scenarios shown in Table 2, it is assumed that unemployment benefits are paid according to the rules of the benchmark UI. This implies that overall changes in transfers to the unemployed, $\Delta B_{j,t}$, are identical across scenarios and hence cancel out:

$$\begin{aligned} \Delta B_{j,t}^{Benchmark-UI,without-debt} &= \Delta B_{j,t}^{Benchmark-UI,with-debt} \\ = \Delta B_{j,t}^{Re-insurance,without-debt} &= \Delta B_{j,t}^{Re-insurance,with-debt} \end{aligned} \tag{7}$$

Transfers from the re-insurance in effect relax the balanced budget condition of the benchmark UI by providing a countercyclical stimulus. In the simulations, it is assumed that this stimulus is used to lower social insurance contributions to the benchmark UI.[14] As a consequence, interregional and intertemporal smoothing effects arise due to differential changes in social insurance contributions across scenarios and equation 6 can be rewritten as follows:

$$\begin{aligned} \tau_{tot} &= \tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,without-debt} \\ &= \underbrace{\frac{\Delta C_{j,t}^{Re-insurance,with-debt} - \Delta C_{j,t}^{Re-insurance,without-debt}}{\Delta Y_{j,t}}}_{\tau_{Intertemporal-Smoothing(EA-level)}} \\ &+ \underbrace{\frac{\Delta C_{j,t}^{Re-insurance,without-debt} - \Delta C_{j,t}^{Benchmark-UI,with-debt}}{\Delta Y_{j,t}}}_{\tau_{Interregional-Smoothing}} \\ &+ \underbrace{\frac{\Delta C_{j,t}^{Benchmark-UI,with-debt} - \Delta C_{j,t}^{Benchmark-UI,without-debt}}{\Delta Y_{j,t}}}_{\tau_{Intertemporal-Smoothing(National-level)}} \end{aligned} \tag{8}$$

3.2 Empirical approach

The economic effects of the re-insurance are assessed based on a counterfactual simulation experiment. The paper simulates the financial flows of the re-insurance under the assumption that it had been introduced in the year 2000. The overall simulation period covers the years 2000–16.

Methodologically, the paper relies on a micro data approach and simulates for each member state a sample of repeated cross sections that precisely replicates

[13] In equation 6, subscripts j and t are suppressed for the sake of simplicity.

[14] In practice, transfers from the re-insurance could be earmarked for various purposes, for example for providing prolonged unemployment benefit payments after unemployment benefits from national UI systems have expired, reduced social insurance contributions or for supporting short-term work programs.

changes in labor market conditions such as earnings, the unemployment rate, the share of short- and long-term unemployed, and the size and socio-demographic composition of the labor force. This is done via reweighting cross-sectional micro data from the EU Statistics on Income and Living Conditions (EU-SILC) released by Eurostat and imputing key labor market variables from the EU Labor Force Survey (EU-LFS) for 18 gender-age-education strata (male/female, three age groups, three education levels). EU-SILC baseline input data is from 2008. For each member state, the baseline input data is first reweighted to reflect labor market conditions as observed in 1999 and then reweighted subsequently for each year of the analysis. Growth in total compensation of employees is imputed from the AMECO-database in order to account for changes in the calculation base for the contribution payments to the re-insurance. These imputations ensure that the reweighted micro-datasets are consistent with aggregate statistics for each year of the simulation period.[15] The key advantage of the micro-data based modelling approach is that the labor market cycles in all EA-19 member states can be replicated more precisely than it would be possible with more aggregate data. This is of crucial importance in the current context since pay-outs from and contribution payments into the re-insurance are calculated based on micro-level labor market variables.

The results of the counterfactual simulation experiment should be interpreted against the background of the following simplifying assumptions. First, the economic effects of the re-insurance are studied in a partial equilibrium framework which does not take into account any general equilibrium effects. Second, the analysis abstracts both from potential moral hazard of national governments and administrations as well as from any macroeconomic stabilization effects of the re-insurance. Instead, the paper takes observed labor market trends and economic behavior as given. If potential macroeconomic stabilization effects (adverse incentive effects) of the re-insurance had led to more (less) favorable labor market trends, the financial flows would probably be smaller (larger) than those presented in this paper. The simulated stabilizing and budgetary effects of the re-insurance should therefore be interpreted as 'first-round' effects. Third, the availability of the re-insurance could be made conditional on compliance with European fiscal rules, for example. Such ex-ante conditionality of the re-insurance has not been accounted for in the simulations. Finally, another simplifying assumption in the simulations is that the re-insurance would have been available to all current EA-19 member states from the year 2000 onwards.

[15] Cf. Dolls et al. (2018). Other reweighting applications for modelling unemployment shocks can be found in Immvervoll et al. (2006) and Dolls et al. (2012).

3.3 Incidence of contributions and pay-outs

For the underlying indicator variable entering the activation and the contribution rule, three potential cyclical indicators are considered that have been put forward in recent proposals (see section 2.1): the unemployment rate, the short-term unemployment rate and the work volume. While changes in the short-term or overall unemployment rate capture labor market shocks at the extensive margin only, the work volume – defined as the product of total number of persons in employment times average number of hours worked – additionally accounts for changes at the intensive margin.

Tables 3 and 4 show which countries would have met the double condition for pay-outs and contributions over the period 2000–16. For pay-outs to be triggered, threshold values of 1 percentage point for the year-on-year increase in the (short-term / overall) unemployment rate and, correspondingly, of 1 per cent for the year-on-year decrease in the work volume are considered. As can be seen in Table 3, the overall number of activations would have ranged between 32 (short-term unemployment rate) to 48 (work volume). Spain would have been the member state with the highest number of activations (6) if the overall unemployment rate had been used as indicator variable, while Cyprus and Portugal (4) or Latvia and Portugal (5) would have met the double condition for pay-outs most often if the short-term unemployment rate or the work volume had been used. Table 3 shows that for some member states the three indicator variables would have led to some notable differences with regard to the number of activations. For instance, Germany would have met the double condition for pay-outs only in 2003 if the overall unemployment rate had been used as indicator variable, in no single year if the short-term unemployment rate had been used, but in four years (2001, 2002, 2003 and 2009) if the work volume had been employed. With all three indicator variables, the re-insurance would have been activated most often in the period 2008–2013 and, to a smaller extent, in the early 2000s.

A corresponding overview for the incidence of contribution payments is presented in Table 4. Irrespective of the underlying indicator variable, all member states would have been obliged to make a contribution payment in at least two years. The number of contributory years ranges from 3 (Luxembourg, Portugal) – 11 (Germany) in case of the overall unemployment rate, from 2 (Luxembourg) – 12 (Finland) in case of the short-term unemployment rate and from 3 (Latvia, Portugal) – 15 (Luxembourg) in case of the work volume. With all three indicator variables, at least two member states would have made a contribution payment into the re-insurance per year, with 2009 being the only year without any pay-ins.

Table 3: Payouts by country and year

	TRIGGER - payments unemployment rate (threshold: 1 percentage point)		TRIGGER - payments short-term unemployment rate (threshold: 1 percentage point)		TRIGGER - payments work volume (threshold: 1 per cent)	
year	num. of countries	country code	num. of countries	country code	num. of countries	country code
2000	3	EE,LT,SK	0		3	EE,LV,SK
2001	0		0		3	DE,LT,MT
2002	0		3	LV,MT,AT	3	DE,LV,SK
2003	3	DE,LU,PT	4	EE,LT,LU,PT	3	DE,MT,SK
2004	1	LU	1	LU	2	LV,MT
2005	0		0		0	
2006	0		0		0	
2007	0		1	IE	0	
2008	2	IE,ES	3	IE,ES,LV	0	
2009	12	EE,IE,EL,ES,FR,CY,LV,LT, AT,PT,SI,FI	12	EE,IE,EL,ES,FR,CY,LV,LT,AT, PT,SI,SK	8	DE,EE,IE,IT,LV,LT,AT,PT
2010	9	EE,IE,EL,ES,LV,LT,PT,SI,SK	1	EL	7	EE,IE,EL,ES,LV,LT,PT
2011	3	EL,ES,CY	3	EL,CY,PT	5	IE,EL,ES,PT,SI
2012	5	EL,ES,IT,CY,PT	3	ES,CY,PT	6	EL,ES,IT,CY,PT,SI
2013	6	EL,ES,IT,CY,NL,SI	1	CY	7	EL,ES,IT,CY,AT,PT,FI
2014	0		0		1	CY
2015	0		0		0	
2016	0		0		0	

unemployment rate (threshold: 1 p.p.)			short-term unemployment rate (threshold: 1 p.p.)			work volume (threshold: 1 per cent)		
country	frequency	number of activations	country	frequency	number of activations	country	frequency	number of activations
ES	35%	6	CY	24%	4	LV	29%	5
EL	29%	5	PT	24%	4	PT	29%	5
CY	24%	4	IE	18%	3	DE	24%	4
PT	24%	4	EL	18%	3	EL	24%	4
EE	18%	3	ES	18%	3	ES	24%	4
IE	18%	3	LV	18%	3	EE	18%	3
LT	18%	3	EE	12%	2	IE	18%	3
SI	18%	3	LT	12%	2	IT	18%	3
IT	12%	2	LU	12%	2	CY	18%	3
LV	12%	2	AT	12%	2	LT	18%	3
LU	12%	2	FR	6%	1	MT	18%	3
SK	12%	2	MT	6%	1	SK	18%	3
DE	6%	1	SI	6%	1	AT	12%	2
FR	6%	1	SK	6%	1	SI	12%	2
NL	6%	1	BE	0%	0	FI	6%	1
AT	6%	1	DE	0%	0	BE	0%	0
FI	6%	1	IT	0%	0	FR	0%	0
BE	0%	0	NL	0%	0	LU	0%	0
MT	0%	0	FI	0%	0	NL	0%	0
total	14%	44	total	10%	32	total	15%	48

Notes: The table shows how often the double condition in the activation rule would have been met in the EA-19 member states over the period 2000–16. Underlying indicator variables: unemployment rate, short-term unemployment rate, work volume.

Table 4: Contribution payments by country and year

	TRIGGER - contribution: unemployment rate		TRIGGER - contribution: short-term unemployment rate		TRIGGER - contribution: work volume	
year	num. of countries	country code	num. of countries	country code	num. of countries	country code
2000	13	BE,DE,IE,ES,FR,IT,CY,LU,NL,AT,PT,SI,FI	11	BE,DE,IE,ES,FR,IT,LV,MT,PT,SI,FI	15	BE,DE,IE,EL,ES,FR,IT,CY,LT,LU,NL,AT,PT,SI,FI
2001	12	BE,DE,IE,ES,FR,IT,CY,LV,LU,NL,SI,FI,	10	IE,ES,FR,IT,CY,LV,LU,AT,SI,FI	11	BE,IE,EL,ES,FR,IT,CY,LU,NL,PT,FI
2002	4	EL,IT,CY,LV	5	EE,CY,LT,NL,SK	9	IE,EL,ES,IT,CY,LU,MT,SI,FI
2003	6	EE,EL,IT,LV,LT,FI	7	IE,EL,FR,IT,AT,SK,FI	9	IE,EL,ES,FR,IT,CY,LT,LU,AT
2004	7	EE,IE,ES,IT,LT,SI,FI	7	EE,IE,ES,CY,LT,MT,FI	14	BE,EE,IE,EL,ES,FR,IT,CY,LT,LU,NL,AT,SI,FI
2005	10	EE,IE,EL,ES,IT,LV,LT,MT,SK,FI	8	EE,ES,FR,IT,LV,LT,SK,FI	12	BE,EE,IE,EL,ES,FR,IT,CY,LT,MT,SK,FI
2006	10	EE,EL,ES,IT,LV,LT,MT,SI,SK,FI	10	EE,EL,ES,FR,IT,LV,LT,NL,SK,FI	15	BE,EE,IE,EL,ES,FR,IT,CY,LV,LU,MT,NL,AT,SK,FI
2007	15	BE,DE,EE,EL,ES,FR,IT,CY,LV,LT,MT,NL,SI,SK,FI	13	DE,EE,ES,FR,IT,CY,LV,LT,NL,AT,SI,SK,FI	19	BE,DE,EE,IE,EL,ES,FR,IT,CY,LV,LT,LU,MT,NL,AT,PT,SI,SK,FI
2008	11	BE,DE,EL,FR,CY,MT,NL,AT,SI,SK,FI	10	BE,DE,EL,FR,CY,MT,NL,AT,SI,FI	14	BE,DE,EL,ES,FR,CY,LV,LU,MT,NL,AT,SI,SK,FI
2009	0		0		1	MT
2010	3	DE,LU,AT	5	DE,LU,MT,AT,FI	4	BE,DE,FR,LU
2011	5	BE,DE,MT,AT,FI	6	BE,DE,MT,AT,SK,FI	8	BE,DE,FR,LU,MT,NL,AT,FI
2012	2	DE,MT	5	DE,EE,LV,MT,FI	5	BE,LU,MT,SK,FI
2013	3	DE,EE,LV	3	DE,IE,LV	2	LU,MT
2014	6	DE,EE,IE,LV,LT,MT	9	DE,EE,IE,EL,ES,LT,MT,PT,SK	5	BE,DE,FR,LU,MT
2015	8	DE,EE,IE,LV,LT,MT,PT,SK	10	BE,DE,EE,IE,EL,ES,LV,LT,MT,PT	10	BE,DE,EE,IE,FR,LT,LU,MT,NL,SK
2016	10	BE,DE,IE,ES,LV,LT,MT,PT,SI,SK	14	BE,DE,IE,EL,ES,FR,CY,LT,MT,NL,PT,SI,SK,FI	13	BE,DE,EE,IE,ES,FR,LT,LU,MT,NL,AT,SI,SK

unemployment rate			short-term unemployment rate			work volume		
country	frequency	number of activations	country	frequency	number of activations	country	frequency	number of activations
DE	65%	11	FI	71%	12	LU	88%	15
LV	59%	10	DE	59%	10	BE	76%	13
MT	53%	9	ES	53%	9	FR	76%	13
FI	53%	9	MT	53%	9	MT	71%	12
EE	47%	8	EE	47%	8	IE	59%	10
IT	47%	8	IE	47%	8	ES	59%	10
LT	47%	8	FR	47%	8	FI	59%	10
IE	41%	7	LV	47%	8	EL	53%	9
ES	41%	7	LT	47%	8	CY	53%	9
SI	41%	7	SK	47%	8	NL	53%	9
BE	35%	6	EL	35%	6	DE	47%	8
EL	35%	6	IT	35%	6	IT	47%	8
SK	35%	6	CY	35%	6	AT	47%	8
CY	29%	5	AT	35%	6	LT	41%	7
FR	24%	4	BE	29%	5	SK	41%	7
NL	24%	4	NL	29%	5	EE	35%	6
AT	24%	4	SI	29%	5	SI	35%	6
LU	18%	3	PT	24%	4	LV	18%	3
PT	18%	3	LU	12%	2	PT	18%	3
total	39%	125	total	41%	133	total	51%	166

Notes: The table shows how often the double condition in the contribution rule would have been met in the EA-19 member states over the period 2000–16. Underlying indicator variables: unemployment rate, short-term unemployment rate, work volume.

In the subsequent analysis, the overall unemployment rate will be used as indicator variable in the activation and the contribution rule. While the work volume might be an attractive indicator variable from an incentive perspective as it does not penalize labor market policies such as subsidized short-time work programs which lead to reductions in hours worked, but not to increases in unemployment (Bénassy-Quére et al. 2018), its measurement is still not fully harmonized and thus lacks comparability across countries (Eurostat 2018). Similarly, the short-term unemployment rate might be prone to measurement error and manipulation. On the contrary, the unemployment rate is harmonized across euro-area countries. Moreover, ex post revisions are less of a concern compared to other cyclical indicators such as the output gap.[16]

4 Results

4.1 Stabilization effects

To illustrate the results of the decomposition analysis, Figure 1 depicts changes in social insurance contributions in the four scenarios presented in section 3.1 and how the resulting interregional and intertemporal smoothing effects would have evolved in Germany and Spain. Results for all other EA-19 member states are presented in Figure 4 in the Appendix.

Consider first the upper two graphs for Germany. As shown by the black solid line labeled 'Delta Y' in the left panel, Germany experienced the largest labor market shock in 2003 with a drop in employment income amounting to roughly 0.7 percent of GDP, caused by an increase in the unemployment rate from 8.6 to 9.7 percent. With the benchmark UI scheme in place and no debt issuance possibility (scenario 1 in Table 2), social insurance contributions would have risen pro-cyclically by 0.1 percent of GDP to finance mounting expenditures on unemployment benefits. This is depicted by the dashed grey line labeled 'Delta C S1' in the left panel of Figure 1. The initial stabilization effect would have been achieved by allowing the benchmark UI scheme to run deficits (scenario 2 in Table 2) so that social insurance contributions would have remained roughly constant in 2003. This is depicted by the dashed yellow line in the left panel of Figure 1. As shown by the red triangle in the right panel of Figure 1, the benchmark UI scheme would have absorbed 18% of the

[16]See Arnold et al. (2018) for a discussion of the properties of alternative indicator variables. They show that the deviation in the unemployment rate from its seven-year moving average - one part of the double condition applied in this paper - is highly correlated with the (ex post) estimated output gap.

reduction in employment income in 2003. This cushioning effect would have been the result of intertemporal smoothing at the national level. As Germany would have received a pay-out from the re-insurance in 2003, social insurance contributions could have been reduced by an amount corresponding to the increase in unemployment benefit spending in that year (0.1% of GDP, see the dashed green (and blue) line in the left panel of Figure 1). As shown by the blue diamond in the right panel of Figure 1, this would have led to an interregional smoothing effect of 17% of the reduction in employment income in 2003.[17]

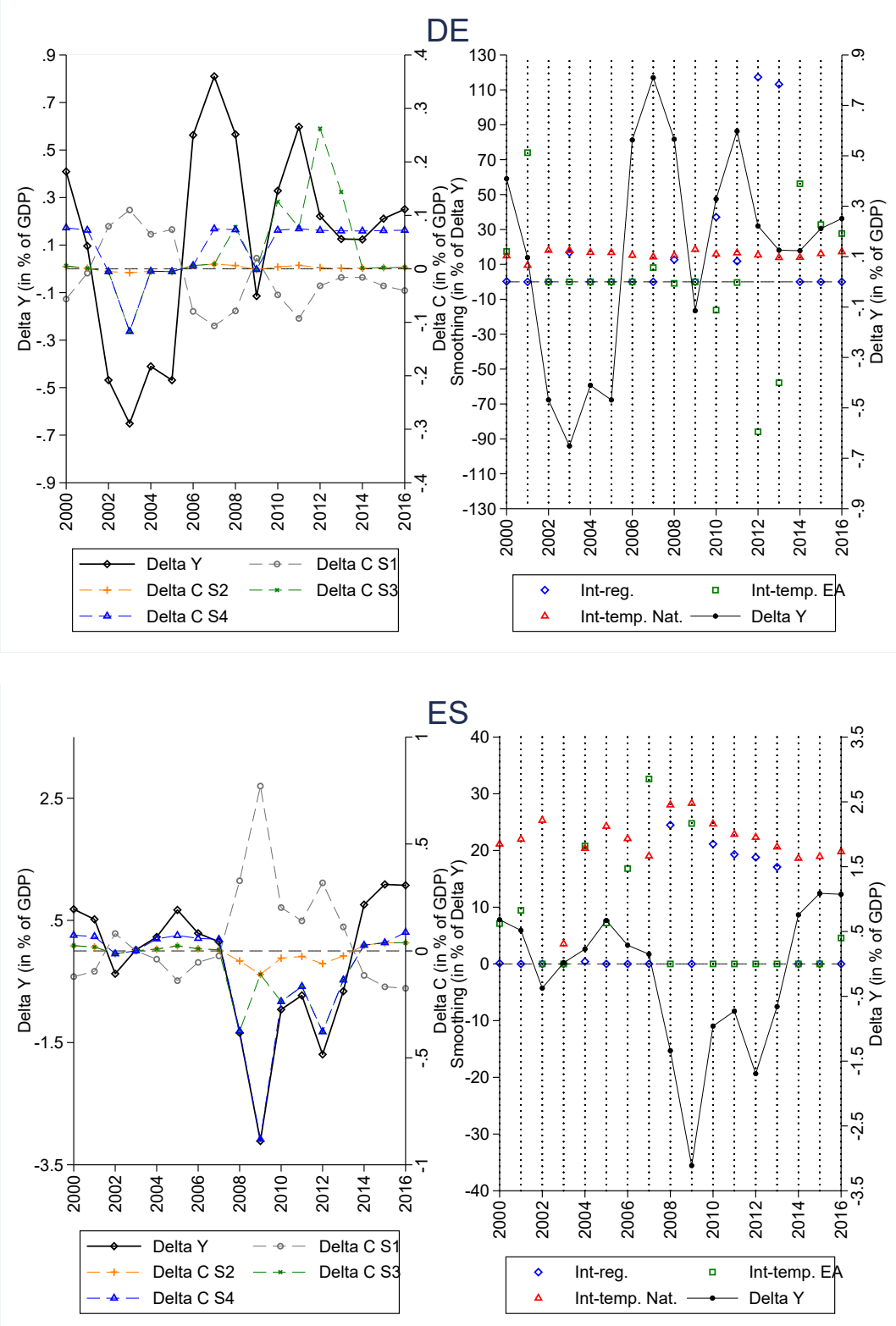
Consider as another example the case of Spain which would have been eligible for pay-outs from the re-insurance in the period 2008–13. In that period, labor market conditions deteriorated significantly and the Spanish unemployment rate surged from 11.3% in 2008 to its peak value of 26.1% in 2013. In 2009, the year with the strongest increase in unemployment, the loss in employment income due to rising unemployment exceeded 3% of Spanish GDP. As shown by the red triangles in the right panel of Figure 1, the benchmark UI would have absorbed 21–28% of the reductions in employment income in the period 2008–13. How large would have been the cushioning impact of the re-insurance in those years? As shown in the left panel of Figure 1, pay-outs from the re-insurance would have prevented pro-cyclical (dashed grey line) or a-cyclical (dashed yellow line) changes in social insurance contributions to the benchmark UI scheme in scenarios 1 and 2. With the re-insurance in place in scenarios 3 and 4, contribution payments to the benchmark UI could have been reduced in a countercyclical way as illustrated by the dashed green and blue lines. As a consequence, 17–25% of the income losses would have been cushioned by the re-insurance, either by means of interregional (2008, 2010-13) or intertemporal smoothing (2009).[18]

Table 5 summarizes intertemporal smoothing effects through the benchmark UI (first column) as well as interregional (second column) and intertemporal (third column) smoothing effects through the re-insurance over the period 2000–16. Average smoothing effects are computed over all years a given member state would have met both conditions in the activation rule. The overall smoothing gain of moving from a benchmark UI scheme with a yearly balanced budget to a scenario where the benchmark UI and the re-insurance have a balanced budget over the period 2000–16

[17]Note that over the whole simulation period, the re-insurance would have led to interregional and intertemporal smoothing effects also in those years when Germany would have been obliged to make a contribution payment into the re-insurance. However, the focus of the subsequent analysis will be on years with rising unemployment.

[18]The fact that no member state would have been obliged to make a contribution payment in 2009 would have prevented interregional smoothing effects of the re-insurance, i.e., only a re-insurance with a borrowing capacity or with accumulated surpluses as in scenario 4 would have provided stabilization effects in that year.

Figure 1: Smoothing effects



Notes: The figure shows how differential changes in social insurance contributions to the benchmark UI across scenarios translate into interregional and intertemporal stabilization effects. Left panels: 'Delta Y': Change in employment income. 'Delta C S1' - 'Delta C S4': Change in social insurance contributions to the benchmark UI in scenarios 1–4 (see Table 2). Right panels: 'Inter-reg.': Interregional smoothing effects of the re-insurance. 'Inter-temp. EA': Intertemporal smoothing effects of the re-insurance. 'Inter-temp. Nat.': Intertemporal smoothing effects of the benchmark UI. 'Delta Y': Change in employment income.

Table 5: Average smoothing effects, 2000–16 (Trigger: 1 p.p.)

	Intertemp (Nat.)	Interreg	Intertemp (EA)	Overall
AT	25	0	24	49
BE	-	-	-	-
CY	26	17	7	49
DE	18	17	0	35
EE	21	12	8	41
EL	18	12	4	34
ES	24	17	4	45
FI	26	0	24	50
FR	23	0	21	44
IE	22	13	8	43
IT	16	15	0	30
LT	23	13	8	44
LU	25	24	0	49
LV	25	10	13	47
MT	-	-	-	-
NL	22	20	0	42
PT	21	14	5	40
SI	21	12	8	40
SK	17	15	0	32
EA19	22	12	8	42

Notes: The table shows average smoothing effects over the period 2000-16, with the average calculated over those years a country would have met both conditions in the activation rule. Intertemp (Nat.): Intertemporal smoothing through the benchmark UI (at national level). Interreg: Interregional smoothing. Intertemp (EA): Intertemporal smoothing through the re-insurance (at EA-level). Smoothing effects across EA-19 member states reported in the last row computed as an unweighted average.

is depicted in the fourth column.

As shown in the first column, the benchmark UI scheme would have cushioned unemployment shocks by on average 22% across EA-19 member states, with smoothing effects ranging from 16% in Italy to 26% in Cyprus and Finland. There are no smoothing effects reported for Belgium and Malta as these two member states would not have met the double condition of the re-insurance in any year. The interregional smoothing channel of the re-insurance would have raised the income insurance provided by the benchmark UI by on average 12% across EA-19 member states due to the asymmetric nature of labor market shocks. In addition to Belgium and Malta, interregional smoothing would not have arisen in Austria, Finland and France. The reason is that these countries would have been eligible for a transfer only in 2009 when no contribution payments would have occurred, shutting down the interregional smoothing channel. In the remaining member states, interregional smoothing effects would have ranged from 10% in Latvia to 24% in Luxembourg. Only a re-insurance with a borrowing and lending capacity would have provided stabilization effects in Austria, Finland and France, as is shown in the third column of Table 5. On average 8% of the unemployment shocks across EA-19 member states

would have been cushioned through intertemporal stabilization of the re-insurance, with smoothing effects ranging between 0–24%.

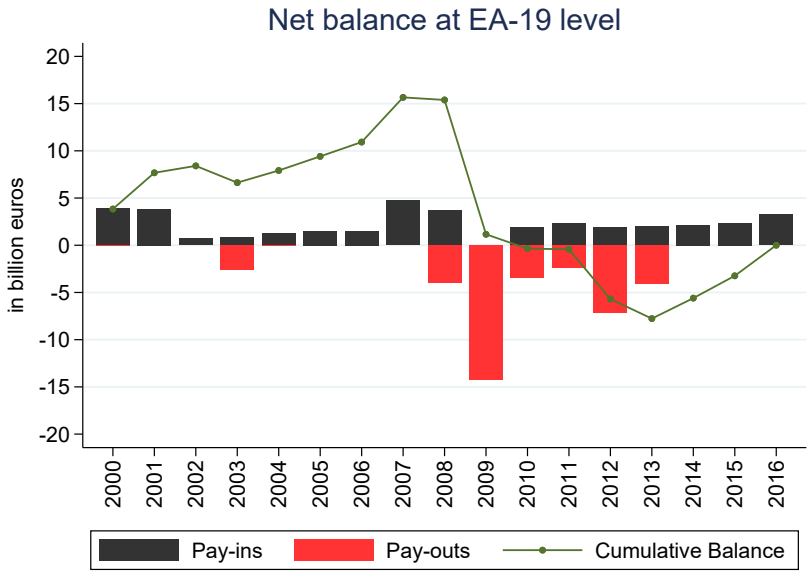
4.2 Budgetary effects

This section presents the budgetary effects of the simulated re-insurance both at EA-19 and at member-state level. It focuses on the financial flows of the re-insurance with the ability to run deficits and surpluses in single years (scenario 4).

Figure 2 presents aggregate pay-ins (black bars) and pay-outs (red bars) and how the resulting cumulative balance of the re-insurance would have evolved over the simulation period. The figure shows that the re-insurance would have built up reserves in the run-up to the financial and economic crisis starting in 2008/09. The reserves would have been completely depleted during the crisis period with the cumulative balance first turning negative in 2010. In the more recent recovery years, aggregate contribution payments to the re-insurance would have again exceeded aggregate pay-outs so that the overall budget would have been balanced in 2016. The largest amount of transfers would have been disbursed in 2009, in total EUR 14 billion. Note that the revenue-neutral contribution rate of the re-insurance has been calculated with hindsight as shown in section 2.2. In practice, the contribution rate would need to be adjusted over time if sufficient surpluses have been built up or if assets have been exhausted (Arnold et al. 2018).

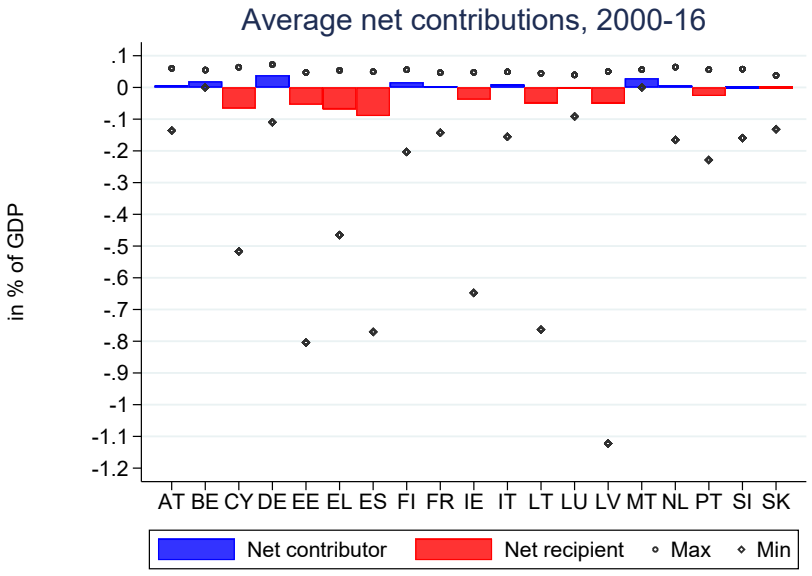
Figure 3 presents average net contributions per member state over the simulation period as well as the maximum contribution (transfer) each member state would have paid into (received from) the re-insurance. The figure shows that average net contributions would have ranged beween -0.1 – 0.1 percent of GDP, while transfers from the re-insurance would have been as high as 1.1% of GDP in Latvia or 0.8% of GDP in Estonia, Lithuania and Spain in single years. Over the whole simulation period, redistributive effects across countries would have been limited due to the design of the contribution and the activation rule. With experience-rated contribution payments to the re-insurance accounting for different risk profiles, redistributive effects across member states would have been further reduced.

Figure 2: Budgetary effects of the re-insurance



Notes: The figure shows aggregate pay-ins and pay-outs and the resulting cumulative balance of the re-insurance over the period 2000-16 (scenario 4 in Table 2).

Figure 3: Redistributive effects of the re-insurance



Notes: The figure shows average as well as maximum and minimum net contributions to the re-insurance per member state over the period 2000-16 (scenario 4 in Table 2).

4.3 Alternative activation rules

This section explores how alternative design features of the re-insurance would have affected its operations.

Single condition. An alternative to the double condition described in section 2.2 would be to condition pay-outs from the re-insurance on changes in the unemployment rate only as proposed by Bénassy-Quére et al. (2018), for instance, thereby increasing its countercyclicality. With a threshold value of 1 percentage point, such an activation rule would have led to five additional country-year pairs with pay-outs from the re-insurance: LV 2008, LT 2008, NL 2003, PT 2002, SK 2009. The relatively small number of additional activations suggests that conditioning on the level of the unemployment rate in addition to its change is not a binding constraint in most instances.

Higher threshold value. A higher threshold value in the activation rule would imply that the re-insurance only operates under exceptional circumstances. Table 6 in the Appendix provides an overview of the incidence of pay-outs from a re-insurance with a double condition including a threshold value for the change in the unemployment rate of 2 percentage points (Bénassy-Quére et al. 2018). The same value is chosen for the short-term unemployment rate, while the threshold value for the work volume as indicator variable is set to 2 per cent. Table 6 indicates that for all three indicator variables the overall number of activations would become substantially smaller. Most pay-outs would have occured in 2009 and following years. Finally, Table 7 presents average smoothing effects over the simulation period. The re-insurance would have provided smoothing effects only in 10 out of 19 euro-area member states, with average (unweighted) smoothing effects as large as with the baseline variant of the re-insurance.

5 Conclusion

This paper has presented a decomposition framework to assess the interregional and intertemporal smoothing effects of an unemployment re-insurance for the euro area. Running counterfactual simulations for the period 2000-16, the paper has shown that on average 12 (8) per cent of the income losses following large labor market shocks would have been absorbed through the interregional (intertemporal) smoothing channel of the re-insurance. These results suggest that in total the re-insurance would have almost doubled the cushioning effect of a typical UI scheme

in the euro area which amounts to 22 per cent. The decomposition analysis has revealed, however, that interregional smoothing gains would have been unevenly distributed across member states. Conditional on meeting the double condition in the activation rule in at least one year, average interregional smoothing effects would have ranged between 0–24%. In terms of its budgetary effects, the simulated re-insurance scheme would have been revenue-neutral at EA-19, but not at the member-state level. Average annual net contributions would have amounted to -0.1–0.1 per cent of GDP. By construction, the re-insurance would not have led to permanent transfers across member states.

The results of the paper should be interpreted against the following limitations of the analysis. The paper does not establish whether or not the introduction of a re-insurance scheme is desirable in terms of overall welfare. It does not advocate or reject the introduction of a re-insurance, but rather provides an ex-ante evaluation. Moreover, in the simulations the paper has taken labor market trends and economic behavior as given and has abstracted from potential adverse incentive effects and macroeconomic second-round effects.

A pre-condition for its political feasibility would be to design the re-insurance such that the risk of moral hazard would be minimized as far as possible. The following features are of particular importance. First, the re-insurance should only provide support for domestic UI schemes in times of severe recessions and cover only part of the costs of unemployment – as the simulated re-insurance scheme in this paper does. In those years, the risk is highest that national automatic stabilizers cannot operate freely. This approach would be akin to the US system where federal UI extensions typically kick in in times of crises. Second, contribution payments to the re-insurance should be experience-rated to account for different risk-profiles across countries. Third, conditions should be attached to its availability, in particular compliance with fiscal rules. Such ex-ante conditionality could eventually improve compliance with the fiscal governance framework.

Further important questions would be whether there should be full automaticity of payouts, whether the re-insurance were to grant loans or provide transfers, and whether the re-insurance should be allowed to issue debt. With regard to automaticity, one possible approach would be to combine an activation rule with a final judgement by an independent body assessing whether labor market shocks are permanent or temporary. Financial support from the re-insurance would only be granted in the latter case in order to preserve incentives for structural reforms. A loan-based re-insurance would be targeted at easing credit constraints rather than sharing the burden of labor market shocks. An effective debt limitation would be needed for the re-insurance itself in order to prevent political pressure building up

and eventually leading to a 'bail-out' of the re-insurance. Finally, imposing ex-post conditionality, for example by earmarking financial support for domestic UI schemes or short-term work programs, could increase the effectiveness of the re-insurance. The paper concludes that an unemployment re-insurance scheme should be viewed only as one potential element of a more comprehensive reform package for the euro area which may combine elements of insurance and market discipline.

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Appendix

Table 6: Payouts by country and year

	TRIGGER - payments unemployment rate (threshold: 2 percentage points)		TRIGGER - payments short-term unemployment rate (threshold: 2 percentage points)		TRIGGER - payments work volume (threshold: 2 per cent)	
year	num. of countries	country code	num. of countries	country code	num. of countries	country code
2000	2	EE,SK	0		1	LV
2001	0		0		2	LT,MT
2002	0		1	LV	1	SK
2003	0		1	EE	0	
2004	0		0		2	LV,MT
2005	0		0		0	
2006	0		0		0	
2007	0		0		0	
2008	1	ES	1	ES	0	
2009	5	EE,IE,ES,LV,LT	6	EE,IE,ES,LV,LT,SK	8	DE,EE,IE,IT,LV,LT,AT,PT
2010	4	EE,EL,LT,SK	0		6	EE,IE,EL,ES,LV,LT
2011	1	EL	0		5	IE,EL,ES,PT,SI
2012	5	EL,ES,IT,CY,PT	0		5	EL,ES,IT,CY,PT
2013	2	EL,CY	0		5	EL,ES,IT,CY,PT
2014	0		0		1	CY
2015	0		0		0	
2016	0		0		0	

unemployment rate (threshold: 2 p.p.)			short-term unemployment rate (threshold: 2 p.p.)			work volume (threshold: 2 per cent)		
country	frequency	number of activations	country	frequency	number of activations	country	frequency	number of activations
EL	24%	4	EE	12%	2	EL	24%	4
EE	18%	3	ES	12%	2	ES	24%	4
ES	18%	3	LV	12%	2	LV	24%	4
CY	12%	2	IE	6%	1	PT	24%	4
LT	12%	2	LT	6%	1	IE	18%	3
SK	12%	2	SK	6%	1	IT	18%	3
IE	6%	1	BE	0%	0	CY	18%	3
IT	6%	1	DE	0%	0	LT	18%	3
LV	6%	1	EL	0%	0	EE	12%	2
PT	6%	1	FR	0%	0	MT	12%	2
BE	0%	0	IT	0%	0	DE	6%	1
DE	0%	0	CY	0%	0	AT	6%	1
FR	0%	0	LU	0%	0	SI	6%	1
LU	0%	0	MT	0%	0	SK	6%	1
MT	0%	0	NL	0%	0	BE	0%	0
NL	0%	0	AT	0%	0	FR	0%	0
AT	0%	0	PT	0%	0	LU	0%	0
SI	0%	0	SI	0%	0	NL	0%	0
FI	0%	0	FI	0%	0	FI	0%	0
total	6%	20	total	3%	9	total	11%	36

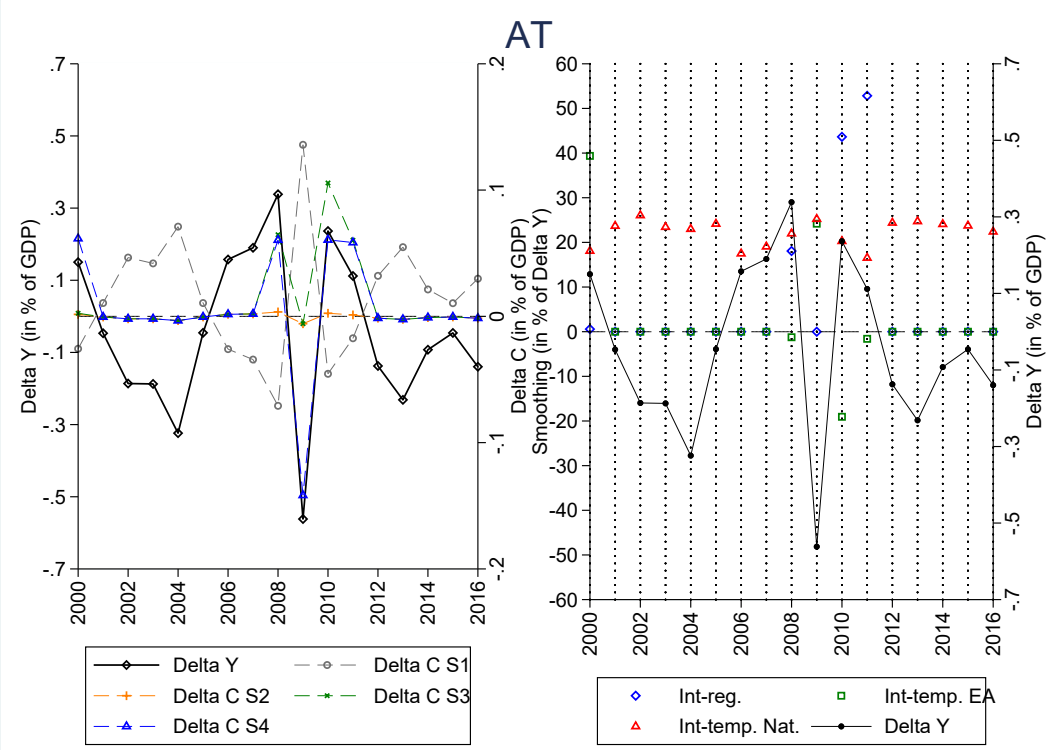
Notes: The table shows how often the double condition in the activation rule would have been met in the EA-19 member states over the period 2000–16. Underlying indicator variables: unemployment rate, short-term unemployment rate, work volume.

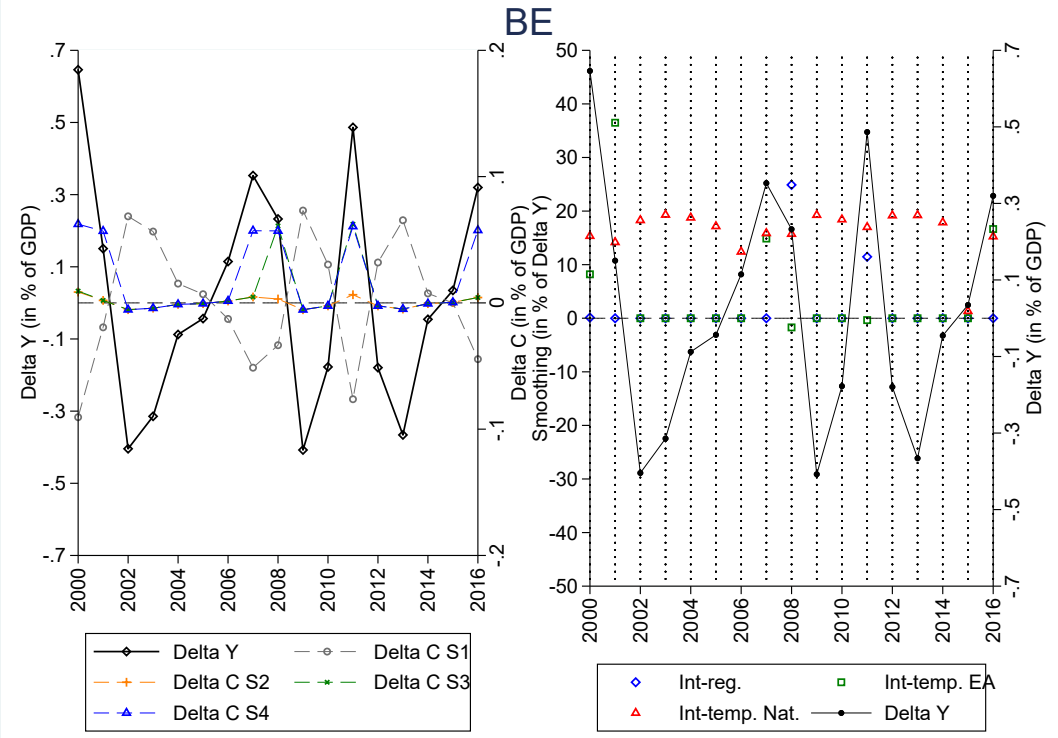
Table 7: Average smoothing effects, 2000–16 (Trigger: 2 p.p.)

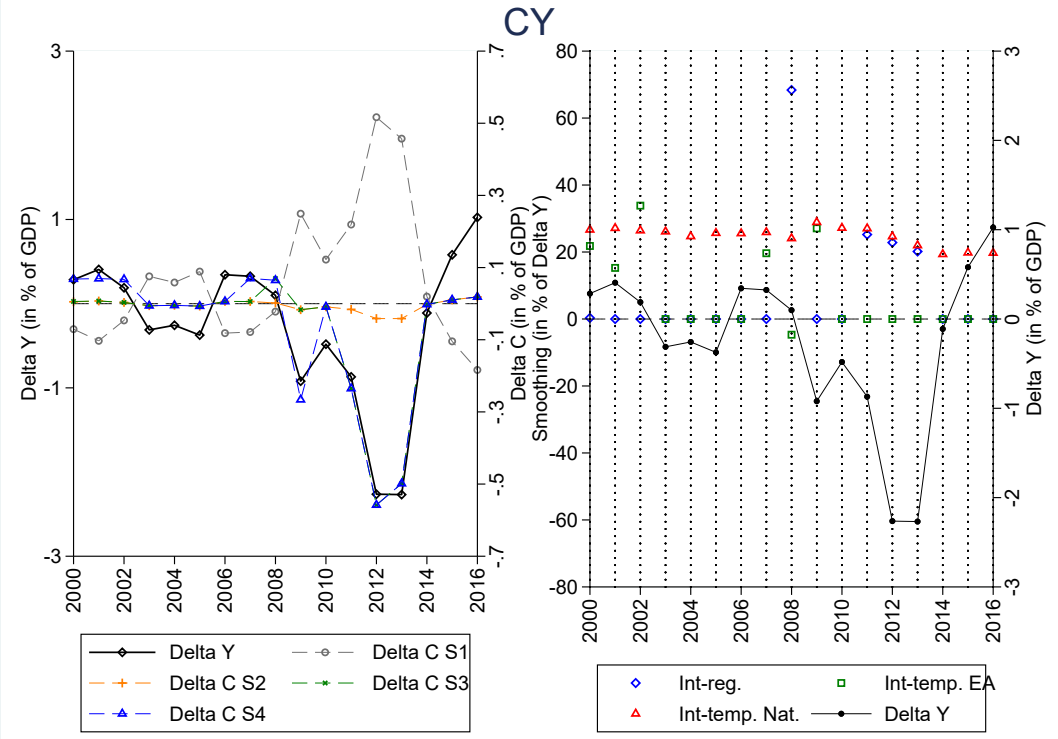
	Intertemp (Nat.)	Interreg	Intertemp (EA)	Overall
AT	-	-	-	-
BE	-	-	-	-
CY	23	21	0	45
DE	-	-	-	-
EE	21	12	8	41
EL	17	15	0	32
ES	26	14	8	49
FI	-	-	-	-
FR	-	-	-	-
IE	25	0	24	49
IT	16	15	0	32
LT	25	10	12	48
LU	-	-	-	-
LV	27	0	25	53
MT	-	-	-	-
NL	-	-	-	-
PT	19	18	0	37
SI	-	-	-	-
SK	17	15	0	32
EA19	22	12	8	42

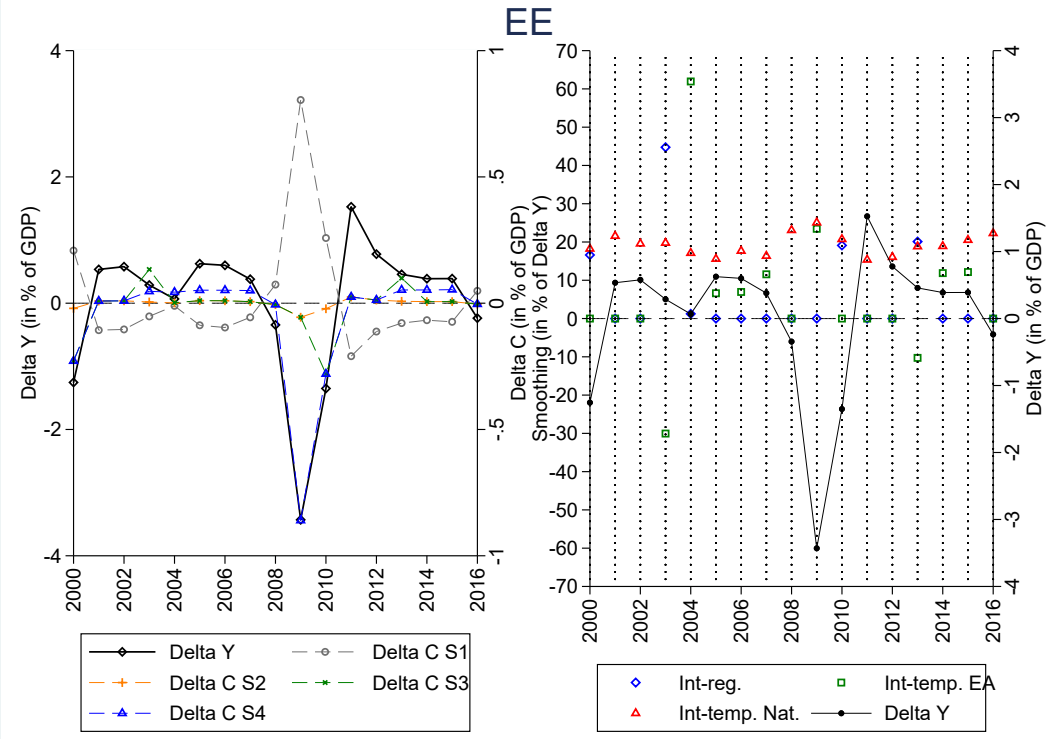
Notes: The table shows average smoothing effects over the period 2000-16, with the average calculated over those years a country would have met both conditions in the activation rule. Intertemp (Nat.): Intertemporal smoothing through the benchmark UI (at national level). Interreg: Interregional smoothing. Intertemp (EA): Intertemporal smoothing through the reinsurance (at EA-level). Smoothing effects across EA-19 member states reported in the last row computed as an unweighted average.

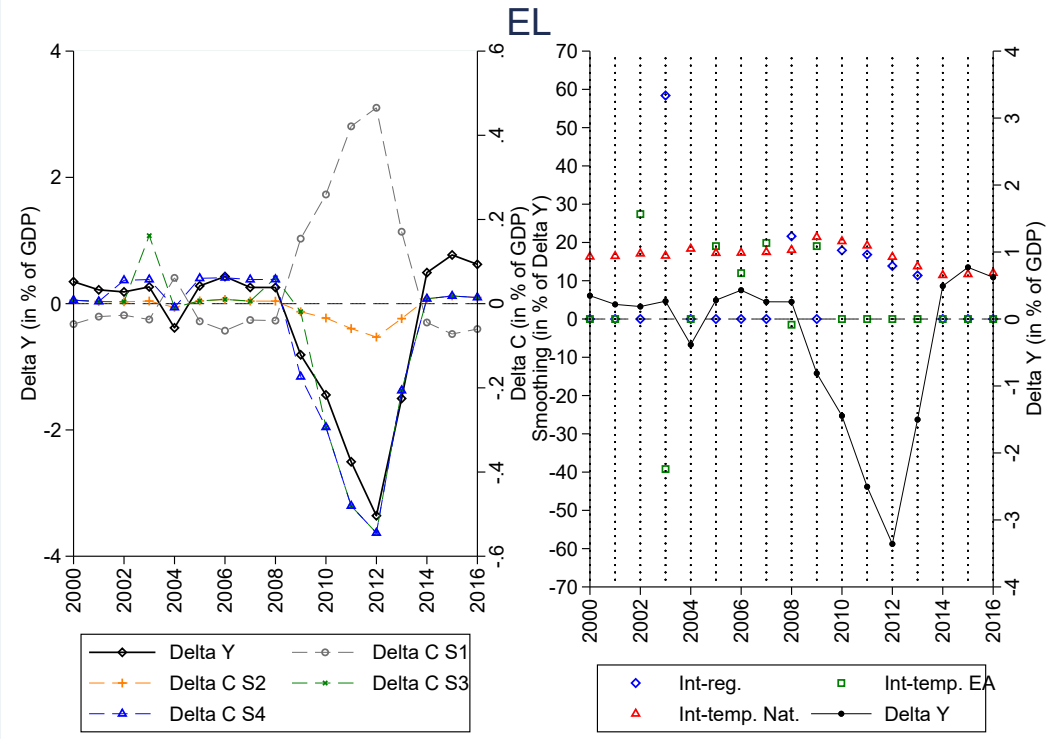
Figure 4: Smoothing effects

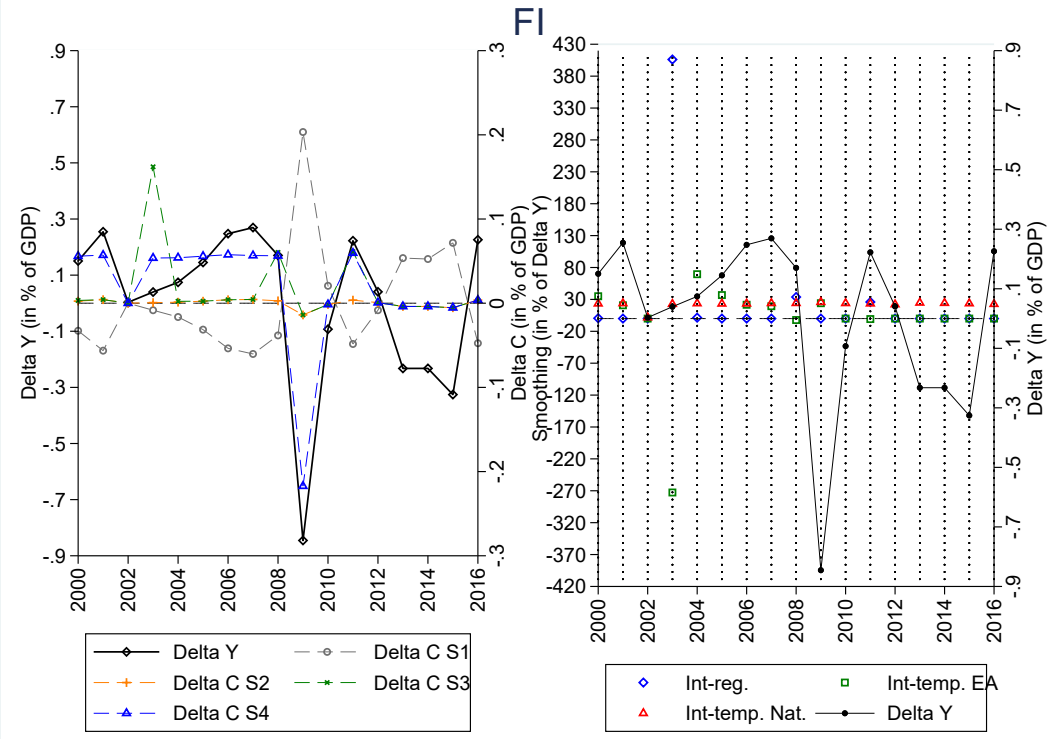


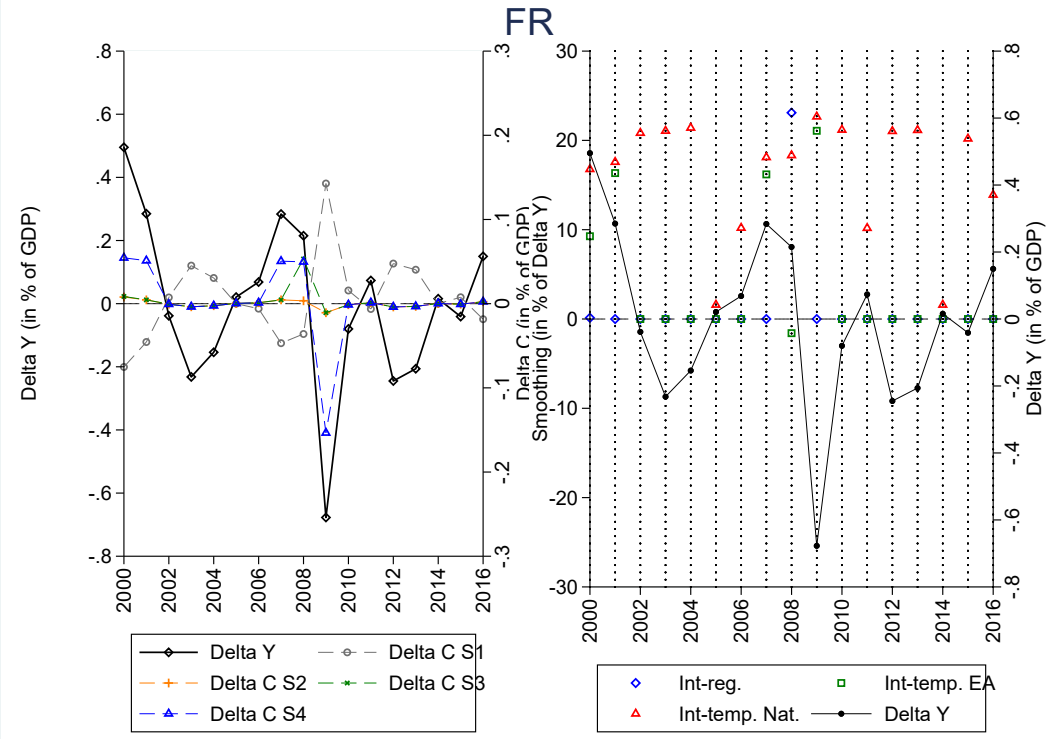


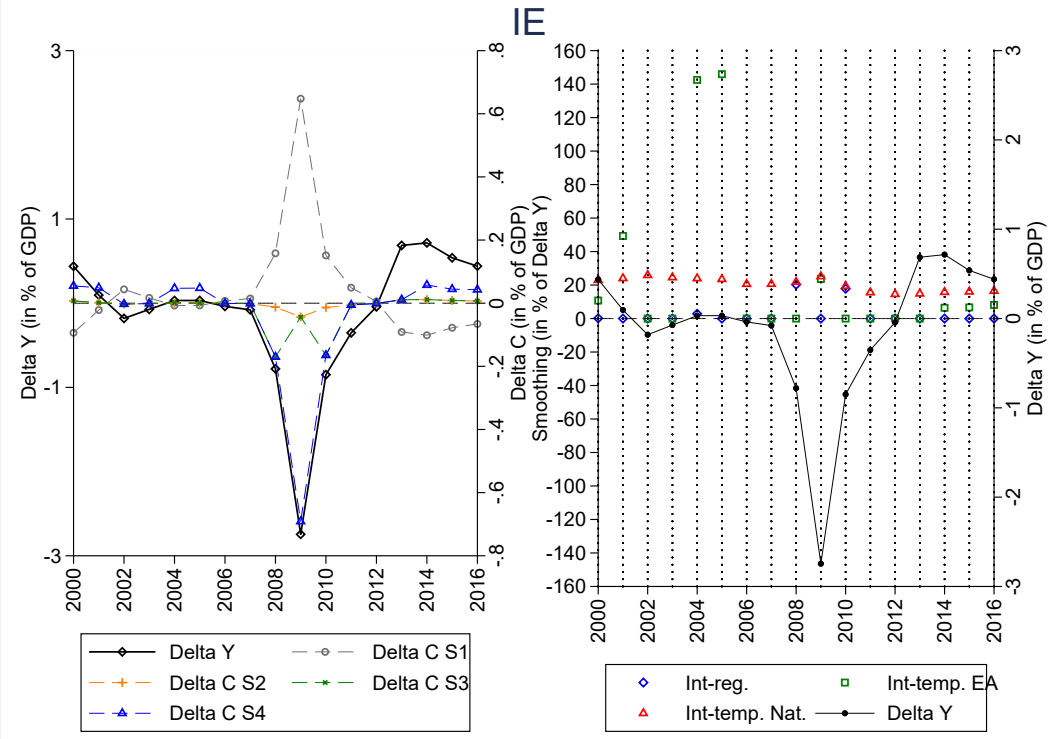

CY
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

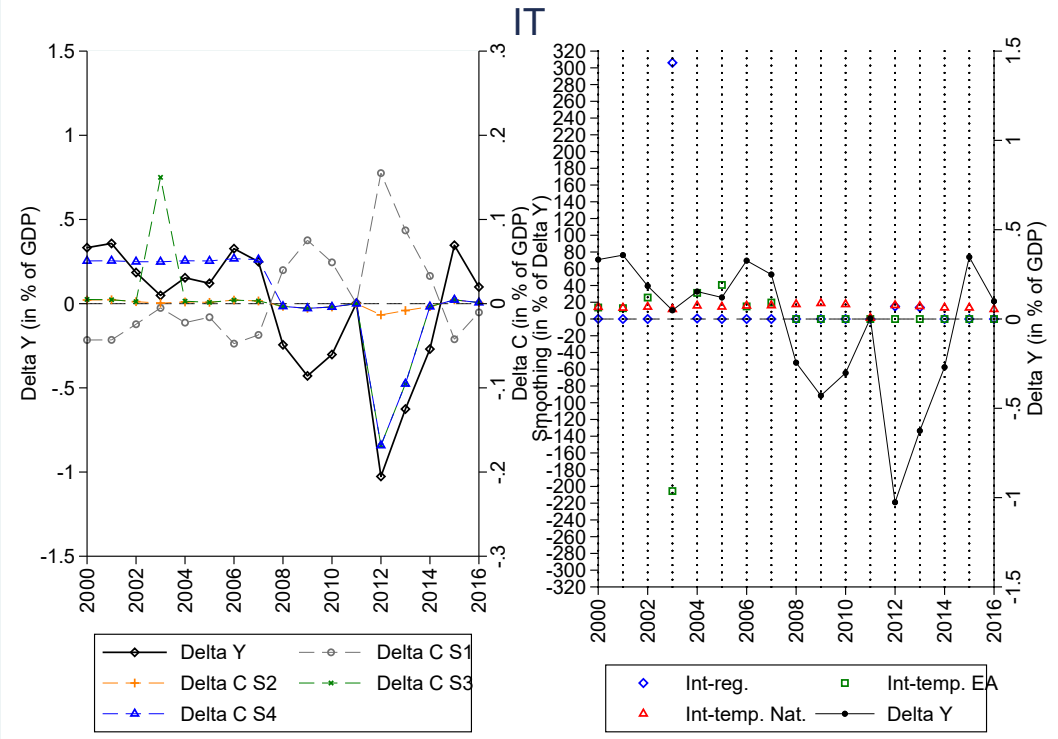

EE
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

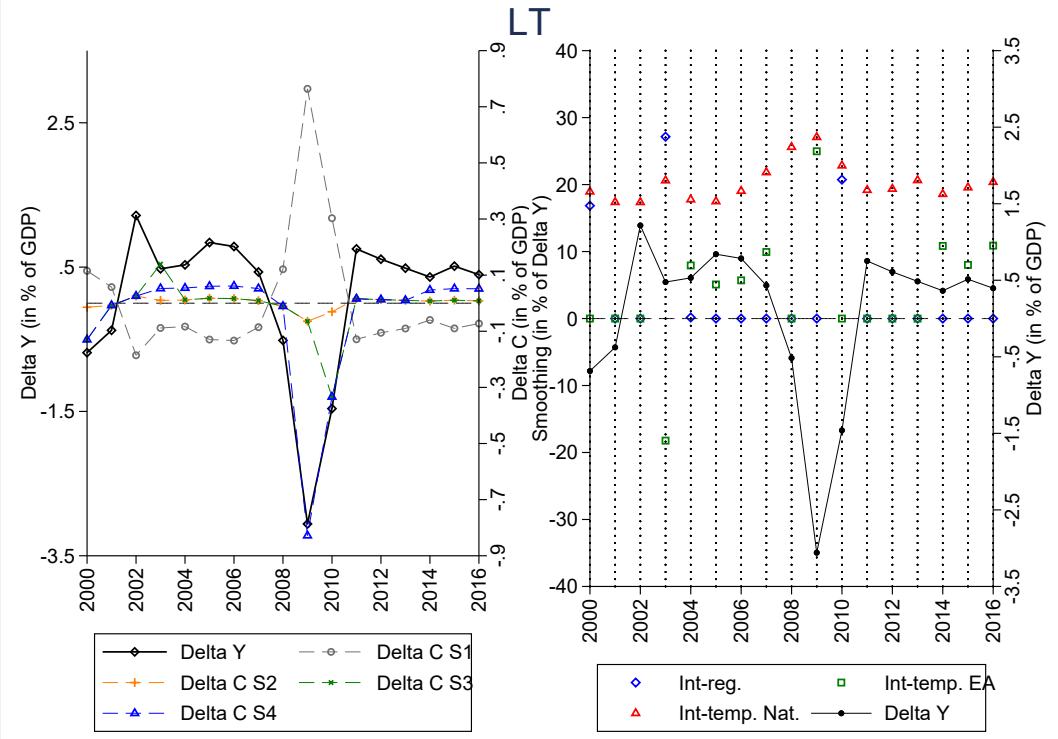

EL
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y (in % of GDP)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

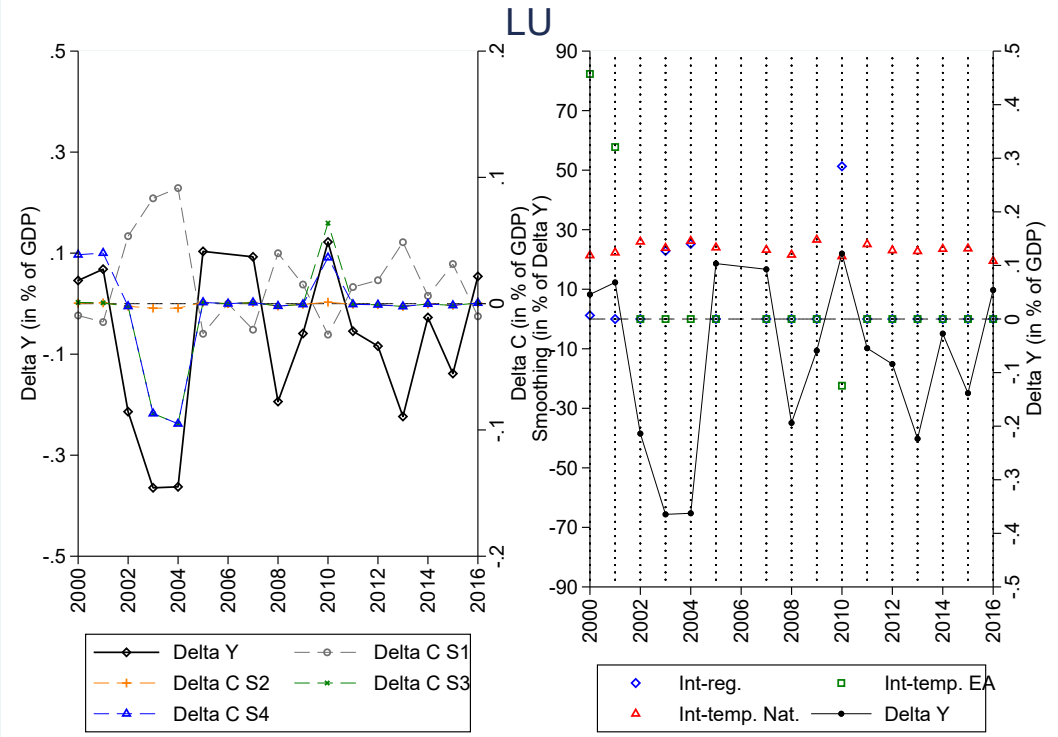

FI
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y (in % of GDP)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

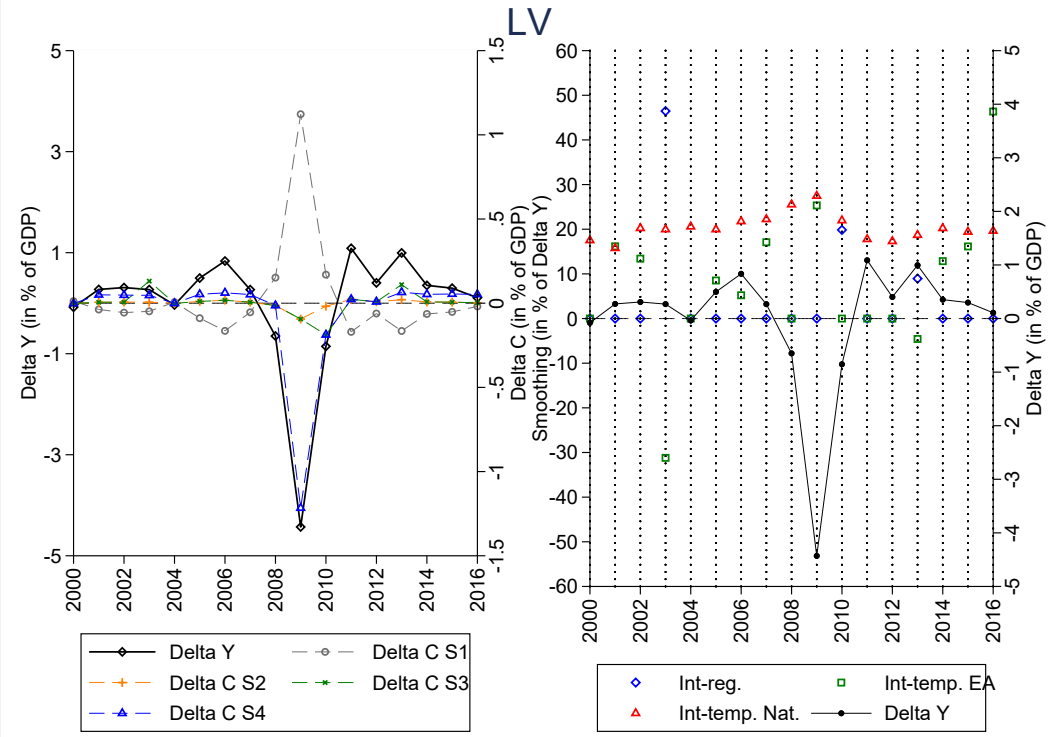

FR
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

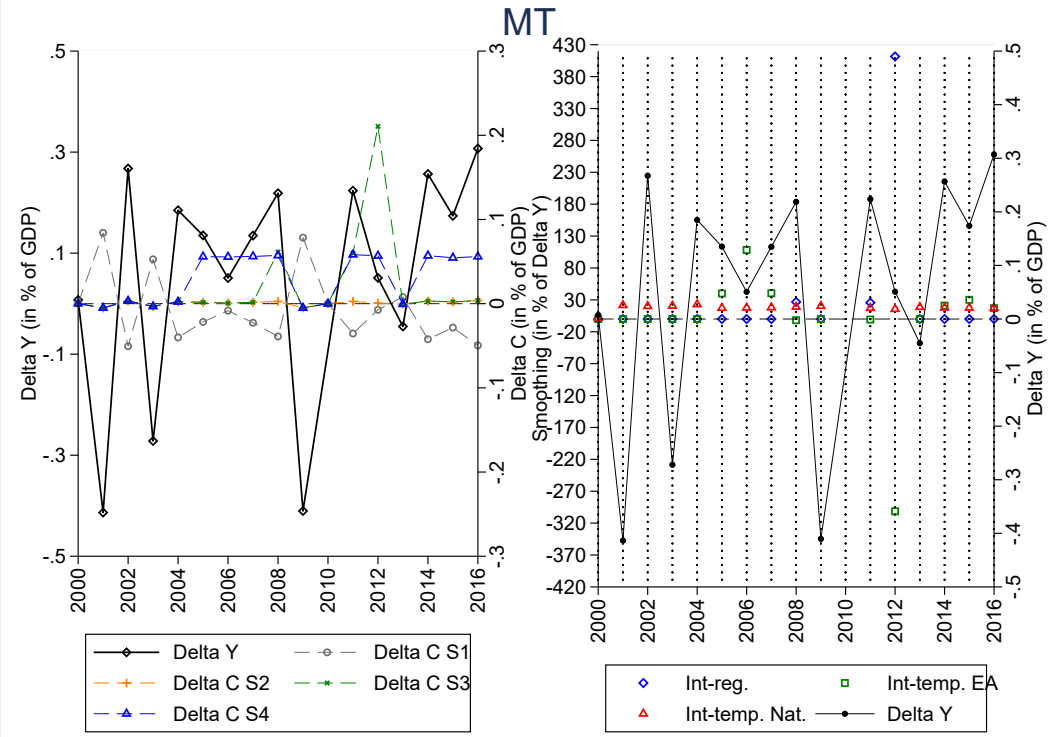

IE
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

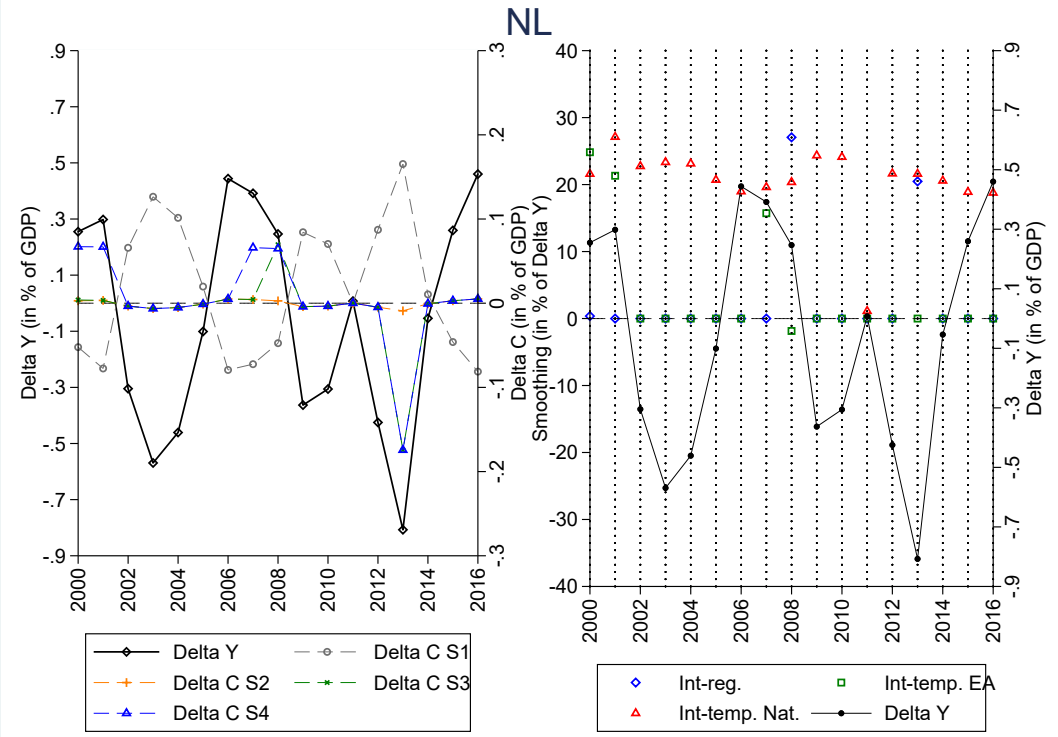

IT
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.

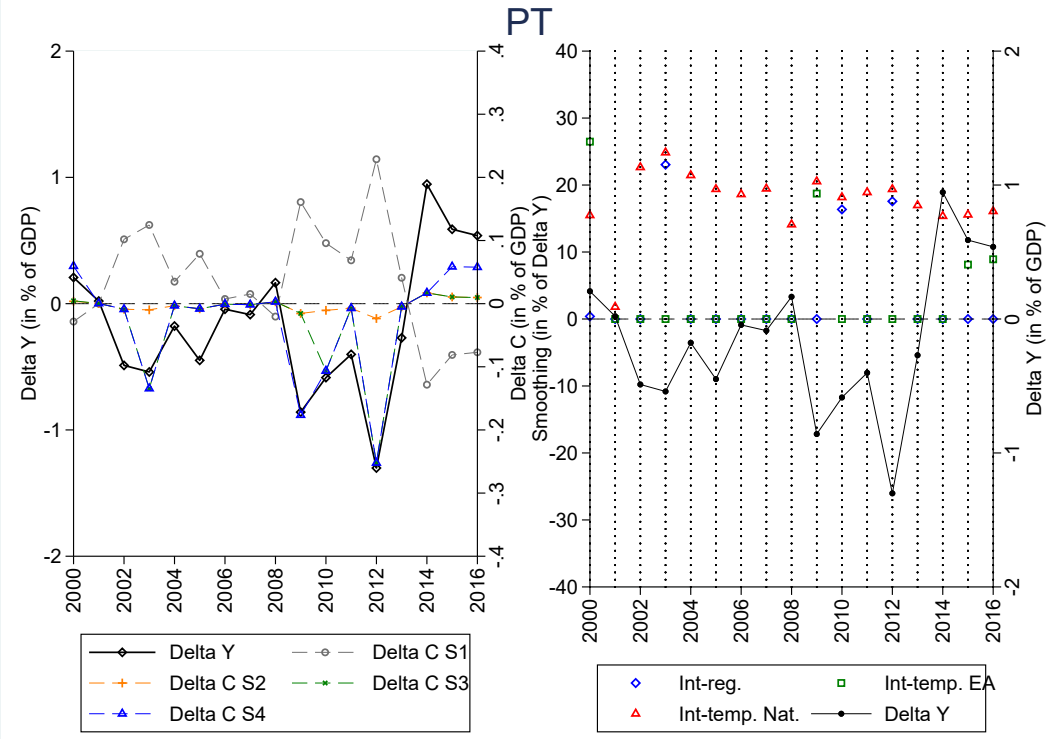

LT
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.

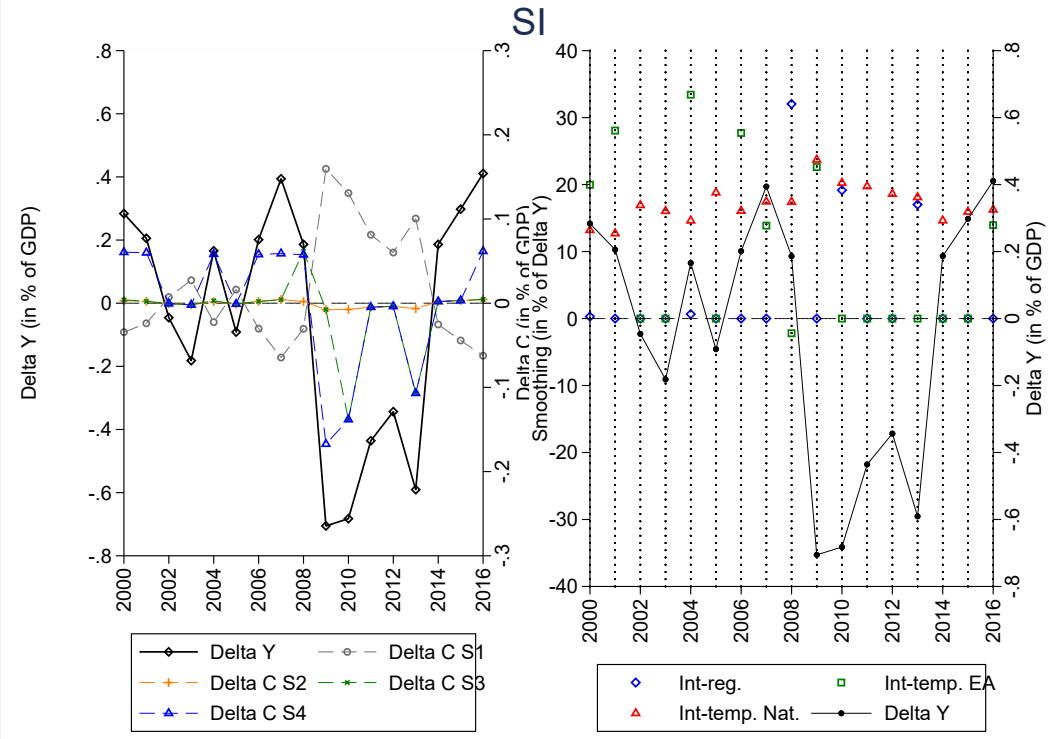

LU
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y

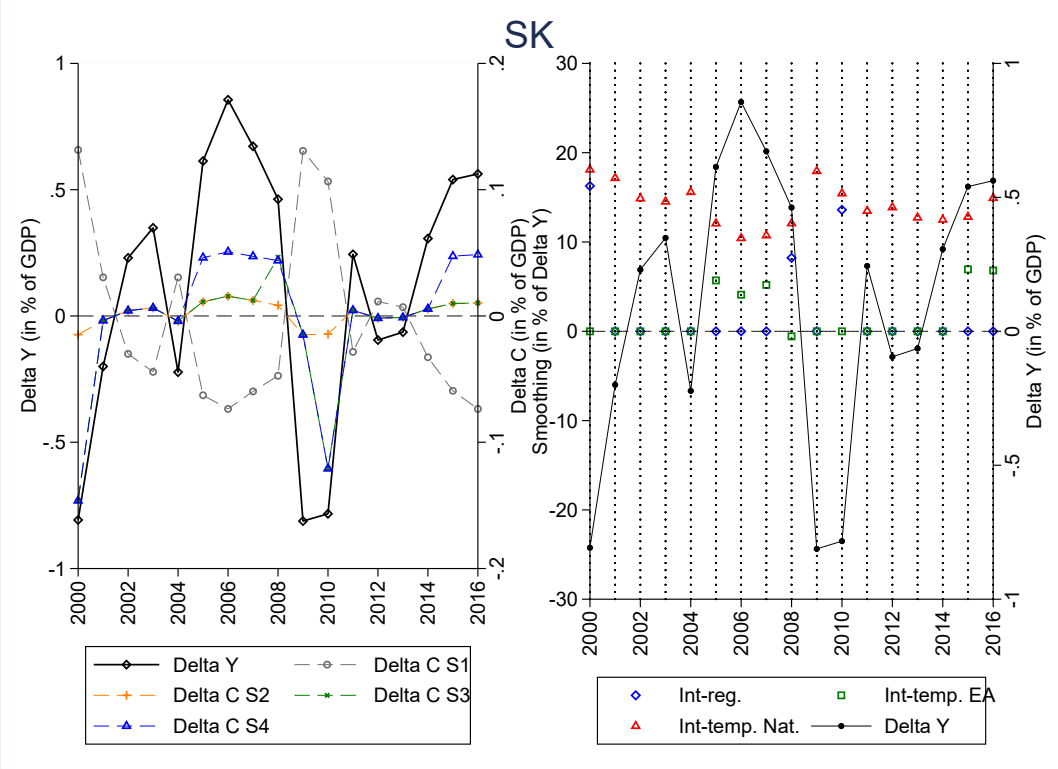

LV
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y


MT
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y (in % of GDP)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y


NL
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y (in % of GDP)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y


PT
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y


SI
Delta Y (in % of GDP)
Delta C (in % of GDP)
Smoothing (in % of Delta Y)
Delta Y
Delta C S1
Delta C S2
Delta C S3
Delta C S4
Int-reg.
Int-temp. EA
Int-temp. Nat.
Delta Y



Notes: The figure shows how differential changes in social insurance contributions to the benchmark UI across scenarios translate into interregional and intertemporal stabilization effects. Left panels: 'Delta Y': Change in employment income. 'Delta C S1' - 'Delta C S4': Change in social insurance contributions to the benchmark UI in scenarios 1–4 (see Table 2). Right panels: 'Inter-reg.': Interregional smoothing effects of the re-insurance. 'Inter-temp. EA': Intertemporal smoothing effects of the re-insurance. 'Inter-temp. Nat.': Intertemporal smoothing effects of the benchmark UI. 'Delta Y': Change in employment income.