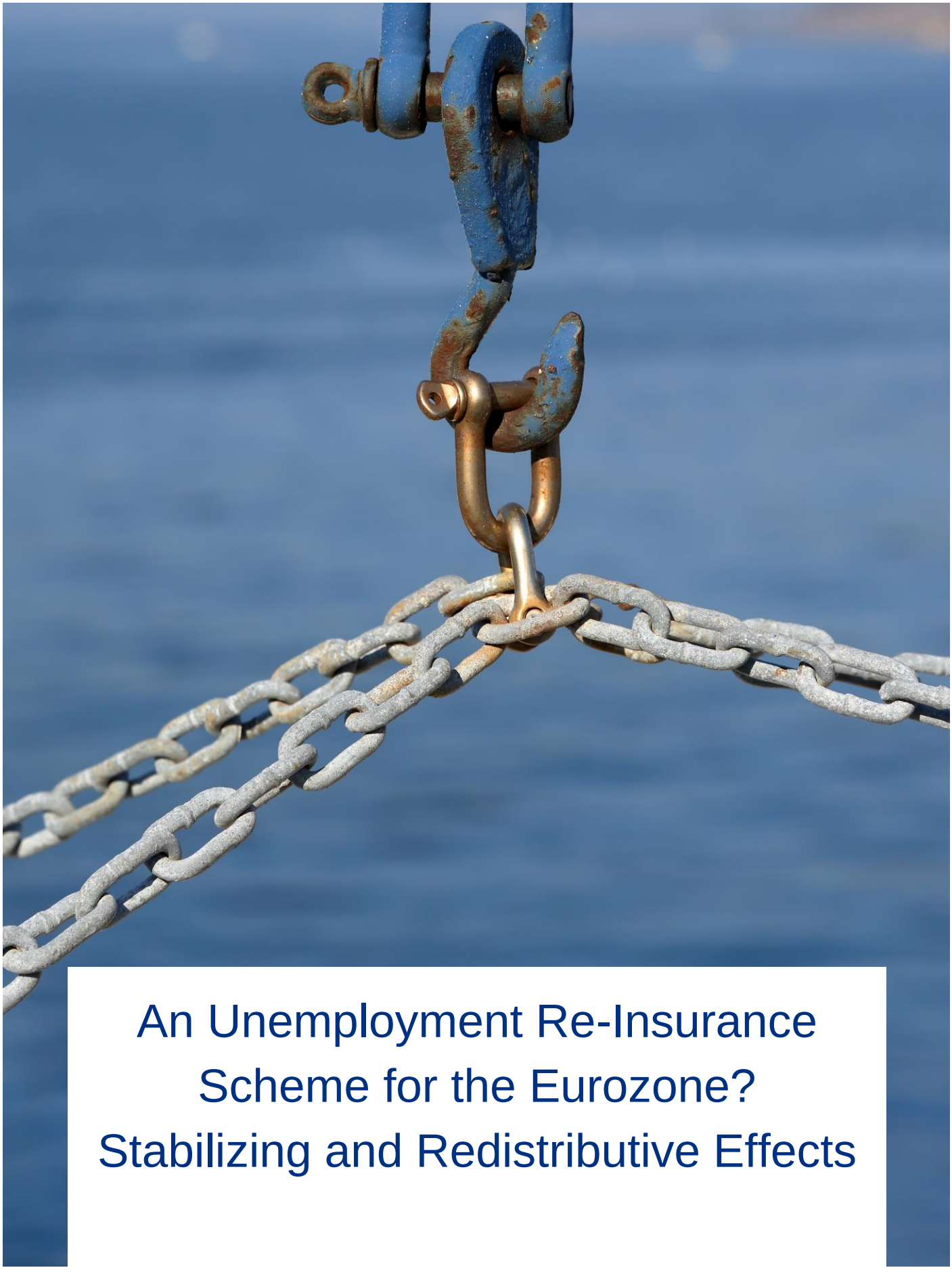

An Unemployment Re-Insurance Scheme for the Eurozone? Stabilizing and Redistributive Effects

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Imprint

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An Unemployment Re-Insurance Scheme for the Eurozone? Stabilizing and Redistributive Effects

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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. The paper provides insights on the potential added value of a re-insurance scheme which crucially hinges on its ability to provide inter-regional smoothing. Running counterfactual simulations based on household micro data for the period 2000–16, the paper finds that on average 15–25 per cent of the income losses originating from rising unemployment in deep recessions would have been absorbed through interregional smoothing effects. The results suggest that the interregional smoothing channel of the re-insurance scheme is economically as important as the intertemporal smoothing effect of an average domestic unemployment insurance scheme in the euro area. The latter would have led to a cushioning effect of 16–27 per cent of large unemployment shocks. 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. No member state would have turned out as a permanent net contributor/recipient.

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1 Introduction

Since the French-German Meseberg declaration from June 2018, the debate about euro-area reforms has gathered new momentum. One element in the French-German reform plans is the creation of a stabilization fund for national unemployment insurance schemes. In October 2018, the German Federal Ministry of Finance (BMF) outlined how such a stabilization fund might be developed. The basic idea of the BMF proposal is to create a stabilization fund which would be financed by national contributions and which could grant loans to national unemployment insurance schemes in times of severe economic crises. These loans would be supposed to help avoiding cuts in unemployment benefits or increases in social insurance contributions in recessions and thereby strengthen the role of domestic unemployment insurance schemes to act as an automatic stabilizer.[1]

Also in the academic debate, several proposals for an unemployment-based stabilization capacity for the euro area have been put forward recently.[2] Early this year, a group of 14 French and German economists presented a reform package for the Economic and Monetary Union (EMU) that aims at strengthening both market discipline and risk sharing (Bénassy-Quére et al. 2018). Their proposal includes a fiscal capacity in the form of an unemployment re-insurance scheme which would pay transfers (rather than loans) if a member state is exposed to a large unemployment shock. Other experts have questioned the need for a fiscal capacity and have raised concerns about permanent transfers and adverse incentives for sound fiscal and economic policies.[3] There is a broad consensus, however, that evaluation studies are needed in order to be able to better weigh potential positive and negative effects of fiscal risk sharing devices (German Council of Economic Experts 2018).[4]

This paper presents the first evaluation study that assesses the importance of different stabilization channels of an unemployment re-insurance scheme for the euro area. It develops a decomposition framework to single out and quantify the *interregional* and *intertemporal* smoothing potential which is of particular relevance in the

[1] Cf. Auerbach and Feenberg (2000), Dolls et al. (2012), McKay and Reis (2016).

[2] Cf. Arnold et al. (2018), Beblavý and Lenaerts (2017), Bénassy-Quére et al. (2018), Carnot et al. (2017) and Dullien et al. (2018). Section 2.1 provides an overview.

[3] A critical view on a euro-area fiscal capacity can be found in this year's 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).

[4] In this paper, the terms 'stabilization fund', 're-insurance scheme' and 'fiscal capacity' are used interchangeably, all referring to an unemployment-based stabilization capacity at euro-area level.

current policy debate.[5] Interregional smoothing arises if labor market fluctuations in euro-area member states are not fully synchronized. It is obtained by pooling the contributions from the member states into the re-insurance scheme and by paying transfers from the common budget if a member state has been hit by a large labor market shock. Intertemporal smoothing can be achieved by running deficits (surpluses) in bad (good) times so that shocks are smoothed over time. The latter channel also indicates the stabilization potential of loan-based re-insurance schemes as in the BMF proposal. The paper argues that the added value of the re-insurance scheme crucially depends on its interregional smoothing potential, whereas intertemporal smoothing can in principle be achieved by countries acting alone.

In the empirical analysis, the paper makes use of household micro data from the EU Labor Force Survey (EU-LFS) and the EU Statistics on Income and Living Conditions (EU-SILC) and runs counterfactual simulations of a re-insurance scheme for the period 2000–16. A key advantage of the micro-data based approach is that the stabilizing and budgetary effects of the re-insurance scheme can be precisely estimated and consistently compared with domestic unemployment insurance schemes in the euro area.

The simulated re-insurance scheme has the following characteristics. Both the contribution and the activation rule contain a double condition that needs to be met for contribution and transfer payments to be triggered, respectively (Carnot et al. 2017). Member states pay contributions into the scheme when unemployment is below its long-term average and falling. Conversely, member states receive a transfer from the scheme if unemployment is above its long-term average and the year-on-year increase in the unemployment rate exceeds a certain threshold. The paper considers variants with threshold values of one and two percentage points. If both conditions in the activation rule are met, a member state receives a one-time transfer from the re-insurance. It amounts to the *additional* expenditures an average unemployment insurance scheme in the euro area (labeled 'benchmark UI') would have to bear in the corresponding year. In the decomposition analysis, the paper studies two scenarios for the budget rule of the re-insurance. In the first scenario, the re-insurance cannot issue debt and its budget has to be balanced in every year. In the second scenario, the re-insurance can run surpluses and deficits in single years and revenue-neutrality is imposed over the period 2000–16.

The paper finds that the re-insurance would have absorbed on average 15–25 per cent of the income losses originating from rising unemployment in deep recessions.

[5]The decomposition approach is based on Dolls et al. (2018) who study the smoothing effects of a European Unemployment Benefit Scheme. Their framework is extended and refined for the case of a re-insurance scheme considered in this paper.

This cushioning effect would have arisen through the interregional smoothing channel of the re-insurance scheme. In particular member states with deteriorating labor market conditions in the aftermath of the financial and economic crisis 2008/09 such as Ireland, Latvia or Spain would have been supported. In the variant with a threshold value in the activation rule of one percentage point, also countries like Austria, Finland, France or Germany would have received transfers from the re-insurance. These interregional smoothing effects would have materialized in addition to the intertemporal smoothing that can be achieved at national level. An average unemployment insurance scheme with the same balanced budget rule and without funding constraints would have cushioned between 16–27 per cent of the large labor market shocks. These results suggest that the counter-cyclical effect of the re-insurance arising through its interregional smoothing potential might be economically as important as the intertemporal smoothing potential of domestic unemployment insurance schemes.

The re-insurance would have disbursed the largest amount of transfers in 2009, in total EUR 14 (10) billion in the variant with a threshold value in the activation rule of one (two) percentage point(s). Average annual contributions paid into the re-insurance would have been below 0.1 per cent 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. All member states would have paid contributions in at least three years. With a threshold value of 1 (2) percentage point(s) in the activation rule, 17 (10) member states would have received a transfer from the re-insurance scheme in at least one year. The rules triggering contribution and transfer payments would have ensured that no member state turns out as a permanent net contributor or net recipient.

The remainder of the paper is structured as follows. In Section 2, the characteristics of the simulated re-insurance scheme, the empirical approach and the decomposition framework are introduced. Main results are presented in Section 3. Section 4 concludes.

2 Characteristics of the re-insurance and empirical framework

2.1 Recent proposals

Table 1 summarizes recent proposals on unemployment-based stabilization instruments according to the following criteria: trigger variable, activation rule, pay-out

rule, contribution rule and existence of a borrowing capacity. The trigger (or indicator) variable measures the magnitude of fluctuations in employment. It enters the activation rule determining under which circumstances a pay-out from the stabilization fund is triggered. Most proposals rely on indicators such as the unemployment rate or the short-term unemployment rate. Bénassy-Quére et al. (2018) additionally propose hours worked or the wage bill as trigger variable. A threshold value in the activation rule stipulates how large the size of the shock must be for a pay-out to be triggered. It can either apply to the year-on-year change in the trigger variable or to the deviation from its long-term moving average. The pay-out rule determines the amount that would be disbursed if the fund is activated. Conversely, the contribution rule characterizes how contributions into the fund are calculated and whether contributions are made on an annual basis or only under specific circumstances. Finally, the existence of a borrowing capacity indicates whether the fund can run (temporary) deficits or not.

Table 1: Recent proposals on unemployment-based stabilization funds

Recent proposals on unemployment-based stabilization funds

author	trigger variable	activation rule	payout rule	contribution rule	borrowing capacity
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
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

Source: ifo Institute | BertelsmannStiftung

2.2 Characteristics of the re-insurance

This paper analyzes stabilizing and budgetary effects of an unemployment re-insurance scheme which is intended to provide counter-cyclical stabilization in case of large labor market shocks. This implies that the re-insurance only kicks in during severe recessions and not in normal times. In general, a re-insurance should be designed in such a way that adverse incentive effects are minimized as far as possible. In what follows, the characteristics of the simulated re-insurance will be presented in detail and critical design issues will be discussed.

Trigger. This paper uses a double condition as in 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 triggering pay-outs and contributions. 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.[6] Analyses are conducted for thresholds values of 1 and 2 percentage points for the required year-on-year increase in the unemployment rate, respectively.[7] 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 counter-cyclical 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. 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.

An alternative contribution rule would require member states to make annual con-

[6] 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.

[7] In the Appendix, additional results for threshold values of 0.5 and 1.5 percentage points are reported.

tribution 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 trigger a transfer from the re-insurance. In contrast, the chosen double condition in the contribution rule might turn out to be too restrictive if the re-insurance has an annually balanced budget rule and no reserves are available. As will be shown in the empirical analysis, this combination can lead to situations in which no transfers can be disbursed because no member state meets the double condition in the contribution rule.

Calculation basis for transfers and contributions. As national unemployment insurance (UI) systems stay in place, unemployment benefits are still administered by the member states according to their respective national regulations. In contrast to a genuine European Unemployment Benefit System (EUBS) which would replace at least part of national UI benefits, the introduction of the re-insurance leaves national UI schemes unaffected.[8] As in Beblavý and Lenaerts (2017), (hypothetical) transfers from a benchmark UI system are used as a calculation basis for the pay-out from the re-insurance in the simulations. 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 unemployment insurance scheme in the euro area.[9]

Contributions into the re-insurance depend on the rule determining over which period its budget has to be balanced. As shown in the next section, two scenarios are considered in the simulations. In a first scenario, the budget has to be revenue-neutral in every year. In that case, the sum of the contributions, C, has to be equal to the sum of the transfers, T, in every year t:

$$\Sigma_{j=1}^{N} C_{j,t\,(triggered)} = \Sigma_{j=1}^{N} T_{j,t\,(triggered)} \tag{1}$$

[8] 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 EUBS.

[9] According to Esser et al. (2013), in 2010 the average gross replacement rate among euro-area unemployment insurance 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).

The subscript *(triggered)* denotes that the two sums are built over all EA-19 member states meeting the double condition either for pay-outs or contributions. The contribution rate s for member states which have to make a contribution payment to the re-insurance in year t is calculated as follows:

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

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 in year t is $C_{j,t} = 0$ if the double condition activating contributions is not met and $C_{j,t\,(triggered)} = s_t * Y_{j,t\,(triggered)}$ 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 contributions has to match the accumulated sum of the transfers:

$$\Sigma_{t=2000}^{2016} \Sigma_{j=1}^{N} C_{j,t\,(triggered)} = \Sigma_{t=2000}^{2016} \Sigma_{j=1}^{N} T_{j,t\,(triggered)} \tag{3}$$

In this case, the contribution rate amounts to

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

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 in year t equals $C_{j,t} = 0$ if the double condition in the contribution rule is not fulfilled and $C_{j,t\,(triggered)} = s * Y_{j,t\,(triggered)}$ if the double condition is met.
Alternatively, transfer payments could be determined as a fixed percentage of national GDP for each pre-determined percentage point/per cent increase in the unemployment rate as proposed, for example, by Arnold et al. (2018), Bénassy-Quére et al. (2018) or Carnot et al. (2017). Similarly, contributions could be set to a fixed percentage of national GDP. Arguably, using compensation of employees and (hypothetical) transfers of an average UI scheme as a calculation basis for contribution and transfer payments – as the present paper does – establishes a more direct link between national labor market cycles and the re-insurance.
There is a trade-off between the counter-cyclicality and the incentive effects of the re-insurance. More generous transfers can provide stronger macroeconomic stabilization effects, but might add to adverse incentive effects. Letting the re-insurance disburse an amount corresponding to the *increase* in unemployment benefit expenditures of an average UI scheme should ensure that a benefit cut or a rise in

contribution rates can be avoided. At the same time member states still have to bear the costs of structural unemployment. Thereby, the re-insurance studied in this paper aims at striking a balance between providing stabilization on the one hand and preserving incentives on the other hand.

2.3 Empirical approach

In the empirical analysis, stabilizing and budgetary effects of an unemployment re-insurance with the characteristics described in the previous section are analyzed. Stabilization effects illustrate the portion of large labor market shocks that are cushioned by the re-insurance. Budgetary effects indicate how its overall net balance and net contributions of the participating member states evolve over time. 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 if it had been introduced in the year 2000. The overall simulation period covers the years 2000–16.

The paper relies on a micro data approach and simulates for each member state a sample of repeated cross sections that precisely replicates changes in labor market conditions such as earnings, the unemployment rate, the share of short- and long-term unemployed, 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.[10] 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.

[10]Dolls et al. (2018) provide more detailed information about the reweighting procedure. Other reweighting applications for modelling unemployment shocks can be found in Immvervoll et al. (2006) and Dolls et al. (2012).

The results of the counterfactual simulation experiment should be interpreted against the background of the following simplifying assumptions. First, participation in 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. Second, the economic effects of the re-insurance are studied in a partial equilibrium framework which does not take into account any general equilibrium effects. Third, 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 study. The simulated stabilizing and budgetary effects of the re-insurance should therefore be interpreted as 'first-round' effects. 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.

2.4 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 case of large labor market shocks.

The scenarios considered in the decomposition analysis are presented in Tables 2 and 3, respectively. The two tables differ in the sequence interregional and intertemporal smoothing effects are introduced. Focus first on the Table 2. As a starting point, the decomposition considers the benchmark UI system introduced in section 2.2 which broadly corresponds to the average UI scheme in the euro area (scenario 1). The average UI scheme is taken as a benchmark in order not to bias interregional smoothing effects of the re-insurance 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.[11] 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.[12] In the baseline scenario, the benchmark UI scheme has a balanced budget rule which has to be met in every year.
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. Contributions from member states that have to make a payment into the re-insurance in a given year are pooled and used to finance transfers to member states which meet the double condition in the activation rule in the corresponding year (scenario 2). For the re-insurance, revenue-neutrality is imposed at the EA-19 level. A comparison of the stabilization effects in scenarios 1 and 2 shows the interregional smoothing potential of the re-insurance. The second step in decomposition 1 is to allow both the benchmark UI and the re-insurance to run deficits or surpluses in single years (scenario 3). In scenario 3, the benchmark UI scheme and the re-insurance are calibrated such that contributions and pay-outs match over the simulation period 2000–16, respectively. This second step leads to intertemporal smoothing.

Table 2: Decomposition 1

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

Notes: The table shows the simulated scenarios in decomposition 1.

Decomposition 1 examines the interregional smoothing potential of the re-insurance in a scenario where member states cannot let their own UI systems act as an automatic stabilizer. In scenarios 1 and 2 of the decomposition, member states must

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

[12] 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.

finance any increases in unemployment benefit payments in a given year by corresponding increases in contributions, mirroring the scenario of a credit-constrained member state. Intertemporal smoothing is only introduced in the second step.
It is interesting to compare the interregional smoothing potential of the re-insurance in decomposition 1 to a scenario where member states can let their own UI systems run deficits and surpluses, i.e., where intertemporal smoothing can be achieved at the national level. This alternative decomposition approach is shown in Table 3. As in decomposition 1, the initial step in decomposition 2 is to introduce the benchmark UI scheme, the budget of which has to be balanced in every year (scenario 1). The next step is to allow the benchmark UI scheme to run deficits and surpluses such that its budget is balanced over the period 2000–16 (scenario 2). In decomposition 2, the re-insurance is only introduced in the last step. It corresponds to the re-insurance in scenario 3 in decomposition 1, i.e., its budget is balanced over the period 2000–16. The pooling of contributions paid into the re-insurance and the disbursement of transfers to crisis-hit countries in the corresponding year leads to interregional smoothing (scenario 3). At the same time, the re-insurance provides intertemporal smoothing by its capacity to run deficits and surpluses in single years.

Table 3: Decomposition 2

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

Notes: The table shows the simulated scenarios in decomposition 2.

For each of the stylized scenarios shown in Tables 2 and 3, a stabilization coefficient $\tau_{j,t}$ is calculated that measures which fraction of a given income change due to increases or decreases in unemployment in member state j and year t is absorbed by transfers and contributions (Auerbach and Feenberg 2000; Dolls et al. 2012; Dolls et al. 2018). $\tau_{j,t}$ is computed using arithmetic changes (Δ) in transfer and contribution payments as well as changes in employment income.[13] Note that the calculation base for contributions (total employee compensation) and transfers (unemployment benefits paid to the short-term unemployed) are the same both for the

[13]The latter 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.

benchmark UI and the re-insurance. $\Delta C_{j,t}, \Delta T_{j,t}, \Delta Y_{j,t}$ are derived and consistently aggregated from the household micro-data simulations described in section 2.3. The stabilization coefficient reads:

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

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.[14]
In decomposition 1:

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

In decomposition 2:

$$\begin{aligned}\tau_{tot} &= \tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,without-debt} \\ &= \underbrace{\tau_{Benchmark-UI,with-debt} - \tau_{Benchmark-UI,without-debt}}_{\tau_{Intertemporal-Smoothing}} \\ &+ \underbrace{\tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,with-debt}}_{\tau_{Interregional-Smoothing}}\end{aligned} \tag{7}$$

In the empirical analysis, interregional and intertemporal smoothing coefficients are calculated for each member state and year.[15] In all scenarios shown in Tables 2 and 3, 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, $\Delta T_{j,t}$, are identical across scenarios so that they cancel out each other:

$$\begin{aligned}\Delta T_{j,t}^{Benchmark-UI,without-debt} &= \Delta T_{j,t}^{Benchmark-UI,with-debt} \\ = \Delta T_{j,t}^{Re-insurance,without-debt} &= \Delta T_{j,t}^{Re-insurance,with-debt}\end{aligned} \tag{8}$$

Transfers from the re-insurance in effect relax the balanced budget condition of the

[14]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.

[15]In equations 6 and 7, subscripts j and t are suppressed for the sake of simplicity.

benchmark UI. As a consequence, interregional and intertemporal smoothing effects arise due to different contribution payments across scenarios and equations (6) and (7) can be rewritten as follows:
Decomposition 1:

$$\begin{aligned}\tau_{tot} &= \tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,without-debt} \\ &= \underbrace{\frac{\Delta C_{j,t}^{Re-insurance,without-debt} - \Delta C_{j,t}^{Benchmark-UI,without-debt}}{\Delta Y_{j,t}}}_{\tau_{Interregional-Smoothing}} \\ &+ \underbrace{\frac{\Delta C_{j,t}^{Re-insurance,with-debt} - \Delta C_{j,t}^{Re-insurance,without-debt}}{\Delta Y_{j,t}}}_{\tau_{Intertemporal-Smoothing}}\end{aligned} \tag{9}$$

Decomposition 2:

$$\begin{aligned}\tau_{tot} &= \tau_{Re-insurance,with-debt} - \tau_{Benchmark-UI,without-debt} \\ &= \underbrace{\frac{\Delta C_{j,t}^{Benchmark-UI,with-debt} - \Delta C_{j,t}^{Benchmark-UI,without-debt}}{\Delta Y_{j,t}}}_{\tau_{Intertemporal-Smoothing}} \\ &+ \underbrace{\frac{\Delta C_{j,t}^{Re-insurance,with-debt} - \Delta C_{j,t}^{Benchmark-UI,with-debt}}{\Delta Y_{j,t}}}_{\tau_{Interregional-Smoothing}}\end{aligned} \tag{10}$$

Tables 4 and 5 show how interregional and intertemporal smoothing effects arise in the empirical analysis, depending on the status of the re-insurance. Focus first on Table 4 for interregional smoothing effects. In decomposition 1, interregional smoothing effects of the re-insurance depend on how changes in contribution payments in the scenario of benchmark UI schemes (without debt) differ from the scenario where benchmark UI schemes are complemented by the re-insurance (without debt). The following relation has to hold in every year due to the revenue-neutrality condition:

$$\Delta C_{j,t}^{Benchmark-UI,without\ debt} = \Delta T_{j,t}^{Benchmark-UI,without\ debt} \tag{11}$$

$$\Delta C_{j,t}^{Re-insurance,without\ debt} = \Delta T_{j,t}^{Re-insurance,without\ debt} \tag{12}$$

The revenue-neutrality condition for the benchmark UI implies that required changes in contribution payments always have a pro-cyclical effect (offsetting the counter-cyclical effect of rising unemployment benefit expenditures). For the re-insurance, such pro-cyclical effects are avoided through the double condition in the activation

and the contribution rule.[16]

There are three different statuses the re-insurance can take for member state j in year t. First, member state j might be eligible to receive a transfer from the re-insurance if the double condition in the activation rule is met and there is at least one other member state making a contribution payment to the re-insurance. In this case, the transfer is used by the member state to finance the increase in unemployment benefit expenditures so that contributions to the benchmark UI system do not have to be raised ($\Delta C_{j,t}^{Re-insurance,without-debt} = 0$). In the scenario without the re-insurance, the member state has to raise the contribution rate to the benchmark UI in order to finance rising unemployment benefit expenditures ($\Delta C_{j,t}^{Benchmark-UI,without-debt} > 0$). It follows that in a situation of rising unemployment leading to a drop in employment income ($\Delta Y_{j,t} < 0$), the re-insurance has a counter-cyclical effect for member state j ($\tau_{Interregional-Smoothing} \geq 0$).

Second, member state j might be obliged to pay a contribution into the re-insurance if the double condition in the contribution rule is met and there is at least one other member state receiving a transfer from the re-insurance in the same year. In this case, the overall change in contribution payments can be positive or negative ($\Delta C_{j,t}^{Re-insurance,without-debt} \leq / \geq 0$). The sign of $\Delta C_{j,t}^{Re-insurance,without-debt}$ depends on whether the contribution to be paid into the re-insurance is larger than the reduction in contribution payments to the benchmark UI. In the scenario without the re-insurance, contribution payments to the benchmark UI go down ($\Delta C_{j,t}^{Benchmark-UI,without-debt} < 0$). Given that the drop in unemployment leads to an increase in employment income ($\Delta Y_{j,t} > 0$), the re-insurance again has a counter-cyclical effect for member state j ($\tau_{Interregional-Smoothing} \geq 0$).

Third, member state j might meet the double condition neither in the activation nor in the contribution rule. In this case, the re-insurance does not have any interregional smoothing effect for member state j ($\tau_{Interregional-Smoothing} = 0$) .

In decomposition 2, interregional smoothing effects arise from the comparison of a scenario with benchmark UI schemes (revenue-neutral over the simulation period) with a scenario with benchmark UI schemes being complemented by the re-insurance (also revenue-neutral over the simulation period). As shown in the last column of Table 4, due to its capacity to run deficits and surpluses, changes in contribution payments to the benchmark UI now have a counter-cyclical effect ($\Delta C_{j,t}^{Benchmark-UI,with-debt} < 0$ if $\Delta Y_{j,t} < 0$ and $\Delta C_{j,t}^{Benchmark-UI,with-debt} > 0$ if $\Delta Y_{j,t} > 0$). The re-insurance strengthens the counter-cyclical effect if the member state meets one of two double conditions. A corresponding overview for intertem-

[16]Note that these budget rules represent a stylized scenario. In practice, surpluses can be built up in normal economic times which are used as a buffer in recessions.

poral smoothing effects is shown in Table 5.

Table 4: Possible statuses of the re-insurance and interregional smoothing effects

Status of the re-insurance	Interregional smoothing	
	Decomposition 1	Decomposition 2
1. Member state receives a transfer ($\Delta Y_{j,t} < 0$)	$\Delta C_{j,t}^{Re-insurance,without-debt} = 0$ $\Delta C_{j,t}^{Benchmark-UI,without-debt} > 0$ $\Rightarrow \tau_{Interregional-Smoothing} \geq 0$	$\Delta C_{j,t}^{Re-insurance,with-debt}$ $<$ $\Delta C_{j,t}^{Benchmark-UI,with-debt} < 0$ $\Rightarrow \tau_{Interregional-Smoothing} > 0$
2. Member state pays a contribution ($\Delta Y_{j,t} > 0$)	$\Delta C_{j,t}^{Re-insurance,without-debt} \leq / \geq 0$ $>$ $\Delta C_{j,t}^{Benchmark-UI,without-debt} < 0$ $\Rightarrow \tau_{Interregional-Smoothing} \geq 0$	$\Delta C_{j,t}^{Re-insurance,with-debt}$ $>$ $\Delta C_{j,t}^{Benchmark-UI,with-debt} > 0$ $\Rightarrow \tau_{Interregional-Smoothing} > 0$

3. Re-insurance is inactive, i.e. neither contribution nor transfer payment triggered ($\Delta Y_{j,t} \leq / \geq 0$)	if $\Delta Y_{j,t} > 0$:
	$\Delta C_{j,t}^{Re-insurance,without-debt}$
	$=$
	$\Delta C_{j,t}^{Benchmark-UI,without-debt} < 0$
	
	if $\Delta Y_{j,t} < 0$:
	$\Delta C_{j,t}^{Re-insurance,without-debt}$
	$=$
	$\Delta C_{j,t}^{Benchmark-UI,without-debt} > 0$
	
	$\Rightarrow \tau_{Interregional-Smoothing} = 0$
		if $\Delta Y_{j,t} > 0$:
		$\Delta C_{j,t}^{Re-insurance,with-debt}$
		$=$
		$\Delta C_{j,t}^{Benchmark-UI,with-debt} > 0$
		
		if $\Delta Y_{j,t} < 0$:
		$\Delta C_{j,t}^{Re-insurance,with-debt}$
		$=$
		$\Delta C_{j,t}^{Benchmark-UI,with-debt} < 0$
		
		$\Rightarrow \tau_{Interregional-Smoothing} = 0$

Table 5: Possible statuses of the re-insurance and intertemporal smoothing effects

Status of the re-insurance	Intertemporal smoothing	
	Decomposition 1	Decomposition 2
1. Member state receives a transfer ($\Delta Y_{j,t} < 0$)	$\Delta C_{j,t}^{Re-insurance,with-debt} < 0$ $\Delta C_{j,t}^{Re-insurance,without-debt} = 0$ $\Rightarrow \tau_{Intertemporal-Smoothing} > 0$	$\Delta C_{j,t}^{Benchmark-UI,with-debt} < 0$ $\Delta C_{j,t}^{Benchmark-UI,without-debt} > 0$ $\Rightarrow \tau_{Intertemporal-Smoothing} > 0$
2. Member state pays a contribution ($\Delta Y_{j,t} > 0$)	$\Delta C_{j,t}^{Re-insurance,with-debt} > 0$ $\Delta C_{j,t}^{Re-insurance,without-debt} \geq / \leq 0$ $\Rightarrow \tau_{Intertemporal-Smoothing} \geq / \leq 0$	$\Delta C_{j,t}^{Benchmark-UI,with-debt} > 0$ $\Delta C_{j,t}^{Benchmark-UI,without-debt} < 0$ $\Rightarrow \tau_{Intertemporal-Smoothing} > 0$

3. Re-insurance is inactive, i.e. neither contribution nor transfer payment triggered ($\Delta Y_{j,t} \leq / \geq 0$)	if $\Delta Y_{j,t} > 0$:
	$\Delta C_{j,t}^{Re-insurance,with-debt} > 0$
	$\Delta C_{j,t}^{Re-insurance,without-debt} < 0$
	
	if $\Delta Y_{j,t} < 0$:
	$\Delta C_{j,t}^{Re-insurance,with-debt} < 0$
	$\Delta C_{j,t}^{Re-insurance,without-debt} > 0$
	
	$\Rightarrow \tau_{Intertemporal-Smoothing} > 0$
		if $\Delta Y_{j,t} > 0$:
		$\Delta C_{j,t}^{Benchmark-UI,with-debt} > 0$
		$\Delta C_{j,t}^{Benchmark-UI,without-debt} < 0$
		
		if $\Delta Y_{j,t} < 0$:
		$\Delta C_{j,t}^{Benchmark-UI,with-debt} < 0$
		$\Delta C_{j,t}^{Benchmark-UI,without-debt} > 0$
		
		$\Rightarrow \tau_{Intertemporal-Smoothing} > 0$

3 Results

3.1 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 Table 1 in section 2.1): the unemployment rate, the short-term unemployment rate and the work volume.[17] While changes in the short-term or overall unemployment rate capture labor market shocks at the extensive margin only, the work volume additionally accounts for changes at the intensive margin.[18] From an incentive perspective, the work volume might be an attractive indicator variable as it does not penalize labor market policies such as subsidised short-time work programmes, implemented for example in Germany during the crisis, which lead to reductions in hours worked, but not to increases in unemployment (Bénassy-

[17] 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 is highly correlated with the (ex post) estimated output gap.

[18] The work volume is defined as the product of total number of persons in employment times average number of hours worked.

Quére et al. 2018).

Tables 6 and 7 show which countries would have met the double condition for pay-outs and contributions described in section 2.2 over the period 2000–16. For pay-outs to be triggered, threshold values in the activation rule of 1 and 2 percentage points for the year-on-year increase in the (short-term / overall) unemployment rate and, correspondingly, of 1 and 2 per cent for the year-on-year decrease in the work volume are considered.[19] This range of threshold values is chosen in order to explore to what extent the interregional smoothing effect of the re-insurance is sensitive to different specifications in the activation rule.

As can be seen in Table 6 for the (pay-out) activation rule, with a threshold value of 1 percentage point for the (short-term / overall) unemployment rate and of 1 per cent for the work volume, 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 6 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. Table 6 also indicates that the overall number of activations becomes substantially smaller if a higher threshold value of 2 percentage points (per cent) is used in the activation rule. Both with the lower and the higher threshold value, the re-insurance would have been activated most often in the period 2008–2013 and, to a lower degree, in the early 2000s.

A corresponding overview for the incidence of contribution payments is presented in Table 7.[20] Irrespective of the underlying indicator variable, all member states would have been obliged to make a contribution payment at least in two years. The

[19] In Table 6, the threshold value for the work volume is labeled as '99 percent' ('98 percent') which implies that the reduction in the work volume must be larger than 1 (2) per cent. Table 10 in the Appendix reports results for alternative threshold values of 0.5 and 1.5 percentage points for the year-on-year increase in the (short-term / overall) unemployment rate and of 0.5 and 1.5 per cent for the year-on-year decrease in the work volume.

[20] Recall that the corresponding double condition in the contribution rule does not include a threshold values for the year-on-year decrease (increase) in the unemployment rate (work volume). A small threshold value of 0.5 percentage points / per cent would reduce the overall number of country-year pairs with contribution payments from 125 to 78 in case of the overall unemployment rate, from 133 to 58 in case of the short-term unempoyment rate and from 166 to 142 in case of the work volume.

minimum number of years a member state would have been obliged to make a contribution payment 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, there would have been contributions paid into the re-insurance by at least 2 member states per year, with the year 2009 being the only exception.

In the subsequent analysis, the overall unemployment rate is used as indicator variable entering both the activation and the contribution rule. In contrast to the other two indicator variables considered in this section, it is harmonized across euro-area countries and less prone to measurement error and manipulation. Ex post revisions are less of a concern compared to other cyclical indicators such as the output gap (Arnold et al. 2018).

Table 6: Payouts by country and year: threshold values of 1 and 2 p.p. (per cent)

Payout trigger by country and year

	TRIGGER – payment: unemployment rate (threshold: 1 percentage point)		TRIGGER – payment: short-term unemployment rate (threshold: 1 percentage point)		TRIGGER – payment: work volume (threshold: 99 percent)	
country	frequency	number of activations	frequency	number of activations	frequency	number of activations
BE	0.0%	0	0.0 %	0	0.0 %	0
DE	5.9 %	1	0.0 %	0	23.5 %	4
EE	17.6 %	3	11.8 %	2	17.6 %	3
IE	17.6 %	3	17.6 %	3	17.6 %	3
EL	29.4 %	5	17.6 %	3	23.5 %	4
ES	35.3 %	6	17.6 %	3	23.5 %	4
FR	5.9 %	1	5.9 %	1	0.0 %	0
IT	11.8 %	2	0.0 %	0	17.6 %	3
CY	23.5 %	4	23.5 %	4	17.6 %	3
LV	11.8 %	2	17.6 %	3	29.4 %	5
LT	17.6 %	3	11.8 %	2	17.6 %	3
LU	11.8 %	2	11.8 %	2	0.0 %	0
MT	0.0 %	0	5.9 %	1	17.6 %	3
NL	5.9 %	1	0.0 %	0	0.0 %	0
AT	5.9 %	1	11.8 %	2	11.8 %	2
PT	23.5 %	4	23.5 %	4	29.4 %	5
SI	17.6 %	3	5.9 %	1	11.8 %	2
SK	11.8 %	2	5.9 %	1	17.6 %	3
FI	5.9 %	1	0.0 %	0	5.9 %	1
total	13.6 %	44	9.9 %	32	14.9 %	48

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	TRIGGER – payment: unemployment rate (threshold: 1 percentage point)		TRIGGER – payment: short-term unemployment rate (threshold: 1 percentage point)		TRIGGER – payment: work volume (threshold: 99 percent)	
year	number of countries	country code	number of countries	country code	number 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	

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Payout trigger by country and year

	TRIGGER – payment: unemployment rate (threshold: 2 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 2 percentage points)		TRIGGER – payment: work volume (threshold: 98 percent)	
country	frequency	number of activations	frequency	number of activations	frequency	number of activations
BE	0.0 %	0	0.0 %	0	0.0 %	0
DE	0.0 %	0	0.0 %	0	5.9 %	1
EE	17.6 %	3	11.8 %	2	11.8 %	2
IE	5.9 %	1	5.9 %	1	17.6 %	3
EL	23.5 %	4	0.0 %	0	23.5 %	4
ES	17.6 %	3	11.8 %	2	23.5 %	4
FR	0.0 %	0	0.0 %	0	0.0 %	0
IT	5.9 %	1	0.0 %	0	17.6 %	3
CY	11.8 %	2	0.0 %	0	17.6 %	3
LV	5.9 %	1	11.8 %	2	23.5 %	4
LT	11.8 %	2	5.9 %	1	17.6 %	3
LU	0.0 %	0	0.0 %	0	0.0 %	0
MT	0.0 %	0	0.0 %	0	11.8 %	2
NL	0.0 %	0	0.0 %	0	0.0 %	0
AT	0.0 %	0	0.0 %	0	5.9 %	1
PT	5.9 %	1	0.0 %	0	23.5 %	4
SI	0.0 %	0	0.0 %	0	5.9 %	1
SK	11.8 %	2	5.9 %	1	5.9 %	1
FI	0.0 %	0	0.0 %	0	0.0 %	0
total	6.2 %	20	2.8 %	9	11.1 %	36

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	TRIGGER – payment: unemployment rate (threshold: 2 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 2 percentage points)		TRIGGER – payment: work volume (threshold: 98 percent)	
year	number of countries	country code	number of countries	country code	number 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	

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Table 7: Contribution payments by country and year

Contribution trigger by country and year

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

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	TRIGGER – contribution: unemployment rate		TRIGGER – contribution: short-term unemployment rate		TRIGGER – contribution: work volume	
year	number of countries	country code	number of countries	country code	number 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, N L, AT, SK, FI
2007	15	BE, DE, EE, EL, ES, FR, IT, CY, LV, LT, MT, N L, 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, S I, SK, FI	13	BE, DE, EE, IE, ES, FR, LT, LU, MT, NL, AT, S I, SK

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3.2 Stabilization effects

This section reports the results of the decomposition analysis. As shown in section 2.4, smoothing effects are measured by the stabilization coefficient showing the portion of the change in employment income due to entries into / exits out of unemployment that is absorbed by the re-insurance and the benchmark UI scheme, respectively. Interregional smoothing effects arise due to the pooling of contributions paid into the re-insurance and the disbursement of transfers to crisis-hit countries in the corresponding year. Intertemporal smoothing effects are achieved by letting the re-insurance and the benchmark UI run deficits (surpluses) in bad (good) times. Figure 3 in the Appendix shows for all euro-area member states how changes in contribution payments and the resulting interregional and intertemporal smoothing effects in the different scenarios in decomposition approaches 1 and 2 would have evolved over the period 2000–16.[21] As an illustration, these results are based on a threshold value in the activation rule of 1 percentage point for the year-on-year increase in the unemployment rate.

Consider first the case of Germany and focus on the upper panel in Figure 3 for decomposition 1. As shown by the purple line labeled 'Delta Y' in the upper left panel, Germany experienced the largest labor market shock in 2003 with a drop in employment income amounting to almost 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), Germany would have been forced to raise social insurance contributions by an additional 0.1 percent of GDP to finance the increase in unemployment benefit payments (see the light green line labeled 'Delta C S1' in the upper left panel). Since Germany would have been eligible for a pay-out from the re-insurance in 2003, no increase in social insurance contributions to the benchmark UI scheme would have been necessary in the scenario with the re-insurance (scenario 2 in Table 2, see the dark blue line labeled 'Delta C S2' in the upper left panel of Figure 3). The pay-out would have sufficed to finance the increase in unemployment benefit expenditures. According to decomposition 1, this would have led to an interregional smoothing effect amounting to 17% of the reduction in employment income. This is illustrated by the orange dot for the year 2003 in the upper right panel of Figure 3. By relaxing the budget rule of the benchmark UI and the re-insurance such that both are revenue-neutral over the period 2000–16, contributions to the benchmark UI would have fallen (green line in the upper left panel labeled 'Delta C S3') and an additional (intertemporal) smoothing effect of 18% would have materialized (red diamond in the upper right

[21] Cf. Tables 2 and 3 in section 2.4.

panel).

In decomposition 2, the initial stabilization effect would have been achieved by allowing the benchmark UI scheme to run a deficit in 2003 (scenario 2 in Table 3), so that social insurance contribution payments to the benchmark UI scheme would have fallen slightly (see the dark blue line in the lower left panel of Figure 3). With the pay-out from the re-insurance (scenario 3 in Table 3), social insurance contributions to the benchmark UI scheme could have been reduced by the corresponding amount (see green line in the lower left panel of Figure 3). As shown by the orange dot in the lower right panel of Figure 3, decomposition 2 would have yielded the same interregional smoothing effect as in decomposition 1. Correspondingly, the re-insurance would have led to interregional smoothing effects in those years when Germany would have been obliged to pay a contribution into the re-insurance.[22]

Consider as another illustration the case of Spain. With the double condition in the activation rule including a threshold value of 1 percentage point for the year-on-year increase in the unemployment rate, Spain 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.

How large would have been the cushioning impact of the re-insurance for Spain? As shown by the orange dots in the upper and lower right panel in Figure 3, the re-insurance would have absorbed 17–25% of the reductions in employment income in the period 2008–13. These smoothing effects of the re-insurance would have materialized in addition to intertemporal smoothing effects of the benchmark UI (red diamonds in the upper and lower right panel). As shown in the upper and lower left panel of Figure 3, the pay-outs from the re-insurance would have prevented pro-cyclical (decomposition 1, light green line in the upper left panel) / a-cyclical (decomposition 2, dark blue line in the lower left panel) changes in contribution payments to the benchmark UI scheme.

Note, however, that the year 2009 – the year with the most severe drop in employment income – is a notable exception. In 2009, smoothing effects of the re-insurance would have materialized only if it had been able to build up reserves as in scenario 3 of the two decomposition approaches. The reason is that in 2009 no member state

[22]Note that interregional smoothing effects in decompositions 1 and 2 deviate from each other in contributory years. The reason is that in decomposition 1, contribution payments must suffice to finance the pay-outs from the re-insurance in the corrresponding year, whereas in decomposition 2 contribution payments are smoothed over time. In the case of Germany, average interregional smoothing effects in contributory years amount to 27% (32%) in decomposition 1 (2).

would have been obliged to make a contribution payment into the re-insurance. As a consequence, no pay-out would have taken place shutting down the interregional smoothing channel. In that case, the only stabilization impact of the re-insurance would have been achieved through intertemporal smoothing.[23]

Tables 8 and 9 summarize interregional and intertemporal smoothing results over the period 2000–16. For each EA-19 member state, average unweighted smoothing effects are reported with the average being computed over all years member state j would have been eligible for a pay-out from the re-insurance.[24] Tables 8 and 9 present average smoothing effects for an activation rule with threshold values of 1 and 2 percentage points for the year-on-year increase in unemployment, while corresponding results for threshold values of 0.5 and 1.5 percentage points are reported in Tables 11 and 12 in the Appendix. The overall smoothing gain of moving from benchmark UI schemes 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 is shown in the third column (titled 'Overall'), respectively. The columns labeled 'Intertemp' refer to the intertemporal smoothing effect of the benchmark UI, while the columns labeled 'Interreg' refer to the interregional smoothing effect of the re-insurance. Importantly, both decompositions yield the same overall smoothing effects, but due to the path-dependency of the decompositions, interregional and intertemporal smoothing effects can differ between decomposition approaches 1 and 2.

Focus first on Table 8 for an activation rule with a threshold value of 1 percentage point. In decomposition 1, average interregional smoothing effects for unemployment shocks exceeding this threshold value range from 10% in Latvia to 24% in Luxembourg, with an average (unweighted) value for all EA-19 member states amounting to 11%. As shown in the previous section, two member states (BE, MT) would not have received a transfer from the re-insurance as these member states had not met the double condition in the activation rule in any year. Moreover, in decomposition 1 interregional smoothing effects would not have arisen in Austria, Finland and France. These countries would have met the double condition in the activation rule only in 2009 when no pay-out from the re-insurance would have taken place in scenario 2. Intertemporal smoothing coefficients are larger, with a mean value at

[23]Strictly speaking, the orange dot for the year 2009 in the lower right panel in effect represents an intertemporal rather than an interregional smoothing effect of the re-insurance. The red diamond for the year 2009 in the upper right panel reflects the overall intertemporal smoothing effect coming from the benchmark UI and the re-insurance.

[24]Note that there are also interregional smoothing effects when member states are obliged to make a contribution payment into the re-insurance. The rule that contributions have to be paid only in years with falling unemployment ensures that contribution payments have a counter-cyclical effect as well.

the EA-19 level of 27%.[25]

Average interregional smoothing effects are somewhat higher in decomposition 2, ranging from 15% in Italy and Slovakia to 24% in Austria, Cyprus, Finland and Luxembourg.[26] The average (unweighted) interregional smoothing effect at EA-19 level equals 18% and is thus almost as large as the average intertemporal smoothing effect which amounts to 20%. As shown in Table 9, with a threshold value in the activation rule of 2 percentage points, pay-outs from the re-insurance are triggered only in 8 (10) countries. The average interregional smoothing effect at EA-19 level equals 6% (10%) in decomposition 1 (2), the average intertemporal smoothing effect amounts to 16% (11%).

The two decomposition approaches illustrate the implications of different design features for the smoothing potential of the re-insurance. Which of the two decomposition approaches represents the relevant scenario? Arguably, decomposition 2 follows the rationale of a stabilization function at EA-19 level more closely. The re-insurance is introduced only after the intertemporal smoothing potential of the benchmark UI is exhausted. Moreover, the re-insurance builds up reserves so that pay-outs can take place also in years when no contribution payments are made (scenario 3 in both decompositions). The latter feature implies that the re-insurance can cover both symmetric and asymmetric shocks in the euro area.

The key results of the decomposition analysis can hence be summarized as follows. First, the majority of member states benefits from interregional smoothing gains in severe recessions. However, these gains are unevenly distributed across member states. If decomposition approach 2 combined with the higher threshold value in the activation rule is taken as the relevant scenario (Table 9), the average interregional smoothing effect ranges between 15–25%. The interregional smoothing effect of the re-insurance for member state j is determined by the correlation between labor market fluctuations in member state j and the other EA-19 member states. The more synchronized labor market cycles are, the higher the correlation and the lower is the interregional smoothing potential. Second, smoothing effects of the re-insurance are roughly as large as intertemporal smoothing effects of an average domestic unemployment insurance scheme (the 'benchmark UI'), with the latter ranging between 16–27% (Table 9).

[25]The average intertemporal smoothing effect refers to the benchmark UI. The only exception is the year 2009 when the re-insurance in scenario 3 provides intertemporal smoothing, too.

[26]Recall that the smoothing effect of the re-insurance in 2009, the year without contribution payments, is subsumed as an interregional smoothing effect, while effectively it is an intertemporal smoothing effect. This explains the positive smoothing coefficients for Austria, Finland and France.

Table 8: Average smoothing effects, 2000–16 (Trigger: 1 p.p.)

	Decomposition 1			Decomposition 2		
	Interreg	Intertemp	Overall	Interreg	Intertemp	Overall
AT	0	49	49	24	25	49
BE	0	0	0	0	0	0
CY	17	32	49	24	26	49
DE	17	18	35	17	18	35
EE	12	29	41	20	21	41
EL	12	22	34	16	18	34
ES	17	29	45	21	24	45
FI	0	50	50	24	26	50
FR	0	44	44	21	23	44
IE	13	30	43	21	22	43
IT	15	16	30	15	16	30
LT	13	31	44	21	23	44
LU	24	25	49	24	25	49
LV	10	37	47	23	25	47
MT	0	0	0	0	0	0
NL	20	22	42	20	22	42
PT	14	25	40	19	21	40
SI	12	28	40	20	21	40
SK	15	17	32	15	17	32
EA19	11	27	38	18	20	38

Table 9: Average smoothing effects, 2000–16 (Trigger: 2 p.p.)

	Decomposition 1			Decomposition 2		
	Interreg	Intertemp	Overall	Interreg	Intertemp	Overall
AT	0	0	0	0	0	0
BE	0	0	0	0	0	0
CY	21	23	45	21	23	45
DE	0	0	0	0	0	0
EE	12	29	41	20	21	41
EL	15	17	32	15	17	32
ES	14	34	49	23	26	49
FI	0	0	0	0	0	0
FR	0	0	0	0	0	0
IE	0	49	49	24	25	49
IT	15	16	32	15	16	32
LT	10	37	48	23	25	48
LU	0	0	0	0	0	0
LV	0	53	53	25	27	53
MT	0	0	0	0	0	0
NL	0	0	0	0	0	0
PT	18	19	37	18	19	37
SI	0	0	0	0	0	0
SK	15	17	32	15	17	32
EA19	6	16	22	10	11	22

3.3 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 a balanced budget rule for the entire simulation period (scenario 3 in Tables 2 and 3). The analysis in the previous section has shown that such a re-insurance performs better in terms of its smoothing effects due to the reserves it has built up at the beginning of the simulation period. An annually balanced budget rule by definition excludes the possibility to build up reserves.

Figure 1 presents for both thresholds values in the activation rule how aggregate contributions (dark blue bars) and pay-outs (light green bars) and 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 (upper panel of Figure 1) / 2009 (lower panel of Figure 1). In the more recent recovery years, aggregate contributions into 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 (10) billion in the variant with a threshold value in the activation rule of one (two) percentage point(s).

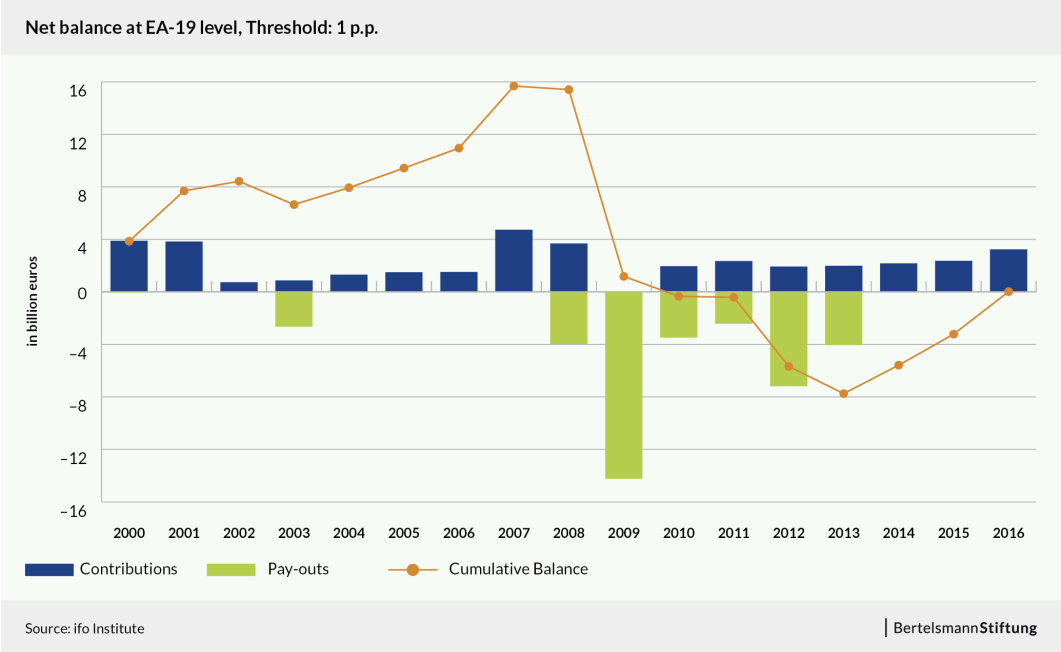
What are the redistributive effects of the re-insurance across member states? To shed light on this question, Figure 2 presents average net contributions per member state (dark blue bars if positive, light green bars if negative) as well as the maximum contribution (transfer) each member state would have paid into (received from) the re-insurance (orange dots and green squares). As can be seen in the upper panel of Figure 2, with a threshold value of 1 percentage point in the activation rule, the majority of member states would have made a contribution payment in some years and received a transfer in other years. Notable exceptions are Belgium and Malta which do not meet the double condition in the activation rule in any year. As shown in the lower panel of Figure 2, the number of member states never receiving a transfer from the re-insurance increases to nine (AT, BE, DE, FI, FR, LU, MT, NL, SI) if the threshold value in the activation rule is set to 2 percentage points (see also Table 6 in section 3.1).

Contribution payments into the re-insurance never exceed 0.1 percent of GDP, whereas the largest pay-outs from the fund can be as high as 1.1% of GDP in Latvia or 0.8% of GDP in Estonia, Lithuania and Spain (all in 2009). Overall, the simulations indicate that Spain would have been the larget net recipient with an

average yearly net transfer of slightly below 0.1% of GDP over the whole simulation period.

Note that the stabilizing and redistributive effects of the re-insurance presented in this section are based on a pay-out rule that conditions on the *increase* in (hypothetical) unemployment benefit payments of a benchmark UI scheme (with characteristics described in section 2.2) within a given year. As shown in this section, such a re-insurance could have been established with a relatively small budget. This calibration has been chosen as it would relieve member states from the need to raise contributions or to cut unemployment benefit during times of stress, while at the same time member states would have to bear the costs of structural (long-term) unemployment. Over the whole simulation period, redistributive effects across countries would have been limited. Obviously, other pay-out rules are conceivable. If transfers from the re-insurance conditioned on the *level* of unemployment benefit payments of the benchmark UI rather than the *increase* in those payments, both smoothing and redistributive effects would become larger. Moreover, contribution payments into the re-insurance could be experience-rated to account for different risk profiles and to further reduce the redistributive effects across member states.

Figure 1: Budgetary effects at EA-19 level



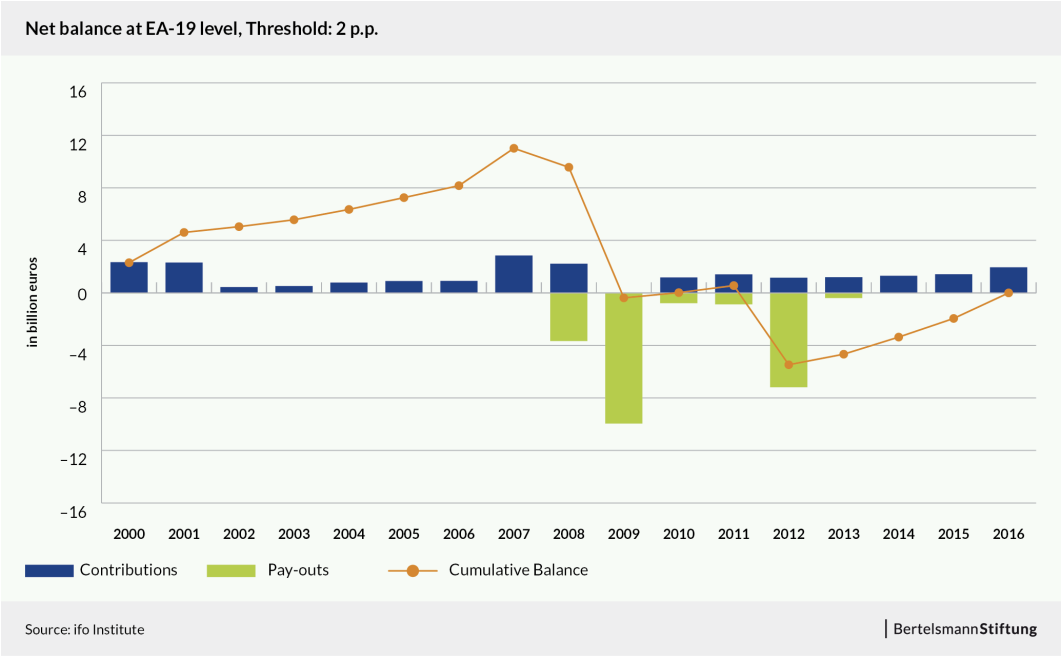
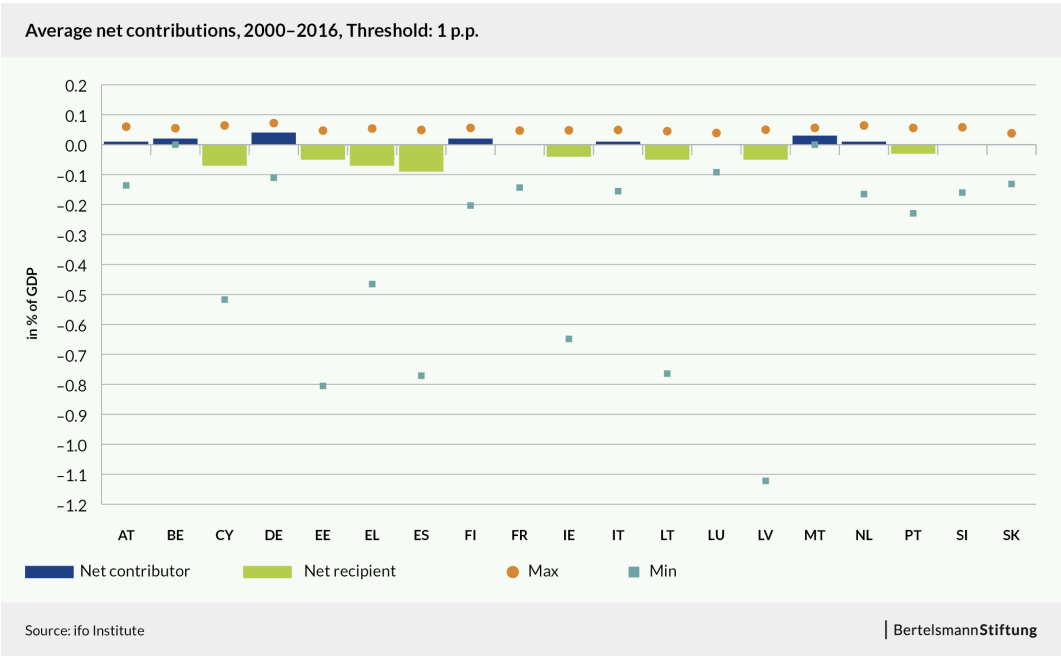
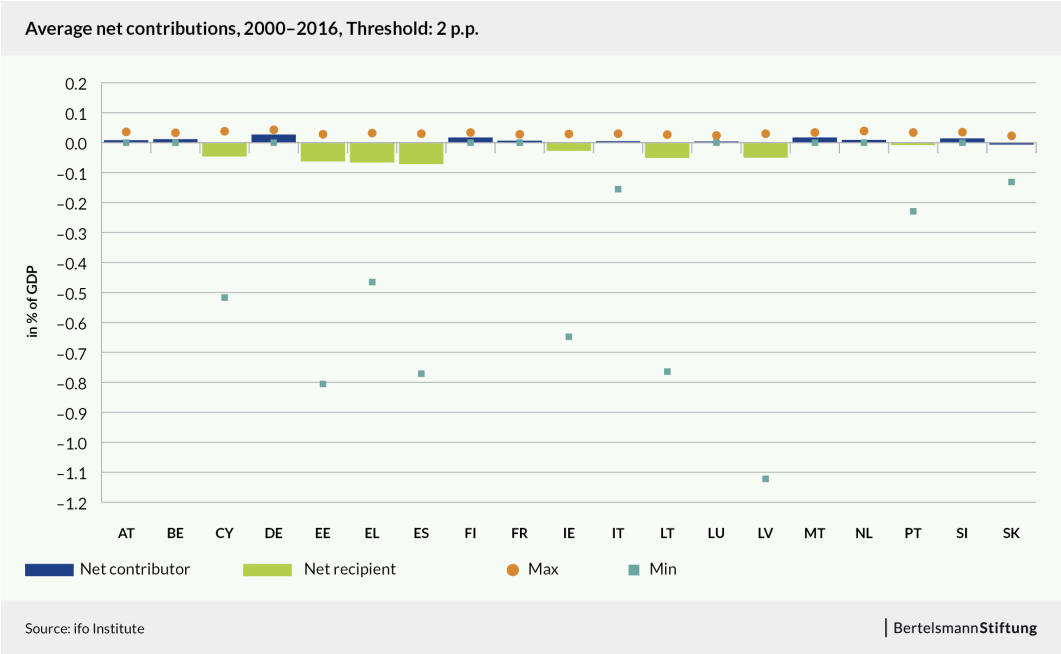


Figure 2: Average net contributions by country, 2000–16





4 Conclusion

This paper has presented an evaluation analysis of an unemployment re-insurance scheme for the euro area. By decomposing the overall stabilization effects of the re-insurance into an interregional and an intertemporal smoothing channel, the study has provided insights on the potential added value of unemployment re-insurance as a fiscal risk sharing device. Arguably, this value added crucially hinges on the ability of the re-insurance to provide interregional smoothing.

A key result of the paper is that the simulated re-insurance scheme would have cushioned on average 15–25 per cent of the income losses following large labor market shocks in the period 2000–16. This stabilization effect would have materialized through the interregional smoothing channel of the re-insurance. It would have come in addition to the stabilization that – in the absence of funding constraints – can be achieved by domestic unemployment insurance schemes through intertemporal smoothing. The results suggest that the interregional smoothing channel of the re-insurance is economically as important as the intertemporal smoothing effect of an average domestic unemployment insurance scheme in the euro area. The latter would have led to a cushioning effect of 16–27 per cent of large unemployment shocks. 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. Due to its activation and contribution rule, 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 ('moral hazard').

In practice, a re-insurance scheme would need to be designed such that negative incentive effects are minimized as far as possible. The following features are of particular importance. First, the re-insurance should only provide support for domestic unemployment insurance schemes in times of severe recessions – as the simulated re-insurance scheme in this study does. In those years, the risk is highest that national fiscal policy might be constrained and not able to provide sufficient stabilization. Second, member states would still need to bear part of the costs of unemployment. Third, conditions should be attached to its availability, in particular compliance with fiscal rules. Such ex-ante conditionality might provide positive incentives and eventually improve compliance with the fiscal governance framework.

A further important question would be whether the re-insurance should be allowed to issue debt. In the simulations, two variants of the re-insurance have been considered where revenue neutrality has either been imposed in every year or over the simulation period. In the latter scenario, the re-insurance scheme would have built up surpluses in the early 2000s which would have been depleted in the course of the financial and economic crisis. Nevertheless, an effective debt limitation would be needed in order to prevent political pressure building up and eventually leading to a 'bail-out' of the re-insurance.

In future research, a systematic comparison of an unemployment-based stabilization fund like the re-insurance analyzed in this study with other proposals, for example investment- or export-based stabilization capacities (European Commission 2018; Beetsma et al. 2018) would be worthwhile. The paper concludes that an unemployment re-insurance scheme should be viewed as a potential element of a balanced and more comprehensive reform package for the euro area that contributes to enhanced market discipline, risk reduction and risk sharing.

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Appendix

Table 10: Payouts by country and year: threshold values of 0.5 and 1.5 p.p. (per cent)

Alternative payout trigger by country and year

	TRIGGER – payment: unemployment rate (threshold: 0.5 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 0.5 percentage points)		TRIGGER – payment: work volume (threshold: 99.5 percent)	
country	frequency	number of activations	frequency	number of activations	frequency	number of activations
BE	5.9 %	1	11.8 %	2	0.0 %	0
DE	17.6 %	3	5.9 %	1	29.4 %	5
EE	17.6 %	3	11.8 %	2	17.6 %	3
IE	23.5 %	4	17.6 %	3	17.6 %	3
EL	29.4 %	5	23.5 %	4	29.4 %	5
ES	35.3 %	6	17.6 %	3	23.5 %	4
FR	11.8 %	2	5.9 %	1	0.0 %	0
IT	29.4 %	5	11.8 %	2	23.5 %	4
CY	35.3 %	6	29.4 %	5	17.6 %	3
LV	11.8 %	2	17.6 %	3	29.4 %	5
LT	23.5 %	4	11.8 %	2	23.5 %	4
LU	29.4 %	5	35.3 %	6	0.0 %	0
MT	17.6 %	3	29.4 %	5	17.6 %	3
NL	23.5 %	4	35.3 %	6	5.9 %	1
AT	11.8 %	2	17.6 %	3	17.6 %	3
PT	41.2 %	7	29.4 %	5	29.4 %	5
SI	29.4 %	5	11.8 %	2	11.8 %	2
SK	23.5 %	4	5.9 %	1	23.5 %	4
FI	11.8 %	2	0.0 %	0	11.8 %	2
total	22.6 %	73	17.3 %	56	17.3 %	56

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	TRIGGER – payment: unemployment rate (threshold: 0.5 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 0.5 percentage points)		TRIGGER – payment: work volume (threshold: 99.5 percent)	
year	number of countries	country code	number of countries	country code	number of countries	country code
2000	3	EE, LT, SK	0		3	EE, LV, SK
2001	3	LT, MT, SK	0		3	DE, LT, MT
2002	1	LU	5	DE, LV, MT, AT, PT	3	DE, LV, SK
2003	4	DE, LU, MT, PT	7	BE, EE, LT, LU, MT, NL, PT	3	DE, MT, SK
2004	5	DE, LU, NL, AT, SK	3	LU, NL, AT	2	LV, MT
2005	3	DE, CY, PT	3	CY, MT, SI	1	DE
2006	0		1	MT	0	
2007	0		1	IE	0	
2008	3	IE, ES, LU	3	IE, ES, LV	0	
2009	14	EE, IE, EL, ES, FR, IT, CY, LV, LT, MT, A T, PT, SI, FI	17	BE, EE, IE, EL, ES, FR, IT, CY, LV, LT, L U, MT, NL, AT, PT, SI, SK	8	DE, EE, IE, IT, LV, LT, AT, PT
2010	12	EE, IE, EL, ES, IT, CY, LV, LT, NL, PT, SI, SK	2	EL, NL	8	EE, IE, EL, ES, IT, LV, LT, PT
2011	6	IE, EL, ES, CY, PT, SI	4	EL, CY, LU, PT	6	IE, EL, ES, LT, PT, SI
2012	8	EL, ES, FR, IT, CY, NL, PT, SI	6	EL, ES, IT, CY, NL, PT	6	EL, ES, IT, CY, PT, SI
2013	9	BE, EL, ES, IT, CY, LU, NL, PT, SI	3	CY, LU, NL	9	EL, ES, IT, CY, NL, AT, PT, SK, FI
2014	1	IT	0		3	EL, CY, FI
2015	1	FI	1	LU	1	AT
2016	0		0		0	

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Alternative payout trigger by country and year

	TRIGGER – payment: unemployment rate (threshold: 1.5 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 1.5 percentage points)		TRIGGER – payment: work volume (threshold: 98.5 percent)	
country	frequency	number of activations	frequency	number of activations	frequency	number of activations
BE	0.0 %	0	0.0 %	0	0.0 %	0
DE	0.0 %	0	0.0 %	0	5.9 %	1
EE	17.6 %	3	11.8 %	2	11.8 %	2
IE	17.6 %	3	5.9 %	1	17.6 %	3
EL	29.4 %	5	5.9 %	1	23.5 %	4
ES	23.5 %	4	11.8 %	2	23.5 %	4
FR	5.9 %	1	0.0 %	0	0.0 %	0
IT	5.9 %	1	0.0 %	0	17.6 %	3
CY	23.5 %	4	17.6 %	3	17.6 %	3
LV	11.8 %	2	11.8 %	2	23.5 %	4
LT	17.6 %	3	11.8 %	2	17.6 %	3
LU	0.0 %	0	0.0 %	0	0.0 %	0
MT	0.0 %	0	5.9 %	1	17.6 %	3
NL	0.0 %	0	0.0 %	0	0.0 %	0
AT	0.0 %	0	0.0 %	0	5.9 %	1
PT	11.8 %	2	0.0 %	0	23.5 %	4
SI	0.0 %	0	5.9 %	1	11.8 %	2
SK	11.8 %	2	5.9 %	1	11.8 %	2
FI	5.9 %	1	0.0 %	0	0.0 %	0
total	9.6 %	31	5.0 %	16	12.1 %	39

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	TRIGGER – payment: unemployment rate (threshold: 1.5 percentage points)		TRIGGER – payment: short-term unemployment rate (threshold: 1.5 percentage points)		TRIGGER – payment: work volume (threshold: 98.5 percent)	
year	number of countries	country code	number of countries	country code	number of countries	country code
2000	3	EE,LT,SK	0		1	LV
2001	0		0		2	LT, MT
2002	0		2	LV,MT	1	SK
2003	0		2	EE,LT	2	MT, SK
2004	0		0		2	LV, MT
2005	0		0		0	
2006	0		0		0	
2007	0		0		0	
2008	2	IE, ES	1	ES	0	
2009	10	EE, IE, EL, ES, FR, CY, LV, LT, PT, FI	8	EE, IE, ES, CY, LV, LT, SI, SK	8	DE, EE, IE, IT, LV, LT, AT, PT
2010	7	EE, IE, EL, ES, LV, LT, SK	0		6	EE, IE, EL, ES, LV, LT
2011	2	EL, CY	1	EL	5	IE, EL, ES, PT, SI
2012	5	EL, ES, IT, CY, PT	1	CY	6	EL, ES, IT, CY, PT, SI
2013	2	EL, CY	1	CY	5	EL, ES, IT, CY, PT
2014	0		0		1	CY
2015	0		0			
2016	0		0			

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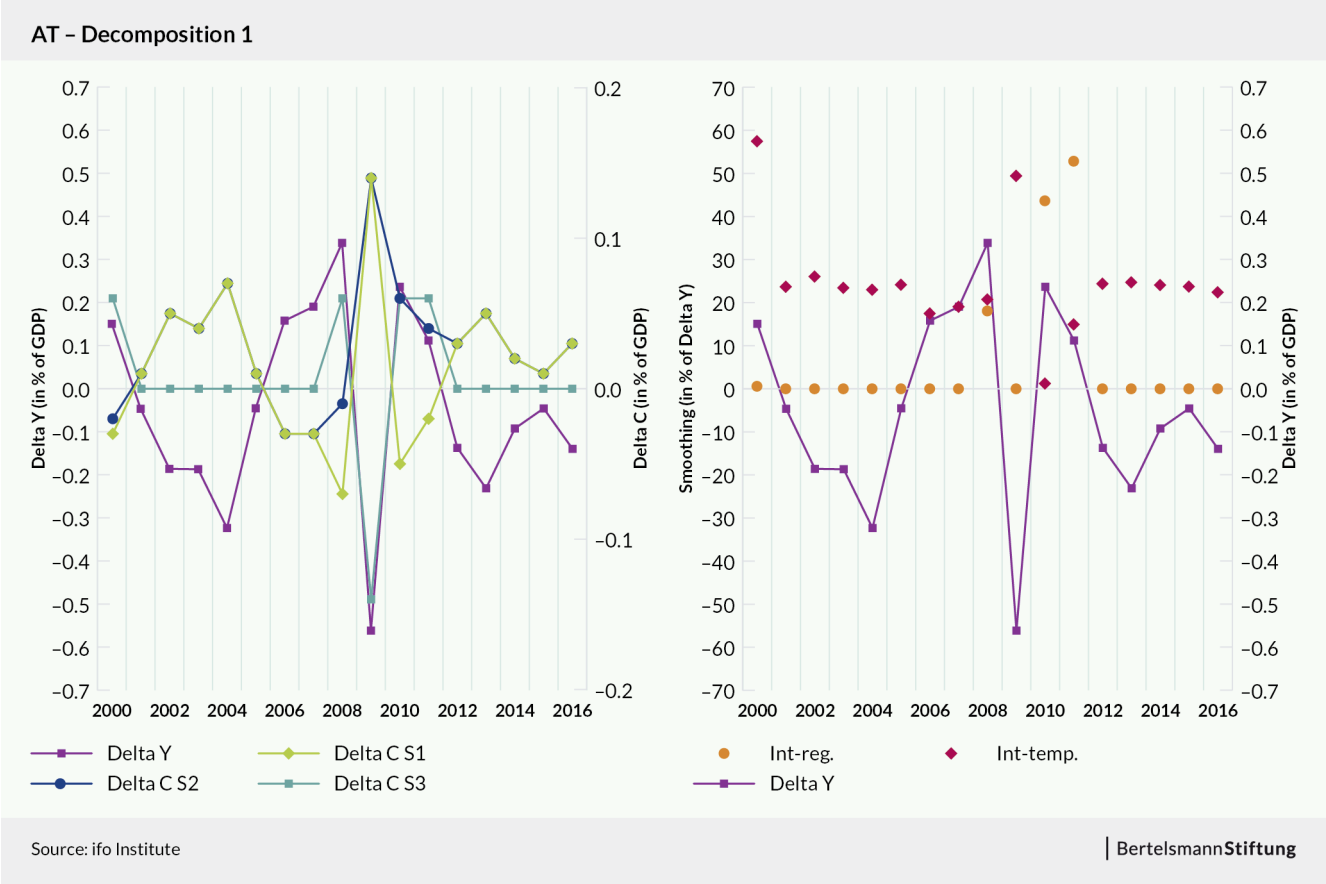
Table 11: Average smoothing effects, 2000–16 (Trigger: 0.5 p.p.)

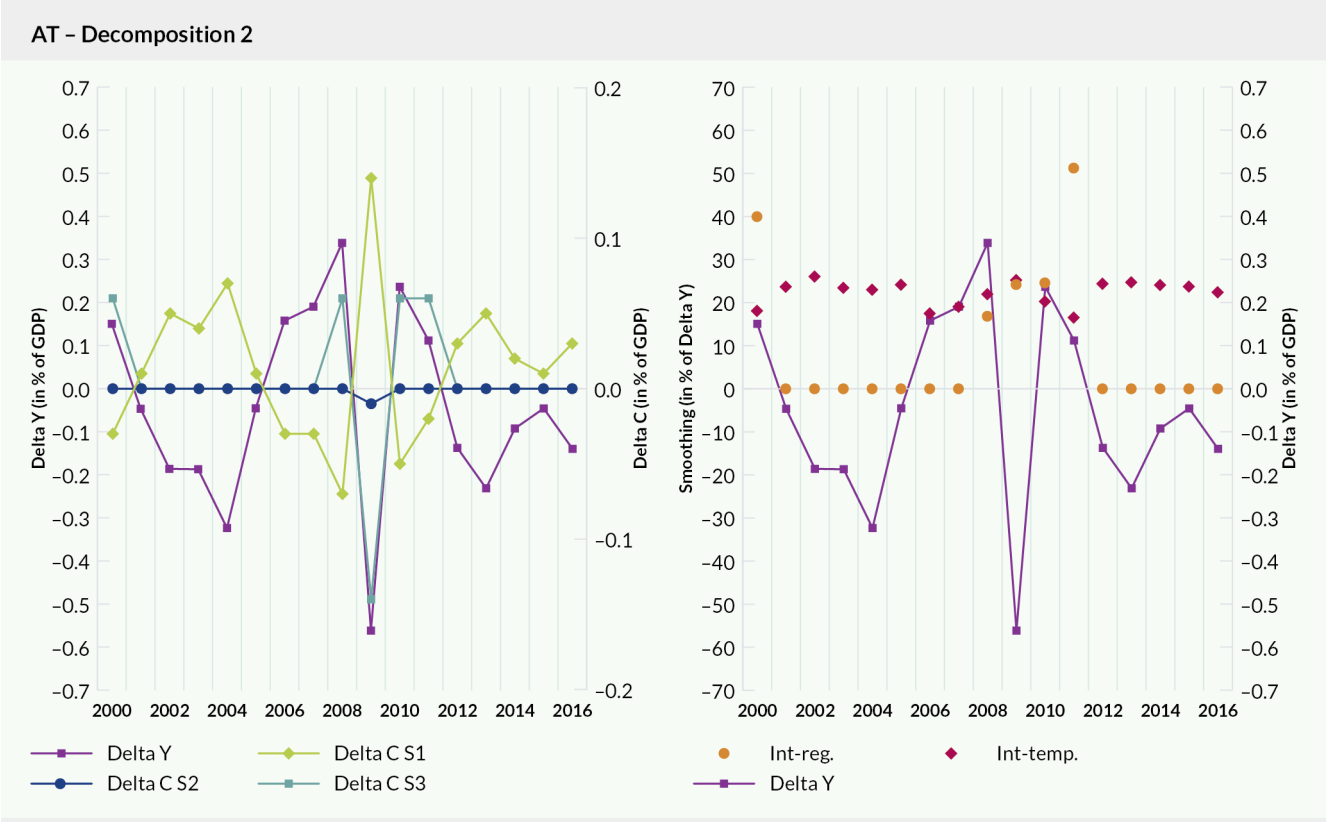
	Decomposition 1			Decomposition 2		
	Interreg	Intertemp	Overall	Interreg	Intertemp	Overall
AT	11	36	47	23	24	47
BE	18	19	37	18	19	37
CY	20	30	50	24	26	50
DE	16	17	33	16	17	33
EE	12	29	41	20	21	41
EL	12	22	34	16	18	34
ES	17	29	45	21	24	45
FI	11	37	48	23	25	48
FR	10	32	42	20	22	42
IE	13	26	39	19	21	39
IT	11	20	31	15	16	31
LT	13	28	41	19	22	41
LU	23	24	47	23	24	47
LV	10	37	47	23	25	47
MT	13	27	40	20	21	40
NL	22	23	44	22	23	44
PT	15	22	38	18	20	38
SI	14	25	39	19	20	39
SK	15	17	31	15	17	31
EA19	15	26	41	20	21	41

Table 12: Average smoothing effects, 2000–16 (Trigger: 1.5 p.p.)

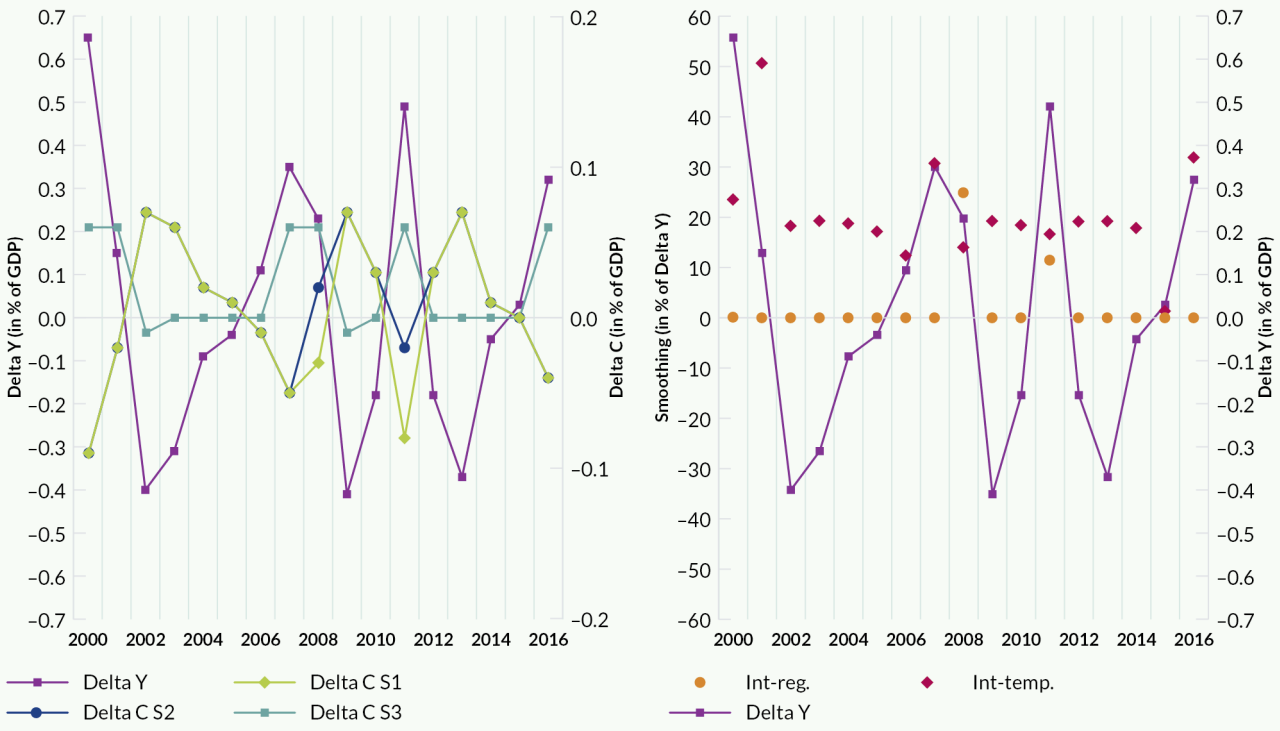
	Decomposition 1			Decomposition 2		
	Interreg	Intertemp	Overall	Interreg	Intertemp	Overall
AT	0	0	0	0	0	0
BE	0	0	0	0	0	0
CY	17	32	49	24	26	49
DE	0	0	0	0	0	0
EE	12	29	41	20	21	41
EL	12	22	34	16	18	34
ES	16	32	48	22	26	48
FI	0	50	50	24	26	50
FR	0	44	44	21	23	44
IE	13	30	43	21	22	43
IT	15	16	32	15	16	32
LT	13	31	44	21	23	44
LU	0	0	0	0	0	0
LV	10	37	47	23	25	47
MT	0	0	0	0	0	0
NL	0	0	0	0	0	0
PT	9	29	38	18	20	38
SI	0	0	0	0	0	0
SK	15	17	32	15	17	32
EA19	7	19	26	13	14	26

Figure 3: Smoothing effects - Threshold value in the activation rule: 1 p.p.





BE – Decomposition 1



Source: ifo Institute

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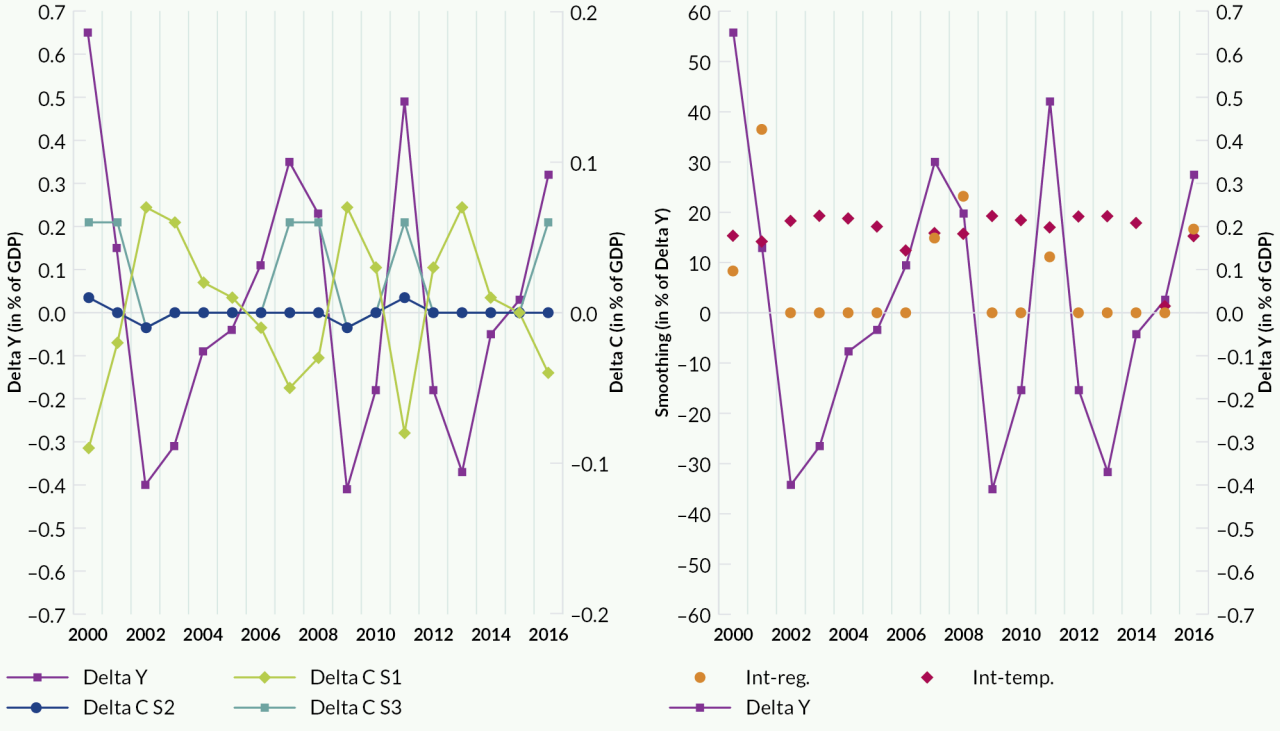
BE – Decomposition 2



Source: ifo Institute

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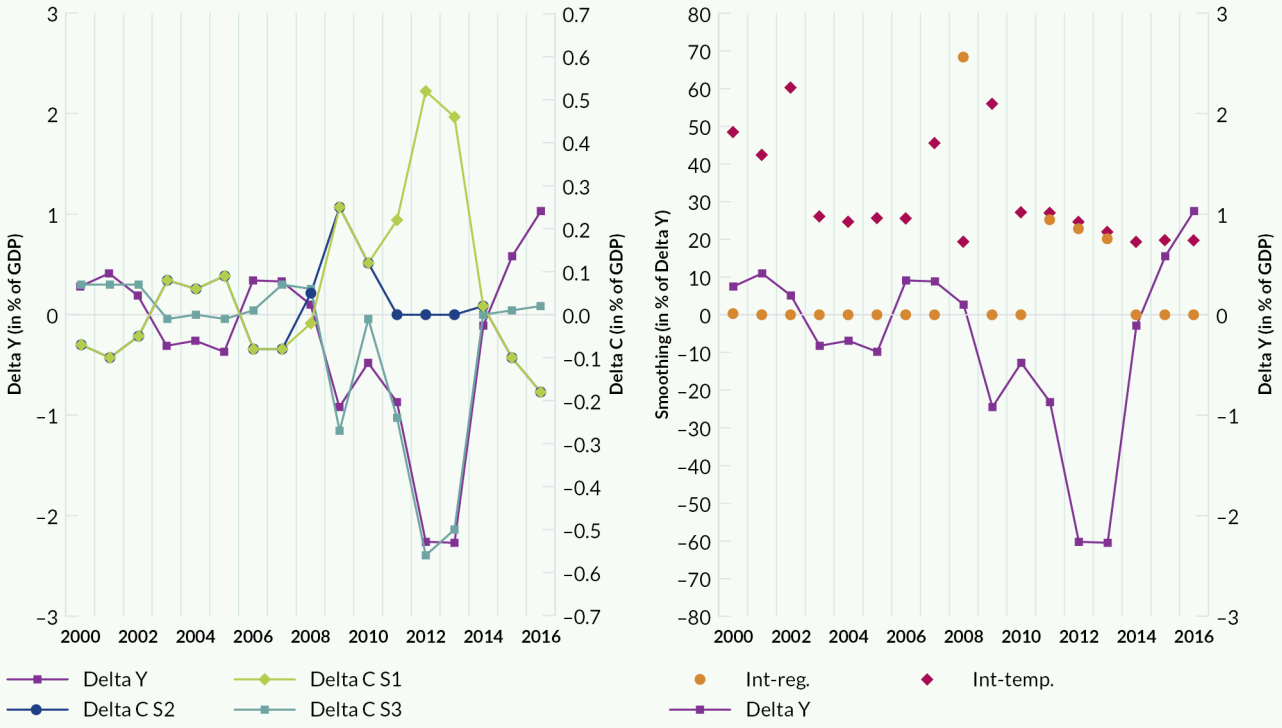
CY – Decomposition 1



Source: ifo Institute

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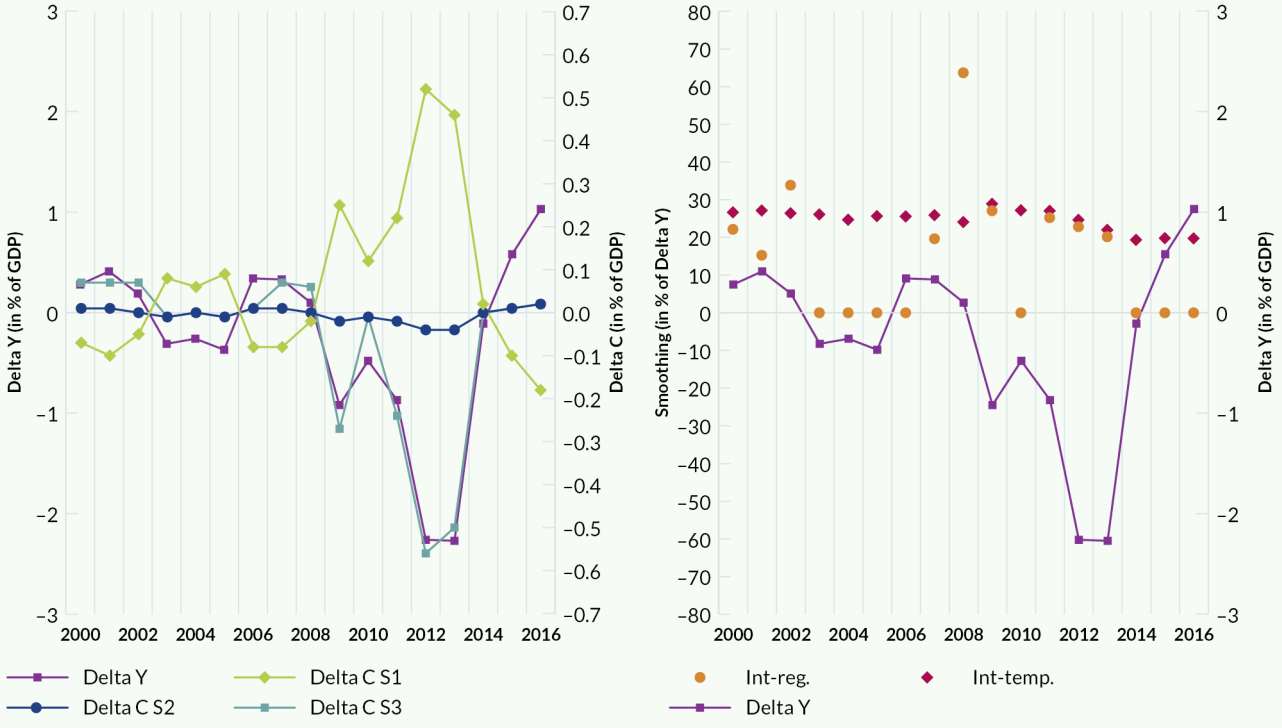
CY – Decomposition 2



Source: ifo Institute

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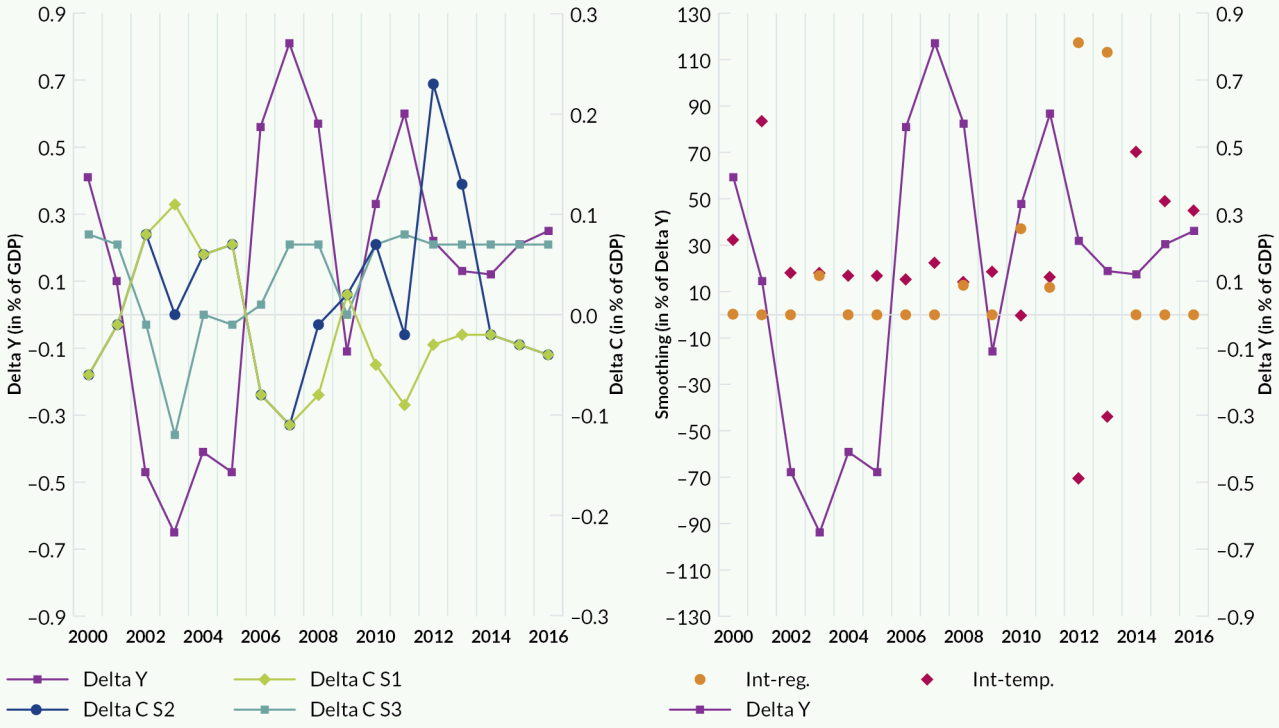
DE – Decomposition 1



Source: ifo Institute

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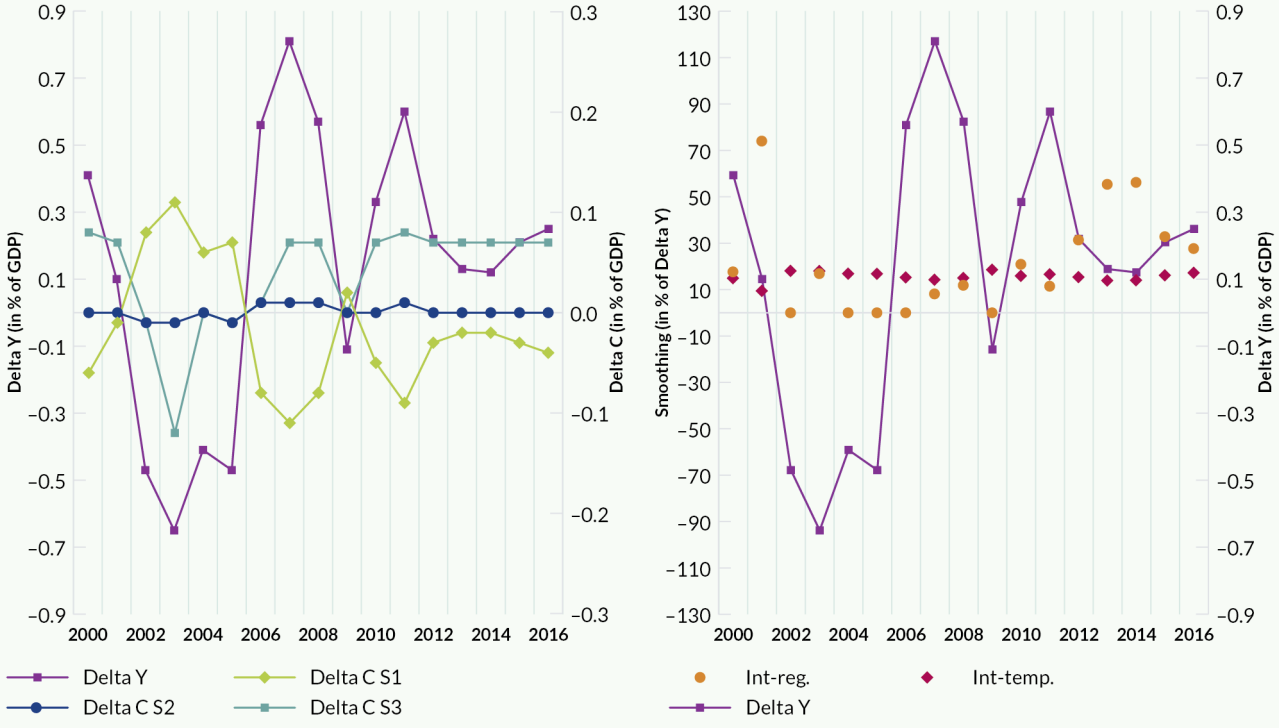
DE – Decomposition 2



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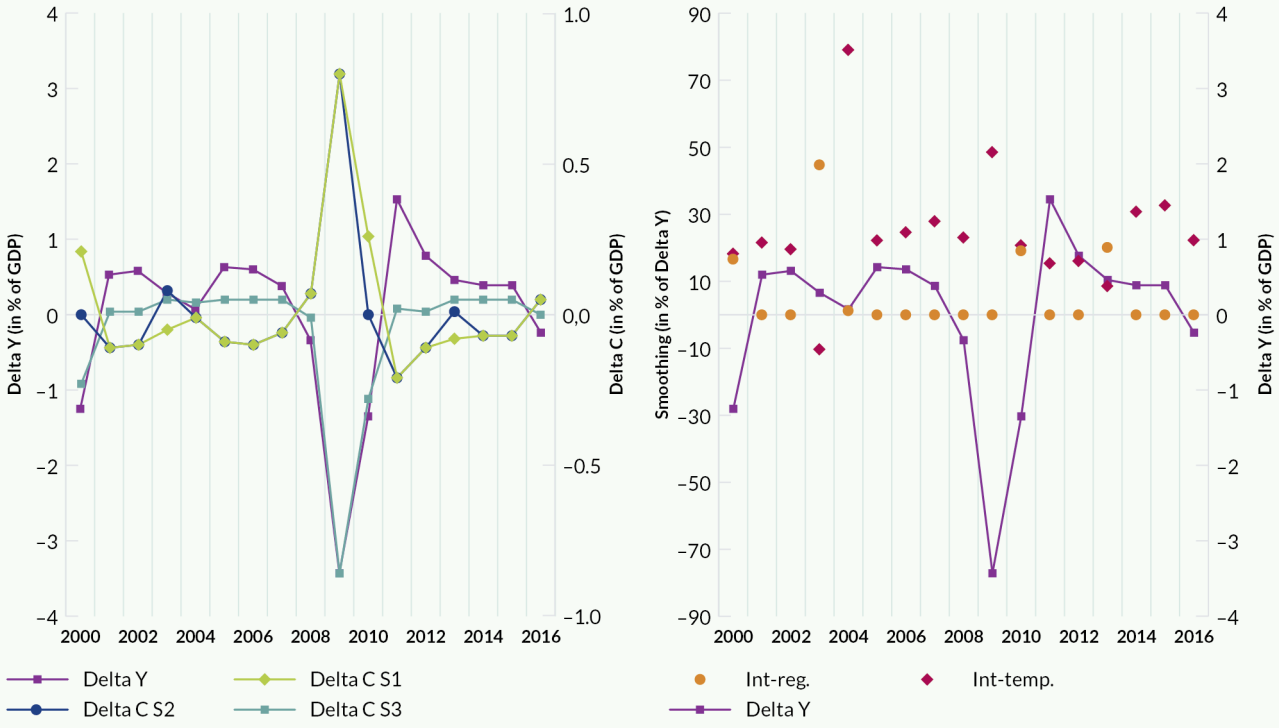
EE – Decomposition 1



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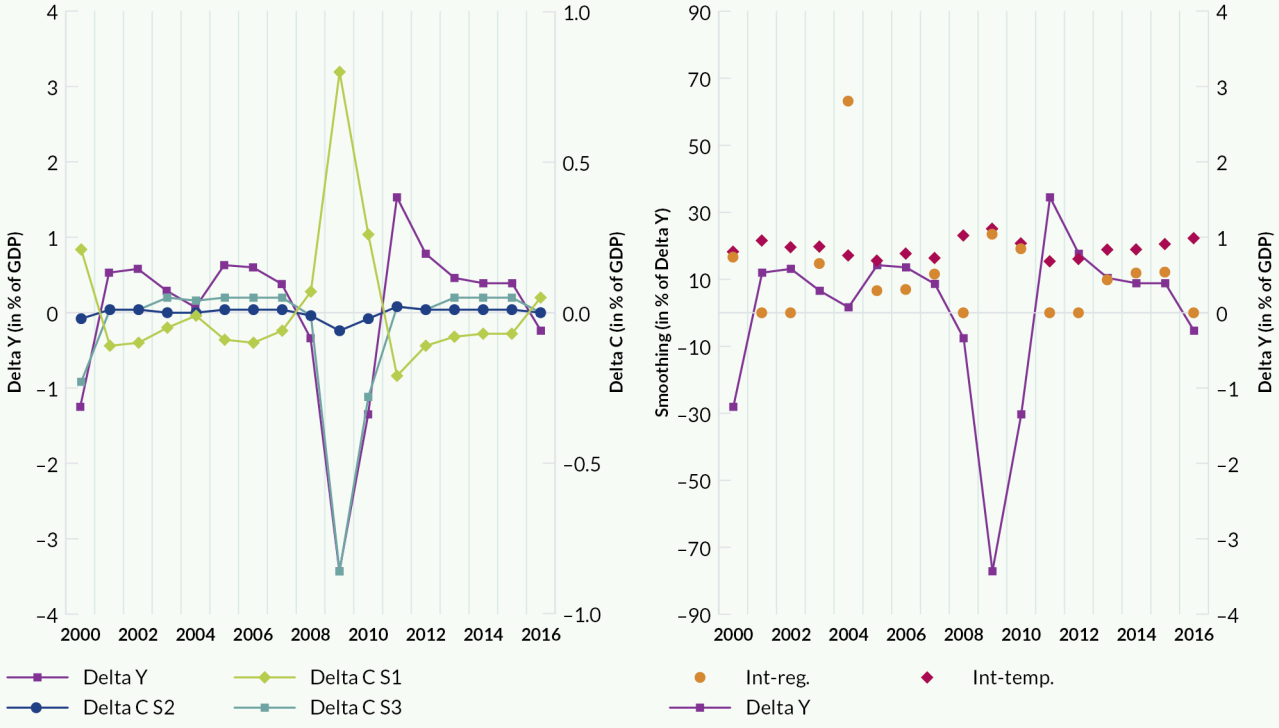
EE – Decomposition 2



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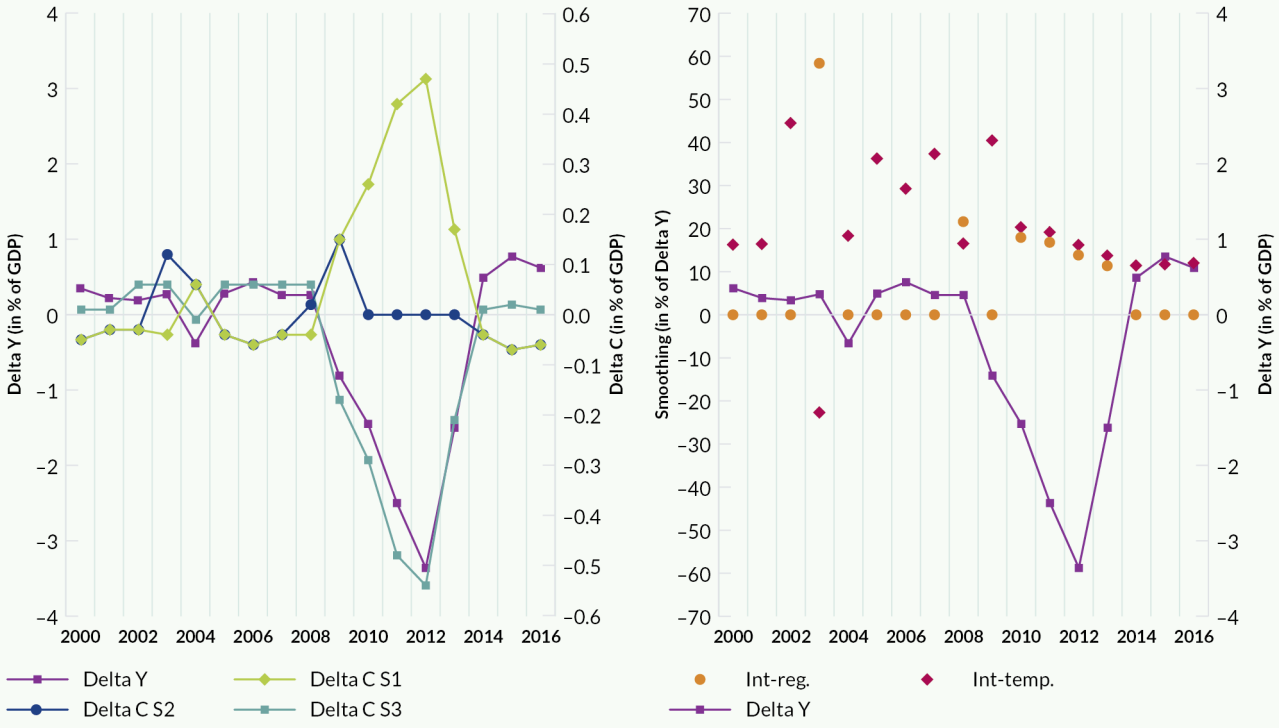

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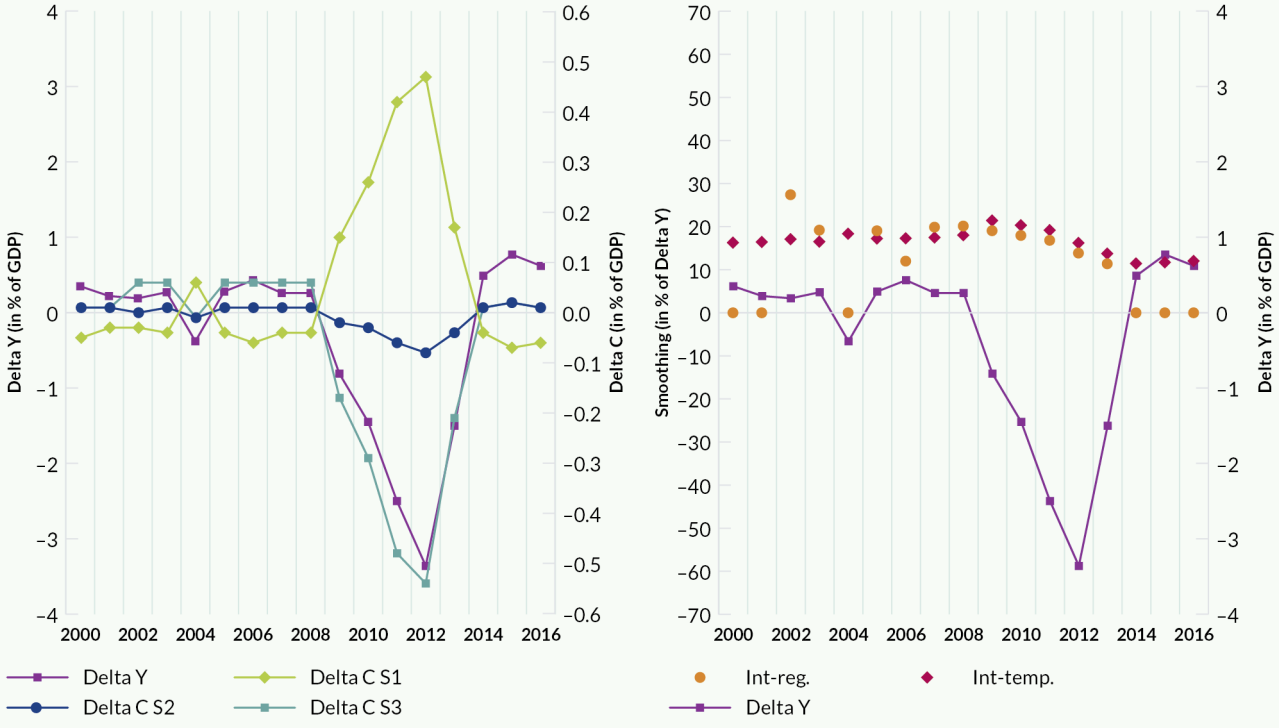

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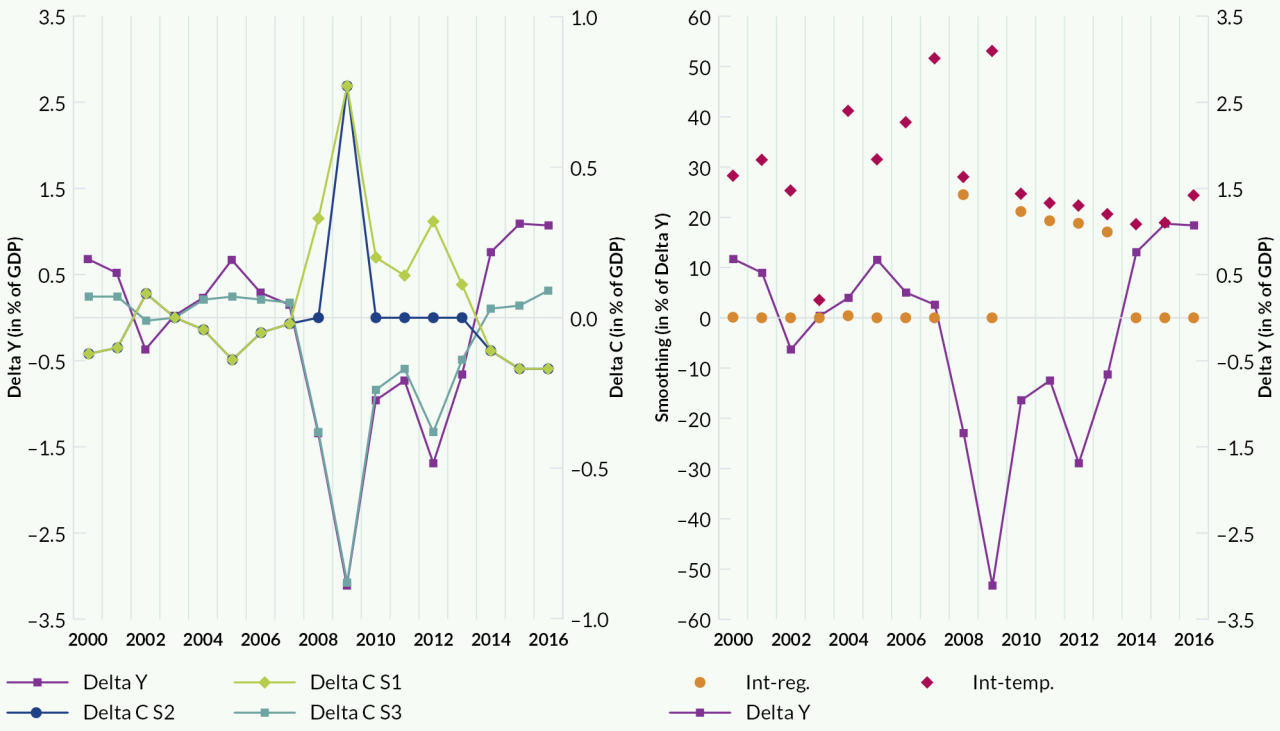
ES – Decomposition 1



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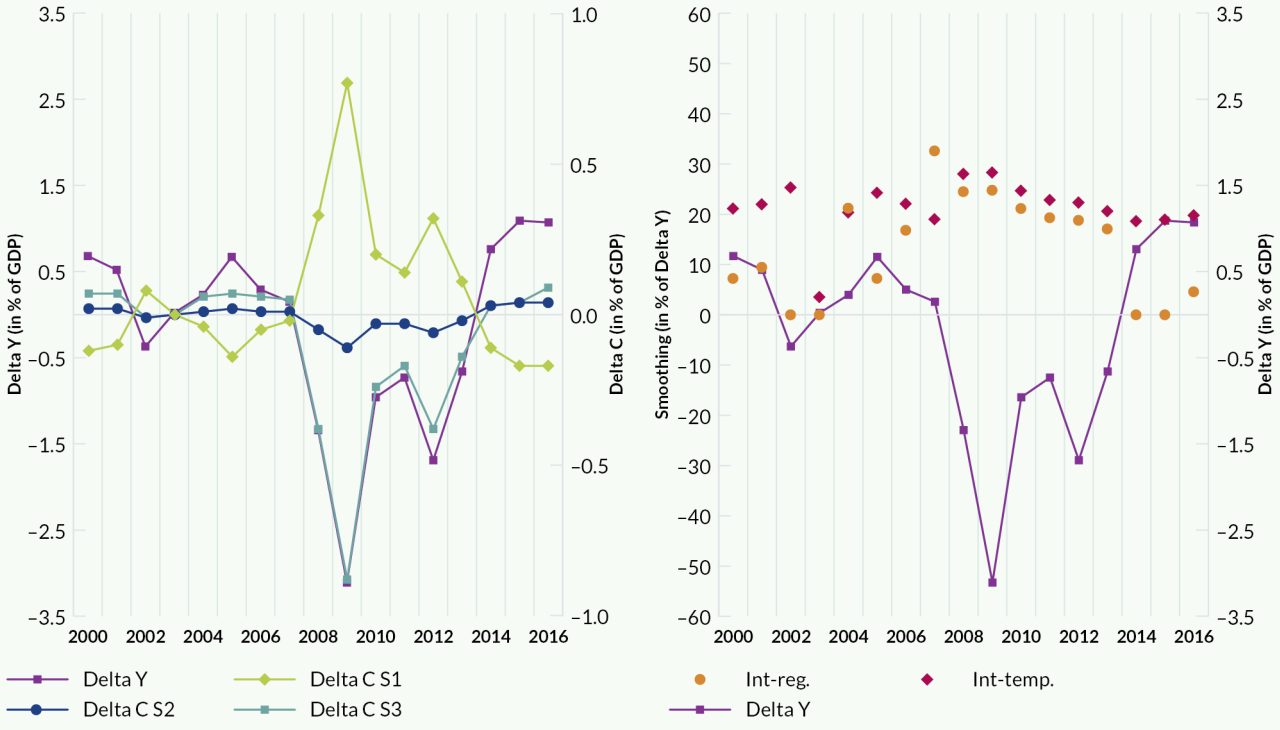
ES – Decomposition 2



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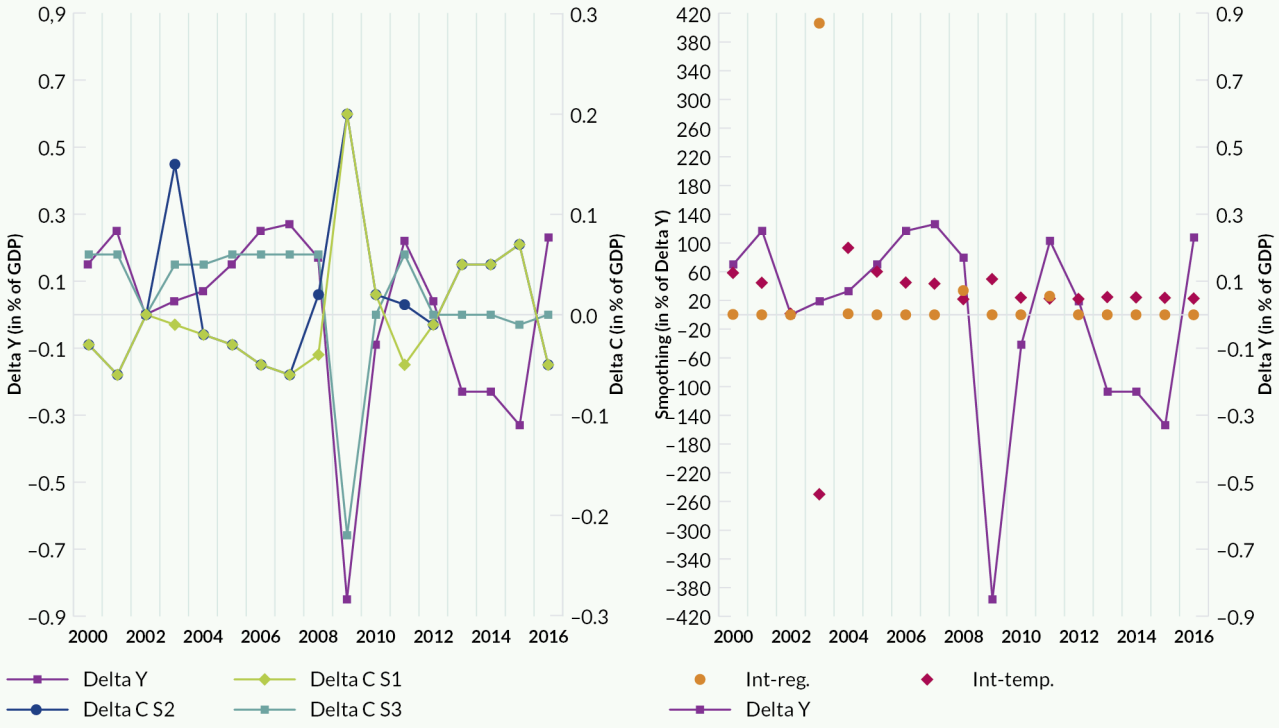
FI – Decomposition 1



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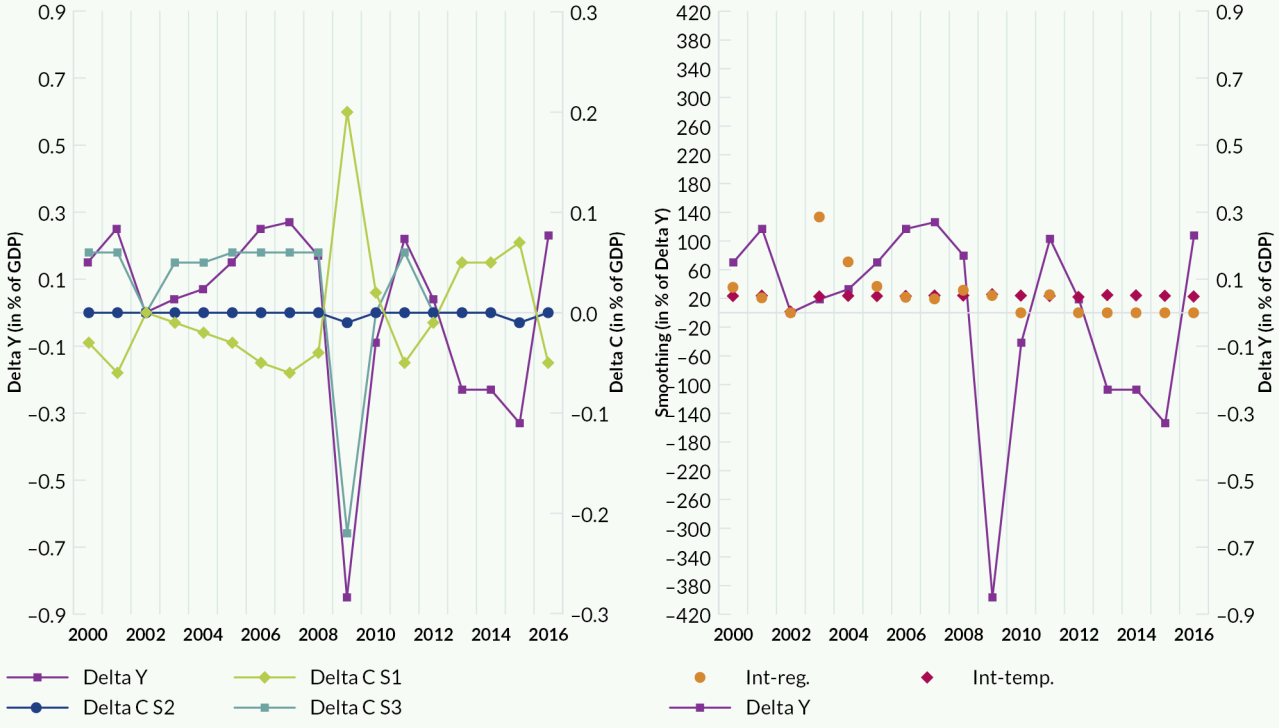
FI – Decomposition 2



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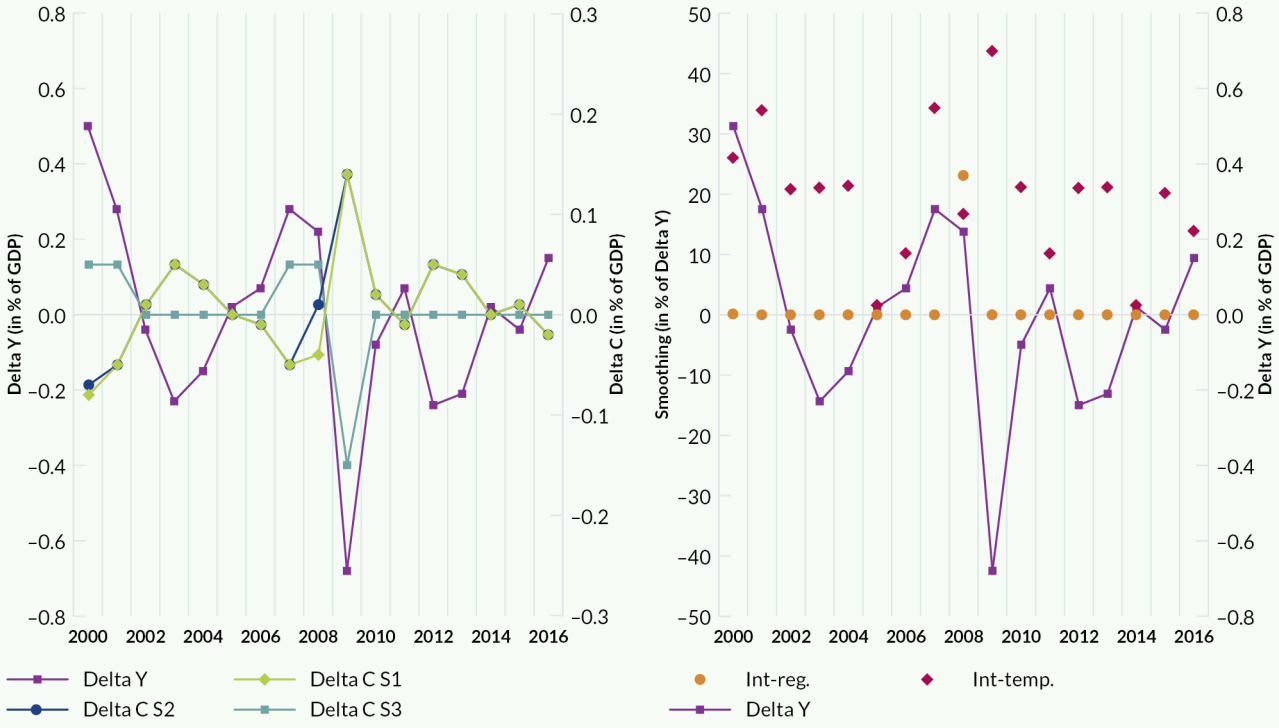
FR – Decomposition 1



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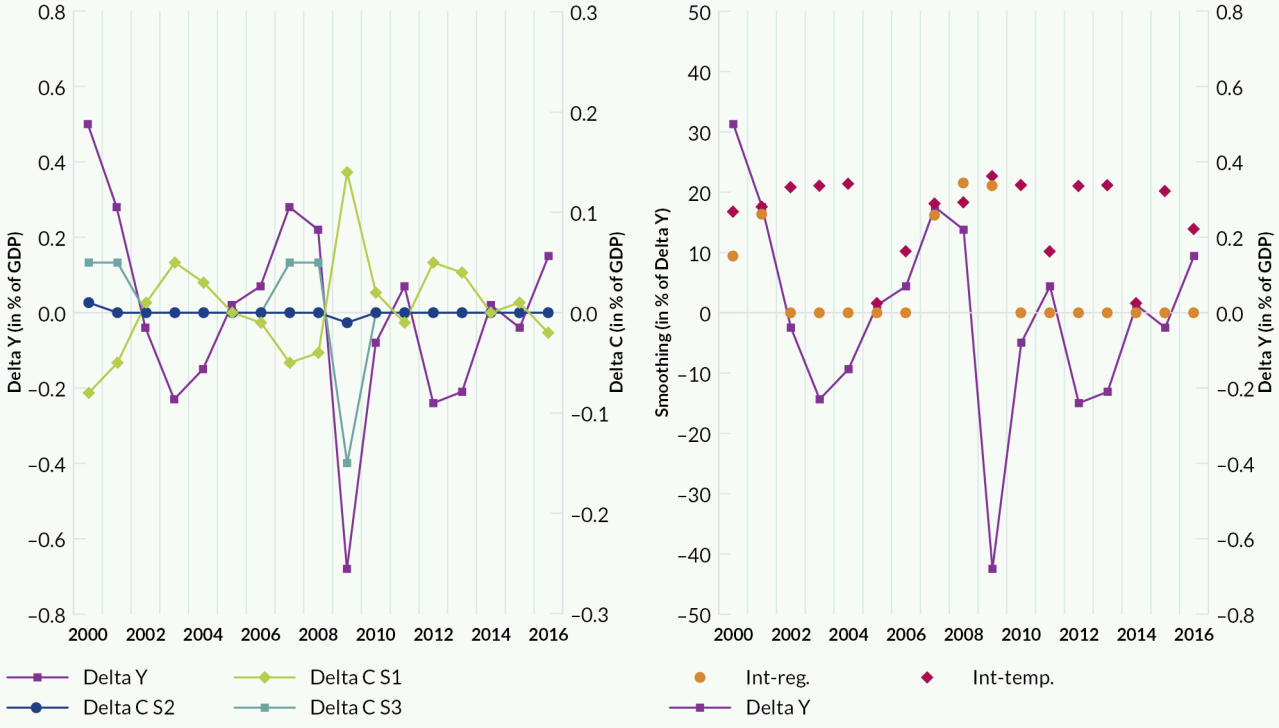
FR – Decomposition 2



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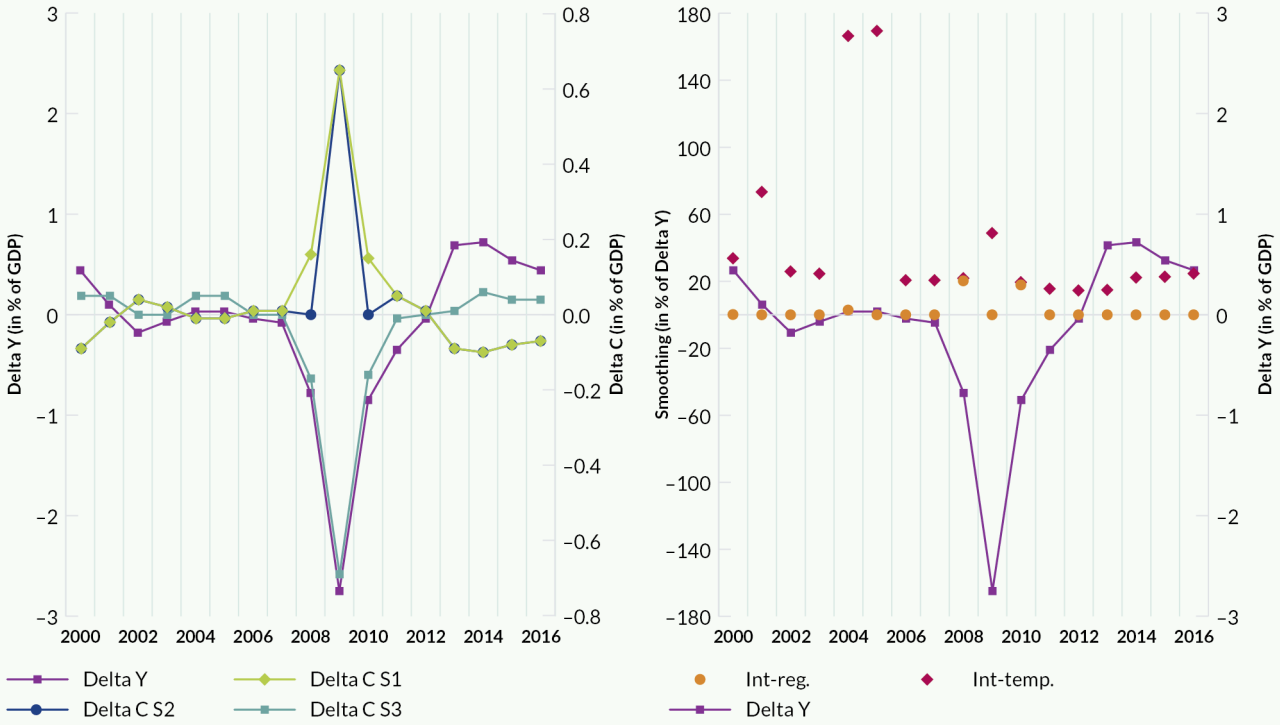
IE – Decomposition 1



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IE – Decomposition 2

Source: ifo Institute

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IT – Decomposition 1

Source: ifo Institute

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IT – Decomposition 2

Source: ifo Institute

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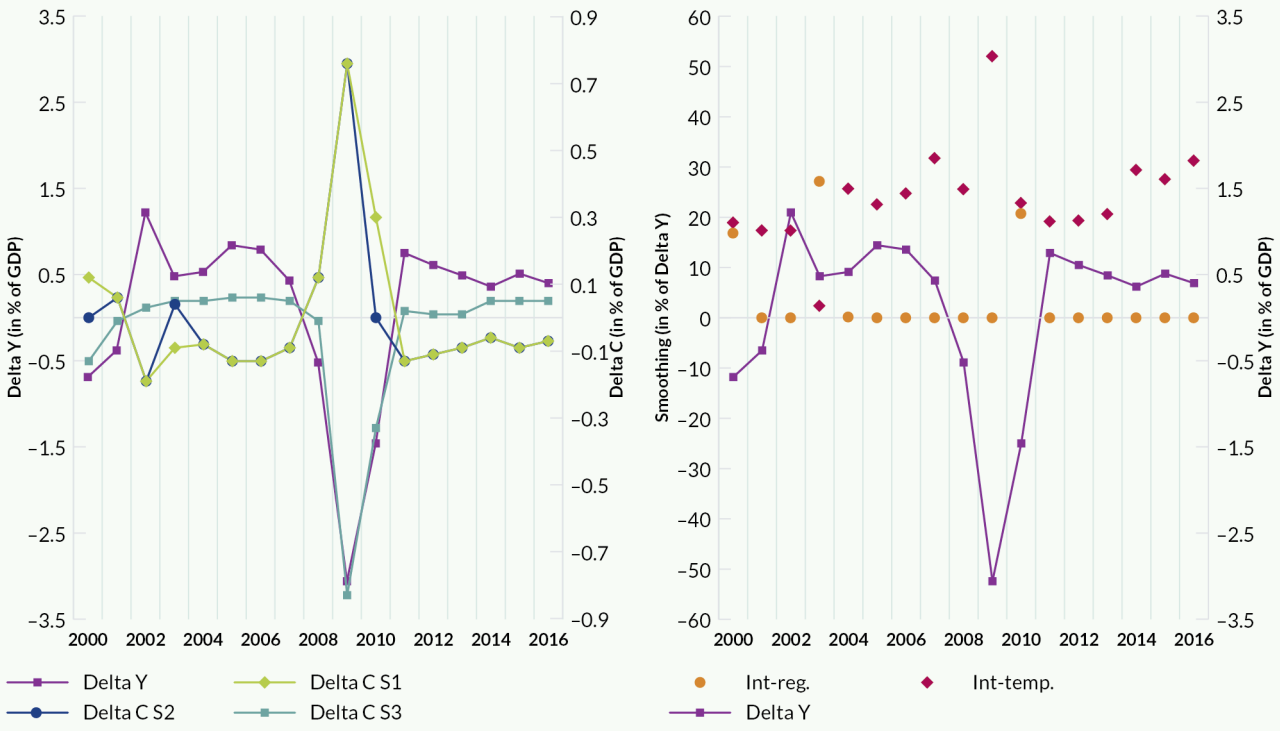
LT – Decomposition 1



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LT – Decomposition 2

Source: ifo Institute

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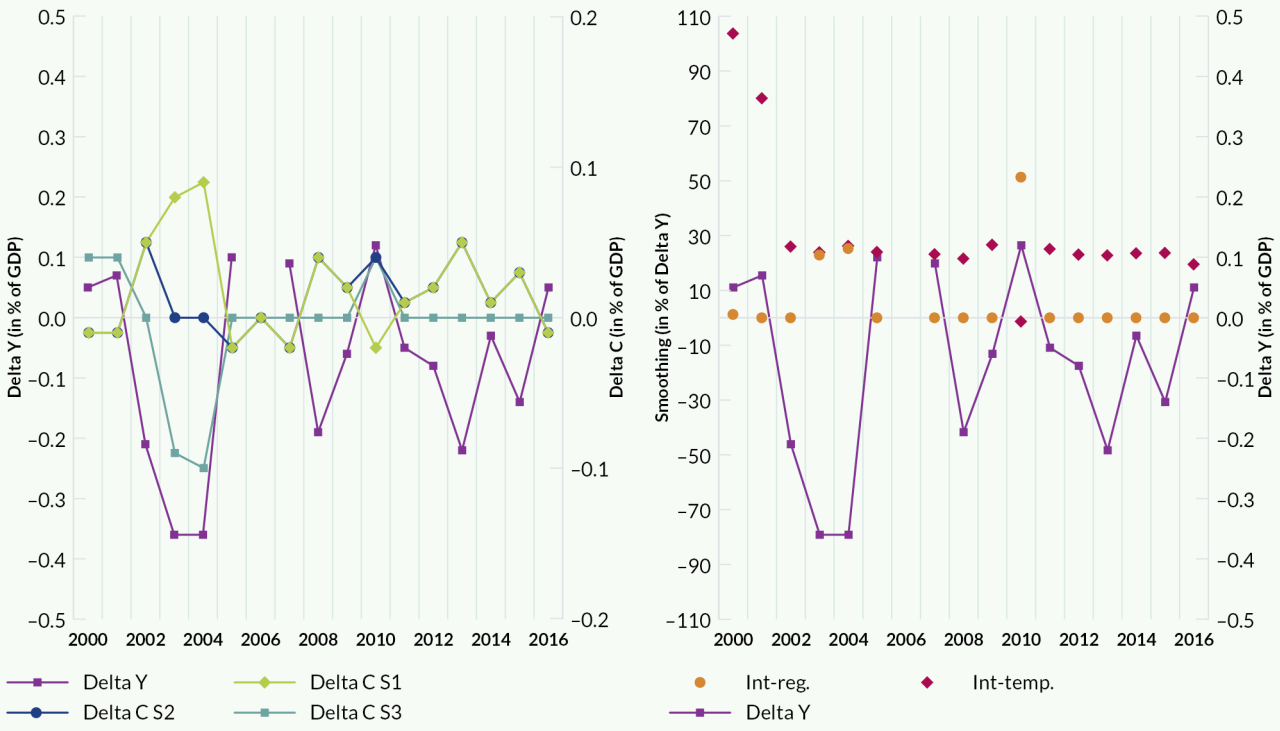
LU – Decomposition 1



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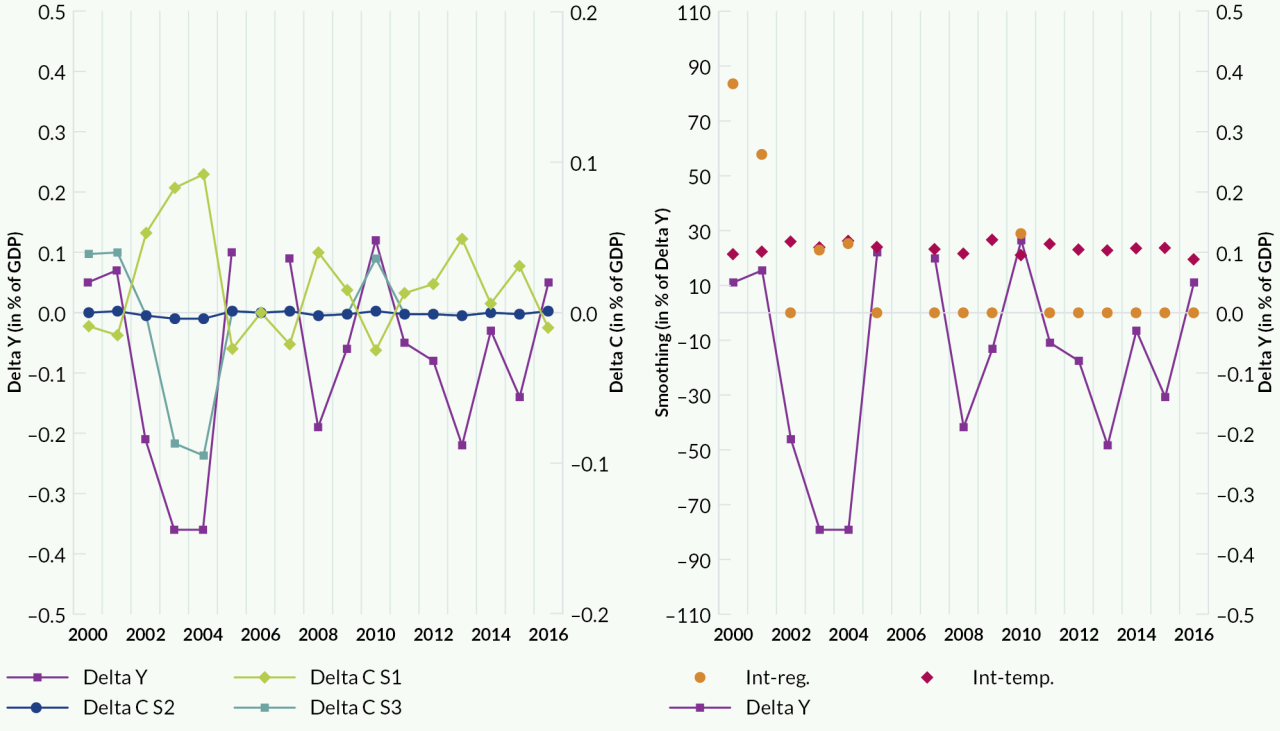
LU – Decomposition 2



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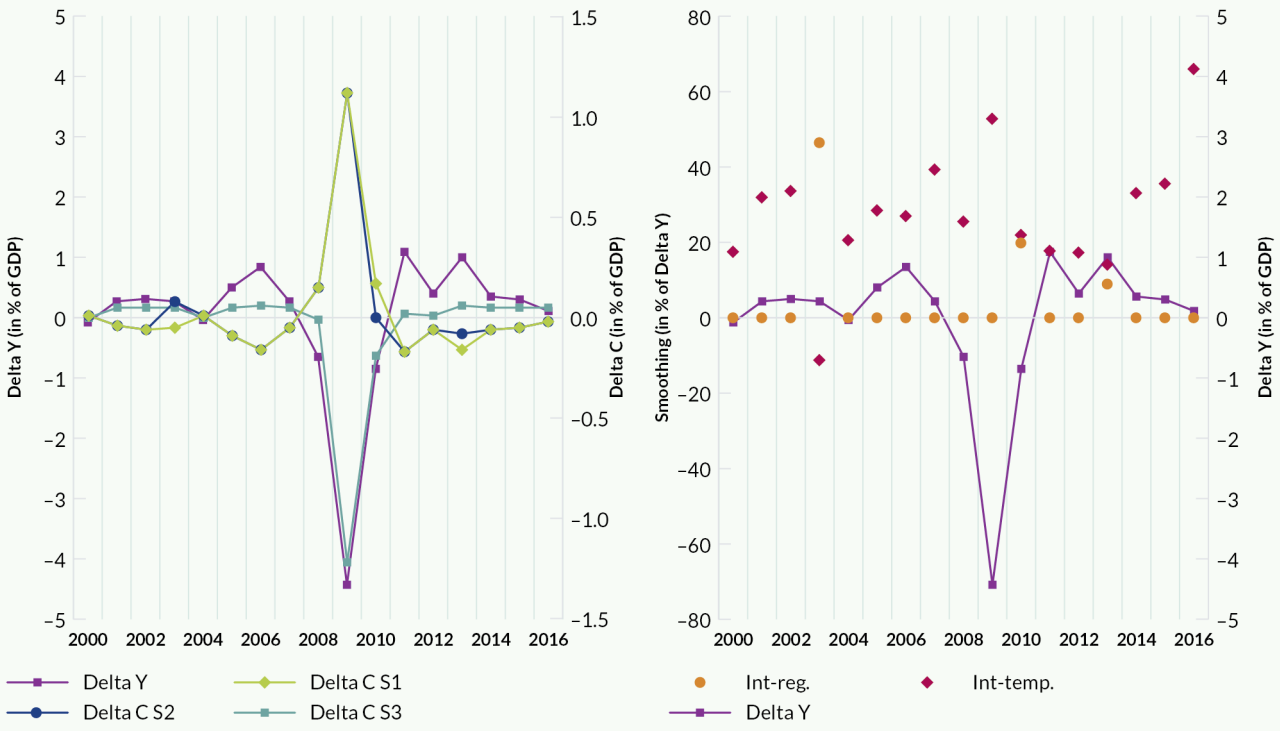

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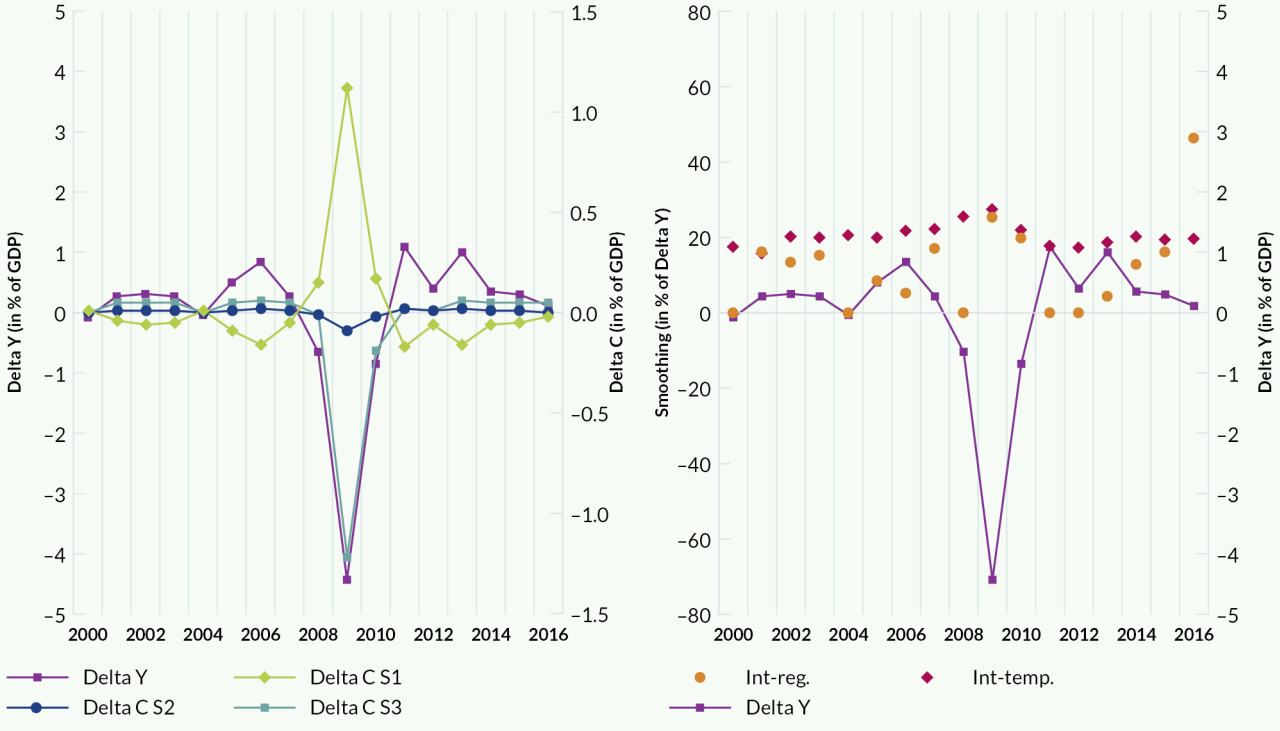
LV – Decomposition 2



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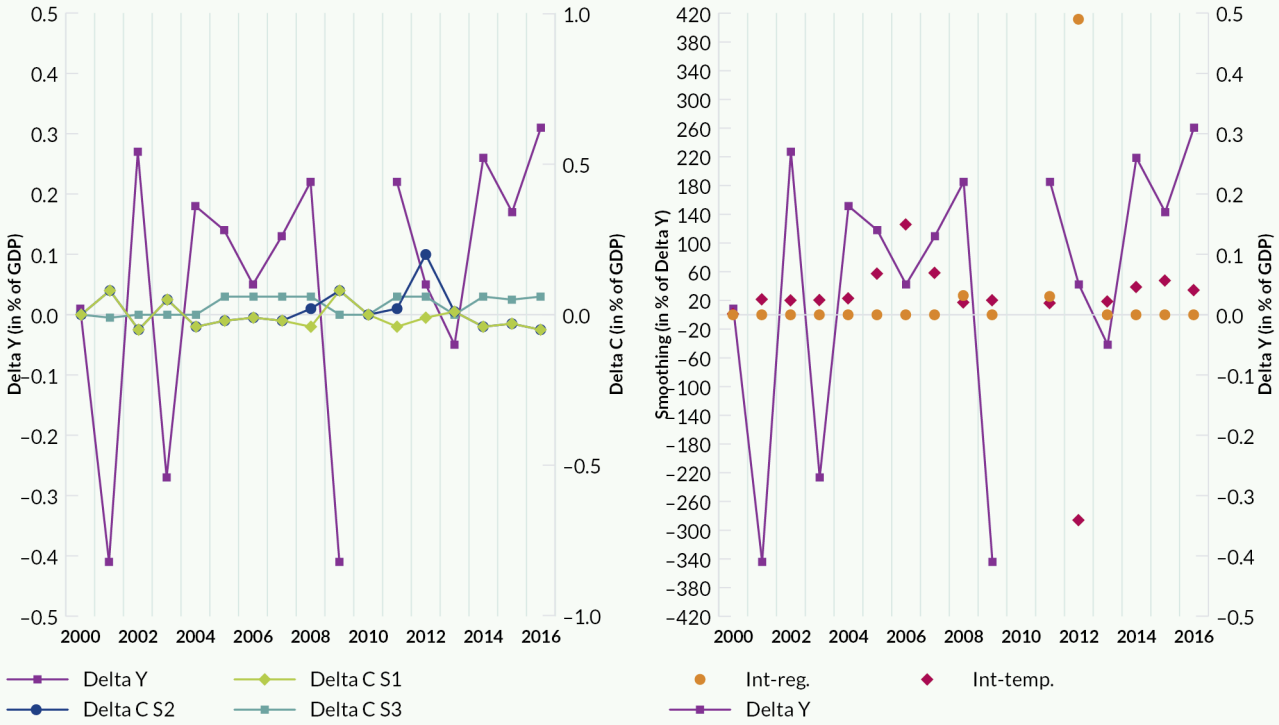

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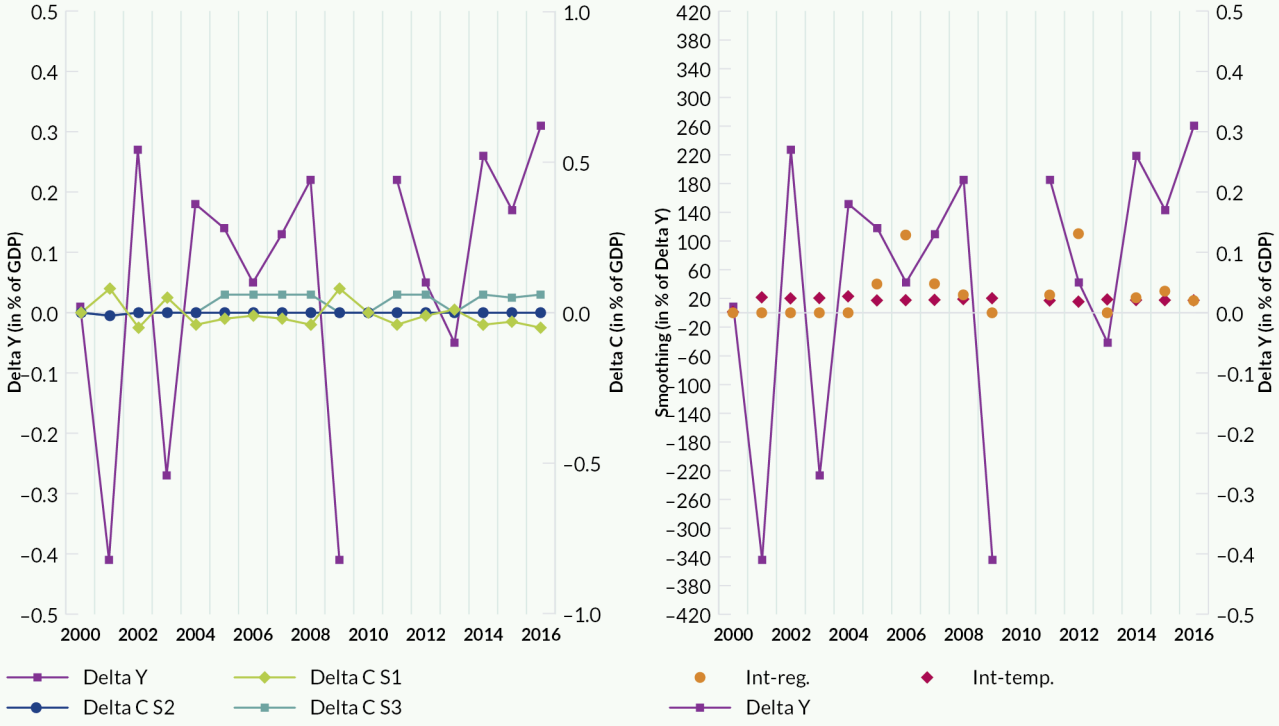

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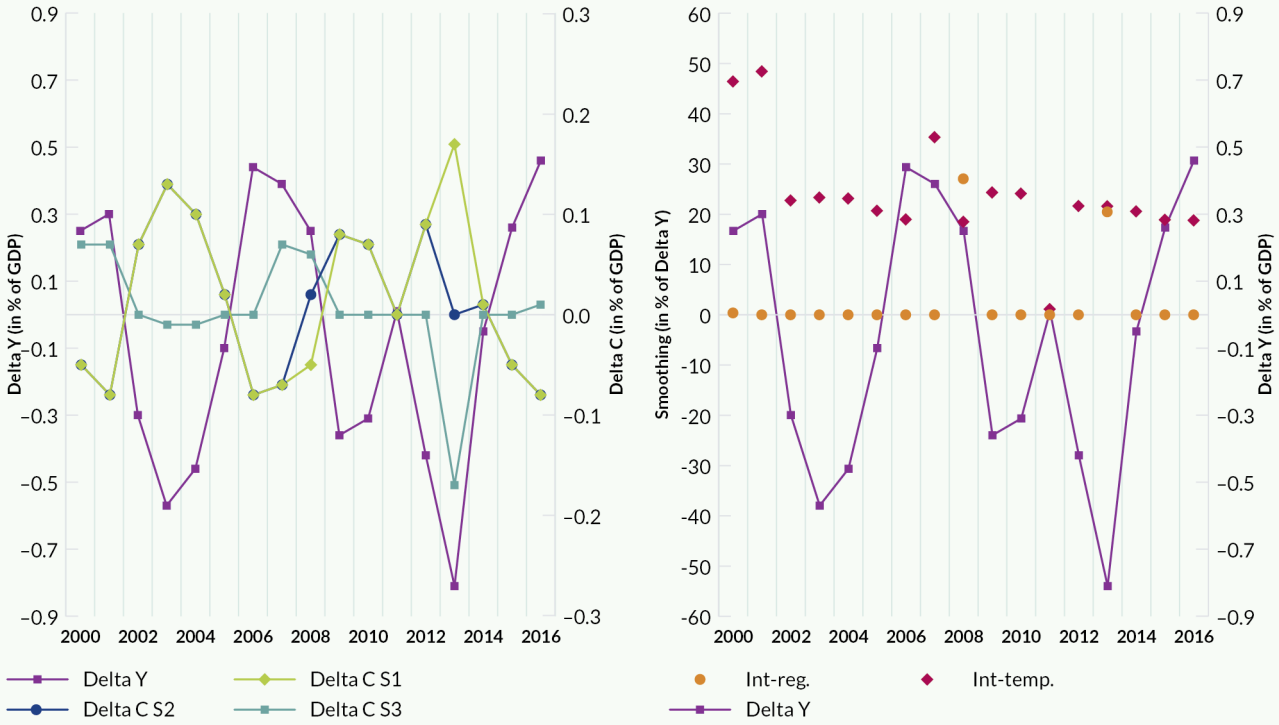

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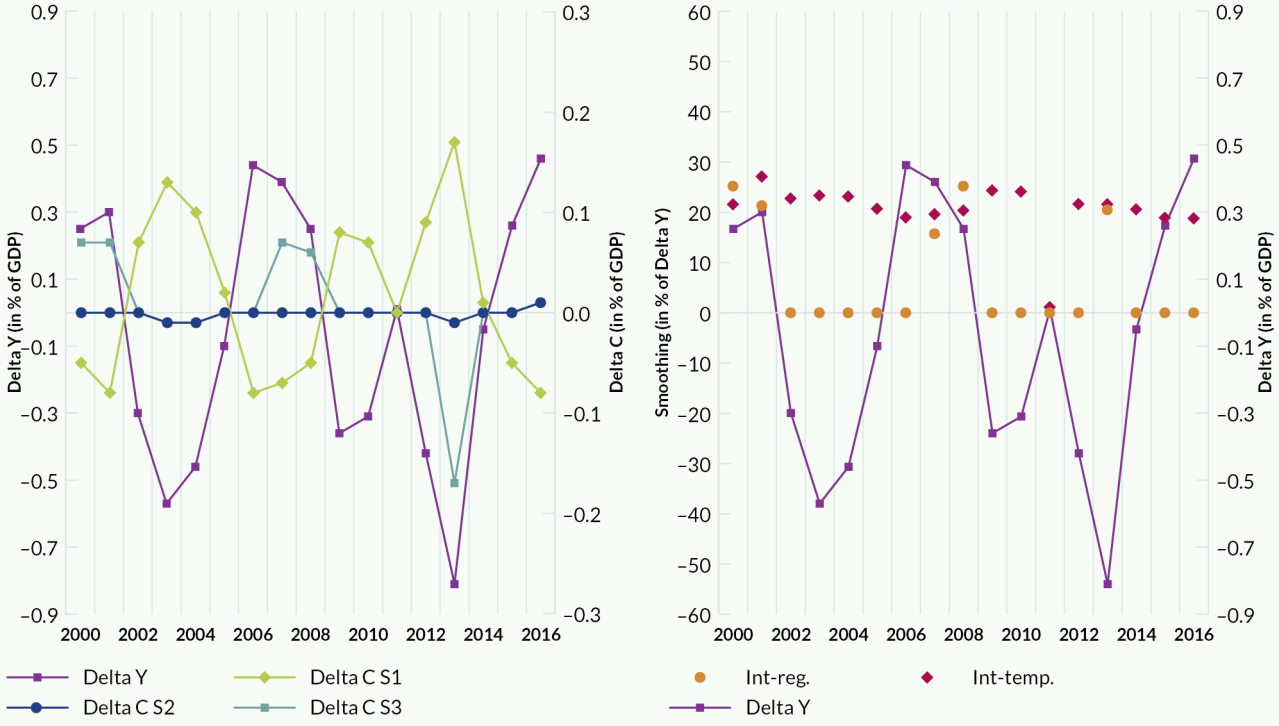
NL – Decomposition 2



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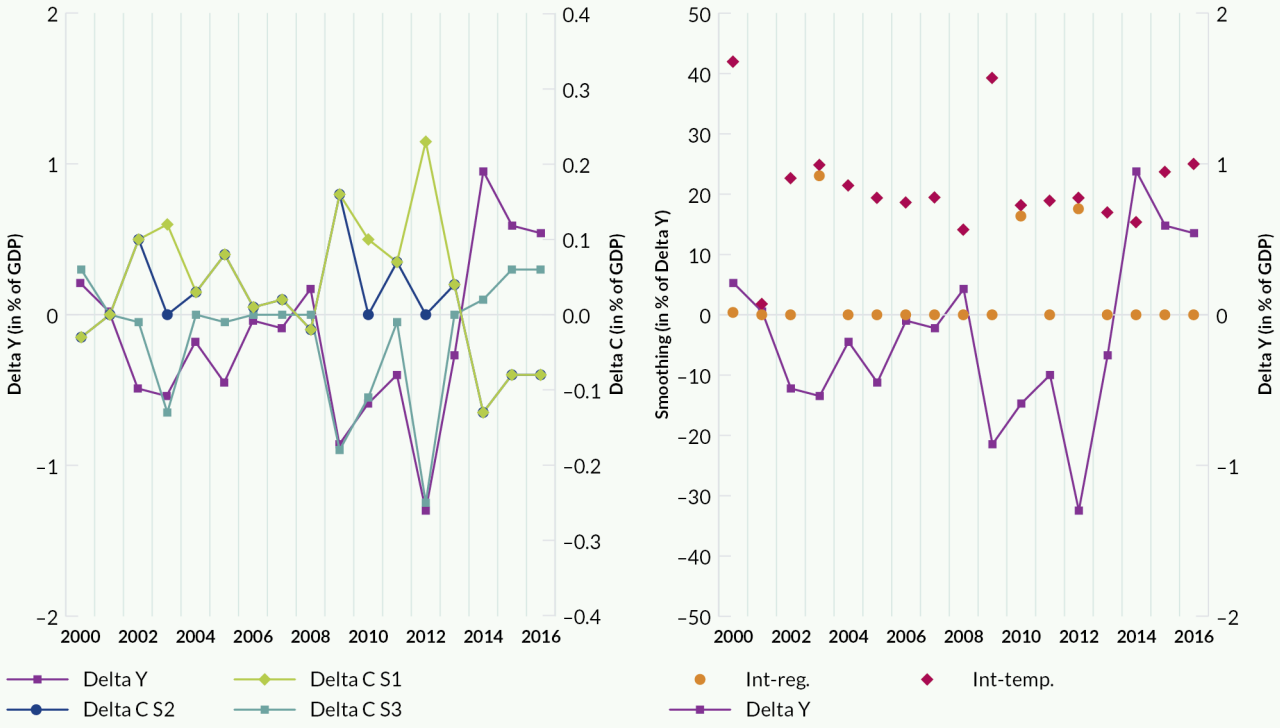
PT – Decomposition 1



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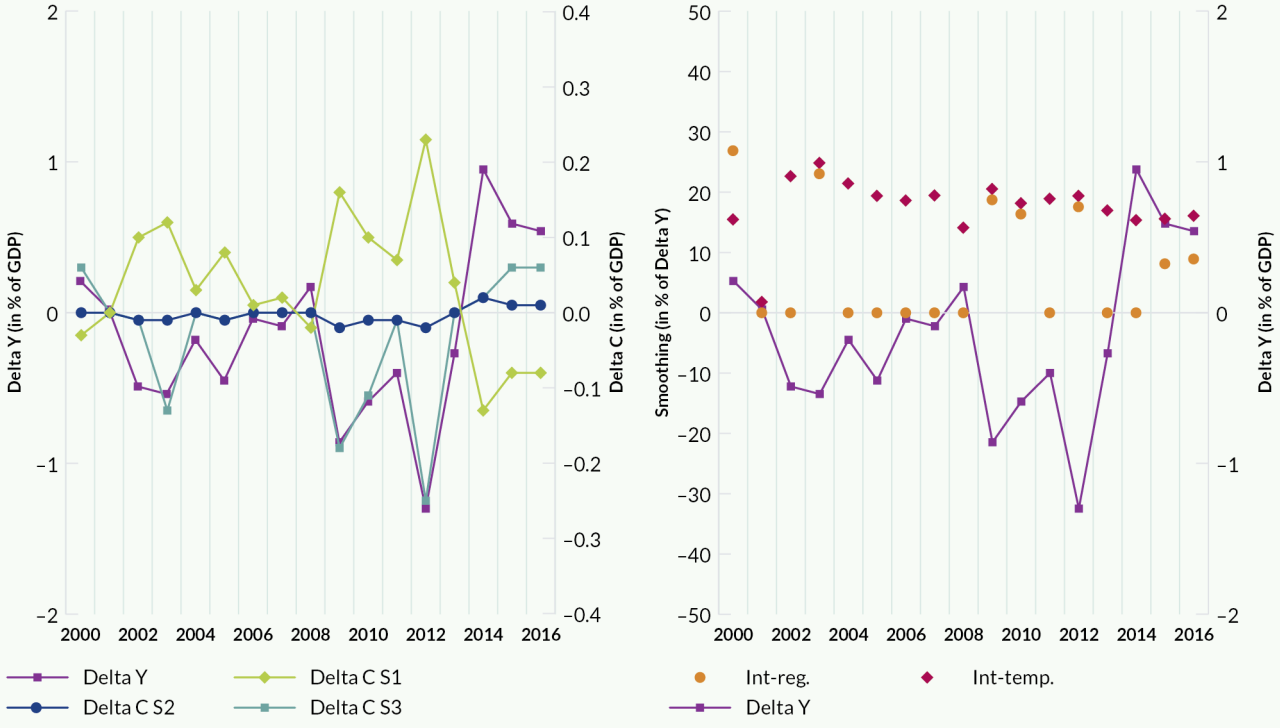
PT – Decomposition 2



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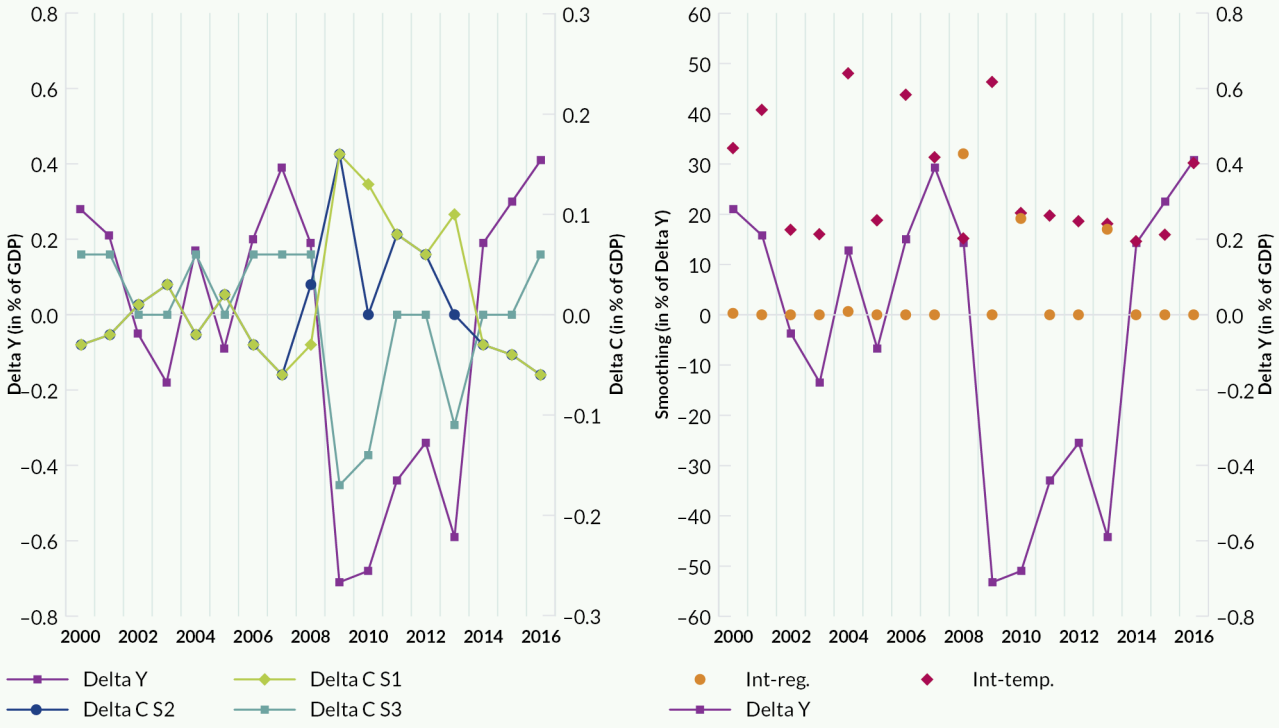
SI – Decomposition 1



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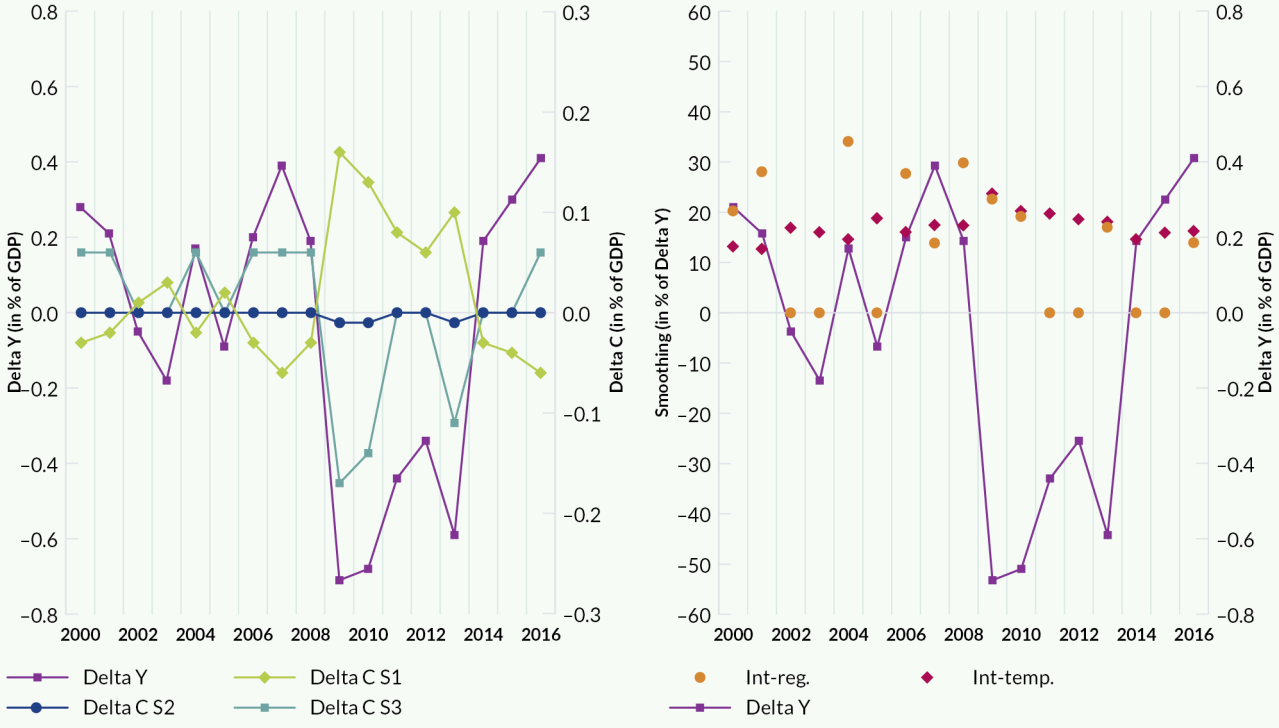
SI – Decomposition 2



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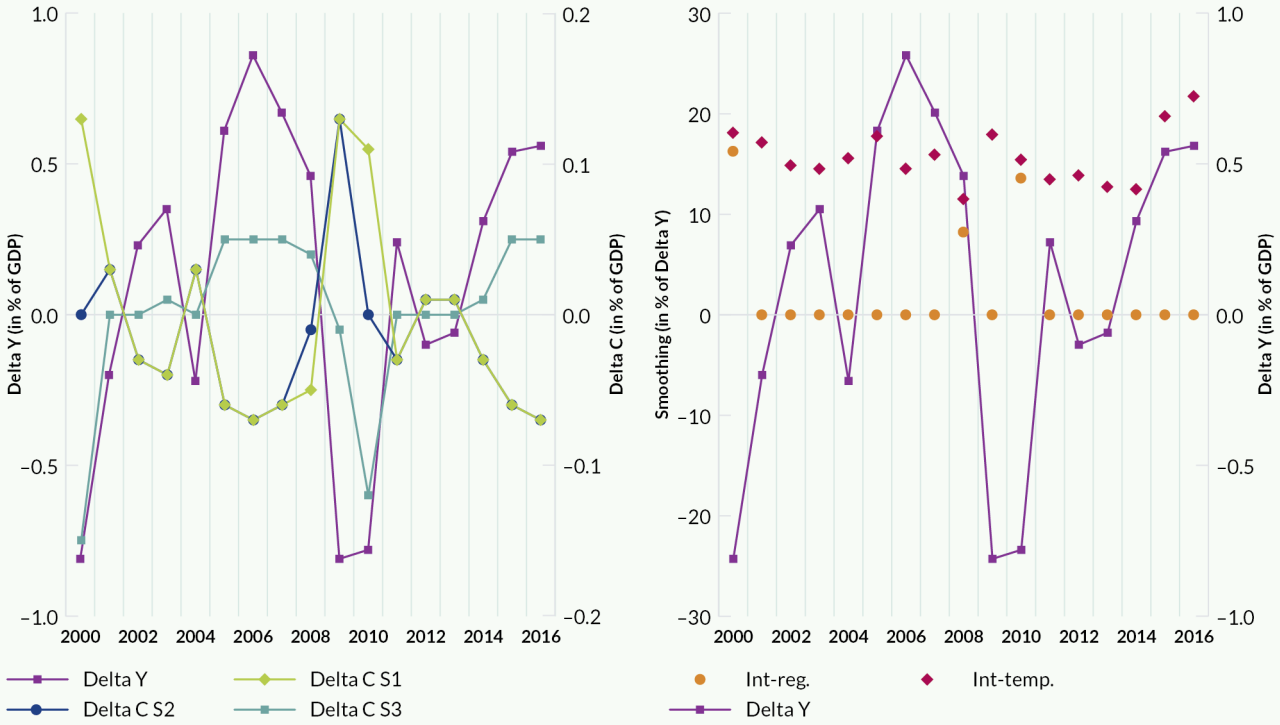
SK – Decomposition 1



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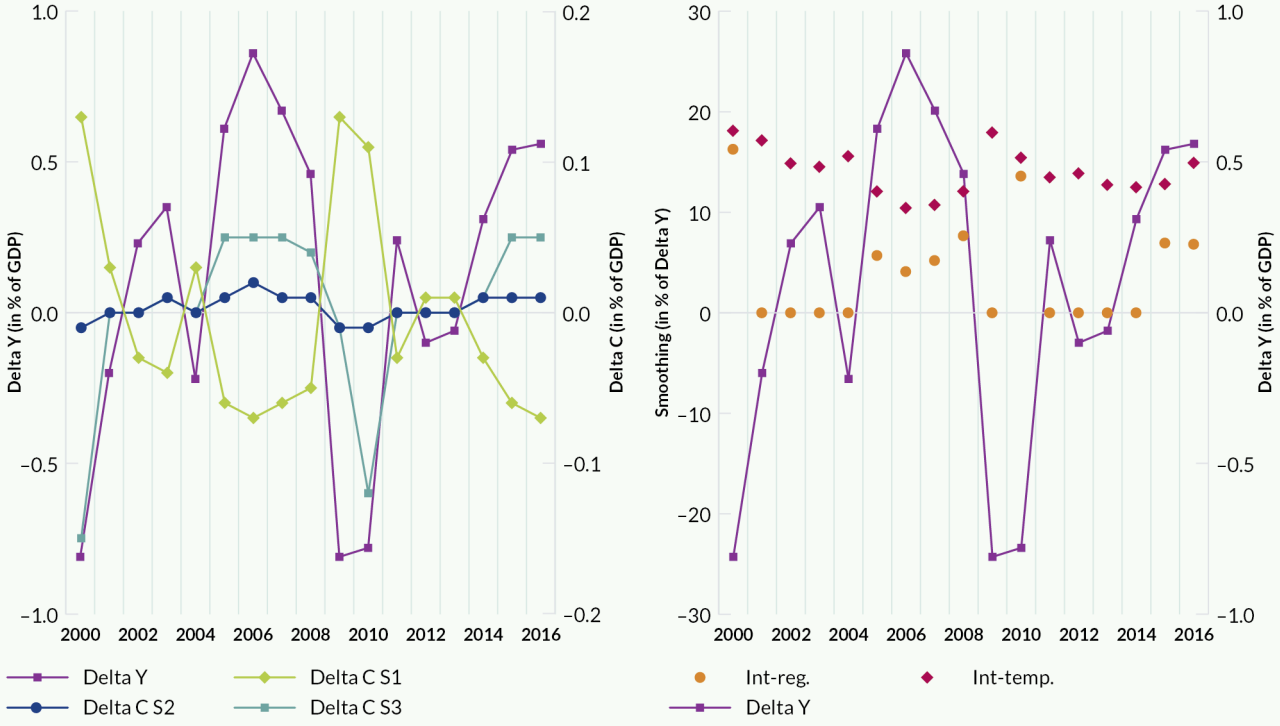
SK – Decomposition 2



Source: ifo Institute

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