BLUEPRINT FOR A CYCLICAL SHOCK INSURANCE IN THE EURO AREA

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Foreword by António Vitorino

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EMU: THE NEED FOR NEW STEPS

Foreword by António Vitorino

Many positive steps have been made in the last four years so as to rein-force the Economic and Monetary Union's architecture: adoption of financial assistance mechanisms (especially the ESM); strengthening of fiscal surveillance via the adoption of the Six Pack, the Two Pack and the Fiscal Compact; adoption of a new procedure for the surveillance of macroeconomic imbalances via the Six Pack; and, last but not least, launching of the "banking union", based on direct bank recapitalization via the ESM and the adoption of the single supervisory mechanism. Nevertheless, the common currency area appears still incomplete, and several EMU weaknesses put in evidence by the crisis were not addressed yet. Beyond the short term challenges, such as achieving better public and private debt positions and lower unemployment, decision makers also need to complete the EMU in order to guarantee the long term sustainability of the common currency. New ambitious initiatives are needed, and this includes in particular reinforcing Eurozone's crisis preven-tion and crisis management capacity.

In this perspective, the **"Tommaso Padoa-Schioppa group" Report**[1], pub-lished in June 2012 and elaborated under the coordination of Henrik Enderlein, has identified three major challenges the euro area will have to solve in the coming decade: preventing large and persistent economic and social hetero-geneities; making the EMU fiscal framework more sustainable and resilient to 'self-fulfilling solvency' crises; breaking the nexus between national banks and national sovereign debts. To solve these challenges, the Report has proposed several key initiatives, on the top of which the creation of an automatic cyclical stabilization fund outside the EU budget.

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1. Henrik Enderlein, Jacques Delors, Helmut Schmidt, Peter Bofinger, Laurence Boone, Paul De Grauwe, Jean-Claude Piris, Jean Pisani-Ferry, Maria João Rodrigues, André Sapir and António Vitorino "Completing the Euro: A road map towards fiscal union in Europe" Studies and reports No 92, *Notre Europe – Jacques Delors Institute*, 26 June 2012

The debate on whether the EMU level should be equipped with some capacity for fiscal macro-economic stabilization is not a new one. This issue was largely discussed in the early 1990s, including during the elaboration of the "Delors report", but then fell into disregard after the adoption of the single currency. The current crisis has revived the claims for greater EMU powers on fiscal stabilization and some political support for this idea has emerged. The Presidents of the European Council, the European Commission, the European Central Bank and the Eurogroup took on board the idea of equipping the EMU with a shock absorption capacity in their report on deepening the EMU issued in December 2012. However, national decision makers are still to be convinced of the need and the feasibility of this initiative.

In this context, this Study by Henrik Enderlein, Lucas Guttenberg and Jann Spiess has the merit to propose a detailed vision and proposal for the "Cyclical Shock Insurance" needed to face such situation and to reinforce the EMU architecture. It is based on in depth analyses and simulations and describes in details what could be the shape of this European insurance fund designed to counter excessive cyclical fluctuations. I draw the attention of the readers on one striking lesson drawn by the simulations made by the authors: had such a system existed from the inception of the euro in 1999, every Member states would have been close to a net-zero financial position after 14 years. This is a key argument to stress that a shock absorption mechanism is not a solidarity mechanism leading to unilateral transfers from the core to the periphery of the euro area: it is instead an insurance mechanism aiming to protect every EMU countries from a common vulnerability linked to the common currency area.

The comparison the authors make between the "Cyclical Shock Insurance" and alternative proposals underlines their wish to take political elements – and then practical feasibility - into consideration. This doesn't only apply to the effects of the Stabilization Fund they propose, and then their symmetric dimension in the long run. It also concerns the founding principle of such Fund, that is to say insurance. Such a principle could indeed more easily be backed by a large number of countries and citizens, provided the risks covered (cyclical divergences) are identified in such a way that they will be perceived as common. An *ex ante* insurance approach should be preferred when compared with the *ex post* bail out approach implemented in the recent period, and which has generated a lot of political tensions all over the euro area.

These political considerations explain why creating a macroeconomic stabilization fund under the form of an "euro area unemployment insurance scheme" has not been proposed by the authors. Such unemployment insurance scheme exists in the United States of America, and its establishment in Europe is defended by decision makers such as Laszlo Andor, EU Commissioner for Employment and Social Affairs, and Pierre Moscovici, French Minister of Economy and Finance. This other option would highly make sense, given the high level of unemployment we face in Europe: it would be a powerful countercyclical tool for our economies, as well as a striking proof of solidarity between the euro area citizens. Such "euro area unemployment insurance scheme" would need an in depth study as convincing as this one – not to forget some intense political negotiations between Member states and European institutions.

The "Cyclical Shock insurance" proposed by Henrik Enderlein, Lucas Guttenberg and Jann Spiess should be considered as one of the components of the *sui generis* form of fiscal federalism the euro area needs. The European "fiscal capacity" to be put in place should indeed rely on at least two other functions: one would be to facilitate the implementation of structural reforms in EMU countries through the provision of financial incentives; another function would consist of a common fiscal backstop for the banking union. On these two issues as well, no doubt that further analysis and political negotiations at the high level are still needed. No doubt either that, if necessary, the use of the enhanced cooperation procedure could be favored to promote all these initiatives, which would stay open to the participation of all EU countries.

My wish is that the perspective of the European elections of May 2014 pave the way for a detailed and pluralist debate over the Cyclical Shock Insurance proposal and the euro area budget at large. And that even if the pressure from the markets seems to be lower, our national and European decision makers will take fully into account the social and political tensions generated by the crisis so as to launch the new initiatives that a well-functioning currency union still requires.

António Vitorino
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Member of the Tommaso Padoa-Schioppa group

EXECUTIVE SUMMARY

W e propose a Cyclical shock insurance scheme (CSI) as a remedy to the lack of automatic stabilization in the euro area. Our proposal fits the criteria for a fiscal capacity as proposed in the "Four Presidents' Report" in December 2012.

Under CSI, member states would pay into the scheme when their business cycle position is better than the euro area average and would receive funds when their business cycle position is weaker than the average. By definition, the CSI would be in balance every year, as the amount of flows into the fund equals the amount of outflows. We simulate such a scheme for the time period 1999-2014 and find that an insurance scheme would have led to a better absorption of asymmetric shocks and a greater convergence of business cycles across the monetary union. Depending on the underlying simulation data, the average deviation from the euro area business cycle would have decreased by around 15% to 40%. Thus, the resilience of the euro area as a whole would be strengthened, as the single monetary policy would be able to address symmetric shocks and developments in a more effective manner. The overall cost of the scheme is limited: our proposal is based on a CSI of around 0.2% of euro area GDP.

Our simulations show that the system tends to balance out over time. Germany is a good illustration. In our analytical simulation exercise, the scheme would have helped Germany during the "bad" years early in the last decade, mainly 2003-2005 at the time of important structural reforms, but Germany would then have become a net contributor to the scheme in recent years. In this simulation, Germany's overall balance between 1999 and 2014 would have been close to zero (–0.01% of GDP) with peaks of transfers reaching around 0.8% in both directions. Countries such as Spain and Italy would have been in the opposite position. Overall, we show that there are strong indications that such an insurance scheme would not lead to permanent transfers from some countries to others, but that all countries would be contributors and benefactors over time.

In our first chapter, we argue from a theoretical perspective that in a currency union it is necessary to deal with asymmetric shocks at the central level because self-insurance of member states is necessarily suboptimal due to its positive externalities and costly due to increased fiscal risks in a currency union. We then show some evidence that the experience of the first fourteen years of Economic

and Monetary Union supports our theoretical argument: The absence of automatic stabilization at the central level has led to an unhealthy divergence in business cycles. This made member states vulnerable to idiosyncratic shocks and hence jeopardized the stability and integrity of the euro area as a whole.

In the second chapter, we present the technical features of the CSI scheme. It mimics automatic stabilizers on the national level by channeling funds from those countries with a better business cycle position than the euro area average to those member states with a weaker business cycle position. Our measure for the business cycle position is the output gap as measured by a production function approach. By definition, the scheme is always balanced in a given year. The design of the scheme based on relative business cycle positions suggests that countries come close to a net-zero position in the long run. Our simulation supports this. An incremental payment schedule allows to correct for adjustments in the calculation of the output gap as data become more reliable over the course of the year in question.

Chapter III takes a closer look at our measure of the business cycle position, the output gap. It presents the way the European Commission calculates it for its forecasts and shows the considerable uncertainty associated with the output gap as an indicator. However, the fact that we use the output gap relative to the euro area average in our design of CSI makes it less prone to ex-post revisions, as a large portion of revisions is symmetric across the euro area. Furthermore, the output gap will be a central component in the implementation of the Fiscal Compact. For example, it is already referred to in great detail in German primary law on the debt brake and hence is already well established in economic policy-making in the euro area.

In Chapters IV and V, we discuss the risk of moral hazard inherent in every insurance scheme and address some administrative issues. In setting up the CSI scheme, there are both ex-ante and ex-post moral hazard risks. Ex-ante, countries could be tempted to reduce domestic stabilizers to benefit more from the common scheme. Here, we propose the introduction of a common rulebook for domestic stabilization. Ex-post, countries could use funds not for those purposes most suitable for stabilization. Here, we remain agnostic whether this risk would materialize in practice, but propose earmarking of funds to finance a decrease of social security contributions as the most suitable solution. Administratively, we estimate that the needs of CSI would be rather limited. We also describe how the ESM and the CSI scheme could complement each other.

In Chapter VI, we compare CSI to four other possible remedies to the lack of central shock absorption. First, we argue that a full-fledged euro area budget is not appropriate at the moment as such a budget would necessarily contain structural transfers and would have to be able to run deficits, which would both not be the case for the CSI scheme. Second, we compare CSI to ideas for a European unemployment insurance scheme and show that such an unemployment insurance scheme would face considerably higher moral hazard risks and would only stabilize income from labor. Also, we consider the political challenge to agree upon a common unemployment insurance scheme and the basis for calculating unemployment rates to be more difficult than agreeing on an output gap insurance scheme, based on an output gap methodology that has already been harmonized and is being introduced in national legislation across the euro area in the context of the implementation of the Fiscal Compact. Third, we support the idea of closer capital market integration through a banking union, but argue that self-insurance of countries is necessarily suboptimal due to externalities and would only stabilize income from capital and therefore needs to be complemented by a device like CSI. Finally, we show why the current policy mix of rules and discretionary measures does not address the necessities for shock absorption and automatic stabilization.

In Chapter VII, we present the results of our simulation and show the effects CSI would have had over the first fourteen years of Economic and Monetary Union. The result of our analytical simulation exercise is very promising: Using ex-post adjusted output gap estimates, the CSI scheme has a strong smoothing effect (reduction of average deviations from the euro area mean by 40%). Using only real-time output gap data (i.e. output gap estimates at the time of their actual publication), the scheme has a stabilizing effect, although with a significantly lower magnitude (reduction of average deviations by around 15%). We mainly attribute this to the well-known weakness of real-time output gap data and also to changes in the output gap estimation methodology in the past decade. Overall, we tend to expect that a CSI scheme on the basis of future real-time output gap data should do at least as well as our simulations based on past real-time output gap data, and might come close to the very positive results of the simulations based on ex-post adjusted output gap data. We are convinced that such a scheme could provide a considerable smoothing effect of business cycle deviations in the euro area (reduction of average deviations by around 15% to 40%) at total annual payments of around 0.2% of euro area GDP.

INTRODUCTION

"A Community fiscal stabilisation policy is a key element in any programme for European monetary integration." This sentence, taken out of the MacDougall report that the Commission published 35 years ago (MacDougall et al. 1977), is still topical. As the report by the "Padoa-Schioppa Group" (Enderlein et al. 2012) has elaborated in detail, sharing a single monetary policy can have a pro-cyclical effect in member states of the currency zone if inflation differentials persist due to lack of market integration and labor mobility: Real interest rates are systematically too high for those countries that are in downturn while being too low for those economies in a boom or already overheating. To avoid the buildup of external and fiscal imbalances as a result of these persisting differentials, a high level of convergence of business cycles across a monetary union is needed. However, this is not what the experiences of the first thirteen years of the EMU have brought about so far.

In the last months, more and more policymakers have come to acknowledge the need for some kind of common cyclical stabilization policy in the euro area, be it via a euro area "fiscal capacity" as referred to by the "Four Presidents' Report" of December 2012, be it via a euro area budget, a European unemployment insurance or a cyclical adjustment fund between member states. However, this growing consensus has so far only rarely been spelled out in detailed proposals of how such a policy could look like. In this study, we aim at filling this void by presenting in detail how a cyclical stabilization insurance fund, as it was proposed in the Padoa-Schioppa report, could be a solution to the problem of lacking business cycle convergence. We also run simulations on how this scheme would have operated had it been in place during the first fifteen years of EMU.

We propose a Cyclical shock insurance (CSI) scheme for the euro area that would work as a macroeconomic insurance fund between euro area members. Member states pay into the scheme when their output gap is above the euro area aggregate output gap, i.e. when their cyclical economic position is better, and countries receive payments from the scheme when their output gap in a given year is more negative than the euro area average. Hence, it achieves

greater business cycle convergence by pushing both contributing and recipient countries closer to the average business cycle, rendering ECB monetary policy much more effective. Our simulation shows that absent measurement problems, a payment volume of as little as 0.2% of euro area GDP can lead to a reduction of individual output gap deviations from the average of about 40%, which would represent a substantial stabilization effect. In the following, we will outline the technical features of the CSI scheme, its economic and political implications, as well as possible alternatives.

In Chapter I, we will discuss theoretically why common cyclical stabilization is needed and show evidence from the first fourteen years of the Economic and monetary union. Chapter II summarizes the technical features of the CSI scheme. In Chapter III, we present the features and challenges of our business cycle indicator, the output gap. Chapter IV discusses the implications of CSI for incentives in member states and possibilities of moral hazard, while Chapter V lines out the interaction between crisis solution and cyclical stabilization as well as legal issues and membership concerns. In Chapter VI, we contrast our proposal with some other proposals that are currently discussed to tackle the issue of business cycle convergence. Finally, in Chapter VII we present the results of our simulation of how our scheme would have performed had it been in place from 1999 on.

1. The need for cyclical stabilization in the euro area: theory and evidence

- We argue from a theoretical perspective that automatic stabilization in a currency union is necessary to deal with asymmetric shocks, and that the best level to apply stabilization policies is at the aggregate, i.e. euro area, level.

- We show that, empirically, the experience of the first fourteen years of Economic and monetary union supports our theoretical argument.

1.1. Macroeconomic stabilization in currency unions

Macroeconomic stabilization, understood as the reduction of the amplitude of recessions (and symmetrically also of booms), has strong positive externalities, as a reduction in output volatility has a positive impact on long-term growth (cf. e.g. Ramey and Ramey 1995). There is a widespread consensus that there is a rationale for government action in this area and that monetary policy is the best tool for this kind of intervention. However, when a country enters a currency union, it abandons the most important device to absorb temporary macroeconomic shocks: the possibility to conduct autonomous monetary policy including the possibility of a flexible nominal exchange rate. While currency unions are still able to use the common monetary policy to deal with symmetric shocks affecting the currency area as a whole, the absorption of asymmetric shocks affecting only one or several members of the union becomes much more difficult. In the presence of short-term sticky goods prices and wages, factor mobility remains the only viable market-based adjustment channel (Mundell 1961; Hammond and Von Hagen 1998).

In the euro area, short-term labor mobility does not seem to be a very likely channel to absorb temporary asymmetric shocks, as it is doubtful that people are willing to move with every business cycle (De Grauwe 2012). Additionally, labor mobility can be expected to remain low at least in multi-lingual and multi-cultural currency unions where moving to another member state is related to significant adjustment processes and costs. As to capital mobility,

i.e. the possibility that integrated capital markets and portfolio diversification across the currency union will lead to a level of consumption smoothing across member states sufficient to even out an asymmetric fall in income (Von Hagen 2007), Farhi and Werning (2012) show that even if capital markets are completely integrated within a currency union, private insurance against asymmetric shocks remains suboptimal precisely because private agents do not internalize the positive externality of macro stabilization. In other words, social benefits of macro insurance exceed private benefits and give a rationale for government intervention. Empirically, Asdrubali, Sorensen, and Yosha (1996) show that even in financial markets as deeply integrated as the U.S., less than two thirds of shocks are absorbed by capital and credit markets, leaving a substantial amount of smoothing to the government. Hence, hopes that a banking union in the euro area and thus a more integrated European financial market will fully take care of risk sharing are likely to be overly optimistic. We can therefore assume that factor mobility alone is unlikely to achieve desirable levels of cyclical stabilization. Instead, governments will still have to take on a major role in macroeconomic stabilization even after banking union will be completed. Indeed, although exact numbers widely vary, the qualitative argument that automatic stabilizers put in place by governments support the absorption of asymmetric shocks and quicken adjustment has been supported empirically in a number of studies (for an overview see Von Hagen 2007).

One could then argue that member states should engage individually in classic Keynesian fiscal policies – accrue surpluses in booms and borrow in capital markets in downturns (cf. Von Hagen 2007). However, two arguments speak in favor of a central solution to absorb asymmetric shocks: First, the risk of default for individual member states usually increases significantly when a country enters a currency union as it now has to issue its debt in the common currency, which is functionally equivalent to a foreign currency to the extent that the government cannot control its supply ("self-fulfilling fiscal crisis", see De Grauwe 2012). Hence, member states could be barred from capital markets in recessions if doubts arise about the viability of their debt. Second, and more importantly, outside-transfer multipliers are significantly higher than self-financed multipliers as outside transfers relax a country's inter-temporal budget constraint, which is not the case when a country borrows on its own (Farhi and Werning 2012a; for an empirical study see Bayoumi and Masson 1998). Therefore, there is a strong rationale for a currency union-wide fiscal

stabilization device to counter asymmetric shocks and facilitate adjustments as long as business cycles do not sufficiently converge.

1.2. The need for stabilization in the euro area: evidence from the first thirteen years

In the run-up to Economic and monetary union, the MacDougall, Delors, and "One Market, One Money" reports all acknowledged the need for some sort of macroeconomic stabilization (MacDougall 1977; Delors 1989; Commission of the European Communities 1990). The nineties saw a surge in academic papers arguing for a fiscal element to monetary union (e.g. Italianer and Pisani-Ferry 1992; Italianer and Vanheukelen 1993; Goodhart and Smith 1993; Hammond and Von Hagen 1998). Nevertheless, the only fiscal elements in the EMU at its start in 1999 were the rules contained in the Stability and Growth pact and the Broad Economic Guidelines, which were to function as a device to coordinate member states' economic policies. It took a decade for the debate to resurface in the wake of the financial crisis (cf. Dullien and Schwarzer 2009; Von Hagen and Wyplosz 2008).

Hence, member states had to deal with asymmetric shocks on their own. In the years since the euro's inception, labor mobility was low (Bräuninger and Majowski 2011); product markets were still not completely integrated (Pelkmans et al. 2009). Based on the theoretical argument developed above, we would therefore expect to see only slow adjustments to asymmetric shocks in the presence of unsynchronized business cycles in the euro area, as adjustment channels other than capital markets were not sufficiently working. This would imply the persistence of different growth rates and inflation differentials over the medium term and a constant shift in the real exchange rate, making those countries nominally growing faster than others while steadily losing competitiveness. Indeed, this was the scenario that could be observed in the euro area from 1999 to the onset of the crisis. Some member states, such as Greece, Spain, or Ireland, grew significantly faster than others (e.g. France or Germany), both in nominal and real terms, over practically the whole period between 1999 and 2008 (Figures 1a and 1b). This was accompanied by a persisting difference in inflation rates over the course of the same period (Figures 2a and 2b).
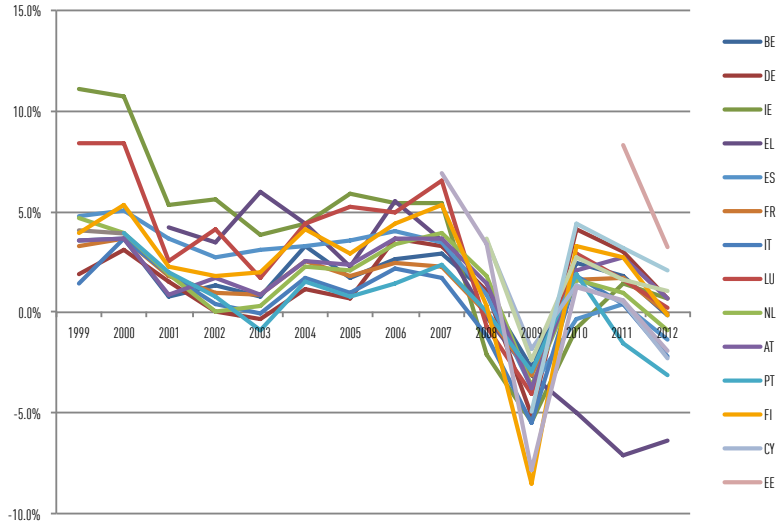
FIGURE 1A ► **Real GDP growth in the Eurozone, 1999-2012**

Source: AMECO February 2013

FIGURE 1B ► **Real GDP growth in selected Eurozone countries, 1999-2012**
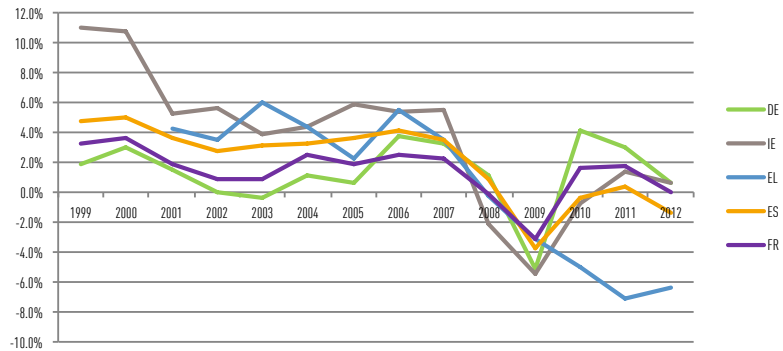
Source: AMECO February 2013

FIGURE 2a ► Inflation (HICP) in the Eurozone, 1999-2012
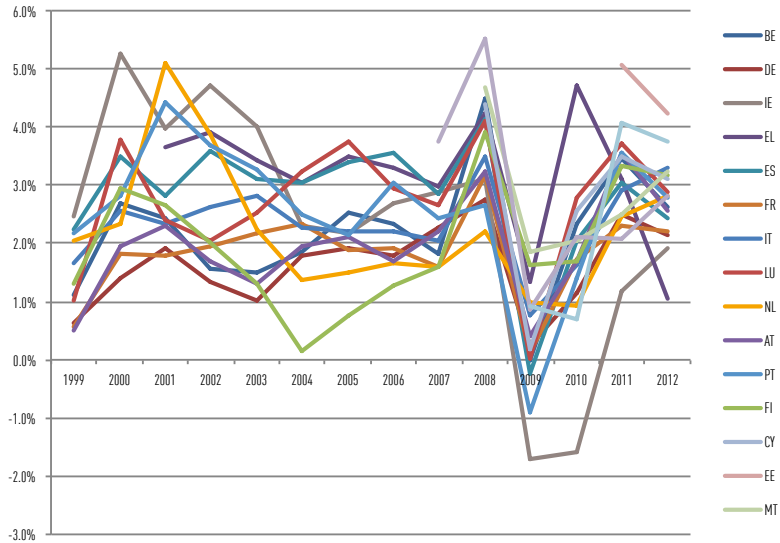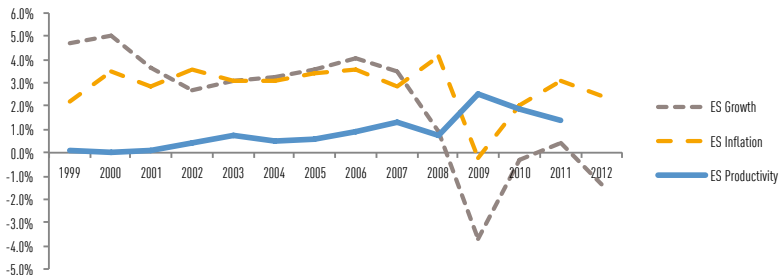

Source: AMECO February 2013

FIGURE 2b ► Inflation (HICP) in selected Eurozone countries, 1999-2012

Source: AMECO February 2013

Both developments would not have been worrisome per se as the fast-growing countries were typically entering EMU with lower GDP per capita levels than those growing slower – we would expect these countries to catch up and to grow faster than those with higher GDP/capital ratios once their productivity increases. However, as Figures 4a-c show, growth and inflation in these member states were above productivity growth, thus leading to competitiveness loss and growing current account deficits (cf. also De Grauwe 2012; Allsopp and Vines 2009). In a world with functioning adjustment channels, be they market-based or provided through automatic stabilizers, inflation in these countries would eventually have decreased: More integrated product markets would have led to a more pronounced fall in foreign demand for home goods and to an export boom in sluggish economies; higher labor mobility would have put pressures on rising wages; sufficient levels of capital market-based insurance would have siphoned away funds to low-growth economies; and automatic stabilizers on the euro area level would have led to transfers from boom to downturn economies, hence depressing demand in the former and boosting growth in the latter.

FIGURES 4a, b, c ➤ Real GDP growth, inflation (HICP) and labor productivity in Spain, 1999-2012
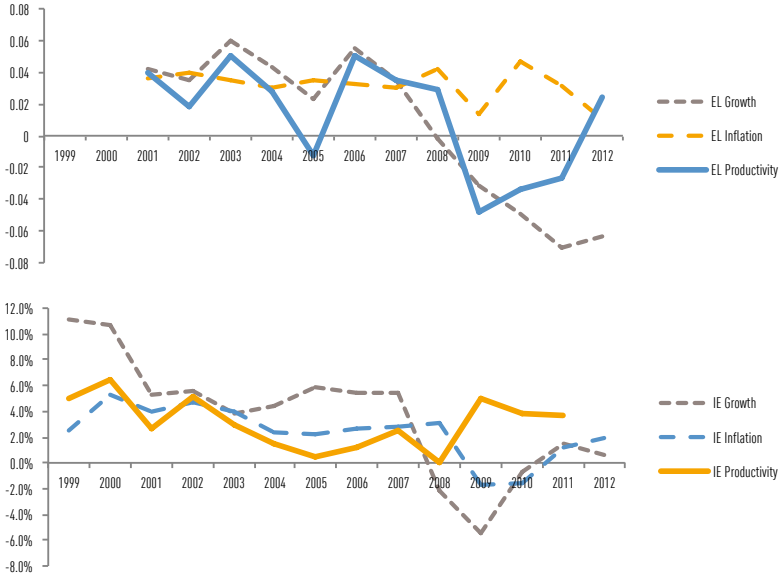
Source: AMECO February 2013, Eurostat March 2013

However, as adjustment channels did not properly work, automatic stabiliza-
tion was absent, and member states all faced the same short-term nominal
interest rates set by the European central bank (ECB), some countries ben-
efitted from low real interest rates to finance their growing current account
deficits in the markets, either through increased budget deficits or, where gov-
ernments were complying with Stability and growth pact (SGP) rules, through
the accumulation of private sector debt that migrated to the government bal-
ance sheets once the financial crisis hit. As a consequence, market sentiment
eventually turned against these countries as their fiscal positions were no lon-
ger perceived as sustainable. This led to the breakout of the euro crisis, the
need for assistance in some member states and the eventual setup of European
financial stability facility (EFSF) and ESM as rescue mechanisms.

1.3. Cyclical shock insurance as an instrument for stabilization in the euro area

We argue therefore that the introduction of a macroeconomic stabilization device on the euro area level would significantly support more rapid adjustment to asymmetric shocks, at least as long as product market integration and labor mobility remain incomplete, and would hence reduce the amplitude and also the duration of idiosyncratic booms and busts in the euro area. This will lead to more synchronized business cycles across the Union, rendering monetary transmission much more efficient, while the buildup of unsustainable external and fiscal positions will become much more difficult. In recent research, Engler and Voigts (2013) show that the introduction of a simple transfer mechanism can be more efficient in stabilizing business cycle positions in a monetary union than national anticyclical policies.

The Four Presidents' Report published in December 2012 argued along those lines in favor of a macroeconomic stabilization mechanism for the Euro area. It stipulated that such a mechanism should

  i.   not lead to unidirectional or permanent transfers;

  ii. not undermine incentives for structural reforms;

  iii. be implementable within the framework and the institutions of the Union;

  iv. not be an additional crisis-solution mechanism, but rather a complement the ESM;

  v.   not lead to an overall increase in tax and expenditure levels.

The Cyclical shock insurance scheme (CSI), as we propose it, will satisfy all these conditions while having a substantial macroeconomic effect. In the following chapters, we will now discuss its features in greater detail.

2. The Cyclical shock insurance scheme: technical features

- We present the calculation method of CSI payments and show why its budget is balanced every year.

- By employing an incremental payment schedule, we allow for adjustments of payments during a year based on updated forecasts.

2.1. General setup

The underlying idea of the scheme is to reduce the difference between individual member states' business cycle positions and that of the euro area as a whole to achieve higher levels of business cycle convergence. It mitigates the amplitude of individual business cycles vis-à-vis the euro area aggregate by channeling funds from those countries running above average to those running below it.[2]

To do so, a country's individual annual transfers are calculated by the formula

$$T_i = a \times ((y_{EZ} - y_{EZ}^*) / y_{EZ}^* - (y_i - y_i^*) / y_i^*) \times y_i^*,$$

where y denotes actual and y^* denotes potential output. The convergence variable a denotes the share of the difference between individual and euro area output gap to be offset. (We will discuss the implications of the output gap as a policy indicator in the next chapter.) Our simulation shows that the reduction in the variance of individual output gaps around the euro area average is a direct function of a. In our baseline scenario, we set $a = 0.5$, which results in an average reduction in the standard deviation of 40% using the output gap data from February 2013. A positive T_i translates into a country receiving payments from

2. Transfer mechanisms to counter asymmetric shocks and to increase business cycle convergence have recently been proposed by Bernoth and Engler (2013) as well, who also discuss net payments based on the output gap.

the scheme in a given year, a negative T_i into a country paying into the scheme in the same period.

By definition and absent rounding errors, the budget of the scheme is balanced every year as the euro area output gap is the average of individual output gaps weighted by shares of absolute potential output. It therefore does not necessitate any issuance of debt on the euro area level as CSI payments are at every stage fully financed by its revenues. Hence, the introduction of CSI does not increase aggregate government expenditure in the euro area as long as governments do not try to offset the foregone spending caused by payment into the scheme through additional taxes or borrowing.

As we will discuss in more detail below, the use of the output gap as the indicator on which transfer payments are based should lead to a long-run net zero position of all member states, hence avoiding unidirectional payments and strictly offsetting cyclical, but not structural imbalances.

One could argue that deviations should only be offset above a certain threshold to avoid payments within the margin of error that could potentially have the wrong sign or to have countries deal with small deviations by themselves (cf. Wolff 2012). However, this would put into question the balanced budget of the scheme. Therefore, we propose to allow for small amounts of 'suboptimal' payments in order to avoid deficits of the scheme, especially since we can assume that such payments will cancel each other out over time as long as output gap measures are not systematically biased in favor of one member state.

2.2. Technical implementation and payment schedule

Payments would need to be calculated as part of an early autumn forecast based on Eurostat numbers at the beginning of September so that national budgetary processes would still be able to factor in CSI payments. Some countries would need to make some minor adjustments to their budgetary processes compared to the current arrangements as they adopt their budgets earlier, but we assume that the European semester will induce convergence in the timeline of budgetary processes that will also be conducive to the functioning of CSI.

The payments for a given year would be made according to the following schedule:

- 50 percent of payments both into the scheme and from the scheme, based on the autumn forecast, would be due at the beginning of January.

- Payments would be adjusted in May according to Eurostat's spring forecast and another 25 percent of the (adjusted) payments would be due at the beginning of July.

- Finally, payments would again be adjusted according to the following autumn forecast and the remaining 25 percent of the adjusted payments would be disbursed at the end of the year.

The payment schedule presented above incorporates the possibility of ex-post adjustments that we will discuss in more detail in the next chapter. If the spring and autumn forecasts following the initial calculation show that a country fares better than expected relative to the rest of the euro area, its payments would be recalculated and it would accordingly receive less (or pay more) then projected in the second and third payment stages. If adjustment is largely due to the fact that not the absolute position of the country has to be adjusted, but rather all other countries are faring worse compared to the member state in question, then this leads to revenue shortfalls that the country would have to shoulder itself, with CSI funds then going to those countries where needs for stabilization are more pronounced. However, if a country fares better than projected in absolute terms, it will also receive more tax revenue and will have to pay less in unemployment benefits than it planned, hence at least partially offsetting the shortfall in projected CSI payments. Finally, it should be noted that as long as adjustments are fully correlated across euro area countries, no payment adjustments would be necessary.

3. The output gap

- The output gap is the cleanest measure of the business cycle position of a country and therefore our basis for a cyclical stabilization scheme.

- It is defined as the difference between actual and potential GDP in a given year.

- The output gap is estimated by the European Commission and already used as a policy variable in the Stability and growth pact and in the Fiscal compact.

- Ex-post revisions of the European Commission's real-time output gap data have been considerable, provoking critique on the output gap's reliance as a policy variable.

- Since our approach relies on relative output gaps and since there is a high correlation in the adjustments between member states, the CSI scheme is not exposed to the full magnitude of these revisions.

3.1. The output gap as a measure of business cycle convergence

The proposed Cyclical shock insurance scheme (CSI) is based on the output gap as a measure of a country's position in the business cycle. The output gap is the difference of a country's gross domestic product (GDP) to this country's potential output – that is, to the highest level of output that is sustainable in the long term. If a country's GDP is above potential output (positive or inflationary output gap), demand outpaces supply, and inflation rises. If, on the other hand, total economic output is below potential (negative or recessionary output gap), inflation goes down, but unemployment is higher than necessary. One of the main aims of short- and medium-term monetary and fiscal policy is then to keep the output gap small (in absolute terms), that is, to bring actual GDP close to potential GDP. The output gap is therefore a widely used concept in monetary and fiscal policy.

While long-term structural differences between countries are manifested in the countries' potential output, the output gap is a measure for the different short- and medium-term positions of countries in the business cycle: If a country is in a boom, its actual GDP is above potential, and it has a positive output gap; if a country is in recession, its output is below potential GDP, and the output gap is negative.

We now reframe the problem of macroeconomic stabilization that we introduced in Chapter I in terms of the output gap: a symmetric negative shock in a currency union would cause all output gaps to decline (likely making them negative), reducing inflationary pressures or inflation expectations and therefore prompting the central bank to lower interest rates, thereby driving output gaps up, optimally to close to zero across all countries (and the other way around for a symmetric positive shock). If, however, there is an asymmetric shock that affects only part of the union, output gaps diverge, and there is, absent individual monetary policies, a case for fiscal stabilization to bring output gaps closer together.

This discussion suggests that the output gap is a natural basis for the design of a fiscal stabilization scheme in the euro area. More precisely, we will use the difference of the gap of a euro area country (measured in percent of its potential GDP) relative to the euro area average output gap as an indicator of this country's business cycle deviation on which the CSI scheme is based. Our aim will then be to increase convergence in business cycles by reducing these deviations from the euro area average.

3.2. The output gap as a policy variable in the European Union

It should be noted that our proposal to use the output gap as a policy indicator is not at all new to European and national legislations. Not only have the Commission as well as international organizations such as the Organisation for economic cooperation and developpemen (OECD) provided comprehensive data on output gaps for years as part of their economic forecasts – the output gap is already a policy indicator in use at both the European and the national level: The two regulations that together form the updated version of

the Stability and growth pact ((EC)1466/97 and (EC)1467/97) make explicit use of potential growth to determine a country's permissible expenditure growth in line with their medium-term budgetary objective and to assess a country's compliance with debt and deficit rules. Regulation 1466/97 even broadly defines how potential growth should be calculated[3]. The Fiscal compact builds its definition of a permissible 'structural deficit' explicitly on the provisions of these regulations, and hence will soon lead to a domestic application of this approach throughout the Union.

The German "debt brake," for example, as set out in article 115 of the Basic Law, explicitly states that "economic developments [that] deviate from normal conditions" should be taken into account, and the implementing act related to this article specifies that "a production function of the type Cobb Douglas"[4] should be used to calculate "normal conditions." Therefore, we feel comfortable at this point to propose a scheme using output gaps calculated based on a Cobb-Douglas production function. That does not mean that we rule out other possible indicators for the business cycle position such as short-term unemployment or inflation rates. However, further research would be needed here as our calculations so far show only weak correlations between inflation rates and calculated output gaps, and short-term unemployment is a problematic indicator as long as labor market institutions are in the realm of national legislation.

3.3. Measurement of the output gap in the euro area

Since potential output is not observable, the output gap has to be estimated. We distinguish two general classes of estimation methods that are common: statistical and structural. Purely statistical methods use properties of GDP time series without any additional assumptions to decompose output into long-term trend GDP and cyclical derivations from the trend; the long-term trend is then identified as the potential output, and the short-term deviations as the output

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3. Council regulation (EC)1466/97, article 5: "The reference medium-term rate of potential GDP growth shall be determined on the basis of forward-looking projections and backward-looking estimates. Projections shall be updated at regular intervals. The Commission shall make public the calculation method for those projections and the resulting reference medium-term rate of potential GDP growth."
4. §2(2), Verordnung über das Verfahren zur Bestimmung der Konjunkturkomponente nach § 5 des Artikel 115-Gesetzes.

gap. Structural methods, in contrast, assume some underlying economic structure, usually a macroeconomic model based on microeconomic foundations, based on which different components of economic output (such as capital and labor) are estimated and then put together to estimate total potential output, and thereby the output gap. For our analysis, we choose the second, model-based approach: It is in good part based on present endowments and not just on backward-looking properties of a time series and therefore a better real-time forecaster than purely statistical measures. Also, the Ecofin Council decided in 2002 to use such a structural method – the production function (PF) approach – as the reference method for all EU official calculations of potential output. This is the method we describe here.

Output gap data is calculated and published twice a year (three times a year from 2013 on) by the Commission using a publicly available program that was developed by its Joint research centre. The program implements a Cobb-Douglas production function method to determine potential growth and output gaps. Following D'Auria *et al.* (2010), the estimation of the output gap as calculated by the Commission assumes that total output can be expressed as a Cobb-Douglas production function

$$y = L^{\alpha} K^{1-\alpha} \times TFP,$$

where L represents labor supply, K is the capital stock, and *TFP* denotes total factor productivity – a measure for the degree to which and the efficiency with which the factors in the economy are used. α and $(1 - \alpha)$ denote the output elasticity of labor and capital, respectively, and can be thought of as the share of return to labor and capital (typically, $\alpha \approx 0.66$). Now, to go from (observed) actual output to (unobserved) potential output, the total factor productivity has to be decomposed into potential TFP and deviations from it. To do so, the Commission's calculations assumes a certain functional form of the TFP and uses data on the utilization of the existing capital stock and the participation in the labor force together with statistical properties of the time series in the past. It thereby mixes economic assumptions and present endowments with statistical properties of the underlying efficiency and labor force participation time series. As a result, the output gap calculation can hardly be "gamed" by a single country, which would be problematic for its use as a policy variable: First, the calculation is done by the Commission, ruling out false reports of the

final output gap estimates; second, the output gap calculation is not driven by one or two indicators, but combines several quantities from different levels, making it hard for a country to directly influence the final estimates in the short term.

The underlying data that is used for the Commission's calculation is taken from DG ECOFIN's annual macro-economic database (AMECO), which combines data on the national accounts of the EU member states and is updated every spring and fall.

## 3.4. Precision of output gap estimates, ex-post adjustments, and the EC's output gap data

In order to implement an effective stabilization scheme that is based on the output gap, we need reliable real-time estimates and even forecasts for the output gap. While the ex-post estimation of the output gap already contains considerable uncertainty about the appropriate method to use and the correct calibration, forecasting the output gap is even more challenging. The production function methodology has the advantage that it is largely based on current endowments (which, in this case, are themselves forecasts), but does also partly rely on statistical methods to decompose time series into trend and current deviation components, and is therefore necessarily prone to ex-post adjustments. In order to analyze the suitability of the output gap as a policy indicator, it is therefore imperative to analyze the quality of the Commission's real-time data and the nature of the ex-post adjustments of this data.

Marcellino and Musso (2011) show that real-time estimates of the aggregate euro area output gap are uncertain beyond model and estimation uncertainly alone. Kempkes (2012) analyses the Commission's real-time output gap estimates and their ex-post adjustments for the EU-15 and concludes that real-time output gap estimates in the sample period are significantly downward-biased. Using the publicly available output gap data for euro area countries published from 2002 to 2013[5] and covering (albeit incompletely) estimates and forecasts for the years 1981 to 2014, we confirm Kempkes' (2012) findings.

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5. Our dataset includes more than 17,000 distinct estimates, which are available from the webpage of the European Commission.

Since CSI transfers will be based on forecasts from the preceding year, we analyze ex-post adjustments of the output gap data that was published the previous autumn. Figure 5 plots the average adjustments over the period 2002-2012 (where available) of the percentage output gaps by country against the time (in years) since the autumn forecast preceding the year for which the gap is estimated. As becomes clear from the graph, ex-post adjustments are considerable and positive, meaning that the original estimates were too low. This is in line with Kempkes (2012), who finds a downward bias of about 0.5 percentage points per year (dashed line).

FIGURE 5 ► Average adjustments of absolute output gap estimates relative to the autumn estimate in the year preceding the realization of the gap over the period 2002-2012
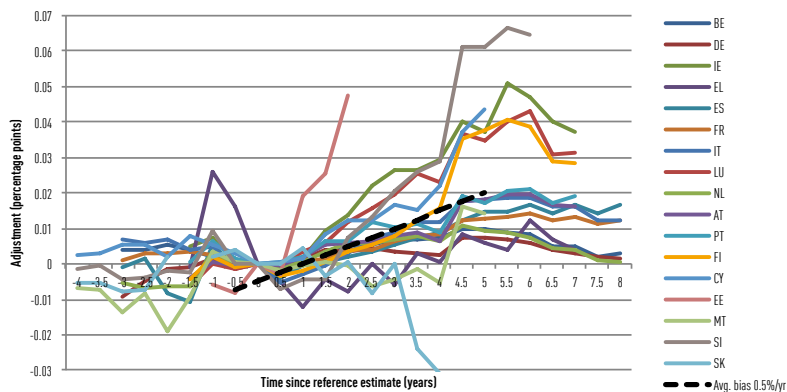
Source: CIRCABC February 2013 and authors' calculations

While these findings generally challenge the usefulness of the output gap as a policy indicator, we argue that it would be wrong to dismiss the output gap as a tool for our specific purposes. First, the output gap methodology employed by the Commission was revised repeatedly during the sample period (D'Auria et al., 2010), which does not only indicate that some of the adjustments may be due to methodological changes, but also suggests that there may be further improvements in future estimates.[6]

6. As an example, see Planas et al. (2013) for a discussion of refinements of the production function methodology that improve real-time estimates and reduce the downward bias.

Second, the period from 2007 to 2012 was dominated by the global financial crisis and the euro crisis, both producing largely unexpected, sudden and severe slumps in economic fundamentals.[7] Third, the ex-post adjustments are highly correlated between countries – indeed, with the exception of countries for which only very limited data is available (and the averages are therefore biased towards certain years), the majority of countries in Figure 5 exhibits a very similar adjustment pattern. This becomes particularly clear when we looking more closely at the adjustments of the data for the 2008 output gap (Figure 6) relative to the forecast from autumn 2007, which show a clear co-movement. While there is still a pronounced degree of divergence in later adjustments, which we partly attribute to changes in the methodology, this hints at an overall high correlation between ex-post adjustments. Indeed, our analysis shows that relative percentage output gap (that is, the difference of a country's percentage output gap to the euro area average) is adjusted considerably less than the absolute values. Most adjustments for the pre-enlargement countries for which full data is available stay within a band of less than 0.8 percentage points from the previous autumn forecast (Figure 7a), and less than 0.6 percentage points from the spring forecast of the same year in the relevant period. Since the CSI scheme is based on relative output gaps, this suggests that our stabilization scheme is not fully exposed to these adjustments. We will later confirm that it would have still had a stabilizing effect, even under the averse conditions of the crises and the observed high ex-post adjustments (Chapter VIII).

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7. Both of these points are challenged by Kempkes (2012), who argues that the same effects persist in data from other sources and at other times.

FIGURE 6 ► Adjustments of absolute 2008 output gap estimates relative to the 2007 autumn estimate over the period 2002-2012

Source: CIRCABC February 2013 and authors' calculations

FIGURE 7a ► Average adjustments of relative output gap estimates relative to the autumn estimate in the year preceding the realization of the gap over the period 2002-2012

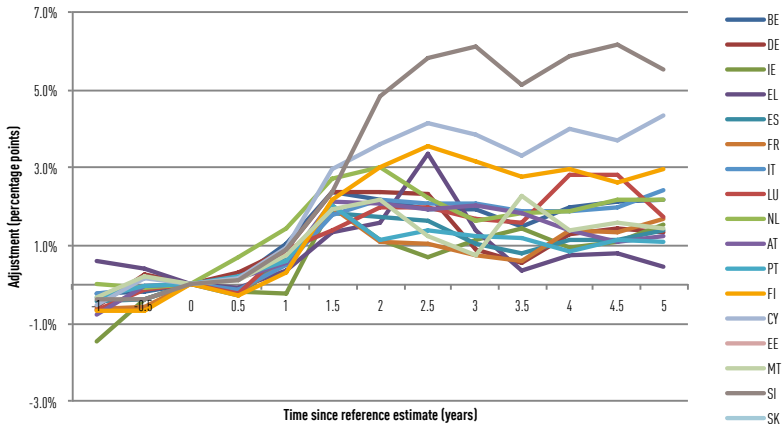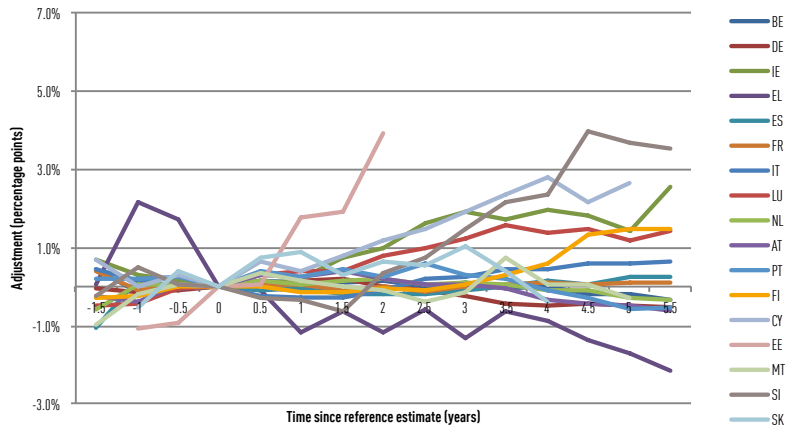Source: CIRCABC February 2013 and authors' calculations

4. Moral hazard in macroeconomic insurance: common standards and earmarking

- To deal with ex-ante moral hazard, we propose the introduction of a common rulebook for domestic stabilization.

- To alleviate ex-post moral hazard, we discuss the advantages and shortfalls of earmarking insurance payments.

- On the contributor side, we do not see a necessity for earmarking.

- On the recipient side, we deem mandatory payroll tax cuts as the most appropriate instrument, while remaining undecided whether the advantages of earmarking will outweigh its pitfalls in practice.

Like all insurance schemes, macroeconomic insurance inevitably entails both ex-ante and ex-post moral hazard that can potentially inhibit its functioning. In the concrete case of the Cyclical shock insurance scheme, we see two main areas where moral hazard could occur:

- Ex-ante, countries have an incentive to deliberately reduce their own resilience to asymmetric shocks by disabling their own automatic stabilizers, triggering larger output gap deviations and thus relying on larger CSI payments that come at less costs than domestic automatic stabilizers, which have to be financed through the general budget.

- Ex-post, countries could generate the funds they owe or use the funds they receive in a way that does not maximize the effectiveness of the scheme towards more budget cycle convergence. More precisely, governments could resort to areas where multipliers are not the highest but where it seems most desirable in political terms.

In the following, we will discuss how these two sources of moral hazard should be mitigated through administrative and implementation provisions to make the scheme as efficient as possible while respecting the principles of budgetary sovereignty of member states and of democratic accountability.

4.1. A common rulebook for stabilization: mitigating ex-ante moral hazard

As we have shown in Chapter III, the complex structure of the output gap makes it relatively difficult for a participating country to "game the system," that is, to deliberately cut back its own automatic stabilizers to rely instead on outside transfers through CSI. Especially since CSI payments are based on individual differentials to the euro area average output gap and not on individual absolute output gaps, a country cannot be certain that its own cutbacks would be offset through outside transfers once other member states are acting in a similar manner. Therefore, the incentive to free-ride on the system is a lot less pronounced than in schemes that would be based on absolute indicators such as short-term unemployment or absolute GDP growth rates. Furthermore, the fact that there are a number of factors entering the output calculation including some that are relatively hard for governments to influence directly or indirectly makes it even less probable that countries will risk falling into deep recession by cutting back domestic stabilizers and failing to trigger offsetting outside payments. Finally, an attempt to bring down current output in order to obtain a more negative output gap and receive payments would likely be reflected in potential output estimates in the medium term, which would lead to more positive output gap estimates given same actual output, thereby further reducing the incentive of "gaming" the output gap calculation.

Nevertheless, there is an obvious need to coordinate a common standard of shock resilience to avoid a "race to the bottom" in the level of domestic stabilization. Hence, countries should settle on a common rulebook for macroeconomic stabilization policies. Importantly, this would not entail harmonization of social security systems or labor market institutions, but rather an agreement on minimum standards. A mechanism, either through judicial means or through a review mechanism, should ensure that a country's membership in the CSI scheme could be suspended if it persistently violated the minimum

standards. New members of the common currency would then also need to show compliance with the rulebook as part of the convergence criteria.

4.2. Earmarking in contributor countries

After payments are calculated, there will be an inherent tension, like in any principal-agent setup, between the overarching goal of the scheme, which is business cycle convergence, and the short-term objectives of both contributing and recipient governments. If a country has to contribute to the scheme in a given year, its contribution will tighten this country's inter-temporal budget constraint, no matter whether it generates the funds through additional revenue, budget cuts or borrowing. Nevertheless, for the macroeconomic effect that CSI is designed to achieve, timing is crucial. Hence, if a country offsets its contribution by borrowing from abroad (which it might very easily be able to do as it will face low real interest rates compared to other member states) and if households and firms do not instantly adjust their consumption and investment decisions accordingly, the stabilization effect in the year in question could be suboptimal.

As long as countries are running below capacity in absolute terms but have to contribute to the scheme as they are faring better than other euro area countries, it might be sensible to allow for deficit-financed contributions. While this might hamper to some extent the symmetric stabilization effect of the scheme, it will increase its political acceptability, as it will enable countries recovering from recessions not to endanger this recovery through budget cuts. If however a country runs above potential, the rules of the Fiscal compact already prohibit any deficit so that in this case, a country would have to finance contributions either by raising additional revenue or by cutting its budget. Hence, there would be no need for additional rules governing deficit-financed contributions.

To achieve the maximum convergence effects, contributing countries would need to raise taxes or cut expenditure where multipliers are the highest and have the shortest time lags. However, these might not be the increases or cuts that are the most feasible for the government from a political perspective. Hence, there might be an argument in favor of a central authority, such as the Commission, directing countries to enact cuts and tax increases in the areas

where it deems them the most effective. We remain skeptical about such an approach for two reasons: First, we attempt to propose a scheme that would be feasible under current primary law. An authority that could direct countries to make certain cuts or raise certain taxes in order to raise funds that then are disbursed to other member states would require substantial treaty change. Second, and more importantly, to achieve the maximum political acceptance in those countries contributing in a given year and not the least to adhere to basic principles of democratic accountability, it should be left to the democratic institutions in the country itself how it finances its contribution to European stabilization. Hence, we see no need for making a certain way of financing CSI contributions mandatory

4.3. Earmarking in recipient countries

While in principle the setup of the CSI scheme is symmetric, there might be a case why recipient countries should be treated differently from contributing countries in terms of earmarking: Firstly, the argument used above that primary law would have to be changed to permit earmarking does not hold for recipient countries as EU funds have come for a long time with "strings attached." Secondly, the more normative argument that countries should decide on their own loses some of its power, as it is foreign taxpayer money that is spent – although one could argue that countries have contributed to CSI before, and hence deserve being paid back.

Inversely to the situation of contributing countries, additional revenue through the CSI scheme will relax the inter-temporal budget constraint of a recipient country irrespective of how it decides to spend this additional revenue and hence can be expected to have some positive stabilization effect. Nevertheless, the channel through which these funds enter the economy, as well as the timing of spending, matters to the size of the multiplier and hence to the magnitude of the stabilization effect.

Therefore, there could be a potential for ex-post moral hazard as there might be a misalignment of the recipient country's preferences and the objective that the CSI scheme was designed to achieve. This would be especially true if countries used additional revenue for structural investment or infrastructure

projects, which have significant implementation lags. The obvious response to such a potential misalignment would be to earmark spending so that funds are used where multipliers are the largest and where decision and implementation lags are the shortest. This is an implicit assumption behind proposals to introduce a European unemployment insurance (e.g. Dullien 2008): social security transfers are assumed to have large multipliers, as marginal propensities to consume are high among those receiving benefits, and unemployment insurances face revenue shortfalls in downturns, making this area prone to budget cuts with high multipliers. Hence, so the idea goes, if funds are earmarked towards social security systems, they are spent effectively by preventing cuts in unemployment benefits.

However, this view might be incomplete. If one looks at the counterfactual where a country has to deal domestically with revenue shortfalls in social security systems, the experience in the recent crisis shows that the typical reaction is not to cut benefits first, but to offset shortfalls in the insurance schemes at least partially through general budget deficits or through budget cuts elsewhere, which might have lower multipliers than social security spending. Hence, any earmarking that would direct additional revenue to an area where it substitutes domestic government spending has practically the same effect as giving the country a lump sum payment without strings attached.

The only way to effectively earmark would therefore be to demand a recipient country to spend its additional revenue in areas where the multiplier is high, time lags are short and, crucially, where it does not crowd out domestic spending. While crowding-out can never be fully avoided, the decrease of social security contributions by employers and employees (payroll taxes) seems to be the best fit: When social security systems face revenue shortfalls during downturns, governments have very low incentives to cut payroll taxes as they already have to increase the support to the systems out of the general budget. A cut taking effect on January 1 of the respective year has an immediate demand side effect as employees have increased net earnings. On the supply side, the effect is less clear, but we can expect some increase in hiring and an increase of a country's competitiveness, especially in the case of larger cuts as unit labor costs decrease.

While, in the long run, incidence of payroll tax cuts needs not necessarily be where cuts are applied (for a discussion and recent empirical findings see Saez et al. 2010), we can assume that, in the short run, a large portion of additional revenue would actually end up in the pockets of employees. Furthermore, although theory predicts potentially larger multipliers for direct government spending than for tax cuts due to the fact that some of the increased net earnings of employees might go to savings, the absence of an implementation lag makes this instrument very appealing for the purposes of stabilization. Finally, it would be hard for a government to offset payroll tax cuts by other measures to get a hand on the additional revenue, as this would most likely mean increasing income taxes, which would have considerable political costs.

In sum, payroll tax cuts seems to be the most promising way to earmark CSI payments to recipient countries. Nevertheless, we remain agnostic about the concept of earmarking as a whole. There is no doubt that it can guarantee a certain degree of stabilization and that it might be appealing to countries that would be currently contributing to exert a certain control over how insurance payments are used. However, a country might itself simply be best suited to detect areas in its economy where multipliers are highest. Additionally, it is unclear whether misalignment of preferences will occur very often in practice, as governments have a strong political incentive to use the funds to stabilize their economies in downturns. Therefore, we would recommend carefully considering the political and economic costs and benefits of earmarking on both the contributor and the recipient side.

Note that we have not considered the case where the Commission or another body would identify for each country the appropriate way to spend additional revenue from the scheme or the right instrument to collect revenue to make payments into the scheme. The experiences so far with country-specific recommendations as part of the European semester have not been particular promising in this respect. Furthermore, such a system would require a significant transfer of sovereignty to the European level, which is not within our scope of proposing a framework that would function under current primary law. For both reasons, this scenario seems not appealing to us.

5. Administrative issues, membership, and ESM complementarity

• We briefly discuss the legal implications of CSI and assume that no or very limited treaty change would be needed.

• The administrative needs of CSI would be limited.

• All euro area members should be CSI members.

• The CSI scheme and the ESM complement each other.

The introduction of CSI gives rise to a host of questions regarding the administrative and political environment of the scheme as well as its legal implications and its relationship to other EU institutions and mechanisms. Furthermore, it should be made clear which countries should be part of the scheme and where membership would stop.

In this paper, we will refrain from making a clear judgment whether CSI would be possible under current primary law. It is however our understanding that, since CSI does not entail the transfer of additional sovereignty to a European institution, treaty change would not be necessary, or at least it would be possible under the simplified Treaty revision procedure. In addition, enhanced cooperation could be another tool to be used that would avoid a treaty change. Finally, as the CSI scheme is largely an intergovernmental arrangement, one could also imagine a legal structure akin to the ESM, although this could entail problems as to the use of Community institutions such as Eurostat that would not arise in the case of enhanced cooperation.

5.1. Administrative arrangements

There are five political decisions that have to be taken before the setup of CSI:

– There has to be an agreement on the method of how Eurostat should calculate the output gap.

– The value of the parameter has to be decided.

– The common rulebook for macroeconomic stabilization policies has to be adopted.

– There needs to be agreement on whether earmarking on the recipient side should be mandatory.

– The procedure how to amend the four decisions above over time has to be clear.

Once these decisions are taken, the administrative needs of CSI are limited. There are some technical capabilities necessary, as payments need to be administered based on Eurostat calculations. Furthermore, there has to be a procedure to make sure that countries comply with the common rulebook. This could be set up akin to the Excessive deficit procedure or like the system under the Fiscal compact for non-compliance with its debt-break provision. The former would give the Commission a stronger role; the latter would place the onus on fellow member states and on the Court. For the functioning of the scheme, both options seem viable as long as the threat of membership suspension in case of persistent breach of the rules is credible. In addition, a similar procedure would be necessary if it were decided to earmark funds on the recipient side.

5.2. Membership and phasing-in

The objective of CSI is to achieve business cycle convergence across the euro area in order to enhance the effect of monetary policy and hence to prevent the buildup of external and fiscal imbalances in euro area member states. To achieve these goals, it is imperative that all euro area members be part of the scheme – otherwise, even if only a small country was missing, there would be a large downside risk that the buildup of imbalances would be even more severe in the outsider country if all other business cycles were to converge. Therefore,

membership in the euro should mandatorily be linked to membership in the CSI scheme.

One could even envisage a longer-term phasing in to maximize structural convergence among CSI member countries before the scheme starts. A set of certain structural criteria could be selected as "minimum requirements" to qualify for CSI. Criteria should be chosen with the objective to enhance business cycle convergence across euro area member states.

In the design of the scheme one might consider whether it shouldn't be made possible to suspend a country's membership in the CSI scheme in exceptional cases. Such cases would apply when countries persistently fail to comply with the common rulebook on domestic stabilization, but also when there is fraud in the provision of necessary data. Suspension should be asymmetric and only take effect when a country is on the recipient side. The country's receivables would then go directly to the EU budget.

Once the political decisions mentioned above are made, all euro area members will have to become part of the scheme. Depending on the size of domestic automatic stabilization agreed upon in the rulebook, there will be a need for a two to four year phasing-in period where countries need to implement the rulebook before the start of the scheme. If countries fail to comply with the rulebook at the start of the scheme and if they were on the recipient side, their membership would be suspended and receivables would be channeled into the EU budget until they would be able to show compliance.

5.3. Interaction between crisis resolution and automatic stabilization

One point that was importantly pointed out in the Four Presidents' Report was that a Euro area stabilization device should not be "an additional crisis-solution mechanism" but should rather be complementary to the existing structure with the ESM at its core. Indeed, CSI is not designed to deal with the kind of crisis the euro area is currently undergoing. Instead, CSI can be thought of as the preventive arm of the crisis-solution structure: The better it works, the less likely balance-of-payments crises in the euro area become, which cause the

need for bailouts through the ESM. Thus, the criterion of complementarity as demanded by the four presidents should be fulfilled.

A special situation arises when a country is at the same time a member of the CSI scheme and in an ESM program. Then, two developments would cause problems for the country and for the functioning of CSI: On the one hand, as long as the country is in a recession due to the measures included in the program, the euro area average output gap would be skewed downwards and the country in question would receive large amounts while a lot of other member states become contributors – and all this due to a recession which is in reality induced by structural changes and not by cyclical fluctuations, and which happens too fast to correctly be picked up by output gap calculations. On the other hand, once a country recovers sufficiently, it will experience a certain period of rapid pick-up growth especially once it regains access to markets. Again, this rapid growth would in the beginning show up in the output gap as "overheating" and hence the country would be penalized for its catch-up.

These are very valid arguments, but one also needs to take into account the following: First, ECB interest rates apply everywhere regardless whether a country is in a program or not – hence business cycle convergence is necessary also in these countries. Second, it would be unfair if countries that have paid into the scheme were to lose support precisely at the moment when they need it the most – when they are in a deep recession. Third, the longer recessions and catch-up periods last, the more are they factored in by the output gap calculation as structural components – and hence they have less and less influence on the calculation of payments. For these reasons, we do not see a sufficient argument why CSI membership be suspended or altered once they are in a program – indeed, we would argue that CSI membership can actually help countries undergoing these reforms in the beginning of the process and might also bring about a more sustainable catching-up growth than it would have otherwise pursued.

Another important consideration is whether CSI membership and revenues would alleviate the pressure for program countries to undertake structural reforms. We do not think that this would be the case: First, program countries usually have urgent refinancing needs that go well beyond what they would receive via the CSI scheme – hence, they would still need ESM assistance and

would not be able to escape conditionality. Second, as mentioned above, output gap calculations are such that countries have an incentive to undertake reforms quickly, as they will then be picked up as "cyclical." The longer a country waits for reforms or the slower it implements them, the more of the lower growth rates will be perceived as "structural" by the indicator and hence will result in lower payments through CSI. Therefore, we do not see a contradiction, but rather a complementarity between CSI and ESM programs.

6. CSI in comparison to alternative proposals

• We discuss four alternatives to the CSI scheme:

• A euro area budget

• A European unemployment insurance

• Stronger capital market integration

• The current policy mix

There seems to be an emerging consensus that slow macroeconomic adjustment and persisting inflation differentials have been at the core of the crisis as they have fueled current account deficits and asset price bubbles, and that shortcomings in the construction of the EMU were some of the main drivers of these phenomena. However, there are different proposals being discussed alongside a cyclical stabilization fund like the CSI scheme. We have identified four main groups of alternative proposals:

   i.   A reformed EU/euro area budget

   ii. A European unemployment insurance

   iii. Stronger capital market integration and banking union

   iv. Rules-based fiscal policy, surveillance, and support contracts

We will discuss the advantages and shortfalls of the above vis-à-vis CSI in the following.

6.1. EU/euro area budget solutions

The reasoning behind the idea that an enlarged and reformed EU budget (Dullien and Schwarzer 2009) or a new euro area budget (Pisani-Ferry et al. 2013) could be a solution is straightforward: Stabilization in large federal states such as the United States, Canada or even Germany before the EMU happens to an important degree through federal budgets (cf. Von Hagen 2007 for a review). Therefore, it would be desirable to have all the means to stabilize inside a European budget, rather than to mimic automatic stabilizers between countries. While we agree that, in a federal Europe, stabilization should eventually happen through the common budget, this would entail steps that do not seem politically viable at present and where it is not clear whether they are economically desirable: First, this would mean that the current expenditure structure of the EU budget would need to be overhauled so that funds are spent in a way that stabilization could work everywhere in the Union. At present, a lot of the expenditure is concentrated in certain sectors and in certain regions without any cyclical component. Second, the common budget would need a revenue source that is sensitive to regional income shocks such as a European income tax. Third, agreement would be necessary that an even slightly increased common budget (Pisani-Ferry et al. (2013) propose a 2% euro area budget) would not only have a cyclical stabilization component, but also a structural one, as both cannot be disentangled within a budget. And fourth, as individual business cycles are indeed to some extend correlated, this would mean that the European budget would have to be allowed to go temporarily into deficit. All four conditions seem highly unlikely to be fulfilled in the near future in light of the recent debate on the Union's multiannual financial framework, notwithstanding the hardship entailed in the necessary sovereignty shifts and treaty changes. Therefore, such solutions do not seem to present a viable alternative to CSI at this point.

6.2. A European unemployment insurance

An idea that has gained increasing traction in recent months is the idea of a European unemployment insurance. While there are many nuances of the idea, the proposal by Dullien (2008) seems to be the standard model to which most proponents refer. In this model, basic benefits at a level below current

national levels would be paid to the unemployed for a limited amount of time out of a common pool and would be complemented by national insurance systems. Hence, while individual benefit levels and durations and thus job search incentives would remain unchanged, the common pool would provide macroeconomic stabilization.

This idea has appealing features: It comes very close to the systems of automatic stabilization that we know from national levels without the need to transfer sovereignty to Brussels, and it seems to channel funds directly to where countries need it most in times of recession – their social security systems. However, it has some important pitfalls: First, as we have pointed out above, as long as benefits out of the common pool are lower than the current national level, they will replace payments that would have been made by the national government, hence effectively handing the government a blank check to use the freed funds wherever it wants. Thus, unemployment insurance faces the exact same ex-post moral hazard concerns as the CSI scheme. Furthermore, the ex-ante moral hazard looks much worse than under CSI, as one additional unemployed person translates directly into more payments, whereas CSI payments are much harder to "game" due to the complexity of the output gap. Thus, a large degree of labor market harmonization would be required in order to avoid free riders, including close monitoring of how unemployment is measured in member states. Additionally, two aspects should not be overlooked: First, a European unemployment insurance would have to be able to run deficits due to business cycle correlation. The CSI scheme would be balanced every year. Second, unemployment insurance just smoothens income from labor, not from capital, whereas CSI factors in both. In sum, we argue that CSI seems at least as promising if not better suited for macroeconomic stabilization in the euro area.

6.3. Enhanced financial market integration and banking union

A longstanding argument already prior to EMU was that financial market integration, i.e. the reduction of home bias in portfolios, would provide a strong stabilizing function. This argument has resurfaced as part of the discussion on banking union (cf. Gros 2012). There is no doubt that a fully-fledged

banking union including a common resolution mechanism and a deposit guarantee scheme would lead to a decrease in home bias by decoupling banks' creditworthiness from the one of their respective sovereign. Nevertheless, the example of the US, where common deposit insurance and resolution has been in place for decades, shows that less than two thirds of shocks are smoothed by capital and credit markets (Bayoumi and Masson 1998; Asdrubali et al. 1996). This leaves a large part unsmoothed or up for smoothing by governments. Theoretically, we can explain this through the fact that macroeconomic insurance has externalities and hence insurance through capital markets is necessarily suboptimal (Farhi and Werning 2012). Additionally, financial markets only smooth income from capital, leaving income from labor unaffected. By using the output gap, the CSI scheme takes into account both sources of income. In sum, although banking union will indeed play a role in providing more macroeconomic insurance, it is not well equipped to provide alone the level and the quality of stabilization that could be achieved by combining it with a device like CSI.

6.4. Rules-based fiscal policy, surveillance, and support contracts

Finally, there is what has evolved as consensus in the European Council so far and what could be further developed: A mix of fiscal policy based on strict rules, stronger macro-prudential surveillance, and so-called "contracts for competitiveness" (cf. December 2012 European Council conclusions). All of these have in common that they are entirely built on discretionary mechanisms. The fiscal rules – the enhanced Stability and growth pact and the Fiscal compact – contain a greater degree of 'automaticity' than the old SGP used to, but nevertheless they remain contingent on individual member states' willingness to comply at a given moment and that of the other member states to enforce rules. The same goes for the macro-surveillance tools (the 'preventive arm' of SGP, the Macroeconomic imbalances procedure, and the countercyclical capital requirements as part of CRR/CRD): They are at the discretion of member states, either as a whole or individually. The past experiences with the SGP have shown that such reliance on discretionary action does not yield the necessary results. Additionally, it is very difficult from a political economy standpoint for authorities in booming economies to apply any kind of

discretionary measures that hamper further economic growth – however, this would be necessary for greater business cycle convergence. Finally, the idea that reforms in slumping economies could be supported by 'reforms for solidarity' contracts seems appealing, but is entirely asymmetrical as it does not address surplus countries, and furthermore encourages structural spending where cyclical spending would be most appropriate to address macroeconomic stabilization. Thus, we do not think that this policy mix will advance macroeconomic stabilization.

7. CSI 1999-2012: simulated effects

- We use the output gap data published by the Commission to simulate the effects the scheme would have had since the beginning of the euro area.

- The result of our analytical simulation exercise is very promising: Given good output gap estimates, CSI has a strong smoothing effect (reduction of average deviations from the euro area mean by 40%).

- The result of our real-time simulation exercise is ambiguous: While overall, the CSI scheme would have smoothed output gaps in the right direction, considerable ex-post adjustments of real-time output gap data would have reduced to an important degree the effect.

- Since a substantial part of the problems arising in our real-time simulation stem from changes in the methodology and from the massive shocks of the global financial crisis and the euro crisis, we conclude that CSI nevertheless can have a considerable smoothing effect (reduction of average deviations by around 20% to 25%) in the long run at total payments of less than 0.2% of euro area GDP.

7.1. Basic assumptions

We conduct two comprehensive simulation exercises in order to estimate the effect the CSI scheme would have had if it had been introduced from the beginning of the euro. First, we show that, had good real-time data about output gaps been available, smoothing of business cycles would have been significant (reduction by 40% in average standard deviations of output gaps from the euro area average, see Section 2). Second, using real-time data as it was available, we show that, under the extremely averse conditions during the global financial crisis and the euro crisis, the CIAF would still have had a positive effect on business cycle convergence, but this effect is considerably smaller (reduction of average standard deviations by around 15%, see Section 3), reflecting the high ex-post adjustments during the global financial crisis and the euro crisis, and methodological challenges of the output gap calculation. Finally,

we discuss the challenges raised by our results and argue that our simulations indicate that CSI can have a positive effect in the future.

For our two simulation exercises, we assume that the amount and timing of payments is as introduced in Chapter II. In particular, we assume that, for a given year, a fraction of the distance of a country's percentage output gap to the euro area average is compensated via payments over the course of the year, where 50 percent of total payments are paid at the beginning of the year, 25 percent in the middle, and 25 percent at the end. For our simulations, we set, but also report the overall effect of CSI as a function of this parameter.

In order to estimate the effect of CSI payments on euro area economies, we make the following assumptions:

– First, we assume that CSI payments only affect actual GDP and not potential GDP, that is, we assume that the payments contribute to the cyclical, but not to the structural component of growth. This allows us to simulate the effect of payments on subsequent output gap estimates.

– Second, we assume that payments are based on this year's GDP net of transfers for this given year, but including the effect of payments from previous years. Hence, GDP data is updated in our simulation, but the underlying output gaps for a given year are those without the effect of the transfer for this year[8].

– Third, we make the following assumption on fiscal multipliers: After a payment is made, 40 percent of the payment amount is added to the GDP within the first six month, another 40 percent is added within the next six months, 25 percent is added in the first half of the second year after payment, and 15 percent in the second half, adding up to a total effect of 120 percent of the payment over two years. A total multiplier of 1.2 is in line with recent estimates of the International monetary fund (IMF, 2012),

8. In our simulation, we have to make an assumption about when payments from previous years are picked up by the output gap estimates. We assume that the first and the second payments in a year are picked up in the estimates for the subsequent year, but that the payment at the very end of the year can not already change the first estimate in the consecutive year. For this last payment, we make the (arbitrary) assumption that it will then be taken into account for the compensation payments at the end of the year. This leads to a slight shift of payments towards the end of the year; however, this assumption is not critical to our findings, as it does not significantly change the overall smoothing results

and the temporal structure reflects our belief that the payments are not fully effective immediately, but are used in a way that guarantees quick pass-through and limits time lag. The assumption on the magnitude of the multiplier is not critical for the functioning of CSI: Our results are robust to variations in the multiplier, which essentially have the same effect on smoothing (but not on net payments) as variations in a.

– Fourth, we assume that GDP does only deviate from its historic path by the effects of CSI payments. In particular, we do not model ex-post or ex-ante moral hazard and assume that the multipliers capture all effects of fiscal policy, including second-order effects.

– Finally, we assume that countries would have joined the scheme only when they also joined the euro.

As benchmark historical data, we use the output gap and GDP datasets from the Commission's winter 2012/2013 forecast, published on February 22, 2013. All results are denoted in 2005 euros in order to allow for comparisons across time.

7.2. An analytical result about the effect of CSI

In order to show that our concept is analytically viable, we start by using the output gap data from the winter 2012/13 forecast exercise to determine potential output and simulate the effect of the CSI scheme on output in the member states from the beginning of the euro area to 2014 (last available forecast data). Our simulation shows that CSI causes a substantial smoothing of business cycle position differences across member states. The average standard deviation relative to the euro area average decreases by 40.0%, with the total amount of net flows at 0.194% of euro area GDP, or less than a fifth of the EU budget. Figure 8 shows one standard deviation above and below the euro area average with (blue) and without (red) the CSI scheme. As one can see in the graph, smoothing effects are the strongest in years when differences are the most pronounced.

FIGURE 8 ► **Standard deviations above and below EZ output gap pre- (yellow/light) and post-transfers (blue/dark)**
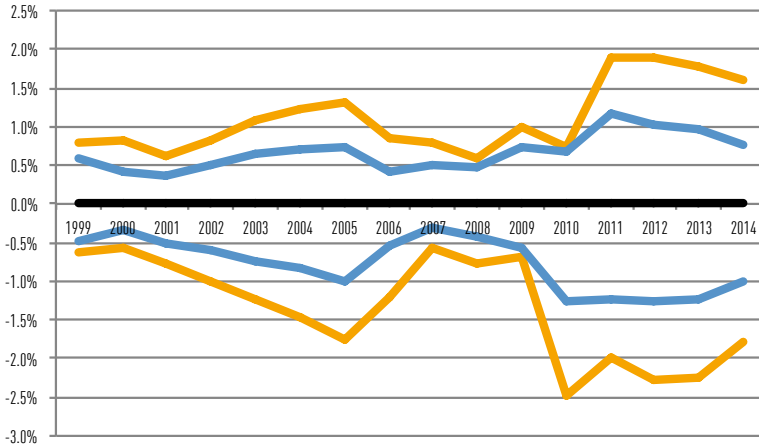
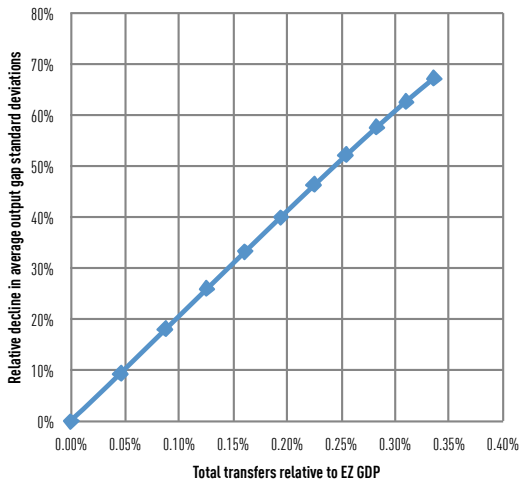Source: CIRCABC and authors' calculations

The overwhelming majority of individual annual payments represent below 1% of a members state's GDP in the given year (see Table 2b, Annex C). Outliers are countries transitioning into the euro at an undervalued exchange rate, which usually find themselves with outflowing transfers between 1 and 2% of GDP in the first two or three years of membership, and Greece in the last three years, which would have seen a strong inflow of payments around 4% of its GDP due to its deep recession. As one can see in the detailed tables on individual transfers in Annex C, none of the eleven founding members of the euro would have had a net position worse or better than 0.25% of its total GDP over the period 1999-2014, nine countries are within a 0.2% band, which comes close to a net-zero position. Greece is a special case due to the depth of its current recession; the five other 'newcomers' have not been sufficiently long in the euro to make a statement on their long-term net position. Even France, whose overall net payments into the system of about €52 billion seem high in absolute terms, would not have paid more than 0.2% of its total GDP into the scheme. One also has to keep in mind that 2014 is an arbitrary cutoff, and it is by definition highly unlikely that all countries achieve net-zero at the same moment in time.

TABLE 2b ► **Simulated transfers (relative to actual GDP)**

Germany is an excellent illustration of the proposal: The scheme would have helped and supported German structural reforms early in the last decade, with payments from the scheme to Germany in the years 2003-2005 amounting to a total of around €42 billion. In turn, Germany would support those countries in worse conditions than itself during 2012 and 2013 with similar total payments of about €40 billion. The overall net balance of Germany between 1999 and 2014 would have almost perfectly hit net-zero, at – 0.01% of GDP, with peaks of transfers reaching around 0.8% in both directions.

The reduction in the standard deviation as well as the amount of net flows is a direct function of the policy variable *a*. Table 1 indicates how different levels of affect average standard deviations and provides an estimate of possible net flows through the scheme. The relationship is approximately linear and represented graphically in Figure 9.

FIGURE 9 ► **Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP**

Source: CIRCABC and authors' calculations

7.3. A simulation exercise using real-time data

The previous result makes a strong case for the effectiveness of CSI in smoothing business cycle divergence across the euro area based on the best available data. We now check how the CSI scheme would have performed from the beginning of the euro area to 2012 (last available real-time data) using the real-time output gap data available from the Commission at the respective times. Our results show that ex-post adjustments of the output gap estimates pose a great challenge to the effectiveness of our scheme. Nevertheless, even under the extreme conditions of the crises and ongoing methodological evolution of output gap measurements over the last decade, our simulation shows a significant smoothing effect across member states. With total net flows of around 0.161% of GDP (less than the above), the average standard deviation relative to the euro area average decreases by 14.8% (see Annex D for details). While the difference in smoothing to the above analytical estimates (38.4% over the same timespan) is substantial due to high ex-post adjustments, we argue below that there is reason to assume a better performance in the future, and that inaccurate smoothing is still substantially better than no smoothing at all.

Our real-time analysis is based on a dataset with more than 17,000 individual output gap estimates for euro area countries as they were published by the Commission twice a year since autumn 2002, covering the output gaps for the years 1981 to 2014. Since real-time data is not available before autumn 2002, we impute the missing data for the years 1999 to 2002 by taking the estimates from autumn 2002. Also, we impute other missing data in the 2002 to 2012 timeframe by the earliest available estimate for the respective output gap, corrected by average adjustments for the respective year.[9] Our overall results are robust to both assumptions: Neither restricting our sample to the years 2003 to 2012, nor imputing the values without corrections, has a substantial effect on our findings.

Ex-post adjustments bring with them the question to which degree too high or low payments due to inaccurate forecasts should be compensated later. In our simulation, we assume that payments are adjusted ex-post according to the data from February 2013 as long as they still fall within the current year, but

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9. A total of 742 missing values were imputed in this way, in particular for smaller euro area countries that joined the common currency rather late, and for which sufficient AMECO data was not available at that time.

not after this (see also chapter II). To summarize, the payments we simulate in the real-time exercise are as follows:

- At the beginning of the year, payments are calculated based on the previous year's autumn forecast, and 50 percent are disbursed at that time.

- In the middle of the year, the total payments for this year are recalculated using the data published in May. An additional 25 percent is disbursed together with a compensation for the adjustment on the 50 percent paid in January.

- At the end of the year, the total payments are again recalibrated using the new autumn estimates. The last 25 percent for this year is disbursed, and the adjustment on the 75 percent already paid is compensated.

- After this, there is no more compensation for payments in that year.

In our simulation, we take into account that compensation payments are disbursed only at the time of adjustment, entailing an additional time lag.

As before, the overwhelming majority of individual annual payments represent below 1% of a members state's GDP in the given year (see Table 5b). However, high ex-post adjustments of the output gap combined with the time lag in the effect of the transfers now significantly alter the effect on the output gap, and the positive overall effect is driven by the last years in the period, for which adjustments are smaller due to improved methodology and shorter timespan to the 'final' output gap estimates. The scheme still has a smoothing effect on output gap deviations across the euro area in most years, and only small pro-cyclical effects in 2005 to 2007, reflecting large ex-post adjustment in the crisis and not exceeding a 9% increase (Table 6). While still being effective overall, the scheme, based on the published real-time data, does not bring all countries closer together – some, like Italy, are pushed further from the euro area average in many years, albeit only to a very limited extend. While the effect on the German output gap goes in the right direction, the smoothing during Germany's downturn is less effective (Figure 13).

FIGURE 13 ➤ Country-specific smoothing effects and payments (Germany)

Legend: CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI
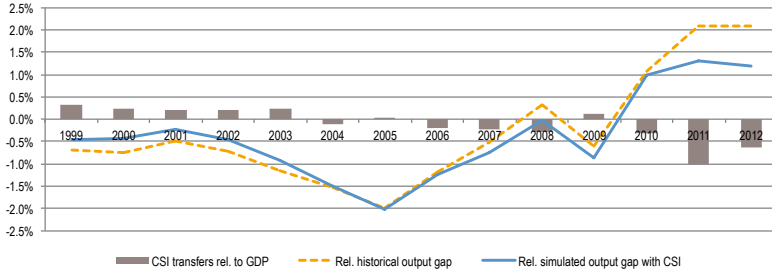
Source: CIRCABC and authors' calculations

Since high transfers now bring with them an increased risk of pro-cyclicality through ex-post adjustments, the dependence of the amount of smoothing on the policy variable a is not linear any more. Indeed, Figure 12 shows that a too high choice of a may curb the effectiveness of the scheme. Our calibration of $a = 0.5$ is confirmed to be a good compromise between effective smoothing and limited net payments.

FIGURE 12 ➤ Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP
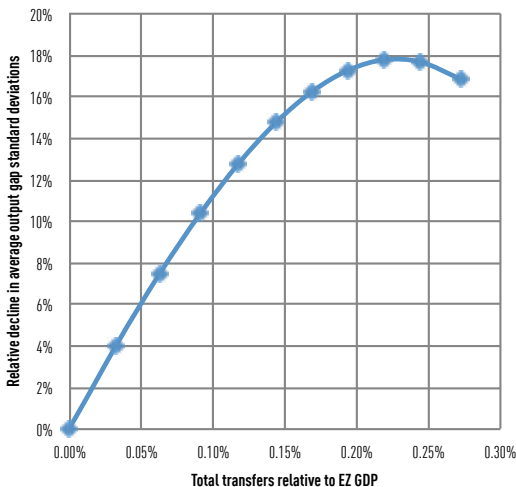
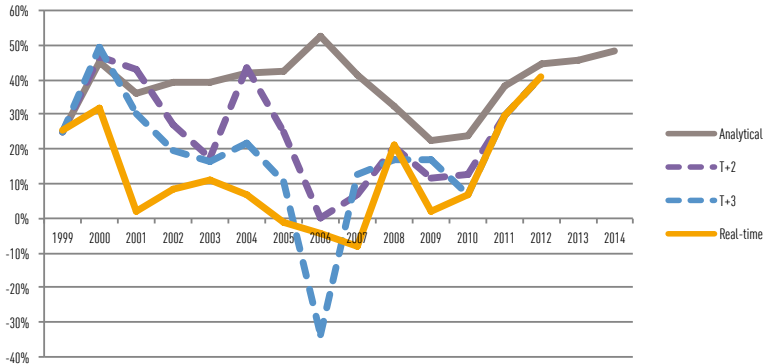Source: CIRCABC and authors' calculations

While these findings highlight the challenges that come through ex-post adjustments of the output gap, two reasons convince us that CSI would perform better than shown here were it introduced now (and thus results would be closer to the analytical results reported above):

- First, the methodology for calculating the output gap was altered repeatedly over the period from 2002 to 2013, with the last major revision taking place in 2010. These revisions are likely to strongly contribute to the output gap revisions that drive the pro-cyclical effects described above. While we do not argue that there would have been considerably less adjustment absent methodological changes, changes in the methodology are more problematic since we now compare estimates for one output gap that were computed using different methods; in particular, our final estimate from February 2013, against which all results are measured, is computed using an altered method from that used for most of the real-time data. This view is supported by the observation that output gap data, especially of these countries that have been in the database from the beginning, is often significantly adjusted a long time after the actual year that is estimated, which we partly attribute to changes in methodology. Once methods are not altered as much anymore, we would not only assume that the quality of the estimates will be better, but also that revision effects will play a smaller role.

- Second, the sudden, severe, and unexpected slumps caused by the global financial crisis and the euro crisis led to extreme adjustments in economic fundamentals that impact our simulation results greatly. This effect is particularly clear when we look at the adjustments of previous output gap estimates in the Commission's spring 2009 forecast, which were significant. Throughout all euro area countries, output gap estimates for the preceding years were corrected upwards, often by five percentage points and more, reflecting that the Commission had significantly overestimated potential output before the crisis. Figure 6 (see p. 65) illustrates the adjustments of the 2008 output gap data relative to the first relevant forecast in autumn 2007. As a result, especially the output gap forecasts for 2005–2007 were revised heavily, which is consistent with the weak performance of the scheme in 2006 and 2007. In the absence of such extreme

shocks, we therefore have reasons to believe that the performance would be closer to the analytic result in Section 2.

In order to back these claims up and develop an estimate for the future effectiveness of the scheme, we provide evidence from the available vintage output gap estimates. Our findings suggest that a part of the reduction of effectiveness of CSI in our sample is indeed due to the evolution of the methodology, with an additional loss in effectiveness coming through the extreme ex-post adjustment of estimates of economic fundamentals during the crisis. To show this, we make the assumption that output gap estimates will – in the future given improved methods and absent methodological changes – be close to the real values within two or three years after they are realized, that is, we assume that very late output gap adjustments (three or more years after the initial spring estimate) are mainly due to changes in the methodology. We then measure the simulated effect of the scheme not against the 2013 data, but against the estimates that were available in the spring forecast two or three years from the respective year, which we assume to be the 'real' output gaps. Table 6 shows that the CSI scheme would then have reduced average output gap standard deviations by 26% (two years) and 22% (three years) respectively, documenting that late adjustments (which we assume are due to changes in methodology) are a big driver behind the reduced performance of the scheme in our real-time analysis. Furthermore, the scheme has a strong smoothing effect in all years except for 2006 and 2007 (see Figure 14), which are the years most affected by the crisis-induced adjustments, consistent with our second argument. In order to provide further evidence, we repeat the real-time simulation exercise for the timeframe 1999 to 2007, measured against the 2008 data (before the large adjustments of 2009). The reduction in average standard deviations is now above 20%.

FIGURE 14 ► Smoothing effect (measured in terms of decline in output gap standard deviations) by year and simulation scenario

Source: CIRCABC and authors' calculations

All in all, we are therefore reasonably confident to conclude that a reduction of average standard deviations by at least 20% to 25% at total payments of less than 0.2% of euro area GDP is attainable through our fund in the long run. Figure 15 shows that this target may be reached by a suitable choice of the policy variable even if future adjustments are more severe than those that happen within the first three years in the historical dataset.

FIGURE 15 ► **Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP by simulation scenario, with smoothing target of decline of 20-25% standard deviations at 0.2% of Eurozone GDP**
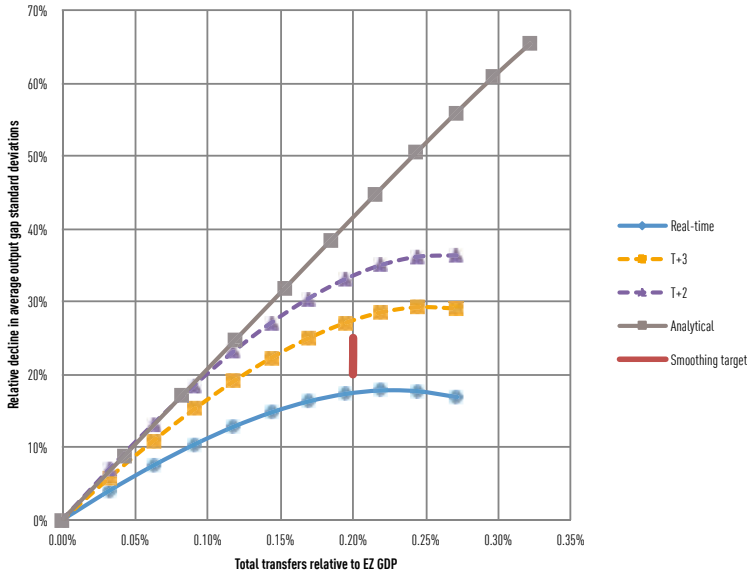
Source: CIRCABC and authors' calculations

CONCLUSION

In this study, we have shown that Cyclical shock insurance based on output gap differential could be a technically feasible and economically sensible solution to the lack of automatic stabilization in the euro area. Even using real-time data, a small amount of payments of less than a fifth of the EU budget could already translate into a significant reduction of deviations of individual output gaps from the euro area average. Therefore, the CSI, combined with banking union and a completed single market, could be a building block in making EMU more resilient and prevent the buildup of the kind of imbalances that have led to this crisis.

In further research, one could try to model the outcomes of CSI by using more sophisticated structural models to take into account dynamic effects. However, we are convinced that such a robustness test would confirm our simulation results. Furthermore, more research needs to be done to ameliorate the calculation of the output gap to make it even more reliable as a policy indicator. Finally, research could also be conducted to search for composite indicators that would mimic the results of the output gap while being more reliable – however, this kind of research is beyond the scope of this study.

In sum, we hope that this study will inform the ongoing debate on a euro area cyclical stabilization mechanism and will contribute to the momentum to complete Economic and monetary union.
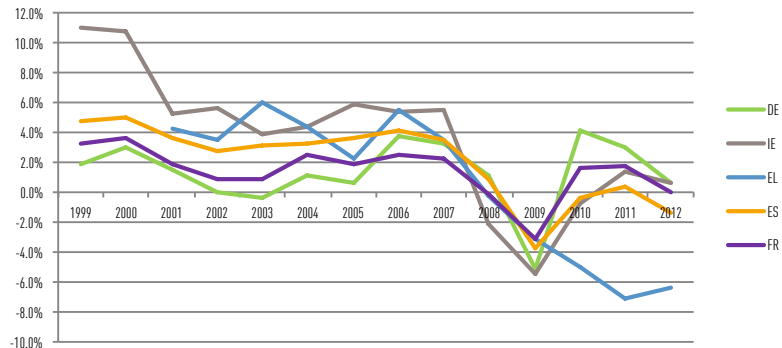
ANNEX A:
GROWTH, INFLATION AND PRODUCTIVITY IN THE EUROZONE

FIGURE 1a ► Real GDP growth in the Eurozone, 1999-2012
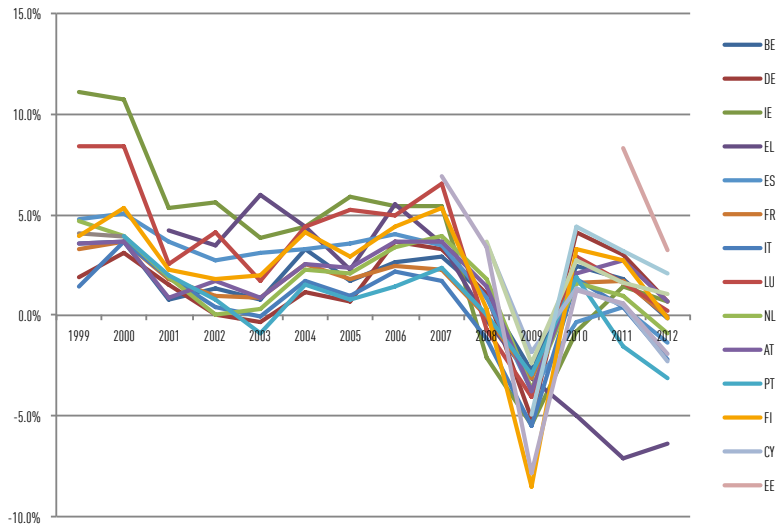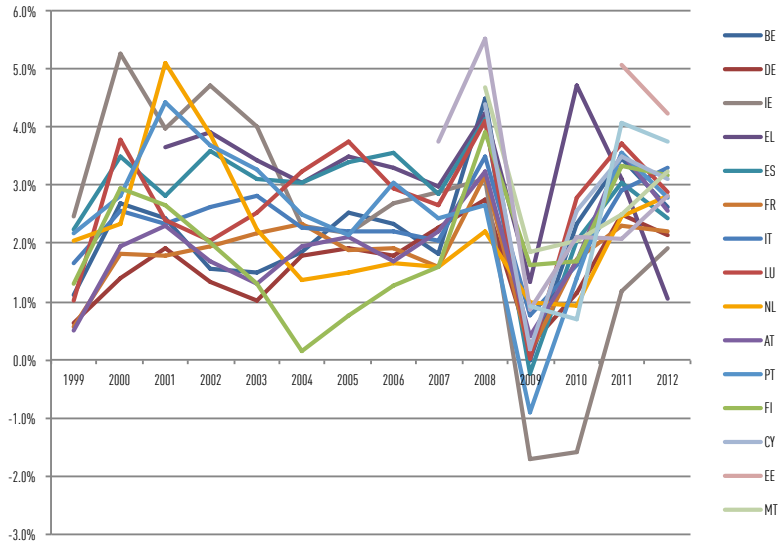

Source: AMECO February 2013

FIGURE 1b ► Real GDP growth in selected Eurozone countries, 1999-2012

Source: AMECO February 2013

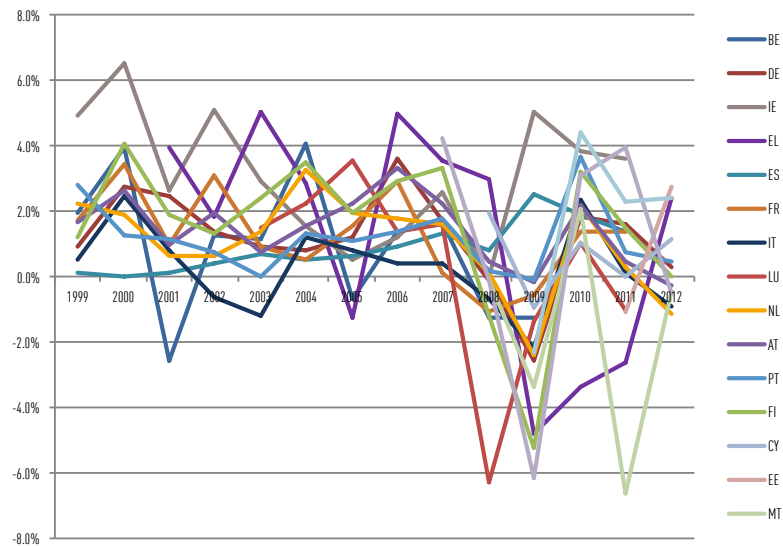**FIGURE 2a** ► Inflation (HICP) in the Eurozone, 1999-2012

Source: AMECO February 2013

FIGURE 2b ► Inflation (HICP) in selected Eurozone countries, 1999-2012

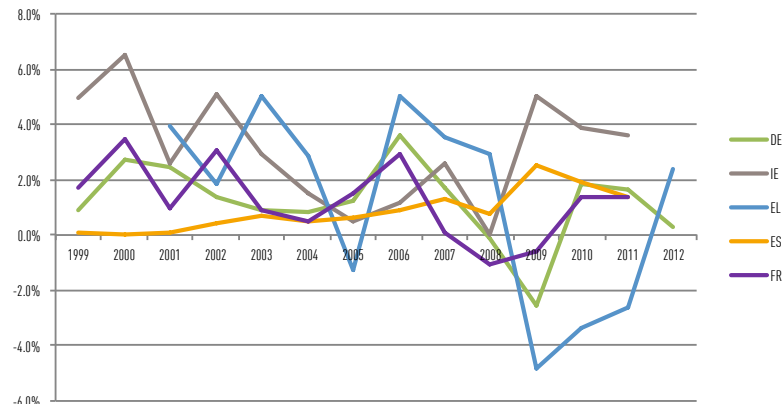Source: AMECO February 2013

FIGURE 3a ► **Labor productivity growth in the Eurozone, 1999-2012**

Source: Eurostat March 2013

FIGURE 3b ► **Labor productivity growth in selected Eurozone countries, 1999-2012**


Source: Eurostat March 2013

FIGURES 4a, b, c ► **Real GDP growth, inflation (HICP) and labor productivity in Spain, 1999-2012**

Source: AMECO February 2013, Eurostat March 2013

ANNEX B
ADJUSTMENTS OF OUTPUT GAP ESTIMATES

FIGURE 5 ➤ Average adjustments of absolute output gap estimates relative to the autumn estimate in the year preceding the realization of the gap over the period 2002-2012
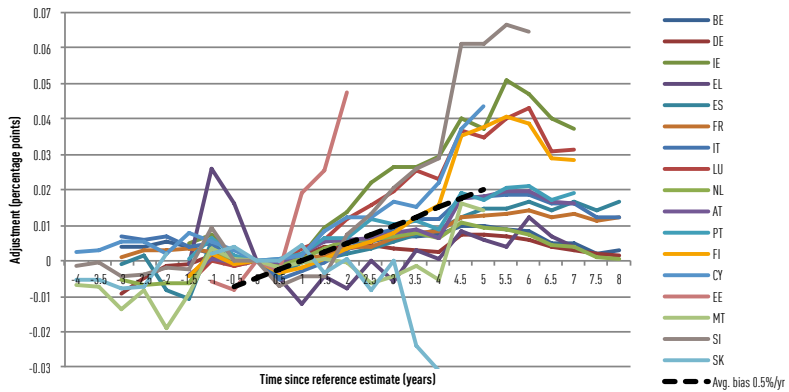
Source: CIRCABC February 2013 and authors' calculations

FIGURE 6 ➤ Adjustments of absolute 2008 output gap estimates relative to the 2007 autumn estimate over the period 2002-2012

Source: CIRCABC February 2013 and authors' calculations

FIGURE 7a ► Average adjustments of relative output gap estimates relative to the autumn estimate in the year preceding the realization of the gap over the period 2002-2012

Source: CIRCABC February 2013 and authors' calculations
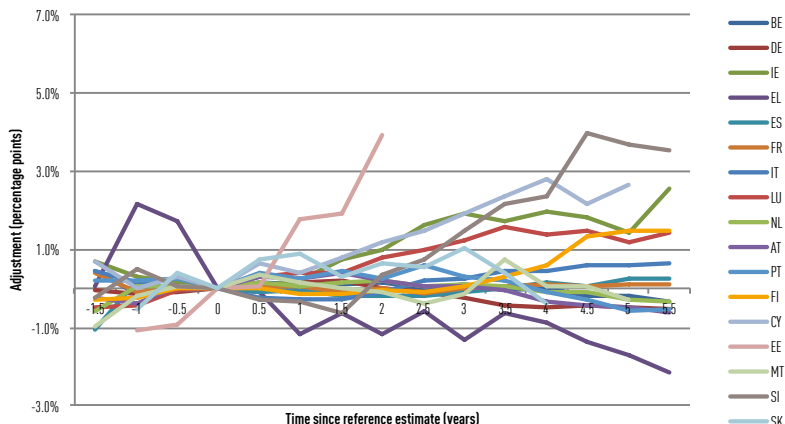
FIGURE 7a ► Average adjustments of relative output gap estimates relative to the spring estimate in the year of the realization of the gap over the period 2002-2012
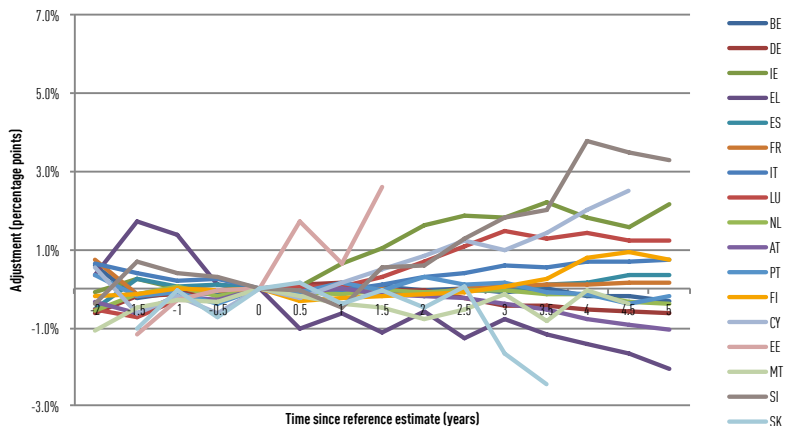
Source: CIRCABC February 2013 and authors' calculations

ANNEX C
RESULTS OF THE ANALYTICAL SIMULATION EXERCISE

FIGURE 8 ➤ Standard deviations above and below EZ output gap pre- (yellow/light) and post-transfers (blue/dark)
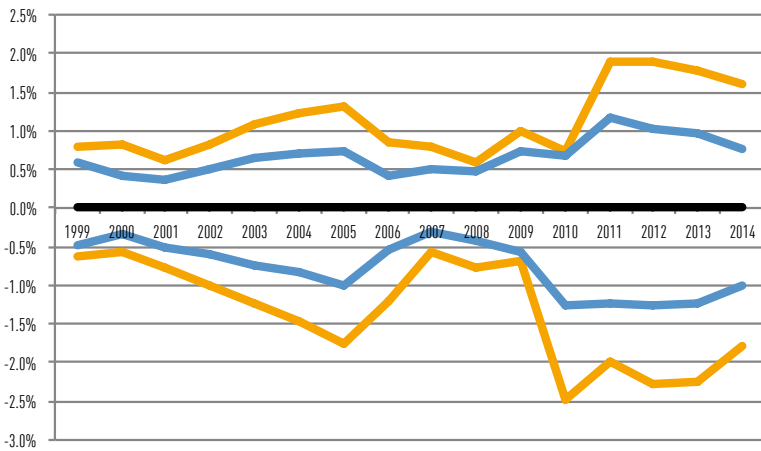
Source: CIRCABC and authors' calculations

FIGURE 9 ► Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP
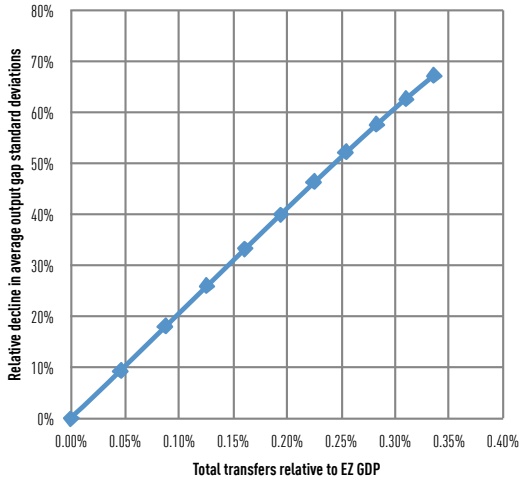
Source: CIRCABC and authors' calculations

TABLE 1 ► Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP

CONVERGENCE MULTIPLIER	RELATIVE DECLINE IN AVERAGE OUTPUT GAP STANDARD DEVIATIONS	TOTAL TRANSFERS RELATIVE TO EZ GDP
0.0	0.0%	0.000%
0.1	9.4%	0.045%
0.2	18.0%	0.087%
0.3	25.9%	0.125%
0.4	33.2%	0.161%
0.5	40.0%	0.194%
0.6	46.3%	0.225%
0.7	52.2%	0.255%
0.8	57.6%	0.283%
0.9	62.7%	0.310%
1.0	67.3%	0.336%

Source: CIRCABC and authors' calculations

TABLE 2a ► Simulated transfers (in bn 2005 euros)

	BE	DE	IE	EL	ES	FR	IT	LU	NL	AT	PT	FI	CY	EE	MT	SI	SK	TOTAL PAID/RECEIVED
1999	– 0.09	7.14	– 1.50	–	– 1.88	– 3.32	3.68	– 0.16	– 1.79	– 0.19	– 1.32	– 0.57	–	–	–	–	–	10.82
2000	0.16	6.08	– 1.43	–	– 0.68	– 3.58	– 0.02	– 0.33	0.15	0.37	– 0.44	– 0.29	–	–	–	–	–	6.76
2001	1.70	3.15	– 0.14	1.17	– 1.35	– 4.96	– 2.82	– 0.02	1.35	1.62	– 0.25	0.57	–	–	–	–	–	9.55
2002	0.57	6.67	– 0.60	1.22	– 1.80	– 7.00	– 3.40	– 0.18	3.65	0.49	– 0.19	0.57	–	–	–	–	–	13.17
2003	0.50	10.82	– 0.19	– 0.59	– 4.40	– 8.94	– 3.20	0.08	4.03	0.77	0.65	0.46	–	–	–	–	–	17.32
2004	– 1.07	13.88	0.48	0.04	– 1.97	– 11.61	– 4.36	0.07	3.33	0.76	0.58	– 0.13	–	–	–	–	–	19.14
2005	– 0.68	18.13	– 0.52	0.71	– 4.06	– 11.30	– 5.63	– 0.06	2.33	0.67	0.61	– 0.19	–	–	–	–	–	22.45
2006	0.06	7.73	– 0.03	– 0.71	– 0.84	– 5.33	– 4.92	0.02	2.35	0.83	1.38	– 0.53	–	–	–	–	–	12.36
2007	0.02	3.10	– 0.95	– 0.28	2.93	– 1.61	– 1.86	– 0.27	0.14	0.30	0.89	– 1.89	–	–	–	– 0.52	–	7.38
2008	– 0.49	– 4.81	1.32	0.12	4.52	1.94	0.67	0.16	– 1.96	– 0.56	0.89	– 1.13	– 0.16	–	– 0.03	– 0.50	–	9.62
2009	– 2.04	8.33	0.26	– 2.26	2.07	– 7.10	1.91	0.05	– 1.77	– 0.59	– 0.83	2.37	– 0.25	–	– 0.05	0.26	– 0.37	15.24
2010	– 1.15	– 14.85	1.88	3.50	12.34	1.81	– 1.87	– 0.08	– 0.33	– 0.28	– 0.74	0.34	– 0.12	–	– 0.02	0.10	– 0.52	19.96
2011	– 1.19	– 21.56	0.83	7.21	10.28	1.42	3.49	0.02	1.05	– 1.54	0.78	– 0.24	– 0.08	– 0.11	– 0.01	0.05	– 0.40	25.13
2012	– 1.23	– 18.82	– 1.02	7.55	7.73	1.47	5.14	– 0.05	1.28	– 2.02	0.89	– 0.12	– 0.04	– 0.19	– 0.03	0.10	– 0.62	24.15
2013	– 1.37	– 16.66	– 1.82	7.57	5.41	3.06	4.44	– 0.13	1.61	– 2.13	0.79	– 0.53	0.07	– 0.19	– 0.05	0.17	– 0.25	23.12
2014	– 0.81	– 11.96	– 1.50	4.30	0.04	6.37	3.28	– 0.08	1.60	– 1.49	0.44	– 0.18	0.04	– 0.12	– 0.02	0.12	– 0.03	16.20
TOTAL	– 7.10	– 3.64	– 4.93	29.55	28.33	– 48.66	– 5.50	– 0.97	17.01	– 2.98	4.13	– 1.47	– 0.53	– 0.61	– 0.22	– 0.21	– 2.19	252.37

Source: CIRCABC and authors' calculations

TABLE 2b ► Simulated transfers (relative to actual GDP, in %)

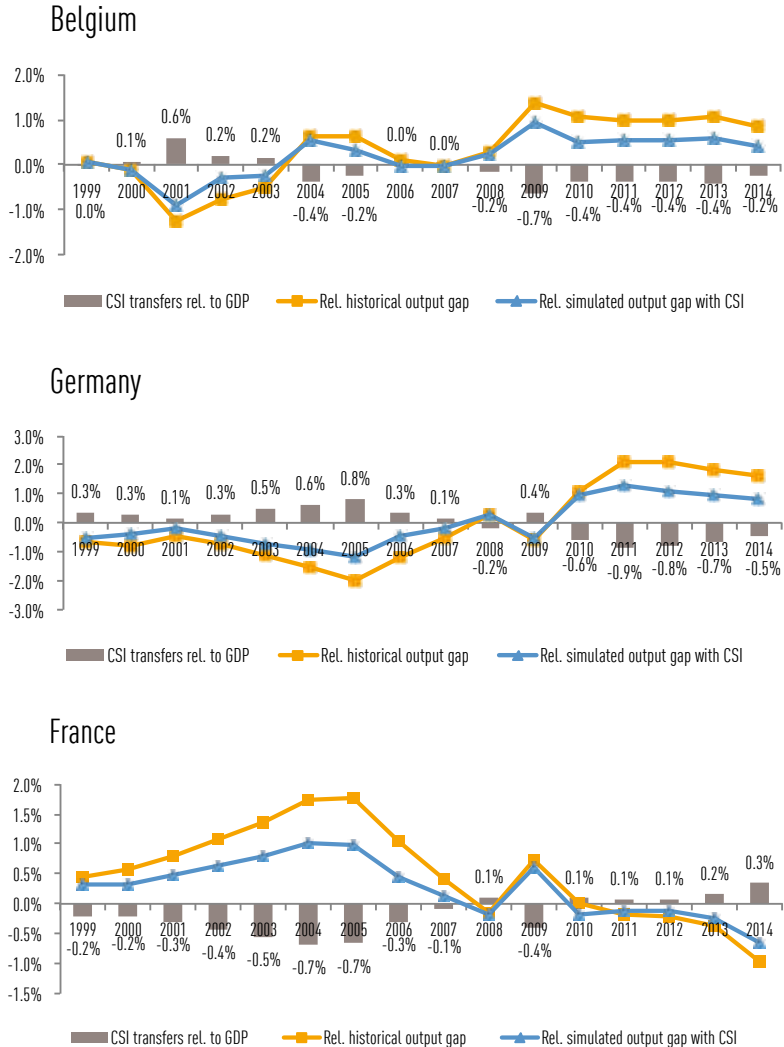|	BE	DE	IE	EL	ES	FR	IT	LU	NL	AT	PT	FI	CY	EE	MT	SI	SK	TOTAL PAID/ RECEIVED REL TO ACT. EZ GDP
1999	-0.03	0.34	-1.31	-	-0.26	-0.22	0.28	-0.70	-0.39	-0.09	-0.93	-0.43	-	-	-	-	-	0.154
2000	0.06	0.28	-1.13	-	-0.09	-0.23	0.00	-1.30	0.03	0.16	-0.30	-0.21	-	-	-	-	-	0.092
2001	0.60	0.14	-0.11	0.71	-0.17	-0.31	-0.20	-0.07	0.27	0.71	-0.17	0.40	-	-	-	-	-	0.125
2002	0.20	0.30	-0.43	0.71	-0.22	-0.43	-0.24	-0.66	0.74	0.21	-0.12	0.39	-	-	-	-	-	0.171
2003	0.17	0.49	-0.13	-0.32	-0.52	-0.55	-0.23	0.29	0.81	0.33	0.43	0.31	-	-	-	-	-	0.224
2004	-0.36	0.62	0.31	0.02	-0.23	-0.69	-0.31	0.25	0.66	0.32	0.38	-0.09	-	-	-	-	-	0.242
2005	-0.23	0.81	-0.32	0.36	-0.45	-0.66	-0.39	-0.21	0.45	0.27	0.39	-0.12	-	-	-	-	-	0.279
2006	0.02	0.33	-0.02	-0.35	-0.09	-0.30	-0.34	0.06	0.44	0.32	0.87	-0.32	-	-	-	-	-	0.149
2007	0.01	0.13	-0.53	-0.13	0.30	-0.09	-0.13	-0.80	0.02	0.12	0.55	-1.10	-	-	-	-1.61	-	0.086
2008	-0.15	-0.20	0.75	0.06	0.46	0.11	0.05	0.46	-0.35	-0.21	0.55	-0.65	-1.06	-	-0.55	-1.50	-	0.111
2009	-0.65	0.36	0.15	-1.11	0.22	-0.41	0.14	0.17	-0.33	-0.23	-0.53	1.49	-1.67	-	-0.90	0.85	-0.63	0.183
2010	-0.36	-0.62	1.12	1.80	1.29	0.10	-0.13	-0.24	-0.06	-0.11	-0.47	0.21	-0.77	-	-0.43	0.31	-0.84	0.235
2011	-0.37	-0.89	0.49	3.89	1.07	0.08	0.24	0.05	0.19	-0.57	0.50	-0.14	-0.54	-0.90	-0.20	0.15	-0.63	0.291
2012	-0.38	-0.77	-0.60	4.26	0.81	0.08	0.37	-0.16	0.23	-0.75	0.58	-0.07	-0.28	-1.51	-0.59	0.32	-0.96	0.282
2013	-0.42	-0.68	-1.07	4.45	0.58	0.17	0.32	-0.39	0.29	-0.79	0.53	-0.31	0.47	-1.52	-0.82	0.57	-0.37	0.270
2014	-0.24	-0.48	-0.87	2.53	0.00	0.35	0.23	-0.22	0.29	-0.54	0.29	-0.11	0.31	-0.92	-0.42	0.40	-0.05	0.187
TOTAL	-0.14	-0.01	-0.19	1.13	0.20	-0.18	-0.02	-0.20	0.20	-0.07	0.17	-0.06	-0.52	-1.21	-0.56	-0.08	-0.57	0.194

Source: CIRCABC and authors' calculations

TABLE 3 ► **Effect of proposed stabilization scheme on output gaps over time**

	OUTPUT GAP STANDARD DEVIATION FROM EUROZONE AVERAGE (PERCENTAGE POINTS)		RELATIVE CHANGE IN OUTPUT GAP STANDARD DEVIATION	TOTAL PAID/ RECEIVED (REL. TO ACT. EZ GDP IN YEAR)
	Absent of intervention (historic data/ current forecast)	Simulated results for the proposed stabilization scheme		
1999	0.72%	0.54%	– 25.0%	0.154%
2000	0.70%	0.38%	– 45.2%	0.092%
2001	0.68%	0.44%	– 35.9%	0.125%
2002	0.91%	0.55%	– 39.1%	0.171%
2003	1.15%	0.70%	– 39.5%	0.224%
2004	1.32%	0.77%	– 42.0%	0.242%
2005	1.51%	0.87%	– 42.4%	0.279%
2006	1.00%	0.48%	– 52.6%	0.149%
2007	0.68%	0.40%	– 41.2%	0.086%
2008	0.65%	0.44%	– 32.4%	0.111%
2009	0.83%	0.64%	– 22.5%	0.183%
2010	1.25%	0.95%	– 24.0%	0.235%
2011	1.95%	1.21%	– 38.0%	0.291%
2012	2.12%	1.17%	– 44.8%	0.282%
2013	2.07%	1.13%	– 45.6%	0.270%
2014	1.70%	0.88%	– 48.1%	0.187%
Average over period (unweighted)	1.20%	0.72%	– 40.0% (change in averages)	0.194%

Source: CIRCABC and authors' calculations

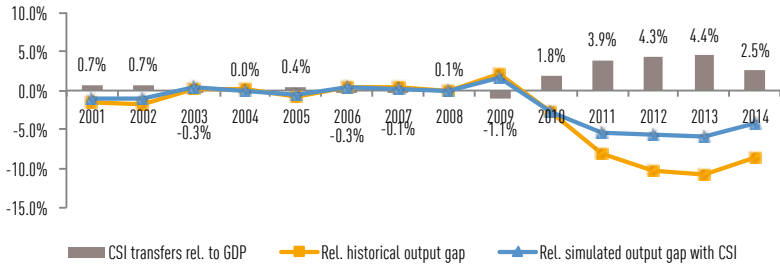**FIGURE 10** ► **Country-specific smoothing effects and payments**

Belgium

Germany

France

Ireland

Legend:
- CSI transfers rel. to GDP
- Rel. historical output gap
- Rel. simulated output gap with CSI

Greece

Legend:
- CSI transfers rel. to GDP
- Rel. historical output gap
- Rel. simulated output gap with CSI

Spain

Legend:
- CSI transfers rel. to GDP
- Rel. historical output gap
- Rel. simulated output gap with CSI

Italy

CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI

Luxembourg

CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI

Netherlands

CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI
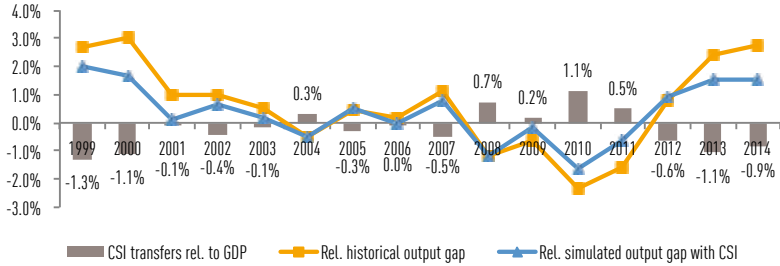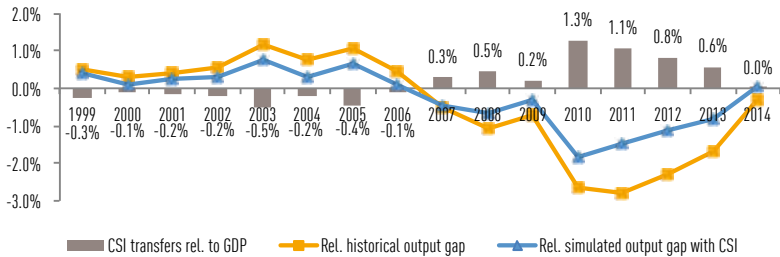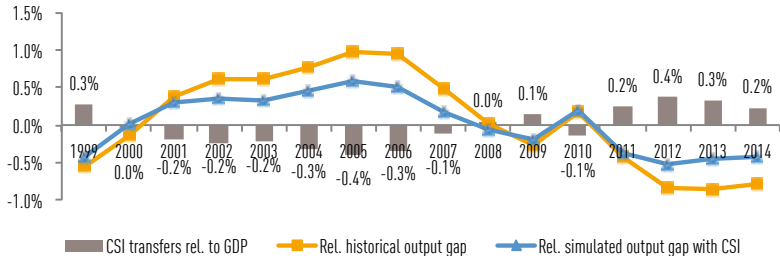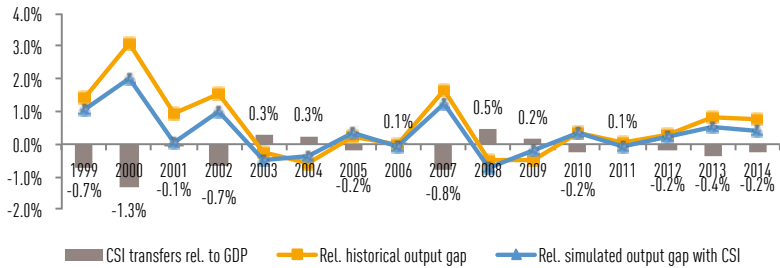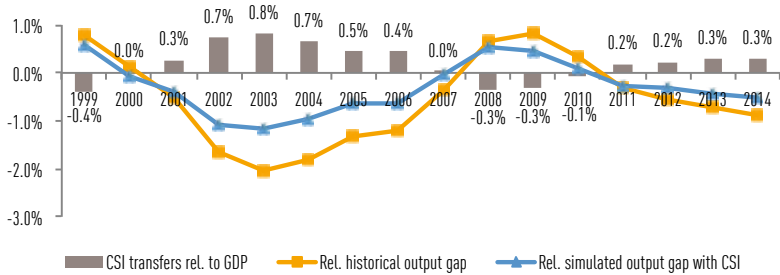
Austria

Portugal

Finland
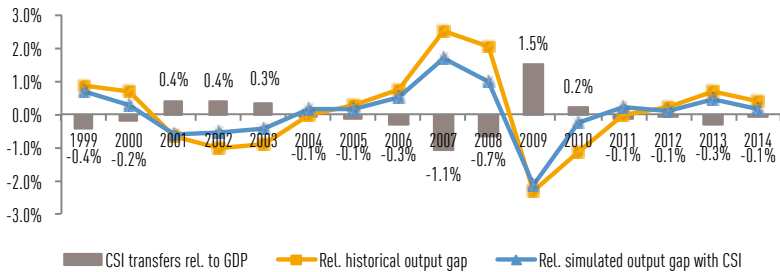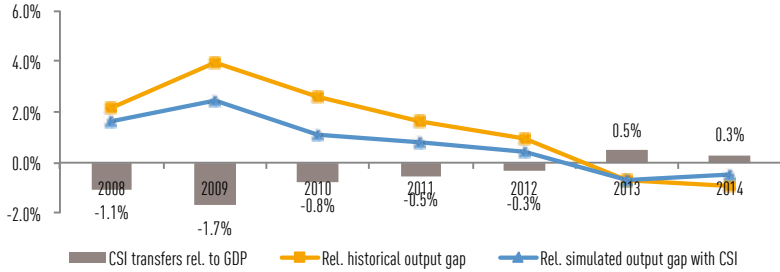
Cyprus

Legend: CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI

Estonia

Legend: CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI

Malta

Legend: CSI transfers rel. to GDP — Rel. historical output gap — Rel. simulated output gap with CSI

Slovenia

| | CSI transfers rel. to GDP | | Rel. historical output gap | | Rel. simulated output gap with CSI |

Slovakia

| | CSI transfers rel. to GDP | | Rel. historical output gap | | Rel. simulated output gap with CSI |
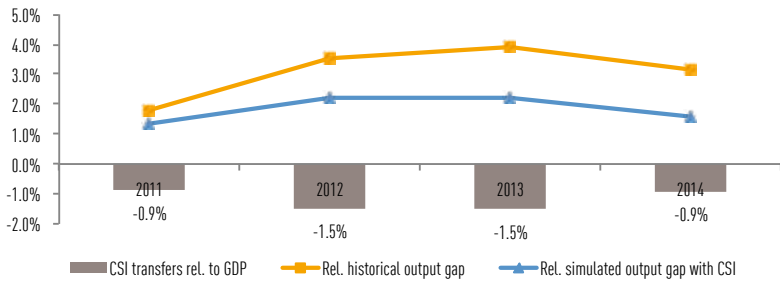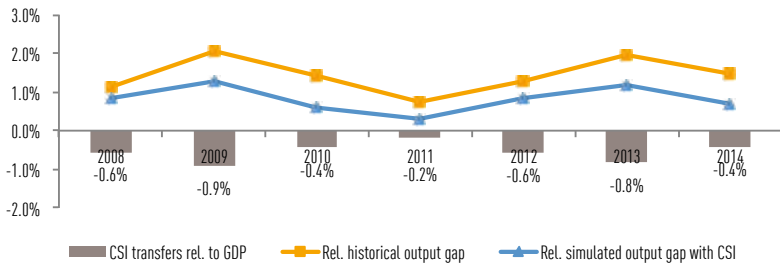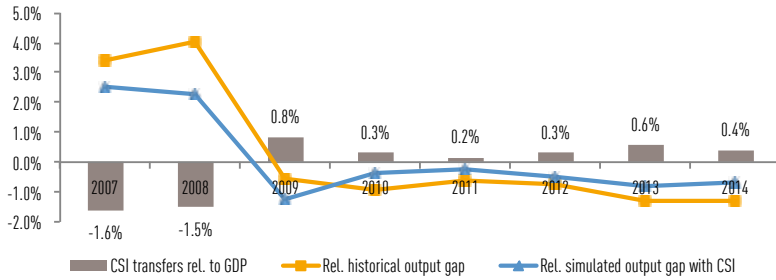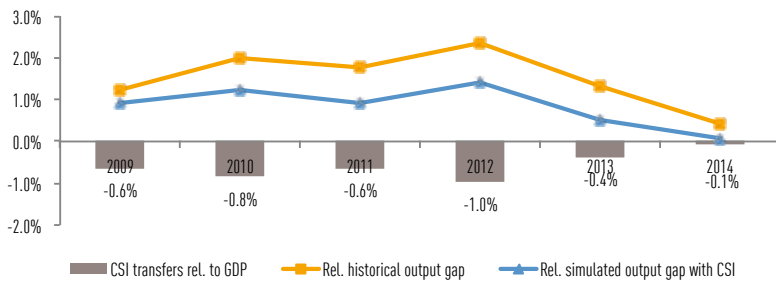
Source: CIRCABC and authors' calculations

ANNEX D
RESULTS OF THE REAL-TIME SIMULATION EXERCISE

FIGURE 11 ► **Standard deviations above and below EZ output gap pre- (yellow/light) and post-transfers (blue/dark)**

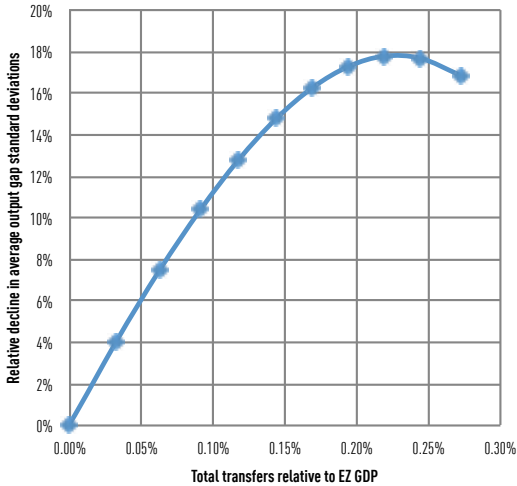Source: CIRCABC and authors' calculations

FIGURE 12 ► Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP

Source: CIRCABC and authors' calculations

TABLE 4 ► Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP

CONVERGENCE MULTIPLIER	RELATIVE DECLINE IN AVERAGE OUTPUT GAP STANDARD DEVIATIONS	TOTAL TRANSFERS RELATIVE TO EZ GDP
0.0	0.0%	0.000%
0.1	4.0%	0.032%
0.2	7.5%	0.062%
0.3	10.4%	0.091%
0.4	12.8%	0.118%
0.5	14.8%	0.144%
0.6	16.3%	0.169%
0.7	17.3%	0.194%
0.8	17.8%	0.219%
0.9	17.7%	0.244%
1.0	16.9%	0.271%

Source: CIRCABC and authors' calculations

TABLE 5a ► Simulated transfers (in bn 2005 euros)

	BE	DE	IE	EL	ES	FR	IT	LU	NL	AT	PT	FI	CY	EE	MT	SI	SK	TOTAL PAID/RECEIVED
1999	– 0.14	6.88	– 1.24	–	– 0.02	– 1.42	1.77	– 0.13	– 3.81	– 0.54	– 0.64	– 0.73	–	–	–	–	–	8.65
2000	– 0.45	5.35	– 1.73	–	0.87	– 2.20	3.88	– 0.35	– 3.56	– 0.39	– 0.48	– 0.95	–	–	–	–	–	10.10
2001	– 0.30	4.63	– 1.07	0.72	0.43	– 3.86	1.19	– 0.05	– 2.28	0.53	– 0.25	0.31	–	–	–	–	–	7.81
2002	– 0.26	4.71	– 1.22	– 0.06	0.01	– 4.75	1.80	0.12	– 0.95	0.21	– 0.13	0.49	–	–	–	–	–	7.36
2003	– 0.63	4.90	– 0.65	– 1.74	– 0.39	– 3.33	0.17	0.02	1.26	– 0.15	0.61	– 0.07	–	–	–	–	–	6.96
2004	– 0.53	– 2.74	– 0.05	– 2.43	4.67	– 3.17	0.29	0.03	3.41	– 0.15	0.96	– 0.30	–	–	–	–	–	9.36
2005	– 0.31	0.21	0.12	– 2.48	4.39	– 6.74	3.73	0.04	1.38	– 0.64	0.87	– 0.58	–	–	–	–	–	10.75
2006	0.55	– 4.55	1.48	– 1.44	– 9.26	5.37	3.78	0.11	2.46	0.22	0.52	0.75	–	–	–	–	–	15.25
2007	– 0.30	– 5.26	– 0.57	– 1.24	7.28	1.20	1.87	– 0.06	– 1.23	– 1.22	0.94	– 1.29	–	–	–	– 0.11	–	11.28
2008	0.17	– 6.51	1.28	– 0.60	0.55	0.14	5.67	0.03	– 0.82	– 0.55	0.62	0.19	0.03	–	– 0.00	– 0.18	–	8.67
2009	– 0.48	2.71	3.64	– 1.68	– 1.20	– 3.75	4.51	0.12	– 2.35	– 0.49	0.07	0.11	– 0.18	–	– 0.05	– 0.17	– 0.81	11.16
2010	– 1.34	– 7.45	2.60	– 0.90	6.47	– 1.34	– 0.25	0.10	0.93	– 0.90	– 0.47	2.08	– 0.04	–	– 0.02	0.38	0.16	12.71
2011	– 1.41	– 24.28	– 1.33	7.03	9.01	16.27	– 2.93	0.08	0.39	– 1.88	– 0.87	0.51	– 0.03	0.02	– 0.07	0.21	– 0.71	33.52
2012	– 1.37	– 15.61	0.20	5.94	11.42	– 8.25	5.19	0.00	2.99	– 1.93	2.54	– 0.91	– 0.04	– 0.08	– 0.02	0.16	– 0.23	28.45
TOTAL	– 6.78	– 36.99	1.46	1.13	34.22	– 15.84	30.67	0.08	– 2.18	– 7.87	4.30	– 0.39	– 0.26	– 0.06	– 0.17	0.28	– 1.60	182.04

Source: CIRCABC and authors' calculations

TABLE 5b ► Simulated transfers (relative to actual GDP, in %)

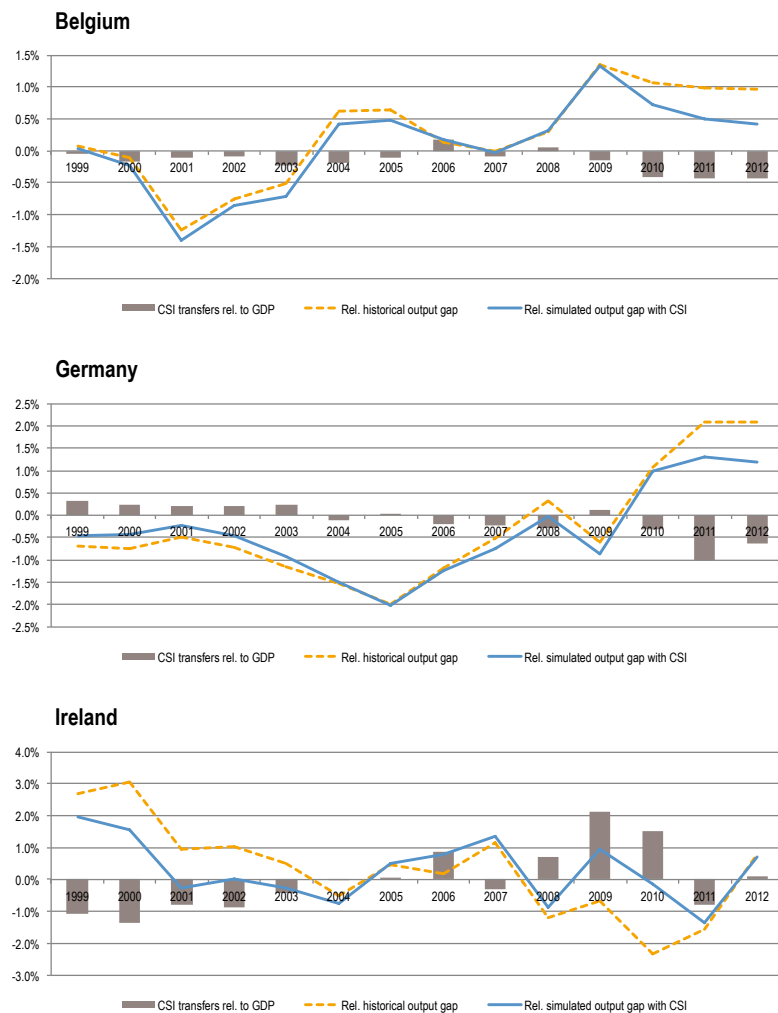|	BE	DE	IE	EL	ES	FR	IT	LU	NL	AT	PT	FI	CY	EE	MT	SI	SK	TOTAL PAID/ RECEIVED (REL TO ACT. EZ GDP)
1999	– 0.05	0.33	– 1.08	–	0.00	– 0.09	0.13	– 0.54	– 0.83	– 0.25	– 0.45	– 0.56	–	–	–	–	–	0.123
2000	– 0.16	0.25	– 1.37	–	0.11	– 0.14	0.28	– 1.40	– 0.75	– 0.17	– 0.33	– 0.69	–	–	–	–	–	0.138
2001	– 0.11	0.21	– 0.80	0.44	0.05	– 0.24	0.09	– 0.21	– 0.47	0.23	– 0.16	0.22	–	–	–	–	–	0.103
2002	– 0.09	0.21	– 0.87	– 0.03	0.00	– 0.29	0.13	0.46	– 0.19	0.09	– 0.08	0.34	–	–	–	–	–	0.096
2003	– 0.22	0.22	– 0.45	– 0.97	– 0.05	– 0.20	0.01	0.07	0.25	– 0.06	0.40	– 0.05	–	–	–	–	–	0.090
2004	– 0.18	– 0.12	– 0.03	– 1.30	0.53	– 0.19	0.02	0.11	0.67	– 0.06	0.62	– 0.19	–	–	–	–	–	0.118
2005	– 0.10	0.01	0.07	– 1.30	0.48	– 0.39	0.26	0.14	0.27	– 0.26	0.56	– 0.37	–	–	–	–	–	0.134
2006	0.18	– 0.20	0.86	– 0.71	– 0.98	0.31	0.26	0.35	0.46	0.09	0.33	0.45	–	–	–	–	–	0.184
2007	– 0.09	– 0.22	– 0.31	– 0.59	0.74	0.07	0.12	– 0.18	– 0.22	– 0.46	0.59	– 0.75	–	–	–	– 0.33	–	0.131
2008	0.05	– 0.27	0.72	– 0.29	0.06	0.01	0.38	0.09	– 0.15	– 0.21	0.38	0.11	0.18	–	– 0.04	– 0.55	–	0.100
2009	– 0.15	0.12	2.13	– 0.83	– 0.13	– 0.22	0.32	0.37	– 0.44	– 0.19	0.05	0.07	– 1.21	–	– 0.94	– 0.54	– 1.38	0.134
2010	– 0.42	– 0.31	1.53	– 0.47	0.68	– 0.08	– 0.02	0.31	0.17	– 0.34	– 0.30	1.26	– 0.27	–	– 0.38	1.19	0.25	0.150
2011	– 0.43	– 1.00	– 0.79	3.81	0.94	0.90	– 0.21	0.24	0.07	– 0.70	– 0.56	0.30	– 0.20	0.17	– 1.33	0.65	– 1.12	0.389
2012	– 0.42	– 0.64	0.12	3.38	1.20	– 0.46	0.37	0.00	0.54	– 0.72	1.67	– 0.54	– 0.25	– 0.62	– 0.43	0.51	– 0.36	0.332
TOTAL	– 0.16	– 0.12	0.07	0.05	0.27	– 0.07	0.15	0.02	– 0.03	– 0.23	0.20	– 0.02	– 0.35	– 0.23	– 0.62	0.15	– 0.64	0.161

Source: CIRCABC and authors' calculations

TABLE 6 ► Effect of proposed stabilization scheme on output gaps over time

	OUTPUT GAP STANDARD DEVIATION FROM EUROZONE AVERAGE (PERCENTAGE POINTS)		RELATIVE CHANGE IN OUTPUT GAP STANDARD DEVIATION	TOTAL PAID/ RECEIVED (REL. TO ACT. EZ GDP IN YEAR)
	Absent of intervention (historic data/ current forecast)	Simulated results for the proposed stabilization scheme		
1999	0.72%	0.54%	-25.5%	0.123%
2000	0.70%	0.48%	-31.9%	0.138%
2001	0.68%	0.67%	-2.2%	0.103%
2002	0.91%	0.83%	-8.2%	0.096%
2003	1.15%	1.02%	-11.2%	0.090%
2004	1.32%	1.24%	-6.7%	0.118%
2005	1.51%	1.53%	1.4%	0.134%
2006	1.00%	1.05%	4.3%	0.184%
2007	0.68%	0.73%	8.2%	0.131%
2008	0.65%	0.51%	-21.3%	0.100%
2009	0.83%	0.81%	-2.1%	0.134%
2010	1.25%	1.16%	-7.1%	0.150%
2011	1.95%	1.37%	-29.8%	0.389%
2012	2.12%	1.25%	-40.8%	0.332%
2013	2.07%	1.13%	-45.6%	0.270%
2014	1.70%	0.88%	-48.1%	0.187%
AVERAGE OVER PERIOD (UNWEIGHTED)	1.11%	0.94%	-14.8% (CHANGE IN AVERAGES)	0.161%

Source: CIRCABC and authors' calculations

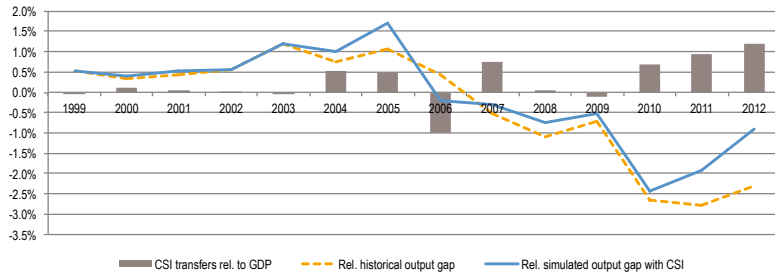**FIGURE 13** ► Country-specific smoothing effects and payments

Belgium

Legend: CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI

Germany

Legend: CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI

Ireland

Legend: CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI

Greece

Spain

France

Italy

CSI transfers rel. to GDP   ---- Rel. historical output gap   —— Rel. simulated output gap with CSI

Luxembourg

CSI transfers rel. to GDP   ---- Rel. historical output gap   —— Rel. simulated output gap with CSI

Netherlands

CSI transfers rel. to GDP   ---- Rel. historical output gap   —— Rel. simulated output gap with CSI

Austria

| CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI |

Portugal

| CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI |

Finland

| CSI transfers rel. to GDP | Rel. historical output gap | Rel. simulated output gap with CSI |

Cyprus

CSI transfers rel. to GDP — — Rel. historical output gap —— Rel. simulated output gap with CSI

Estonia

CSI transfers rel. to GDP — — Rel. historical output gap —— Rel. simulated output gap with CSI

Malta

CSI transfers rel. to GDP — — Rel. historical output gap —— Rel. simulated output gap with CSI
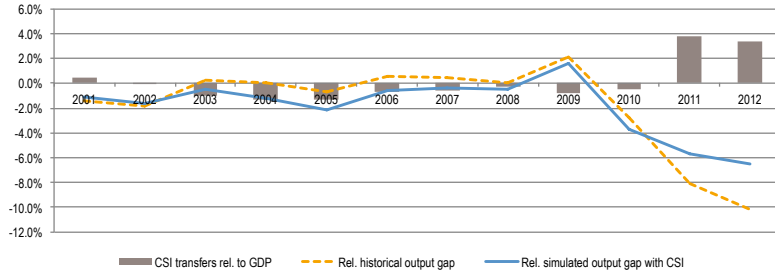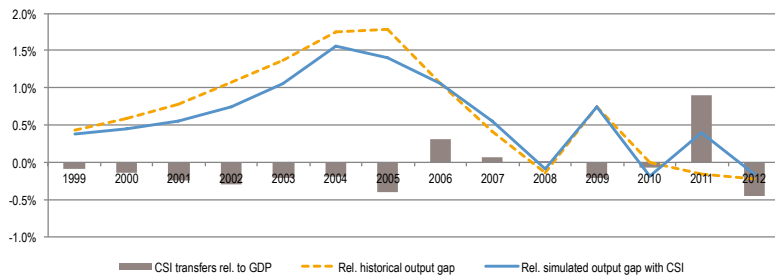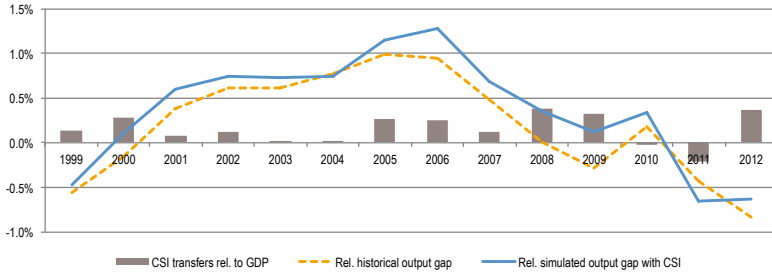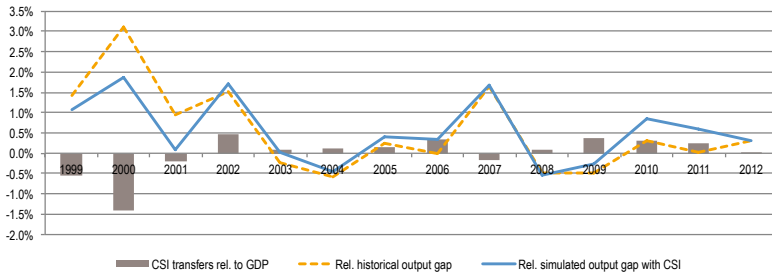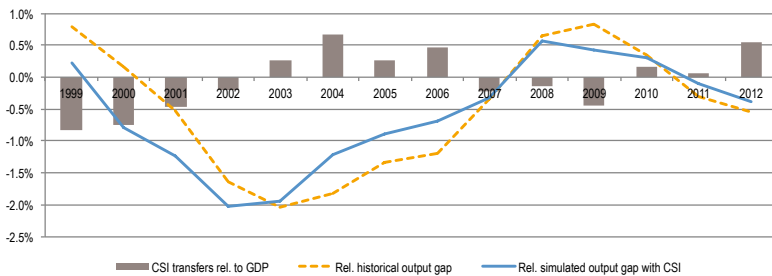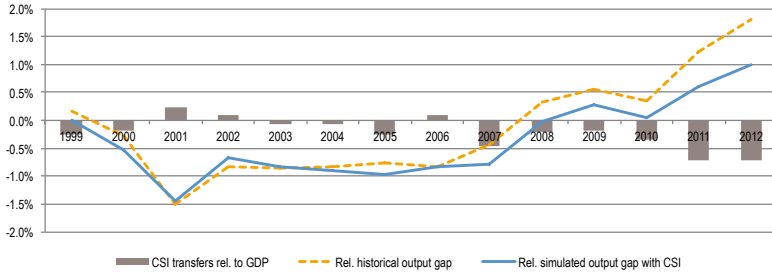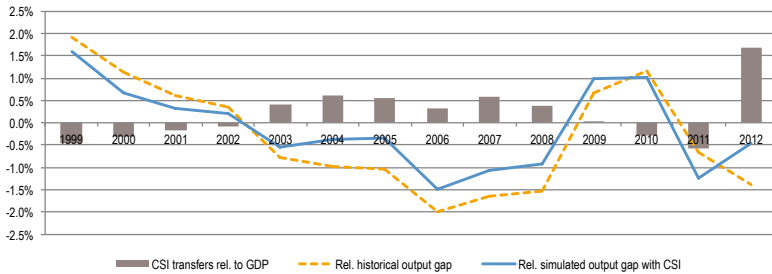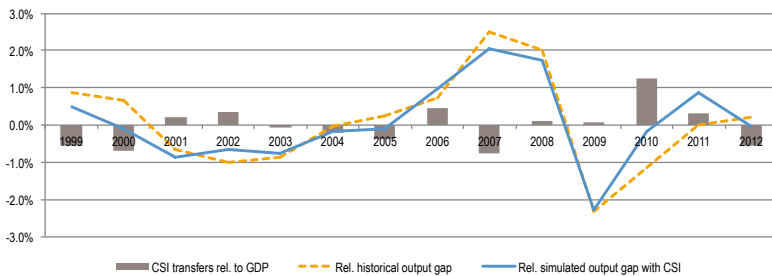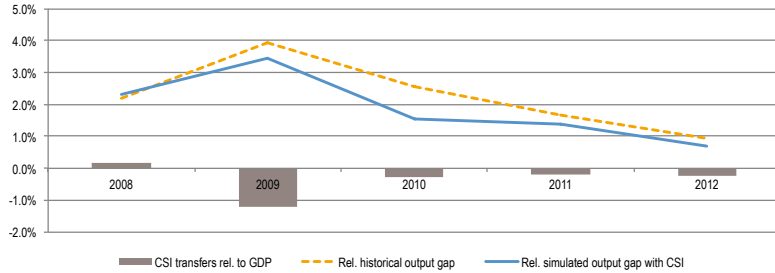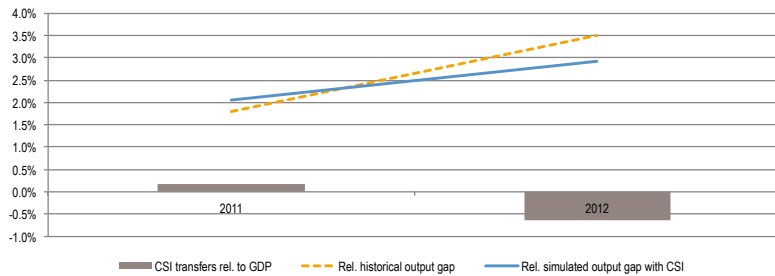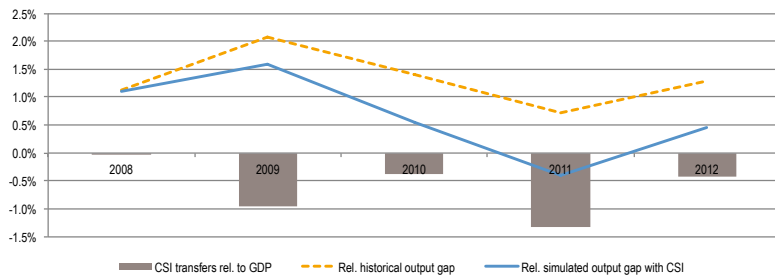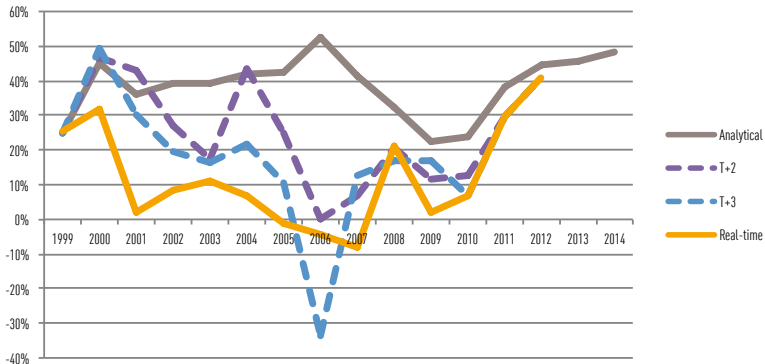
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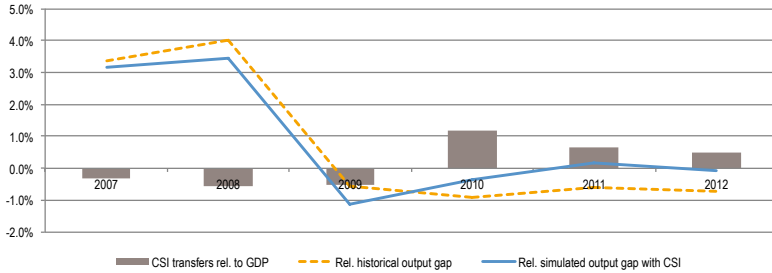
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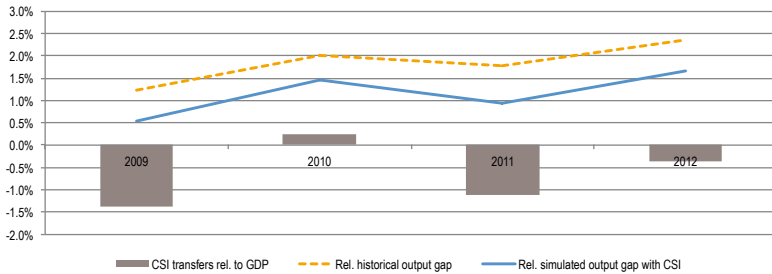
Source: CIRCABC and authors' calculations

ANNEX E
COMPARISON BETWEEN DIFFERENT SIMULATION SCENARIOS

FIGURE 14 ► Smoothing effect (measured in terms of decline in output gap standard deviations) by year and simulation scenario
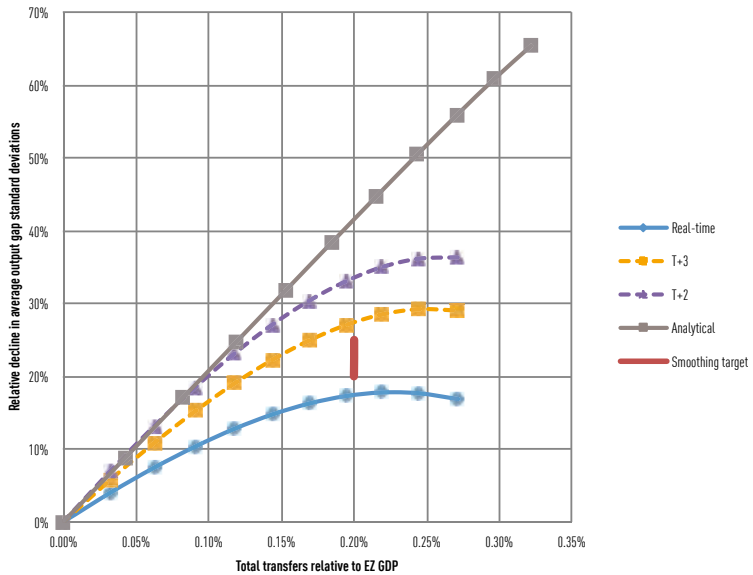

Source: CIRCABC and authors' calculations

TABLE 6 ► Relative change in output gap standard deviation by year and simulation scenario

	ANALYTICAL	T+2	T+3	REAL-TIME
1999	– 25.0%	– 25.0%	– 25.0%	– 25.5%
2000	– 45.2%	– 46.8%	– 49.1%	– 31.9%
2001	– 35.9%	– 43.1%	– 30.0%	– 2.2%
2002	– 39.1%	– 26.9%	– 19.5%	– 8.2%
2003	– 39.5%	– 17.3%	– 16.4%	– 11.2%
2004	– 42.0%	– 43.7%	– 21.7%	– 6.7%
2005	– 42.4%	– 24.9%	– 10.5%	1.4%
2006	– 52.6%	– 0.1%	33.6%	4.3%
2007	– 41.2%	– 6.7%	– 12.6%	8.2%
2008	– 32.4%	– 20.7%	– 17.0%	– 21.3%
2009	– 22.5%	– 11.5%	– 17.0%	– 2.1%
2010	– 24.0%	– 12.8%	– 7.1%	– 7.1%
2011	– 38.0%	– 29.8%	– 29.8%	– 29.8%
2012	– 44.8%	– 40.8%	– 40.8%	– 40.8%
CHANGE IN PERIOD AVERAGE	– 38.4%	– 27.1%	– 22.3%	– 14.8%

Source: CIRCABC and authors' calculations

FIGURE 15 ► **Relative decline in average output gap standard deviations and total transfers relative to actual EZ GDP by simulation scenario, with smoothing target of decline of 20-25% standard deviations at 0.2% of Eurozone GDP**

Source: CIRCABC and authors' calculations

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BLUEPRINT FOR A CYCLICAL SHOCK INSURANCE IN THE EURO AREA

Many positive steps have been made in the last four years so as to reinforce the Economic and Monetary Union's architecture. Nevertheless, the common currency area appears still incomplete, and several EMU weaknesses put in evidence by the crisis were not addressed yet. Beyond the short term challenges, such as achieving better public and private debt positions, more growth and lower unemployment, decision makers also need to complete the EMU in order to guarantee the long term sustainability of the common currency.

In June 2012, the members of the Padoa-Schioppa group presented a report with their roadmap towards a fiscal union in the euro area. One of the main proposals of this report was the need to create an automatic cyclical stabilization fund to alleviate the problem of cyclical divergences in the euro area. Since then, more and more policymakers have come to acknowledge the need for some kind of common cyclical stabilization policy in the euro area. However, this growing consensus has so far only rarely been spelled out in detailed proposals of how such a policy could look like.

This study published by Notre Europe-Jacques Delors Institute aims at filling this void by presenting in detail how a cyclical stabilization insurance fund, as it was proposed in the Padoa-Schioppa report, could be a solution to the problem of lacking business cycle convergence in the euro area. In this study, Henrik Enderlein, Lucas Guttenberg and Jann Spiess outline the technical features of the proposed "Cyclical Shock Insurance" scheme as well as its economic and political implications. The authors also contrast their proposal with some other proposals that are currently discussed to tackle the issue of business cycle convergence, such as an unemployment insurance scheme. Finally, the authors run a simulation on how this scheme would have operated had it been in place during the first fifteen years of EMU.

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