A Proposal for a Federalized Unemployment Insurance Mechanism for Europe

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WORKING PAPER 2015-02

DEPARTMENT OF ECONOMICS

UNIVERSITY OF MASSACHUSETTS BOSTON

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Abstract

The ongoing crisis in the Eurozone, together with growing evidence of structural imbalances, points to a role for new institutions to support a more stable EMU structure. As is well established in the context of monetary union when business cycles are not synchronized, a system of fiscal transfers can support monetary union. Unemployment insurance (UI) is, in particular, a key component of fiscal crisis management. UI supports household incomes during downturns, and also acts as an automatic stabilizer, thereby helping individual countries respond to asymmetric shocks. This paper proposes a 'federalized' EMU-level UI mechanism as one program that can contribute to a system of fiscal transfers in the EMU, and estimates the cost of the proposed system under different financing and eligibility scenarios. We find that, under a variety of reasonable institutional parameters, such a system is fiscally feasible with limited reason to expect adverse employment effects in member countries. We conclude that fiscal transfers extended via automatic stabilizers are a productive avenue towards a more stable Eurozone architecture.

JEL Codes: E45, E61, E62

Keywords: Eurozone, Unemployment insurance, Fiscal transfers

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1. Introduction

This paper estimates the cost of an EMU-wide unemployment insurance (UI) system, and argues that such a system is both fiscally feasible and has the potential to contribute to a more stable EMU architecture, as part of a larger system of fiscal transfers. The ongoing crisis in Europe has raised questions about structural imbalances in the Eurozone and the sustainability of the EMU's current structure (De Grauwe, 2006; Dullien and Fritsche, 2009; Nikiforos et al, 2014). This literature points to renewed interest in the conditions for successful monetary union, and to a need for concrete discussions about specific institutions and policies that can contribute to a more stable EMU architecture (De Grauwe, 2012 and 2013; Hein and Detzer, 2014).

One direction for reform is a set of fiscal transfers to cushion adverse asymmetric shocks to EMU countries (Dullien and Schwarzer, 2009). Theoretical support for fiscal transfers in the European context is found in optimum currency area theory (Mundell, 1961; Kenen, 1969; Krugman, 2012), and also more recently in the context of surplus-recycling mechanisms targeting systematic trade imbalances across Eurozone countries (Varoufakis, 2011). As the Greek crisis has deepened, policy calls for across-EMU fiscal transfers have also grown. The IMF's July 2015 country report on Greece, for example, explicitly recommends direct fiscal transfers to the Greek budget to help quell the debt crisis (IMF, 2015, p. 3). Similarly, Obstfeld (2013) argues that Eurozone countries cannot maintain both cross-border financial integration and financial stability simultaneous with national fiscal independence.

The logic for fiscal transfers is well known: countries in monetary unions neither have independent monetary authority nor exchange rate control and, therefore, have limited policy options with which to respond to adverse shocks. Fiscal transfers across member countries can, however, mitigate the impact of asymmetric shocks, particularly in the context of restrictions on domestic fiscal spending. Accordingly, fiscal transfers may be particularly important in the European context for at least two additional reasons. First, the budgetary restrictions of the

Stability and Growth Pact constrain the use of fiscal policy by individual member states as a response to adverse shocks. Second, significant intra-European trade suggests that fiscal transfers that maintain demand in the European periphery – an important source of external demand for the core – also support aggregate demand in the core.

In this paper, we contribute to the discussion on fiscal transfers in the EMU via a detailed investigation of one policy proposal: an EMU-wide UI system, which we find to be one fiscally feasible mechanism with the potential to generate short-term, stabilizing transfers across EMU countries, and which can contribute to a larger system of fiscal transfers. Unemployment insurance is a key component of fiscal crisis management: during downturns, UI supports both household incomes and aggregate demand. UI is, furthermore, expected to be associated with higher-than-average fiscal spending multipliers, given that UI is a direct injection of fiscal spending to households with recent declines in income that, therefore, have relatively high propensities to consume. Additionally, a growing literature emphasizes the point-in-business cycle dependence of fiscal multipliers (Auerbach and Gorodnichenko, 2012; Fazzari et al, 2014), as well as cross-country spillovers from fiscal policy (Auerbach and Gorodnichenko, 2013). Thus, because business cycles in the EMU remain, at best, imperfectly synchronized, transfer of automatic stabilizers like UI to the 'federal' level amplifies the macroeconomic efficacy of fiscal policy by directing spending towards member countries currently furthest from their business-cycle peak.

An EMU-wide UI program has received recent attention in both academic and policy circles. In June 2014, EU Employment Commissioner Laszlor Andor urged the Eurozone to set up a common UI program as part of a social and economic safety net (Andor, 2014). An empirical literature, furthermore, suggests that an EMU-wide UI program may mitigate output fluctuations (Dullien, 2007; Dullien and Fichtner, 2013; Dolls et al, 2014), and support household incomes (Jara and Sutherland, 2013). This existing literature does not, however, provide a detailed discussion of institutional design, fiscal feasibility, or fiscal sensitivity to policy

parameters. Thus, this paper builds on the duscyssuib on EMU-wide UI by laying out a detailed institutional proposal, analyzing the questions of fiscal feasibility and fiscal sensitivity to institutional design, and linking the analysis to distributional and stabilization outcomes.

We, first, present an institutional structure for an EMU-wide UI mechanism and analyze the cost and fiscal feasibility of the system under a range of financing and eligibility scenarios. For all years of the EMU, and including projections through 2020, we find that such a system is fiscally feasible for a range of reasonable institutional parameters. We define a scenario to be fiscally feasible when the stock of the fund remains positive in all years for the specified parameters, with limited reason to expect adverse employment effects from either labor supply or labor demand responses to benefit levels or tax changes. In particular, the payroll tax necessary to finance the scheme does not exceed 1.5%, which is less than or equal to existing payroll taxes in most EMU countries.

Second, we assess two consequences of the proposed system closely tied to political feasibility: distributional outcomes across EMU countries and output stabilization effects. We find that distributional consequences are limited, but more importantly, that net contributions to the scheme vary with a country's business cycle, such that countries are on average net contributors to the fund during expansions. This feature of the system stems from the proposed design, which links each country's contributions and benefits to its wage base, as well as from the fact that UI is an automatic stabilizer. Finally, calculations point to a positive output stabilization effect. Because UI spending constitutes a relatively small proportion of total government spending, the direct stabilization potential of 'federalizing' UI alone is limited. Nonetheless, the discussion points to the stabilization potential of fiscal transfers in the EMU and, in particular, fiscal transfers via automatic stabilizer.

The paper is organized as follows. Section 2 discusses UI in the EMU context; Section 3 introduces institutional specifics and plausible parameter ranges for the proposed system; Section

4 presents cost calculations for the proposed institutional design; Section 5 discusses distributional impacts and stabilization properties; and Section 6 briefly concludes.

2. Unemployment insurance and the European Monetary Union

The post-2008 period in the EMU highlights the role of unemployment insurance in the fiscal response to crisis. During recessions UI plays a key microeconomic role by supporting household incomes and contributing to an economic safety net. At the macroeconomic level, UI acts as an automatic stabilizer supporting aggregate demand. First, in line with empirical evidence pointing to the particularly efficacy of "targeted transfers" in the fiscal response to crisis (Oh and Reis, 2012), the fact that UI directly supports consumption among households with recent declines in income and thus above-average propensities to consume, suggests that UI is a particularly effective form of fiscal spending (i.e. entails an above-average multiplier).

Second, the expansionary effect of fiscal policy is stronger in recessions—when there is considerable 'slack' in the economy—than during expansions, or as the economy approaches full employment (Auerbach and Gorodnichenko, 2012; Fazzari et al, 2014). Lack of business-cycle synchronization across EMU economies, therefore, provides an additional rationale for fiscal transfers in the Eurozone.[1] Fiscal transfers in the form of automatic stabilizers direct fiscal spending towards member states currently furthest from full employment, with larger multipliers. Simultaneously, of course, automatic stabilizers help prevent overheating in member countries at or above full employment by automatically reducing spending in these economies. Finally, the automatic nature of UI spending is particularly advantageous in the European case given the small scale of the discretionary EU-level budget, which suggests that important features of fiscal transfers in the EMU include automatic funding and dispersion of funds.

[1] Altavilla (2004) finds differences in the timing of EMU members' business cycles at the inception of the euro, and more recent evidence suggests that business cycle convergence among Eurozone countries during the 1990s ended roughly with the introduction of the euro (Crespo-Cuaresma and Amador, 2013).

As an automatic stabilizer, UI spending increases during recessions. Consider the post-2008 period in the EMU: crisis countries' spending on UI increases substantially after 2008, despite a concurrent push to restrict total government expenditures. Table 1 summarizes the change in UI spending as a share of total government spending between 2008 and 2012 in the five countries central to the post-2008 crisis in Europe. In Greece, for example, UI spending increases approximately 50%, from 0.84% to 1.23% of total government spending from 2008 to 2012. Ireland – frequently cited as an example of "successful austerity" – records even larger growth in UI: as a percentage of government expenditures, UI increased 89.9% between 2008 and 2012, from 2.86% to 5.43% of total spending. Over the same time period total government spending contracted 15.6% in Greece and 5.6% in Ireland. While total government spending grew between 2008 and 2012 in Portugal, Italy and Spain, the percentage growth in total government expenditures is dwarfed by the percentage growth in UI spending. Thus, these data suggest that 'federalized' UI alleviates countries of an otherwise largely un-relievable portion of government expenditure during downturns. This budgetary relief is particularly important in the EMU given the Stability and Growth Pact, and already-high debt burdens in EMU crisis economies.

[Table 1: Pctg change in unemployment expenditures and gov't spending]

Two additional points are relevant to note. First, these figures do not include long-term unemployed for whom benefits have expired. Given the length and depth of this particular crisis the duration of unemployment is an important factor to keep in mind. However, this paper emphasizes short-term unemployment, discussed further in Section 3. Second, UI is a relatively minor component of government spending, particularly in Italy and Greece, suggesting that – particularly when considering small economies like Greece – transferring UI to the Eurozone level is a relatively inexpensive policy. If limited fiscal costs are also associated with stabilization of the currency zone, there is a strong rationale to further investigate the plausibility of the policy.

3. An EMU-wide UI scheme: institutional design

In this section we outline a simple institutional structure for an EMU-wide UI scheme, which allows us to clarify policy parameters under which such a system is fiscally feasible, and isolate specific fiscal trade-offs in the design of such a scheme. This structure forms the basis for the cost calculations presented in Section 4.

The basic objective in the design of the scheme is to consider the fiscal plausibility of short-term unemployment assistance guaranteed at the EMU level. Individual countries are then able to 'top up' and provide additional benefits – either higher levels or longer duration – beyond those guaranteed by the EMU. To estimate the net cost of the system (the yearly surplus or deficit), we calculate contributions paid into the system (revenues) and total benefits paid out of the system in each year (payouts).[2] Because the system utilizes existing administrative structures for collecting revenues and dispensing benefits, we assume the system does not entail significant costs in terms of new administrative infrastructure. Thus, the size of the fund is the annual difference between contributions and benefit payouts – i.e. the sum of the yearly surplus or deficit across countries – aggregated over time. We can, therefore, express the stock of the fund, and the yearly flows of revenues and benefit payouts as:

$$Fund = \sum_{t} (Revenues_t - Payouts_t) \tag{1}$$

$$Revenues_t = \sum_{i} t * W_{i,t} \tag{2}$$

$$Payouts_t = \sum_{i} (e_{i,t}\, U_{i,t}) B_{i,t} \tag{3}$$

where the subscripts i and t refer to country and year; $W_{i,t}$ is the taxable wage base; t is the funding tax; $e_{i,t}$ is the percentage of unemployed eligible for benefits; $U_{i,t}$ is the total number of unemployed; and $B_{i,t}$ is the benefit level. Equations 1-3 indicate that the key elements of a UI

[2] The calculations use ex ante figures and, therefore, do not account for impacts of the proposed policy on the relevant variables over time. Because the impact of the demand injection from UI in any given year does not enter the next period's figures, ex ante numbers bias *against* fiscal feasibility.

scheme to estimate fiscal cost are, first, the method of *funding*; second, the *eligibility* criteria; and, third, the *level* and *duration* of benefits.

3.1 Funding

Following most existing UI systems in the EMU, contributions are defined by a payroll tax (t^p) levied on each country's taxable wage base:

$$Revenues_t = \sum_i t^p W_{i,t} \tag{4}$$

Taking the payroll tax to be constant over time and place, we consider a baseline tax of 1.5 percent, which is less than or equivalent to existing payroll taxes in most EMU economies and, importantly, in the large EMU economies.[3] Thus, the system transfers fiscal authority from the country level to the EMU level, largely without cost implications for firms or budgetary implications for governments. Note that we do not specify who pays the tax (firms, employees, federal or local government), such that existing national pay-in systems simply pay into the EMU-level fund. In Germany, for example, firms, workers and the state each contribute 1.5 percent of payroll; as such, the existing funding system in Germany is sufficient to contribute to the EMU fund while also providing additional – for example, long-term – benefits domestically. Importantly, by transferring existing national systems to the EMU level, we neither require convergence in the structure of existing UI systems across the EMU, nor do we enter into a debate about 'optimal' UI design.

The payroll tax is levied on the taxable wage base, which we define as a constant percentage across time and place of each country's annual wage base. A taxable wage base less than one hundred percent reflects that payroll taxes generally do not apply to an individual's wages above a certain threshold. The definition of the taxable wage base is clearly a policy

[3] Four EMU member countries currently have payroll taxes less than 1.5%: Luxembourg (0%), Estonia (1%), Slovakia (1%) and Slovenia (0.06%) (SSA, 2014).

choice; however, because our objective in the baseline cost calculations is to maintain taxes in line with existing systems, we apply taxable wage base assumptions intended to reflect the current institutional setting. Thus, baseline calculations assume a taxable wage base of 83%. Because EMU data is collected nationally rather than at the level of the monetary union, this assumption is based on US data, where wages subject to payroll tax average 83% since the early 1980s. This post-1980 average masks, however, a decline in the taxable wage base from a maximum of 90% in 1983 to 83% in 2012 (SSA, 2013); rising inequality due to income growth at the top of the US distribution implies that a greater share of total earned wages exceed the payroll tax cap.

Because the top-end inequality that decreases the share of the aggregate wage base subject to payroll taxes is lower in Europe than in the US (Alvarado et al, 2014), the higher end of the US range is expected to be more applicable to the European case. Thus, 83% is considered a lower bound for the EMU, biasing the baseline towards fiscal *in*feasibility; consequently, we also show sensitivity calculations in Section 4 analyzing values for the taxable wage base ranging from 80%-90%.

3.2 Eligibility and benefits

With regard to eligibility, the primary objective is to capture short-term unemployment, such that the system generates short-term fiscal transfers in response to cyclical shocks differentially impacting member states, rather than permanent redistributive transfers. Accordingly, eligibility can be defined various ways. Dullien (2007), for example, proposes eligibility defined by twelve months of consecutive employment in the last twenty-four months, with a twelve-month benefit cap based on prior job tenure (p. 36). Because the individual-level panel required for this calculation is unavailable, however, Dullien assumes 50% of the short-term unemployed are eligible. The primary objective of this assumption is to provide twelve full months of benefits and include individuals that become unemployed twice in a short period, while

excluding the seasonally unemployed. As such, Dullien's assumption aims to address a common contention that short-term unemployment in the EMU is largely seasonal and, therefore, reflects structural characteristics of particular European economies and, specifically, differences between core and periphery.

Restricting eligibility to 50% of the short-term unemployed, however, significantly overstates seasonality in EMU unemployment. Using quarterly data to capture seasonal unemployment, we estimate the median share of seasonal unemployment in short-term unemployment across EMU economies to be 7.6%.[4] Seasonal unemployment does not exceed 28.0% of short-term unemployment for any country in any year from 1999 to the present. Furthermore, seasonal unemployment does not follow a core-periphery pattern: Finland, Estonia, Cyprus, Italy have the highest median shares of seasonal unemployment, whereas Malta, Ireland, and Spain have the lowest. Accordingly, restricting eligibility to 50% of the short-term unemployed on the basis of seasonality significantly biases calculations towards fiscal *feasibility*, by reducing benefits paid out and thus increasing the accumulated stock in the fund.

Our baseline eligibility scenario, therefore, guarantees EMU-level benefits to 100% of the short-term unemployed, where short-term unemployment is defined as unemployment spells lasting less than twelve months. Dolls et al (2014) utilize the same criterion. This eligibility requirement can be interpreted as an upper bound for the fiscal cost of the system, given that stricter eligibility assumptions bias the system towards fiscal infeasibility. For comparability, calculations based on stricter eligibility requirements are also included in Section 4.

Finally, we define benefit levels as a percentage of the country-specific minimum wage and, in the baseline calculations, replace 45% of minimum wages to the eligible unemployed.[5]

[4] Using Eurostat data, we extract the seasonal component of unemployment by subtracting the quarterly seasonally adjusted unemployment rate from the non-seasonally adjusted data. We then calculate the ratio of the seasonal component of unemployment relative to short-run unemployment.

[5] Five EMU countries (Austria, Cyprus, Finland, Germany and Italy) do not have a minimum wage for the relevant period, although Germany instituted one in 2015 that we utilize for the projections. On average across EMU countries, the minimum wage is approximately 50% of the average wage. For these five

As opposed to a lump sum payment, benefits tied to the minimum wage link each country's benefit level to its wage level, thereby guaranteeing benefits sufficient to support aggregate demand in higher-income economies without defining benefits that exceed any country's minimum wage. Note that the lowest existing benefit *levels* – defined by the UI systems of smaller EMU economies (e.g. Malta, Slovakia, Estonia) – are too low to support incomes or stabilize output in larger EMU economies. The definition of benefits used here, therefore, balances the goals of supporting household incomes and aggregate demand against possible dis-employment effects deriving from a labor supply response to benefits exceeding the minimum wage**.** Linking each country's benefits and contributions, furthermore, increases the political feasibility of implementation in higher-income EMU countries.

Thus, total yearly benefits paid out of the system are defined as:

$$Payouts_t = \sum_i \left(e_{i,t} U_{i,t}\right) B_{i,t} = \left(U_{i,t}^{ST}\right) * \beta w_{i,t}^{min} \tag{5}$$

where β is 45% in the baseline scenario. In addition to the baseline, sensitivity calculations in Section 4 analyze combinations of the payroll tax and taxable wage base necessary to replace up to 50% of minimum wages.[6]

4. The fiscal cost of EMU-wide unemployment insurance

4.1 The baseline proposal

Figure 1 presents cost calculations for the baseline scheme outlined above, based on a 1.5% payroll tax, 83% taxable wage base, and benefits replacing 45% of the minimum wage for (100% of) the short-term unemployed. This figure plots four series: contributions to the scheme (revenues); benefits paid out; the yearly surplus or deficit, calculated as the difference between contributions and benefits; and the accumulated stock of the fund calculated using a 2% discount

countries we, therefore, construct a shadow minimum wage utilizing the average relationship in each year between average wages and minimum wages in other EMU countries.

[6] Estonia, Latvia and Slovakia (and Slovenia, under certain circumstances) currently pay 50% of earnings.

rate.[7] The series are also shown in Table 2. The calculations are based on gross wage, unemployment and inflation data from AMECO, and minimum wage and employment duration statistics from Eurostat for 1999-2014; these data are extended through 2020 with projections from AMECO and the IMF's *World Economic Outlook*.[8]

[Figure 1: Baseline scenario]

[Table 2: Baseline scenario]

Figure 1 highlights that, with the baseline parameters, the accumulated stock of the fund – shown by the solid black line – is positive in all years. Thus, the baseline calculations point to the fiscal feasibility of an EMU-wide UI scheme: the fund is expected to run a sustained surplus, given parameters that are not expected to generate adverse employment effects. Figure 1, furthermore, highlights that despite running a deficit between 2009 and 2014, the fund is projected to be in surplus beginning in 2018, thereby reversing the reduction in the accumulated stock of the fund following the 2008 global financial crisis.

As the fund exceeds zero for all years, the baseline scenario also suggests that the system may be feasible when funded by lower taxes, or when financing higher benefits. Recall, furthermore, that the baseline parameter assumptions regarding both the taxable wage base (83%) and eligibility (100% of the short-term unemployed) bias the fund towards fiscal *infeasibility*. Increases in the taxable wage base and more restrictive eligibility requirements would both further increase this fiscal surplus.

4.2 Sensitivity calculations

[7] The size of the fund shown in Figure 1 and the final column of Table 2 is calculated with a 2% discount rate. Note, however, that we have not assigned a return to the accumulated funds in the system, despite the fact that these funds may be invested to earn, for example, a risk-free rate of return. To account for returns earned on the accumulated funds in the system, we can instead calculate the stock of the fund with a 0% discount rate, assuming that the risk-free rate of return is approximately equal to the discount rate. For comparability, calculations with a 0% discount rate are shown in Table 2, Column 4.

[8] The dataset is described in the appendix.

We, therefore, analyze the fund's sensitivity to plausible ranges of the payroll tax and taxable wage base, as well as to variations in eligibility requirements. In each case, we also establish the parameters necessary to finance benefits replacing 50% of the minimum wage. Subsequently, Section 4.3 considers benefit expansions taking the form of extended-*period* benefits in case of deep crises, rather than higher minimum wage replacement. These sensitivity calculations indicate that, although the fund's fiscal feasibility is sensitive to specific parameter values, the system is feasible for reasonable ranges of the key parameters and, importantly, for taxes sufficiently in line with current tax rates to mitigate the possibility of dis-employment effects.

To begin, Figure 2 plots the baseline stock of the fund, as well as the evolution of the fund over time for variations in the benefit level ranging from 40-50% replacement of the minimum wage. Figure 2 indicates that, when holding all other parameters equal to the baseline, 45% minimum wage replacement (i.e. the baseline) is the maximum benefit that can be financed while maintaining a positive fund for all years. While 45% minimum wage replacement is feasible, 46% minimum wage replacement causes the fund to fall below zero in the projections (2016-2020).[9] Thus, relative to the baseline scenario, a higher payroll tax, higher taxable wage base, or stricter eligibility requirements would be necessary to finance higher benefits.

[Figure 2: Baseline, with variations in benefit level]

Turning to the funding parameters, Figures 3 and 4 plot the accumulated stock of the UI fund for payroll taxes ranging from 1.4% to 1.6%, and for taxable wage base values between 80% and 90%, respectively. In each case, the baseline is shown for comparability by the solid line. First, Figure 3 highlights that, when holding all other parameters equal to the baseline, the scheme is fiscally feasible for payroll taxes greater than or equal to 1.48%, denoted by the line marked by

[9] The projected deficit with 46% minimum wage replacement is, however, quite small – particularly in 2016-17 (0.34 billion in 2016 and 1.69 billion in 2017) – and is sensitive to assumptions used in the projections regarding the reincorporation of short- versus long-term unemployed into the labor force during recoveries, which are explained in the appendix.

white diamonds plotted directly below the baseline. Second, Figure 4 highlights that, with all other parameters equal to the baseline, the scheme is fiscally feasible for values of the taxable wage base greater than or equal to 82%, again marked by white diamonds and plotted directly below the baseline fund. Recall, however, that the baseline parameter selection for the taxable wage base is likely underestimated, and that the taxable wage base in Europe is expected to be closer to the top end of the range plotted in Figure 4. Accordingly, Figure 4 also highlights that a higher taxable wage base dramatically increases the fund's accumulated surplus. Relatively small increases in the payroll tax, similarly, substantially increase the accumulated stock in the system over time.

[Figure 3: Baseline, with variations in the payroll tax]

[Figure 4: Baseline, with variations in the taxable wage base]

One way to analyze the size of the surplus accumulated in the system is to establish combinations of payroll tax and taxable wage base necessary to replace 50% of the minimum wage for the short-term unemployed. First, holding the taxable wage base constant at 83%, a payroll tax of 1.7% is necessary to cover 50% of each country's minimum wage. Given the sensitivity of the fund to the taxable wage base, however, 1.7% is a clear *upper* bound estimate for the payroll tax required for 50% minimum wage replacement.[10] In fact, with a 1.7% payroll tax, 50% minimum wage replacement is possible for all values of the taxable wage base between 80% and 90%. Furthermore, with a payroll tax of 1.6%, 50% minimum wage replacement is feasible for values of the taxable wage base greater than 84%.[11]

Finally, Figure 5 turns to variations in eligibility requirements. While the baseline calculations indicate that providing EMU-level benefits to 100% of the short-term unemployed is

[10] An increase in the size of the fund can either be generated via increases in the taxable wage base, or in the payroll tax, and the chosen combination of these parameters influences the distributional consequences of the policy. In particular, funding the system via a relatively higher cap on income subject to payroll tax (higher taxable wage base) and a relatively lower payroll tax increases the progressivity of the tax system financing the scheme.

[11] With a 1.5% payroll tax, on the other hand, 50% minimum wage replacement is not possible for any values of the taxable wage base less than or equal to 90%.

fiscally feasible, more restrictive eligibility requirements may be more politically feasible. Eligibility defined by the first six months of unemployment, for example, is consistent with existing UI programs in some EMU economies, including Malta, Cyprus and Slovakia.[12] On average, 70.1% of short-term unemployment in the sample lasts zero to six months; thus, guaranteeing EMU-level benefits for six – rather than twelve – months substantially increases the accumulated stock of the fund.

Figure 5 compares the baseline (in which 100% of the short-term unemployed are eligible for benefits) to scenarios in which: (1) individuals are eligible for six months of benefits; and (2) individuals are eligible for nine months of benefits, beginning after three months of unemployment (i.e. a period of unemployment is required before kick in). Because the accumulated stock of the fund with these stricter eligibility requirements is dramatically higher than the baseline, Figure 5 plots the yearly surplus/deficit for each eligibility scenario, rather than the accumulated stock of the fund. The accumulated stock of the fund increases dramatically, however, for both variations in eligibility requirements. In 2014, for example, the accumulated fund for the baseline scenario is 16.6 billion euros; on the other hand, the fund holds 184.5 billion euros when eligibility is restricted to the first six months of unemployment, and 250.3 billion euros when benefits are provided for months 3-12 of unemployment.

[Figure 5: Baseline, with variations in eligibility requirements; yearly surplus/deficit]

Figure 5 highlights that, for each stricter definition of eligibility, the fund runs a surplus in all years, including the post-2009 crisis years. Thus, stricter eligibility requirements are strongly compatible with higher benefit levels, or lower funding taxes. Holding the payroll tax and taxable wage base equal to their baseline values (1.5% and 83%, respectively), six months of eligibility is compatible with a maximum of 65% minimum wage replacement, and eligibility from months 3-12 of unemployment is feasible for up to 74% minimum wage replacement. These

[12] There are also stricter eligibility requirements, for example, in the Netherlands, which provides individuals benefits on the basis of prior job tenure. Unfortunately, these types of eligibility requirements cannot be captured in the aggregate data.

replacement levels exceed current UI benefits in some countries; more importantly, however, these sensitivity calculations highlight that stricter eligibility requirements are fiscally feasible with significantly higher minimum wage replacement levels.

Conversely, stricter eligibility requirements are also compatible with a lower funding tax. When holding the taxable wage base and minimum wage replacement levels equal to the baseline (83% and 45%, respectively), and providing benefits six months of unemployment benefits, the fund is feasible for payroll taxes greater than or equal to 1.03%; for eligibility from 3-12 months of unemployment, the fund is feasible for payroll taxes greater than 0.91%. Thus, not only is the system feasible for the baseline institutional design, but a range of policy parameters exist whereby tradeoffs can be made between, for example, benefit levels and payroll taxes while establishing an EMU-level UI system that is fiscally feasible.

4.3 Automatic trigger for extended benefits

One natural extension to the baseline design is an automatic trigger that partially allocates the fund's accumulated surplus towards extended-duration benefits during particularly severe crises. Extended benefits both provide additional income support and further support aggregate demand during particularly during deep recessions. Automatic triggers replicate a feature of the US system, which provides benefit extensions during deep recessions both via automatic triggers and via congressional ability to legislate emergency benefits on a discretionary basis. In practice, UI extensions in the US are primarily executed through legislation rather than through the automatic trigger. In the EMU case, however, the EC's minimal budgetary capacity suggests it is preferable to provide extended benefits via automatic trigger.

We propose a trigger that goes into effect in response to a large increase in one member's unemployment rate, such that the trigger extends emergency benefits in response to severe asymmetric shocks. We analyze two triggers, both of which extend unemployment benefits to eighteen – from twelve – months. The first trigger ("Trigger 1") goes into effect when a country's

unemployment rate: (1) is more than two standard deviations greater than its mean unemployment rate, and (2) exceeds 10%. These two conditions are fulfilled for 11 of 337 country-year pairs. The second trigger ("Trigger 2") goes into effect when a country's unemployment rate: (1) is more than 1.5 times its mean unemployment rate, and (2) exceeds 10%. Trigger 2 is more expansive, going into effect for 7.1% of observations (24 of 337 country-year pairs). Note that both triggers link an individual country's trigger unemployment rate to its labor market structure, such that countries with historically higher unemployment must hit relatively higher unemployment rates to be eligible for the trigger.

[Figure 6: Automatic trigger for extended benefits]

Figure 6 plots the baseline fund with the automatic triggers. Both triggers first go into effect in 2005, at which time the dashed lines indicating the fund with triggers separate from the solid line indicating the baseline scenario. Subsequently, Trigger 2 further diverges from the baseline in 2011, such that Trigger 2, which provides extended benefits for more observations, depletes the accumulated stock of the fund to a greater extent than Trigger 1. Nonetheless, the system remains fiscally feasible with both triggers. Thus, the scheme can finance extended benefits in deep recessions without increasing the payroll tax or decreasing benefit levels. Furthermore, both triggers execute primarily after 2008, they are successful in responding to the severity of crisis in post-2008 Europe.

Finally, note that the precise country-year pairs for which the triggers go into effect vary with the trigger's design. Both first execute in Germany in 2005. Trigger 1 (the stricter rule) again goes into effect in Portugal in 2012 and 2013; in Slovenia in 2013; in Greece from 2012 to 2015; and in Cyprus from 2013 to 2018. After going into effect in Germany in 2005, Trigger 2 finances extended benefits in Cyprus from 2012 to 2020; Portugal from 2011 to 2016; and Greece from 2011 to 2018. Thus, both the number of country-year pairs for which each trigger is in effect, and the 'winners' and 'losers' of the particular policy design vary, such that the trigger's design entails within-Eurozone distributional tradeoffs. Importantly, however, the fact that the trigger

first goes into effect for Germany indicates that the provision of extended benefits need not be limited to 'peripheral' EMU countries.

5. Political economy implications: distribution and output stabilization

5.1 Distributional implications

One important question with regard to the political feasibility of the system concerns distributional outcomes across Eurozone countries. As discussed above, the proposed institutional design of the scheme, which links contributions and benefit levels to each country's wage base, mitigates some distributional impacts by construction. Nonetheless, growing evidence of structural imbalances suggests that, in the absence of strict country-level caps linking contributions and benefits over the business cycle, some redistribution is likely.

[Table 3: Distributional impacts, baseline scenario]

Table 3 lays out the year-by-year distributional impacts of the baseline scheme. Each cell records the yearly ratio of a country's contributions into the scheme relative to benefits received from the scheme ($Contributions_{i,t}/Benefits_{i,t}$). When the ratio is greater than one, the country is a net contributor to the UI scheme; when the ratio is less than one, the country is a net beneficiary. From Table 3 it is, first, useful to note that – consistent with the fact that the scheme accumulates a positive stock of funds from a starting point of zero – more country-year pairs are net contributors than net beneficiaries. Second, Table 3 indicates that countries' net contributor/beneficiary status is not necessarily consistent over time, and does not clearly follow core-periphery patterns. Not only do some countries – including Cyprus, Portugal, Ireland, and Italy – alternate between being net beneficiaries and net contributors, but there are also some surprising core-periphery trends. France, for example, is a net beneficiary in all years except 2008; the Netherlands is a net beneficiary in 2013 and 2014; and Portugal is a net contributor until 2009.

Despite these variations over time, however, the table does suggest some sustained distributional impacts. Perhaps most striking, given the current political economy of Europe, is that – in the baseline scenario – Greece is a net beneficiary in all years and, despite 'breaking even' in 2005, Germany is a net contributor in all other years. Nonetheless, Greece's net beneficiary status increased after the onset of the crisis whereas, prior to 2009, Greece's net position was approaching one. Furthermore, the automatic triggers introduced in Section 4.3 provide extended benefits to Germany in 2005; with these triggers, Germany is a net beneficiary in 2005.

Accordingly, a third, and perhaps the most important, conclusion from Table 3 is that net contributor/net beneficiary status is closely linked to each country's business cycle, such that countries' net positions increase when they are in expansions and decrease when in contractions. Of 337 observations, 91.1% of net contributors are country-years with positive GDP growth. This relationship is captured in Table 3 by the bold italicized cells, which indicate observations for which a country had negative growth. The column indicating 2009, when all EMU countries contracted, is particularly informative: even when countries with negative growth remain net contributors, this net position declines relative to the last year with positive growth.[13] Importantly, this feature of the system is largely by construction: because UI is an automatic stabilizer, countries (automatically) pay more in contributions when the economy is booming (the wage base is high and unemployment is low) relative to recessions (as the wage base shrinks and unemployment rises). This distributional analysis, consequently, suggests that the extension of fiscal transfers via automatic stabilizers is a particularly useful starting point for designing fiscal transfers in the Eurozone: by clearly linking a country's change in net contributions to its business cycle, automatic stabilizers limit sustained distributional consequences.

[13] The only exception is Finland, for which net beneficiary status in 2012 remains constant from 2011, despite positive growth in 2011 and a contraction in 2012.

5.2 Stabilization properties

The logic for fiscal transfers in a monetary union is based on the role of expansionary fiscal policy in supporting aggregate demand – and, in turn, output – following adverse macroeconomic shocks. A growing empirical consensus points to a positive multiplier effect of expansionary fiscal policy (Blanchard and Leigh, 2013; Batini et al. 2014). Furthermore, traditional Keynesian theory, as well as more recent empirical evidence (Auerbach and Gorodnichenko, 2012; Fazzari et al, 2014), emphasizes the point-in-business-cycle dependence of fiscal multipliers. Thus, the same country's multiplier is larger during a recession than when at, or approaching, a business cycle peak. Lack of business cycle synchronization in the EMU, consequently, implies that the stabilizing potential of fiscal spending is amplified when EMU-level spending is directed towards countries furthest from their business cycle peaks, pointing to a role for fiscal transfers via automatic stabilizers in the EMU.

In this section, we lay out simple stylized calculations that point to a positive output stabilization potential of the baseline system. Note, however, that there is an inverse relationship between the magnitude of fiscal transfers and the potential for output stabilization. Thus, relative to the baseline, a system that includes automatic triggers or provides higher minimum wage replacement generates a larger fiscal 'shock' and has greater stabilization potential. Recall, furthermore, that UI is a small percentage of total government expenditure; as such, we do not expect a large stabilization effect from this policy in isolation. Nonetheless, a small but positive stabilization effect points to a role for 'federalized' UI as one useful tool in the design of a more stable EMU architecture.

The stabilization potential of the UI scheme can be analyzed both for individual countries, and at the Eurozone level. In both cases, we first isolate the fiscal transfer for each country-year pair—defined as the country- and year-specific surplus or deficit—normalized by GDP. This fiscal 'shock' captures the yearly spending transfer into or out of a country. In the baseline scheme, these fiscal transfers as a percentage of individual countries' GDP are small,

exceeding 0.5% of a country's GDP only for Spain between 2009 and 2015 (the highest value being 0.77% in 2012) and Greece from 2011 to 2013 (0.74% in 2012). Importantly, during these periods unemployment in both Greece and Spain exceeds 17.9%, signifying significant "slack" in the countries receiving transfers.

We apply the fiscal transfer for each country-year (starting with each country's first year of EMU membership) to empirical estimates for fiscal spending multipliers in order to adjust each country's observed GDP by the effect of its participation in the fiscal transfer scheme. Following the recent empirical literature on multipliers, we differentiate the magnitude of fiscal multipliers in expansions and contractions, and apply multipliers ranging from 0 to 1 for expansions, and 1 to 2.5 for contractions (Batini et al., 2014). We then derive subsequent years' GDP figures using *ex ante* GDP growth rates and repeating the GDP adjustment procedure, based on the following year's transfer and the relevant multiplier. These calculations point to the potential for output stabilization in countries facing deep recessions: in the presence of the baseline scheme, Spanish GDP would contract by 0.3-1.4% in 2012, compared to an observed 2.1% contraction. Similarly, compared to a 6.6% decline in Greek GDP in 2012, GDP would decline by 4.9-5.9%. Thus, we expect a clear positive stabilization effect for individual countries during deep recessions.

We can, similarly, analyze the magnitude of the stabilization effect at the Eurozone level by aggregating the adjusted GDP series described above to the EMU level. In 2009, for example, Eurozone GDP contracted 3.77%. Applying the EMU-wide UI program, however, suggests that EMU-level GDP would have contracted 3.61-3.71%. Thus, at the Eurozone level, the magnitude of the stabilization effect is small but positive. These figures suggest that an EMU-wide UI program can mitigate the depth of EMU-level downturns and, as such, point to a role for fiscal transfers in mitigating asymmetric shocks to EMU countries. Furthermore, these results indicate the usefulness of fiscal transfers extended via automatic stabilizers, which both support countries furthest from their business cycle peaks and act as a break on growth for countries reaching full employment levels of output.

6. Conclusion

The post-2009 period in the Eurozone has raised questions about the sustainability of the EMU's current structure, and pointed to a need for policy-oriented discussions exploring institutions with the potential to contribute to a more stable Eurozone design. This paper contributes to this discussion by detailing an institutional design and cost calculations for an EMU-level UI system. The baseline system provides benefits to the short-term unemployed by extending existing national systems of revenue collection and disbursement to a fund operated at the EMU level. Cost calculations indicate that such a system is one fiscally feasible policy mechanism that can support both household incomes and aggregate demand following asymmetric shocks to EMU countries. Furthermore, sensitivity analysis indicates that, while the selection of institutional parameters does vary the accumulated surplus within the fund, the system is feasible for a range of policy designs.

It is important to note that the scheme discussed in this paper is neither proposed as a singular solution to structural problems plaguing the Eurozone, nor a magic bullet to end the current Greek crisis. In particular, this scheme helps mitigate asymmetric shocks to Eurozone countries, rather than differences in labor market characteristics across EMU countries; for this reason the system emphasizes short-term unemployment. Predicted stabilization effects, furthermore, highlight that this system alone cannot eliminate the impact of asymmetric shocks to EMU economies. Nonetheless, we highlight the potential for positive output stabilization effects. Thus, the analysis suggests that an EMU-wide UI scheme is one policy that can contribute to a broader agenda targeting weaknesses in EMU design and, specifically, a broader system of fiscal transfers.

One clear advantage of the emphasis on short-term unemployment is that distributional implications across Eurozone countries are limited, increasing the program's political feasibility.

Specifically, distributional implications clearly vary with individual country's business cycles, such that there is a clear barometer defining increases and decreases in net contributions. These characteristics of the system are largely by design: each country's contributions into the system and benefits received from the system are linked to its business cycle, because UI is an automatic stabilizer, and also to its own wage levels. Importantly, the selection of institutional parameters also carries distributional consequences *within* Eurozone countries, which are only alluded to in this paper, but which are an additional feature of the political economy of any changes to the EMU architecture.

Finally, the results presented in this paper point to the usefulness of fiscal transfers extended via automatic stabilizer. Automatic stabilizers, by construction, link each country's net contributions to a system of fiscal transfers to their place in the business cycle. As such, they inherently aim to mitigate the impacts of asymmetric shocks that generate divergence among member countries. Output fluctuations are dampened both for countries in contractions and in booms: countries facing recession receive positive net transfers that support aggregate demand, whereas contributions to the fund increase as countries near their business cycle peak. The post-2009 period in Europe, furthermore, highlights that asymmetric shocks may be highly persistent in monetary unions, given the lack of policy options individual member states have to combat such shocks. Thus, by mitigating the effects of asymmetric shocks, this policy can contribute to a larger set of EMU-level fiscal transfers, and a more stable EMU architecture.

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Appendix: Construction of dataset

The calculations in this paper utilize data from AMECO, Eurostat, and the IMF's *World Economic Outlook*. Data for gross wages, total compensation of employees, the number of unemployed, and GDP deflators are from AMECO for 1999-2014. AMECO includes gross wage data for all EMU countries except Malta; for Malta we utilize total compensation to calculate gross wages by assuming that the ratio of wages to compensation is equal to the EMU median. AMECO also includes gross wage projections through 2016.

We augment the AMECO data with minimum wage and unemployment duration data from Eurostat from 1999-2014, and minimum wage data for 2015. The minimum wage is a biannual average of minimum wage statistics published January 1st and July 1st; for 2015 we use the January 1st minimum wage. As noted in footnote 5, Austria, Cyprus, Finland, Germany and Italy do not have a minimum wage for some or all of the years in our sample. For these countries we construct a shadow minimum wage utilizing the average yearly relationship between average and minimum wages in other EMU countries (approximately 50%).

Finally, we use projections for GDP growth, the GDP deflator, the unemployment rate, and total population from the IMF's *World Economic Outlook* through 2020. While AMECO provides gross wage projections for 2015 and 2016, projections for gross wages from 2017-2020 as well as unemployment duration (short-term unemployment) are unavailable. We calculate gross wage projections by assuming that the ratio of gross wages to GDP is constant for 2017-2020, equal to the average of the last years for which there are data. This assumption utilizes that the ratio of gross wages to GDP is fairly constant over time in each Eurozone country over the relevant time period, consistent with a common stylized assumption that the wage share is constant, at least over short time periods.

Second, IMF projections include the unemployment rate, but not the duration of unemployment, or the numbers of unemployed or employed workers. To calculate the number of

short-term unemployed, we first impute the size of the labor force and the numbers of unemployed and employed workers using population projections, by assuming the labor force is a constant share of population. We then assume a constant share of short-term unemployment in total unemployment to calculate the number of long-term and short-term unemployed. Across the sample, a one-unit increase in the unemployment rate is associated with a 1.5 unit increase in the share of long-term unemployment in total unemployment. Note that this assumption implies the short-term and long-term unemployed are re-incorporated into employment at the same rate during recoveries. Because short-term unemployment generally falls more quickly than long-term unemployment during recoveries, this assumption is relatively stringent and biases the projection calculations against fiscal feasibility. Finally, we apply the same methodology to generate projections for various unemployment durations (Figure 5 and Figure 6).

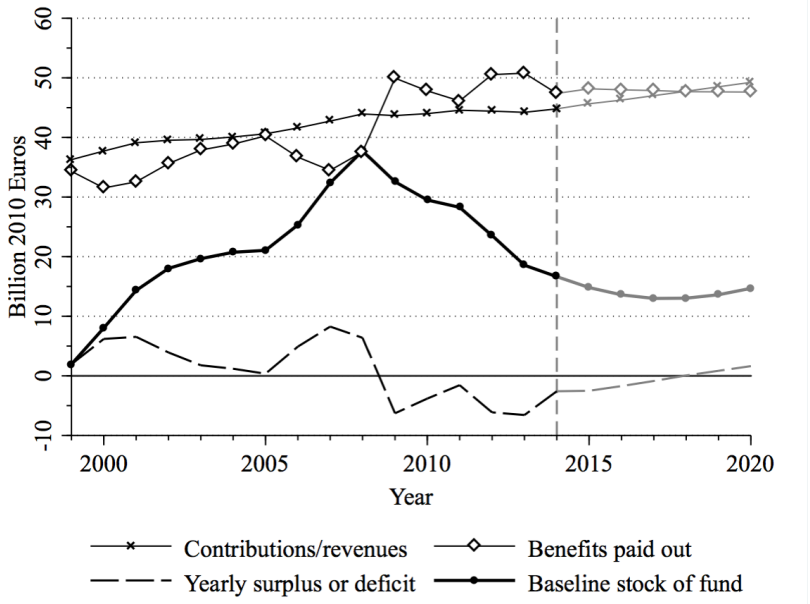
Tables and figures:

Table 1: Percentage change in unemployment expenditures and government spending in the EMU crisis economies, 2008 and 2012

	Unemployment benefits as a percentage of government expenditure					Pctg change in UI expenditure (2008-2012)	Pctg change in gov't expenditure (2008-2012)
	2008	2009	2010	2011	2012		
Ireland	2.86	4.83	3.95	5.10	5.43	72.03	-9.42
Italy	0.73	0.99	1.06	1.08	1.25	78.48	3.53
Greece	0.84	1.14	1.32	1.51	1.23	29.05	-12.01
Portugal	1.94	2.32	2.37	2.35	3.17	66.05	1.54
Spain	3.02	5.00	4.76	5.19	4.91	77.55	9.12

Notes: Detailed data on the composition of government expenditure is only available through 2012. We do not expect the approximation wherein the sum of the final two columns (growth in UI spending, and growth in government expenditure) equals the third column (growth in UI/G) to hold in the cases for which there is significant movement in the denominator (change in government spending).
Source: Eurostat. Unemployment benefits are defined as benefits compensating for loss of earnings where a person is capable and available for work, but unable to find suitable employment; government spending is defined as total annual government expenditure.

Figure 1: Baseline Scenario, billion 2010 Euros



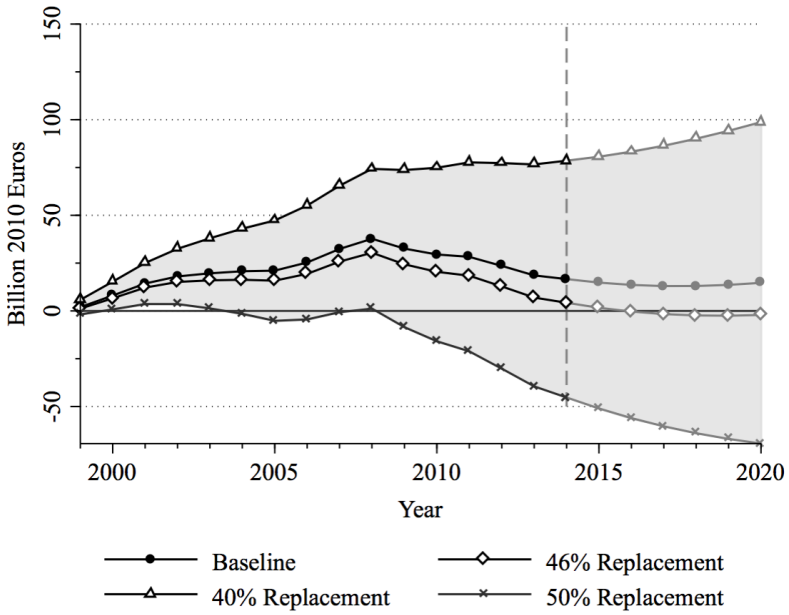
Notes: The baseline calculations are based on a 1.5% payroll tax, 83% taxable wage base, and 45% minimum replacement to 100% of the short-term unemployed. All calculations are in constant 2010 Euros, based on the GDP deflator. Yearly contributions/revenues are the product of the payroll tax, taxable wage base, and gross wages. Benefits paid out utilize the minimum wage, and (number of) short-term unemployed. The yearly surplus/deficit is defined as contributions less benefits paid out. The stock of the fund is the aggregation of the yearly surplus/deficit over time, calculated with a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Table 2: Baseline scenario; billion 2010 Euros

	(1)	(2)	(3)	(4)	(5)
Year	Total yearly contributions	Total yearly benefits paid out	Surplus/Deficit (current values)	Size of fund (0% discount rate)	Size of Fund (2% discount rate)
1999	36.28	34.31	1.96	1.96	1.96
2000	37.72	31.53	6.19	8.16	8.04
2001	39.10	32.56	6.54	14.70	14.33
2002	39.53	35.61	3.92	18.62	18.02
2003	39.66	37.89	1.77	20.39	19.66
2004	40.08	38.89	1.19	21.58	20.73
2005	40.61	40.25	0.36	21.95	21.06
2006	41.59	36.69	4.91	26.85	25.33
2007	42.75	34.48	8.27	35.12	32.38
2008	43.94	37.56	6.38	41.50	37.72
2009	43.67	49.95	-6.28	35.22	32.57
2010	44.00	47.81	-3.81	31.41	29.50
2011	44.56	46.12	-1.56	29.85	28.27
2012	44.41	50.54	-6.12	23.72	23.54
2013	44.22	50.78	-6.57	17.15	18.56
2014	44.80	47.38	-2.59	14.57	16.64
2015	45.65	48.16	-2.51	12.06	14.81
2016	46.27	47.99	-1.71	10.34	13.59
2017	47.01	47.87	-0.86	9.49	12.99
2018	47.75	47.68	0.07	9.55	13.03
2019	48.50	47.65	0.85	10.40	13.61
2020	49.25	47.62	1.63	12.03	14.68

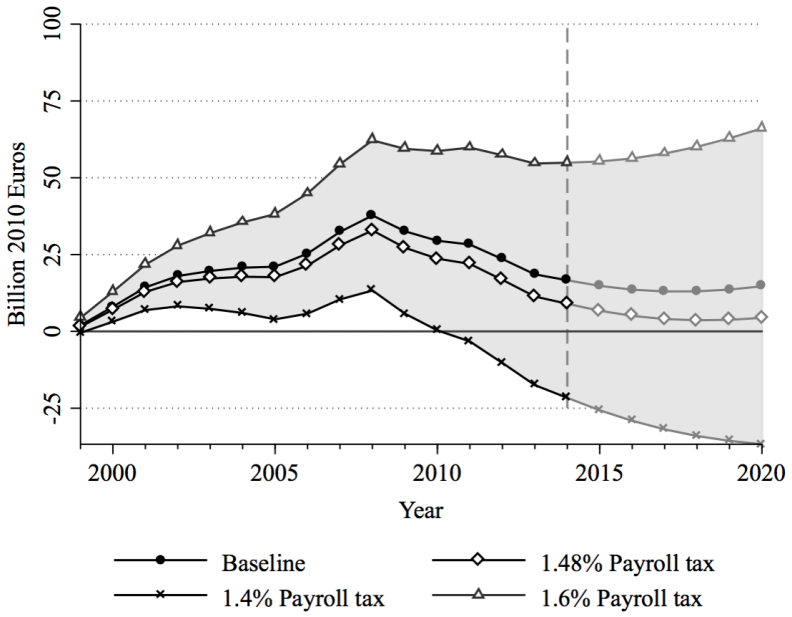
Notes: The baseline calculations are based on a 1.5% payroll tax, 83% taxable wage base, and 45% minimum replacement to 100% of the short-term unemployed. All calculations are in constant 2010 Euros, based on the GDP deflator. Yearly contributions/revenues are the product of the payroll tax, taxable wage base, and gross wages. Benefits paid out utilize the minimum wage, and (number of) short-term unemployed. The yearly surplus/deficit is defined as contributions less benefits paid out. The stock of the fund is the aggregation of the yearly surplus/deficit over time, calculated with a 0% discount rate (Column 4) and 2% discount rate (Column 5).
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Figure 2: Baseline, with variations in the benefit level
Stock of fund (1999-2020)



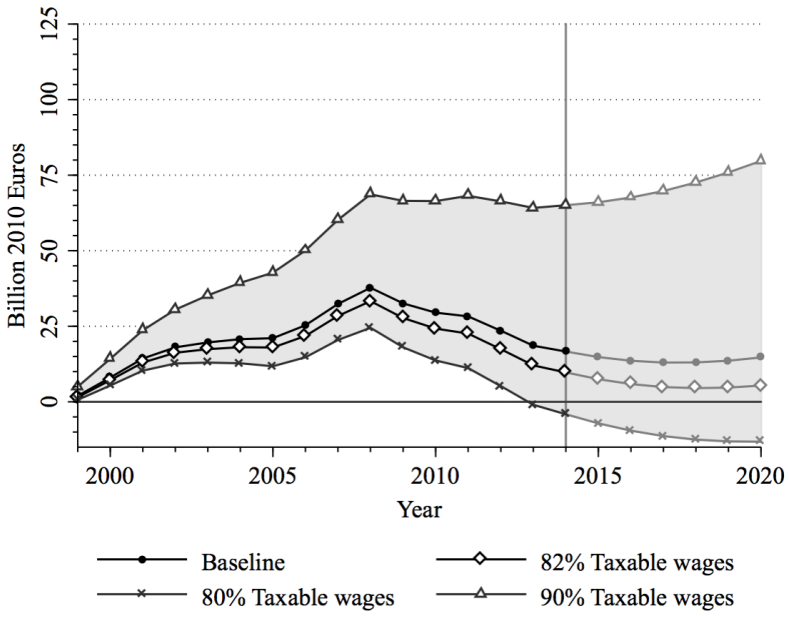
Notes: The calculations are based on a 1.5% payroll tax, 83% taxable wage base, and eligibility to 100% of the short-term unemployed. The figure highlights a range of benefit levels, based on minimum wage replacement ranging from 40-50% of the yearly, national minimum wage. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Figure 3: Baseline, with variations in the payroll tax
Stock of fund (1999-2020)



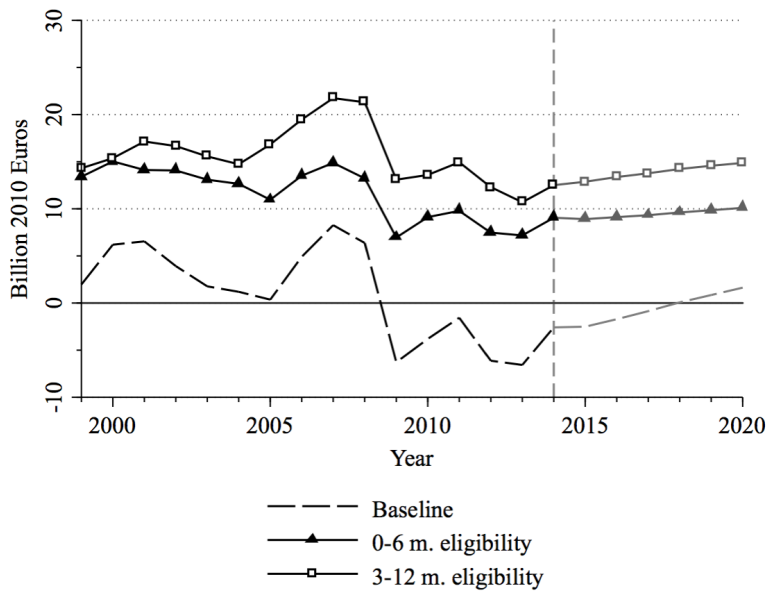
Notes: The calculations are based on an 83% taxable wage base, eligibility to 100% of the short-term unemployed, and benefits equal to 45% minimum wage replacement. The figure presents the stock of the fund over time based on a range of payroll taxes, from 1.4% to 1.6%. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Figure 4: Baseline, with variations in the taxable wage base
Stock of fund (1999-2020)



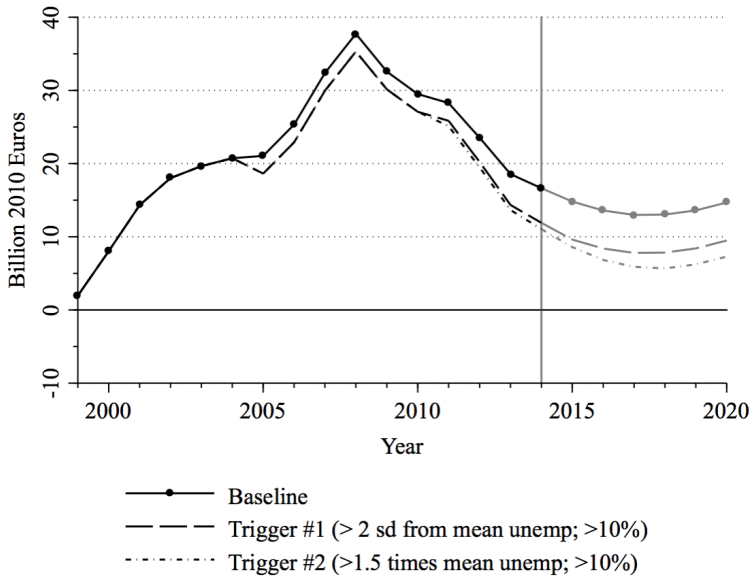
Notes: The calculations are based on a 1.5% payroll tax, eligibility to 100% of the short-term unemployed, and benefits equal to 45% minimum wage replacement. The figure presents the stock of the fund over time based on values for the taxable wage base ranging from 80-90%. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Figure 5: Baseline scenario, with variations in eligibility requirements
Yearly surplus or deficit (1999-2020)



Notes: The calculations are based on a 1.5% payroll tax, 83% taxable wage base, and benefits equal to 45% minimum wage replacement. The figure presents the yearly surplus/deficit of the fund over time for various eligibility scenarios. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Figure 6: Automatic trigger for extended benefits
Stock of fund (1999-2020)



Notes: The baseline calculations are based on a 1.5% payroll tax, 83% taxable wage base, and benefits equal to 45% minimum wage replacement provided to 100% of the short-term unemployed. The figure includes two automatic triggers that provide extended-duration unemployment benefits through 18 months. Trigger 1 goes into effect when a country's unemployment rate is more than two standard deviations greater than its mean unemployment rate and exceeds 10%. Trigger 2 goes into effect when a country's unemployment rate is more than 1.5 times its mean unemployment rate and exceeds 10%. Both triggers first go into effect in 2005, at which time the dotted lines separate from the baseline scenario. Trigger 2 executes again in 2011. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.
Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.

Table 3: Distributional impacts; baseline scenario

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Austria	1.99	2.11	1.91	1.70	1.67	1.32	1.24	1.40	1.49	1.68	***1.26***	1.45	1.54	1.42	1.31	1.29	1.65	1.65	1.71	1.76	1.78	1.76
Belgium	1.23	1.49	1.43	1.26	1.08	1.13	1.18	1.22	1.32	1.34	***1.06***	1.10	1.29	1.15	1.03	1.10	1.10	1.10	1.17	1.16	1.16	1.15
Cyprus	.	.	.	.	.	.	.	.	.	1.62	***1.06***	1.00	0.78	***0.57***	***0.46***	***0.54***	0.53	0.56	0.52	0.55	0.58	0.62
Estonia	.	.	.	.	.	.	.	.	.	.	.	.	1.32	1.61	1.49	1.74	1.80	1.85	1.93	1.95	2.00	2.04
Finland	0.69	0.72	0.74	0.72	0.73	0.74	0.79	0.87	0.95	0.97	***0.72***	0.77	0.81	***0.81***	***0.76***	***0.73***	0.71	0.71	0.76	0.78	0.80	0.81
France	0.72	0.85	0.89	0.86	0.85	0.81	0.85	0.91	0.98	1.01	***0.77***	0.83	0.86	0.78	0.74	0.77	0.8	0.81	0.82	0.84	0.84	0.84
Germany	1.31	1.47	1.37	1.22	***1.10***	1.18	1.00	1.20	1.43	1.52	***1.30***	1.47	1.76	1.84	1.89	1.98	1.72	1.73	1.73	1.73	1.73	1.73
Greece	.	.	0.67	0.74	0.86	0.76	0.78	0.91	0.90	***0.90***	***0.63***	***0.47***	***0.33***	***0.30***	***0.34***	0.45	0.44	0.45	0.47	0.50	0.54	0.60
Ireland	1.62	2.03	2.12	1.83	1.86	1.96	1.90	1.80	1.60	***1.12***	***0.58***	***0.66***	0.79	***0.85***	0.95	1.12	1.26	1.35	1.46	1.51	1.57	1.64
Italy	1.14	1.28	1.39	1.41	1.38	1.22	1.28	1.49	1.59	***1.38***	***1.17***	1.14	1.22	***0.96***	***0.91***	***0.97***	0.95	0.95	0.96	0.97	0.98	0.98
Latvia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.08	1.04	1.08	1.13	1.17	1.21	1.26
Lithuania	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.05	1.08	1.09	1.11	1.13	1.15
Luxemb.	3.98	3.91	4.82	3.61	2.29	1.69	1.92	1.99	2.16	1.99	***1.55***	1.91	1.85	***1.63***	1.53	1.49	0.78	0.78	0.65	0.65	0.66	0.66
Malta	.	.	.	.	.	.	.	.	.	1.29	***1.11***	1.16	1.39	1.46	1.31	1.49	1.43	1.42	1.39	1.40	1.41	1.42
Netherlands	1.68	1.72	2.07	***1.69***	1.29	1.21	1.29	1.63	1.86	1.95	***1.39***	1.26	1.38	***1.16***	***0.94***	0.98	1.02	1.03	1.05	1.10	1.17	1.26
Portugal	1.74	2.03	1.86	1.46	***1.21***	1.35	1.29	1.32	1.19	1.22	***0.90***	0.89	***0.73***	***0.56***	***0.64***	0.82	0.83	0.84	0.86	0.88	0.90	0.92
Slovakia	.	.	.	.	.	.	.	.	.	.	***1.05***	1.1	1.33	1.25	1.33	1.45	1.51	1.59	1.63	1.68	1.72	1.76
Slovenia	.	.	.	.	.	.	.	.	2.41	2.59	***1.49***	1.33	1.09	***1.04***	***0.94***	1.04	1.09	1.15	0.84	0.91	0.97	1.04
Spain	0.86	0.94	1.00	0.88	0.88	0.88	0.92	0.95	0.97	0.68	***0.44***	0.46	***0.44***	***0.38***	***0.39***	0.45	0.48	0.50	0.51	0.53	0.55	0.57

Notes: Each cell lists a country's ratio of contributions to benefits for a given year. A ratio greater than one implies the country is a net contributor in that year; a ratio less than one implies a country is a net beneficiary for that year. Bold italicized cells indicate a recession year; note that, given the April 2015 extraction from the IMF database, there are projections for negative growth. This table uses the baseline scenario, based on a 1.5% payroll tax, and 45% minimum wage replacement to 100% of the short-term unemployed. All calculations are in constant 2010 Euros, based on the GDP deflator. Calculations utilize a 2% discount rate.

Sources: AMECO, Eurostat, and the IMF's *World Economic Outlook.* See the Appendix for details.