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for the euro area

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OUTLINE OF A REDISTRIBUTION-FREE DEBT REDEMPTION FUND FOR THE EURO AREA

by Marika Cioffi*, Pietro Rizza*, Marzia Romanelli* and Pietro Tommasino*

Abstract

Public debts in the euro area have increased sharply due to the economic crisis, and remain at historically high levels in several countries. In a monetary union, high-debt members represent a permanent threat to financial stability, as they are subject − even if fundamentally solvent − to significant rollover risk. Given the tight financial and economic links between member states, a liquidity crisis in one of them would trigger area-wide turmoil. While prudent fiscal policies are essential to address the legacy debt problem, it takes time for them to bring the debt back to (at least) pre-crisis levels. Against this background, the paper explores the feasibility and desirability of transferring a share of national public debts to a European Redemption Fund. In exchange, each country would transfer a yearly flow of resources to the Fund. We show that it is possible to design such a scheme so that it does not entail any ex-ante cross-country redistribution, while the euro area as a whole would benefit as the lowering of member states' annual refinancing needs would improve financial stability. The fraction of mutualized debt would be fully redeemed over a reasonable number of years. The scheme would not jeopardize national commitment to debt reduction; if anything, market discipline would become more effective at the margin.

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* Bank of Italy, Economic Research and International Relations.

1. Introduction[1]

Ten years marked by a double-dip recession – caused first by the global financial crisis and then by the European sovereign debt crisis – left a legacy of high public debt in many countries of the Economic and Monetary Union (EMU). High public debt, even if at sustainable levels, is a source of financial vulnerability as it exposes a country to a loss of market confidence, and creates contagion risks for its neighbours.

Concerning the first aspect, it is well known that above a certain level of indebtedness, liquidity crises in sovereign debt markets can arise suddenly. Because of the government's need to roll over its debt, investors' scepticism can lead to a self-fulfilling default even countries which are fundamentally solvent (Calvo 1988; Cole and Kehoe, 2000).

With regard to the second aspect, contagion and increased interdependence were evident during the euro-area sovereign crisis. Following adverse fiscal developments in Greece, funding costs in other periphery countries were affected to an extent above what would have been justified by their fundamentals (Giordano *et al.*, 2013; De Grauwe and Yi, 2013; Favero and Missale, 2012, 2017). Furthermore, all countries suffered due to market fears of a euro break-up, to trade and financial portfolio spillovers, and to a more difficult environment for monetary policy (the ECB had to cope with more fragmented financial markets and an impaired monetary transmission channel).[2]

First and foremost, the problem of high public debts should be addressed by achieving and maintaining adequate primary balances over a sufficiently long horizon. Yet fiscal prudence by itself will likely take a long time to bring the debt back to (at least) pre-crisis levels.[3] In the meantime, the euro area would remain exposed to the risk of a systemic crisis if adverse equilibria materialized in one or more high-debt countries.

Against this background, we therefore explore the feasibility and desirability of a European Redemption Fund (ERF), as a way to significantly speed up the reduction of legacy debt. An ERF can be defined as a financial vehicle which issues bonds guaranteed by all participating countries. The resources raised from the bond issuance are used either to buy and hold a corresponding amount of national sovereign bonds or to redeem them all together.[4] In the first case, the resources needed to service the fund's debt come from its portfolio of national sovereign bonds; in the second

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[1] The views expressed in this paper are those of the authors and do not necessarily reflect those of Banca d'Italia. We would like to thank Fabrizio Balassone, Marco Committeri, Giancarlo Corsetti, Eugenio Gaiotti, Marco Magnani, Paolo Sestito, Luigi Federico Signorini, Jeromin Zettelmeyer, participants in the 20th Banca d'Italia Workshop on Public Finance and the 30th Annual Conference of the Italian Society of Public Economics (SIEP) for their comments. The usual disclaimers apply.

[2] Incidentally, notice that the consequences of contagion are magnified in a context of multiple equilibria, as tensions in one country can trigger a self-fulfilling crisis in another one.

[3] Baldacci *et al*. (2012) show that significant debt reductions typically take several years.

[4] A combination of the two approaches is of course technically feasible.

case, they come from a stream of resources (e.g. revenues from specific taxes or from seigniorage) which is earmarked in each country and channelled periodically towards the fund. Crucially, in both cases the only activity of the fund is to pay interest on its debt and gradually redeem it: no other expenditure may be financed by the fund's bond.

In the wake of the crisis, the introduction of an ERF has been seriously considered by institutions and academic economists alike (see Section 2). While we will review these proposals in detail below, it is important to stress from the start that, given the temporary and 'passive' nature of the redemption fund, ERF bonds are fundamentally different from 'Eurobonds', which are meant to be a permanent means of financing for member countries. Those in favour of Eurobonds think they should be issued to fund pan-European investment projects and/or to pursue counter-cyclical fiscal policy (e.g. Minenna and Aversa, 2018). ERF bonds are also different from 'European Safe Bonds' à la Brunnermeier *et al.* (2011)[5] because the former are not permanent, nor do they require any sophisticated debt management strategy (issuance of tranches with different seniority). Differently from 'European Safe Bonds', ERF bonds are not meant to address the problem of safe asset scarcity, or to facilitate the transmission of the common monetary policy impulses.[6]

The redemption scheme that we will analyse has two main features. First, the initial size of the ERF is relatively large. This is necessary in order to address the debt legacy problem promptly, and bring even member states with very high debts outside the multiple-equilibrium zone. Second, the ERF is financed via earmarked yearly transfers amounting to a country-specific percentage of national GDP. The transfers would be computed in such a way that the price for participating in the ERF would be higher for riskier countries. In this way, systematic subsidization from fiscally strong to fiscally weak countries can be avoided. This is clearly a prerequisite for the political acceptability of the scheme.

Were the market price of sovereign risk only based on public finance sustainability, a scheme with these features would not substantially change the constraints and the risks faced by the participants: according to most studies, the benefits stemming solely from the higher liquidity of the new bonds would likely be small, at least in the short-to-medium run. But *if* (i) sovereign spreads in high-debt countries price in the risk of a liquidity (as opposed to a solvency) crisis *and* (ii) yields in all countries include a premium for the risk of contagion, *then* the fund can represent a first-order improvement for all the participants. The decrease in sovereign yields in weaker countries would be larger than the increase of yields in the core, so that it would then be possible to design a set of payments which implements an outcome which is Pareto superior to the status quo.[7]

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[5] See also the recent European Systemic Risk Board (2018) report. An early (albeit less financially sophisticated) version of the same approach can be found in the report by the Giovannini Group (2000) and in Monti (2010).

[6] Needless to say, the ERF could *indirectly* contribute to the pursuit of these objectives as well.

[7] For theoretical analyses which show that this can be the case see Beetsma and Mavromatis (2014), Basu and Stiglitz (2015) and Tirole (2015).

Much more important than the size of the expected interest savings is the insurance that the ERF would provide, thereby shielding the euro area from sudden swings in market sentiments. While the Fund is not a substitute for national fiscal discipline, it ensures that the results of the fiscal efforts pursued by member countries are not wiped out by a disruptive confidence crisis.

The rest of the paper is structured as follows. Section 2 reviews previous proposals to introduce a redemption fund for the European countries. In Section 3 we spell out the features of a redistribution-free debt redemption scheme and study its financial implications. Section 4 discusses various aspects of the moral hazard problem in connection with the functioning of the ERF. Section 5 concludes.

2. Literature review

Since the start of the sovereign debt crisis, the introduction of an ERF has been proposed by several authors (Table 2). Proposals differ in several ways, such as the size of the transferred debt, the time horizon of the fund, the nature of the resources flowing from the member countries to the Fund, the presence of ancillary provisions in order to rein in fiscal indiscipline.

The first detailed scheme was advanced by the German Council of Economic Experts (GCEE, 2011; see also Doluca *et al.* 2013). Participants would be allowed to refinance themselves through the ERF up to a level equal to (or slightly higher than) the difference between the debt accumulated to date and 60 per cent of GDP (the Maastricht reference value). This implies a transition phase whose length depends on the schedule of the country-specific refinancing needs.[8] Each country would have to provide resources to the Fund yearly, of an amount sufficient to redeem the transferred debt over a period of 20-25 years.[9] This quick phase-out implies that, notwithstanding the considerable reduction in sovereign yields on the remaining national debt that would be achieved according to the proponents, participant countries would still be required to significantly increase their primary balance. Each participating country would earmark a specific surcharge on a national tax to guarantee its payments. Moreover, participants would pledge a sizeable amount of resources (up to 20 per cent of the transferred debt) as collateral against their liabilities. In order to avoid a new build-up of excessive imbalances, the GCEE requires the introduction of national fiscal brakes, mandating a structural deficit below 0.5 per cent of GDP and residual national debt not

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[8] Using January 1st 2012 as a fictitious starting date for the ERF, Doluca *et al.* (2013) estimate that the roll-in phase would stretch over three to four years.

[9] Doluca *et al.* (2013) clarify how the annual payment has to be computed for each country. The first year, it is equal to the EFR's pro-rata annual interest payments plus one per cent of the amount of debt to be transferred. The country-specific ratio between such an amount and nominal GDP in 2011 is then computed and used as a payment key in proportion to/in relation to? GDP for the subsequent years. The hypotheses underlying the computation are a nominal GDP growth rate of about 3 per cent and the ERF's financing cost of 4 per cent.

exceeding 60 per cent. In the event that a country does not comply with its commitments, the roll-in into the ERF is immediately halted, and the collateral lost for good.

Parello and Visco (2012) build upon the public debt redemption scheme proposed by the GCEE. There are however two important differences: first, in their proposal the fund would operate for slightly longer (around 30 years instead of 20-25); second, their ERF would only issue very long-term bonds and, because of this, would record a surplus in the early years of operation. This initial temporary surplus would be invested in low-risk financial instruments. While this time-profile of the ERF's outlays creates the possibility of investing on financial markets, it is not clear whether this scheme is preferable overall to the plain vanilla GCEE approach. Indeed, the ERF would earn more money on average, but its balance sheet would also become more risky, so markets might require higher risk premiums on its bonds. The authors do not foresee any device to guarantee fiscal discipline.

Another debt redemption scheme is outlined in Paris and Wyplosz (2014). Here, the scheme involves the ECB buying sovereign bonds from each country in proportion to ECB capital keys, and swapping them into zero-interest perpetuities (which is clearly tantamount to cancelling the debt). The ensuing reduction in the ECB's profits is passed on to governments via a reduction in seigniorage revenues (again in proportion to ECB capital keys). In this way, each Member State will pay the ECB back the total amount– in the present value sense – of the initial debt cancellation in the form of reduced distributed profits over an indefinite future.

According to Paris and Wyplosz (2014), since both the national governments' benefits (in terms of initial debt cancellation) and losses are in proportion to the capital key, any explicit cross-country transfer would be ruled out. The scheme is viable only as long as the ECB is able to generate a sufficient stream of income over the infinite horizon *without jeopardizing the achievement of its inflation target*. The authors argue that this is possible, providing simulations showing under what combinations of interest rates, real growth and inflation, given the elasticity of money demand, the present value of the future infinite stream of seigniorage is at least as big as the face value of the cancelled debt. To deal with possible moral hazard, debt mutualization would be coupled with stringent conditionality, embedded in a covenant. The authors specify that, should a country accumulate debt again, the ECB would swap (part of) the zero-interest national perpetuities back into interest-yielding bonds, thus deterring governments from sliding back into fiscal indiscipline. Such a swap should be made automatic and linked to clearly specified trigger events. The role assigned to the ECB by Paris and Wyplosz (2014) could also be played by another intergovernmental body such as a reformed ESM, once all participating countries formally agree to transfer a sufficient amount of their seigniorage to such an institution on a permanent basis.

Corsetti *et al.* (2015) suggest the launch of a one-off sovereign debt buyback by a stability fund, financed through the commitment of future national revenues, sufficient to bring the debt of each participating country below 95 per cent of GDP. The bonds thus acquired would then be swapped into non-interest-bearing perpetuities. The fund would finance its purchases by issuing bills, collateralized by dedicated future fiscal incomes – be it seigniorage, VAT or a wealth (transfer) tax

– of the participating countries over a long horizon (e.g. 50 years or more). The stability fund bills would be accepted by the ECB in refinancing operations and could be bought by the ECB on the secondary market in the event of liquidity shocks.

Table 1 Proposals for a debt redemption scheme

	Size of the pooled tranche	Time horizon	Resources paid to the ERF	Other enforcing tools
German Council of Economic Experts (2011)	debt exceeding 60% of GDP	20-25 years	constant fraction of GDP (mark-up on a national tax, e.g. VAT and/or income tax)	- strengthened national fiscal rules - commitment to a medium-term consolidation and growth strategy. If not respected, 'roll-in' immediately discontinued - pledge of collateral equal to 20% of the loans provided by the ERF. If commitments are not fulfilled, the collateral is lost.
Parello and Visco (2012)	debt exceeding 60% of GDP	30 years		
Paris and Wyplosz (2014)	half of the eurozone public debt (distributed among countries on the basis of the ECB capital keys)	infinite horizon	a fraction of seigniorage revenues	- automatic call of perpetuities back into reimbursement in the event the remaining national debt to GDP ratio exceeds a given threshold - national debt brakes
Corsetti et al. (2015)	debt exceeding 90-95% of GDP	50 years	VAT, solidarity surcharge, wealth tax or seigniorage	- introduction of an automatic debt restructuring mechanism - regulatory changes that limit the exposure of banks to sovereign debt

The scheme could or could not envisage explicit between-countries redistribution. Corsetti *et al.* (2015) start by proposing the calibration of a no-redistribution buyback scheme using only seigniorage and VAT revenues. They first estimate the net present value of non-inflationary seigniorage (i.e. compatible with an inflation target of 2 per cent) over a 50-year horizon, considering a real interest rate ranging between 1 and 3 per cent, a real growth rate between 1 and 2 per cent and an elasticity of currency demand to output of 0.8 per cent. Depending on the combination of parameters, the net present value of seigniorage ranges between €800 and €2,000 billion. If distributed according to the ECB capital keys, even in the more optimistic scenario, this amount would not be enough to bring the debt-to-GDP level below 95 per cent for some countries (namely Italy, Greece and Portugal). Such resources could be supplemented by additional VAT revenues channelled directly into the stability fund. The authors estimate that VAT revenues equal to 1 per cent of GDP in each country should be broadly sufficient to do the job. In order to use just

the stream of income coming from seigniorage, it would be necessary to pool all resources together, thus allowing for some redistribution among countries. The same is true in the event a solidarity tax is adopted.

We should also mention a few other papers that, while they do not strictly speaking discuss redemption funds, are relevant for our purposes as they outline forms of debt mutualization which envisage country-specific repayments as a means to avoid cross-subsidization between core and periphery countries (as we do in the present paper). In particular, Mayordomo *et al.* (2015) and Minenna and Aversa (2018) suggest that national transfers should reflect each country's CDS premiums. According to Muellbauer (2013), transfers should instead be a function of a country's fiscal fundamentals.[10] To our knowledge, the very short, informal note by De Grauwe and Moesen (2009) is the only other contribution that suggests – as we do – that transfers should reflect the sovereign yields prevailing at the start of the mutualization operation.

Finally, it should be noted that most proposals include provisions to ensure that each participant honours its financial obligations to the Fund. This can be accomplished in a relatively straightforward way by earmarking sources of revenue which can be credibly pledged by the States, as is already the case with national contributions to the EU budget or to other international organizations. While this potential source of moral hazard is easily addressed, a more difficult problem concerns the effects of introducing the Fund on the participants' incentives for fiscal discipline in general (which we discuss in Section 4).

3. A redistribution-free European Redemption Fund

3.1 Overview

We propose that each euro-area country *i* transfers to the ERF at time *0* an amount of sovereign bonds equal to a quota *γ* (the same for all participants) of its GDP:

$$D_{i0}^{ERF} = \gamma Y_{i,0} \quad \forall i. \tag{1}$$

The transfer of national debt to the ERF is modelled as a one-off operation, ensuring an ideally instantaneous redemption of the agreed fraction. We tend to prefer this solution as it would minimize the risks of financial tensions which could arise in the transition phase, but is clearly not the only way to implement the Fund: the analytic intuitions provided in this Section would be valid overall also in the event of a more gradual phase-in.

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[10] Mayordomo *et al.* (2015) proposal is similar to that for "Esbies" in Brunnermaier *et al.* (2011). Minenna and Aversa (2018) and Muellbauer (2018) aim at building a permanent common fiscal capacity, as an instrument to pursue an active fiscal policy. In Muellbauer (2013), each country would be free to issue 'Euro-insurance bonds' in a decentralized way; in Minenna and Aversa (2018), the issuance of the new bonds would be decided by a centralized entity.

While the legal details of the scheme go beyond the scope of this paper, at a general level we could envisage several alternative ways to implement such an instantaneous transfer.[11] The first solution would be for the ERF to buy the bonds on the market and simply scrap them, using the resources provided by a large initial issuance of ERF bonds. A second solution consists in splitting each existing bond into two distinct securities, one to be repaid by the Member State and one by the ERF; the face value of the two bonds would reflect the share of national and supranational responsibility respectively.[12] What matters is that under both technical arrangements, part of the national debts would be de facto transformed into ERF liabilities. Refinancing the transferred fraction at maturity would become an exclusive responsibility of the ERF, and Member states would be relieved from any direct debt-service obligation on the transferred fraction.

In exchange for this, member states would earmark yearly transfers to the ERF equal to a percentage α_i of their GDP:

$$T_{it} = \alpha_i Y_{it} \quad \forall i, \qquad (2)$$

These transfers would basically be used by the ERF to service and redeem its debt. We do not look in detail at what national resources should be used to provide for the transfers. Transfers (such as those for the EU structural funds) linked to a treaty obligation are usually considered safe. However, earmarking a specific revenue source could be more credible.

What is crucial is that the fraction α_i will be country-specific, reflecting the fact that countries differ in their creditworthiness. Combining equations (1) and (2) makes it clear that the fraction $\frac{\alpha_i Y_{i0}}{D_{i0}^{ERF}}$ can be interpreted as the implicit interest rate charged by the ERF to the countries. In order to rule out financial gains/losses from the scheme, we therefore require that for each participant this interest rate be equal to the sovereign yield paid by the country before the launch of the ERF, which we call r_i:

$$\alpha_i Y_{i0} = r_i D_{i0}^{ERF} \quad \forall i \qquad (3)$$

In what follows, we will refer to eq. (3) as the **no financial gain/losses condition**.

For the ERF to be solvent, it must be the case that:

$$D_0^{ERF} \equiv \sum_i D_{i0}^{ERF} \leq \sum_i \sum_{t \geq 0} T_{it}(1 + r^{ERF})^{-t} \qquad (4)$$

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[11] The accounting representation of the debt levels can differ as a consequence of the adopted legal solution. However, the economics of the scheme and the related incentives do not change.

[12] While the implementation of the first solution might be complex from the financial viewpoint (the mere announcement of the operation might increase the market value of outstanding national debt overnight, making the financing of the ERF more onerous while creating asymmetric capital gains for national states), the second solution might be complex from a legal viewpoint, as it would constitute a unilateral contractual modification (the sovereign is partly replaced by the ERF as debtor). A third option might be that the ERF unilaterally promises to pay pro-quota interest and principal of each existing bond.

That is, the future flow of transfers, discounted at the rate of interest at which the ERF is able to borrow (r^{ERF}) should be equal to or higher than the initial level of debt. This is what we call the **solvency condition**.

Given equation (1) and (2), after some algebra it turns out that this condition can be rewritten (under the assumption of equal growth for all the countries) as:

$$\alpha \geq \gamma(r^{ERF} - g)/(1 + r^{ERF})$$

where α is the GDP-weighted average of the $\alpha_i s$. The non-financial gain condition, together with eq. 1, implies that:

$$\alpha = \gamma r,$$

where r is the weighted average of the sovereign yields without the ERF. So, to the extent that:

$$r^{ERF} \leq (r + g)/(1 - r), \qquad (5)$$

the non-financial gain condition is sufficient for the solvency condition to hold.

Notice that condition (5) is a very conservative assumption, because it does not require that $r^{ERF} \leq r$, which should instead realistically be the case, as the ERF should significantly reduce the risk of a crisis in the euro area (risk which is instead included in the r_is).

Other proposals (see for example Porello and Visco, 2012) have highlighted the further potential gains which would stem from interest rate differentials between the current yields paid by the sovereigns and those of an almost safe bond guaranteed by all member states. Of course the latter would depend on the structure of the guarantees, which in turn determines the creditworthiness of the ERF. It goes without saying that the creditworthiness (and therefore the benefits for high-debt countries) would be higher with a structure of joint and unlimited guarantees (where all countries are jointly responsible for the whole amount of the mutualized debt) rather than with limited guarantees (where each country pledges an amount of collateral proportional to its transferred debt).[13] Whatever the structure of guarantees, exploiting gains from interest rates differentials is not

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[13] The provision of joint guarantees could be in conflict with the EU legal framework, if a strict interpretation of the no-bail-out clause prevails. However, the evolution of the instruments and the conditions of financial assistance granted during the sovereign debt crisis has shown that such a strict interpretation has been de facto overcome. In particular, in 2011 an amendment to Article 136 of the Treaty on the Functioning of the European Union has been introduced by inserting the following text: 'The Member States whose currency is the euro may establish a stability mechanism to be activated if indispensable to safeguard the stability of the euro area as a whole. The granting of any required financial assistance under the mechanism will be made subject to strict conditionality'. This amendment paved the way for setting up the ESM and could, in principle, provide the legal basis to authorize countries to pledge joint and unlimited guarantees to the ERF.

the focus of our proposal. Such gains are difficult to identify ex ante: therefore, in our baseline simulation we prefer to be on the safe side and we set the size of the yearly transfer to the ERF on the basis of prudent assumptions of interest rates and growth.[14]

In general, the solvency condition does not guarantee that the ERF's debt goes down over time, i.e. that the annual inflows from participating countries are more than sufficient to cover the ERF's interest bill and the debt that comes due. However, we will show that realistic assumptions for interest rates and growth and a proper calibration of the transfers do ensure that the ERF is not systematically in deficit and that mutualized debt is fully repaid in a finite time even if, differently from previous proposals (Corsetti *et al.*, 2015; Doluca *et al.*, 2013; Parello and Visco, 2012), the deadline to fully redeem ERF's debt is not fixed ex ante. In our proposal, the length of the redemption phase is endogenous and it depends on two parameters: the prevailing interest-growth differential and the size of the annual payments received from the countries. The fact that the length of the debt redemption phase is not fixed ex ante allows some counter-cyclicality within the repayment scheme: during recessions the payment to the ERF decreases in nominal value, thus lowering the effort required for a country to be compliant with the scheme commitments and therefore enhancing its credibility.

Finally, it should be acknowledged that, no matter how realistic the assumptions and accurate the calibrations, in the real world the implementation of the scheme may lead to some financial redistribution ex post. This would be the case, for example, if the macroeconomic assumptions on which payments are calibrated turned out to be wrong. To address this issue, the ERF's design (in terms of countries' annual payment, penalizations and allowances) should be periodically revised to adapt to changing macroeconomic conditions and/or to compensate for outturns different from the forecasts used for the original design. The frequency of the revision must take account of long-term structural trends rather than business cycle-related economic fluctuations (for example, a revision every 8-10 years could be appropriate).

3.2 Baseline calibration

Numerical examples can be used to show how the scheme outlined in general terms in the previous section would work in practice. For this purpose, two scenarios are compared: one with no policy changes (No-ERF baseline scenario) and the other featuring the introduction of the ERF (ERF-baseline scenario).

As a first step, we constructed the baseline scenario without the ERF for the debt dynamics in the four largest euro-area countries (Germany, France, Italy and Spain)[15] based on realistic assumptions

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[14] In the simulations below we assume that all countries have the same rate of potential growth. However, in principle, the annual payment is to be modulated to take into account structural differentials in economic growth across countries. If a Member State permanently grows less than its partners, it can be required to increase its annual contribution to the scheme (in terms of incidence over its GDP) in order to avoid free- riding on the growth dividends of other countries.

about growth and interest rates. For the years 2017-18 we used the 2017 Autumn European Commission economic forecasts for each country. Starting from 2019, we assumed the following:

- the primary balance is set to gradually increase (by 0.5 percentage points of GDP yearly, in line with the general requirements of the preventive arm of the Stability and Growth Pact - SGP)[16] until reaching the budget balance which is maintained thereafter;
- countries' interest expenditure reflects the average interest rate paid on the existing stock of debt, the interest rates at issuance and the maturity structure as of the first quarter of 2018; it is computed considering the effects (common for all the participating countries) of a gradual increase (from 2019 to 2025) of the ECB monetary policy reference rates;
- all economies are assumed to grow at a yearly rate of 3.5 per cent starting from 2019, which reflects a real GDP growth of 1.5 per cent and a GDP deflator in line with the ECB inflation target.

Figure 1 shows the projected dynamics of the average cost of debt in the four countries. The differences in 2018 reflect the differential impact that the sovereign debt crisis had on the four countries. Values range from 2.7 per cent in Italy to 1.7 per cent in Germany. The gap at the end of the projection horizon only mirrors the currently observed differentials among the interest rates at issuance (monetary policy affects all countries' interest spending in the same way).

Figure 1. Projected average cost of debt (2018-2048)
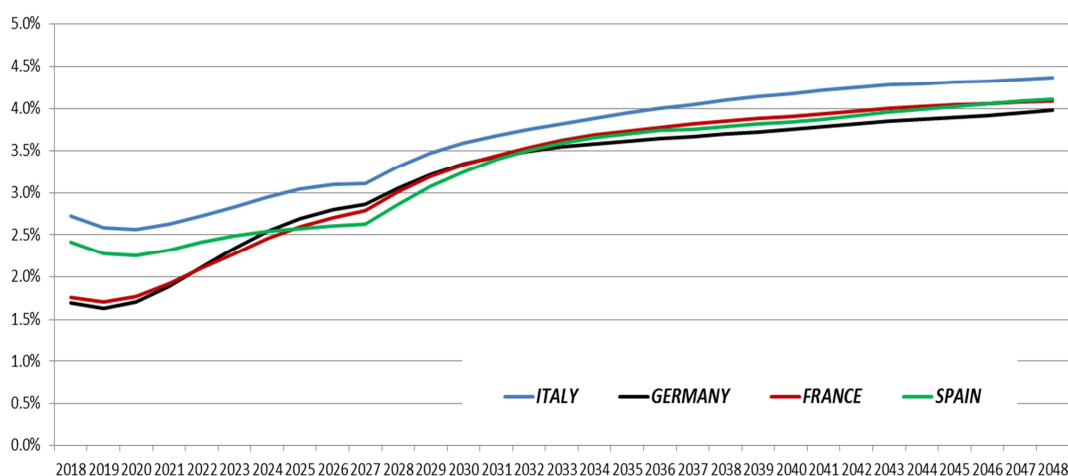
Source: our calculations taking into account current rates at issuance, maturity structure of debt and assuming a gradual increase of the MRO by 3 percentage points over seven years (2019-2025)

The dispersion in the individual countries' average interest rate at the end of the simulation period halves with respect to the start of the period: this reflects the rather uniform (they are all close to

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[15] We only considered these four countries, with no loss of generality, to keep the presentation of the scheme as simple as possible. Of course the building blocks of our simulations remain valid and can be adapted to extend the scheme to all the euro-area Member States.

[16] The requirement in terms of fiscal effort can be made country-specific by taking into account the individual cyclical conditions.

zero) interest rates currently charged at issuance to euro-area countries (that gradually affect the stock of sovereign debt according to the maturity structure).

Figure 2 (blue bars) shows the debt dynamics in each country in the No-ERF baseline scenario. Under the assumption that countries' primary balances comply with the SGP and point towards a balanced budget, public debt is expected to fall significantly over the next 30 years in all countries, also benefiting from a favourable interest-growth differential over the next 5 years.

Figure 2. Projected baseline national debt-to-GDP ratio dynamics with and without the ERF (2018-2048)
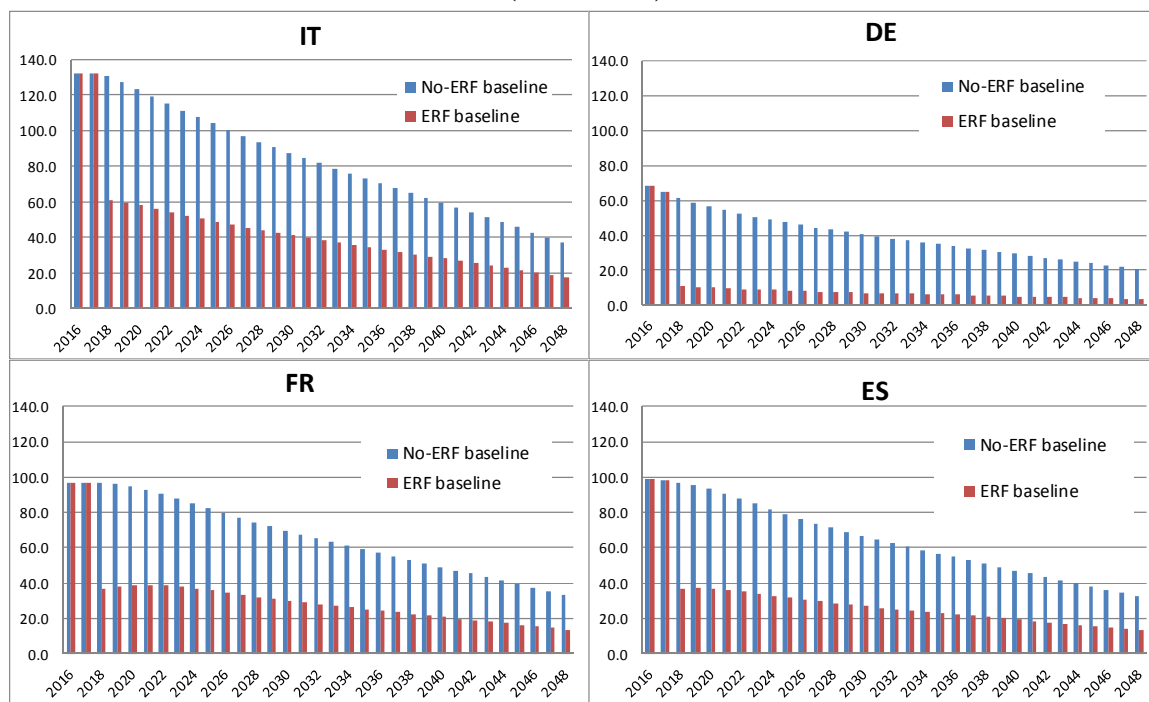
Note: in the ERF scenario the national debt is the quota of sovereign debt not transferred to the ERF which has to be refinanced by each individual country.

Clearly, the debt level in Italy remains rather high for some years to come and only goes below 100 per cent of GDP in 2027. This notwithstanding, Italy records a 30- percentage- point reduction in around ten years, whereas France and Spain would bring their debt down by 20 percentage points (to below 80 per cent) over the same time span.

As a second step, we constructed the ERF-baseline scenario in which a redemption scheme is introduced. At the end of 2018, the participating countries transfer an amount of debt (what we labeled γ in the previous Section) to the ERF, equal (for the sake of exposition) to 60 per cent of their own GDP via a one-off operation. This quota represents the benchmark; the actual share of transferred debt varies according to the current incidence of public debt in each country. Countries with a current debt above 120 per cent of GDP should be allowed to transfer more (even though at the cost of a penalization; see below), while virtuous countries already compliant with the Maastricht threshold would transfer less debt and would thus benefit from a more favourable

treatment (see below). In the case of Italy, whose debt exceeds 130 per cent of GDP, a transfer of 60 per cent of its GDP would not suffice to bring the national debt below the Maastricht threshold. Therefore Italy would transfer a higher share of debt, namely 70 per cent of GDP so as to end up with a national debt level below the threshold. At the other extreme, Germany, whose public debt is around the threshold, would transfer a lower quota, for example 50 per cent of GDP. The redemption mechanism would start operating in 2019.

Another possibility would be to leave each participant free to transfer an amount of debt between a minimum and a maximum, expressed as percentages of national GDP. We think that, while in principle thresholds are not necessary, it is important that each country puts a significant stake in the ERF project, as a means of effectively communicating its commitment to the success of the project itself and, more broadly, to the EMU endeavour.

Obviously, introducing the ERF requires making further assumptions on many different parameters of the scheme. They are set in such a way as to minimize cross-country transfers. As discussed above, the yearly payment from countries, set equal to a fixed percentage (α_i) of national GDP, is meant to finance the redemption of the debt transferred to the ERF by the individual countries. In the benchmark case, for most countries α_i equals 1.2 per cent of their GDP, which represents an implicit interest rate (α_i/γ) of around 2 per cent on the transferred tranche of debt (60 per cent of GDP).[17] For countries with low public debt, an allowance of around 0.2 percentage points is provided: the annual transfer is lowered to around 1 per cent of GDP per year to keep the implicit interest rate equal to the one that is paid by the other countries. For high-debt countries, the transfer is increased by a penalization of around 0.5 percentage points of GDP. As a result, the implicit interest rate on their transferred debt is around half a percentage point higher.

The interest rate paid by the ERF on its debt, r_{ERF} is initially equal to the weighted average of the interest rates paid by governments on their sovereign debts, as its debt fully reflects the current maturity structure of national public debts. In order to project the future evolution of ERF debt, we also require an assumption for the interest rate paid by the ERF on the new debt issued to roll over the expiring bonds. This parameter signals the market's assessment of the ERF's riskiness and it is crucial because it shapes the countries' interest rate differential between the mutualized and the national tranche of their sovereign debt and is therefore the main driver of financial gains or losses for both the ERF and individual countries. We acknowledge that making forecasts for this parameter is very difficult. In the baseline we set such a rate as being equal to the weighted average currently observed for national governments and we assume that it will increase following the pattern of monetary policy reference rates. Let us remark again that this is a very conservative

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[17] The size of national payments is kept fixed, although the ERF's debt is gradually redeemed. Since the country's pro-quota mutualized debt decreases through the simulation horizon, this is equivalent to setting a gradually increasing implicit interest rate on the national quota.

assumption, as it rules out any benefit stemming from the elimination of a tail risk of a sovereign crisis and also any discount stemming from the high liquidity of the ERF bond.

The red bars in Figure 2 show the dynamics of national debts placed on the market in the ERF-baseline scenario.[18] By assumption, the introduction of the redemption scheme mechanically reduces the ratio of national debt to national GDP in the first year of simulation (2018); in the projection horizon this ratio continues to decline, even though at a slower pace compared with the baseline scenario without the ERF.

In order to quantify the financial effects of the introduction of the ERF, we focus on two metrics, for countries and for the ERF respectively, both expressed in terms of the net present value (NPV) over the first ten years of the simulation horizon (2019-2018).

The metric used for countries is the NPV of the difference in interest expenditure between the ERF baseline and the No-ERF baseline scenario, both discounted by a discount rate R, as follows:

$$A_{it} = \sum_{t=1}^{T} \frac{r'_{it} + \alpha_i Y_{it}}{(1+R)^t} - \sum_{t=1}^{T} \frac{r_{it}}{(1+R)^t}$$

In this formula, r_{it} and r'_{it} are country i's sovereign yields before and after the introduction of the ERF. As discussed in Section 3.1, if the α_i that we have chosen in our calibration is close to those that would guarantee the no loss/gains condition, A_{it} should be close to zero, independently of the discount rate. In other words, the yearly *total interest expenditure* should be the same in both scenarios.

The metric used for the ERF is the NPV of its budget balances over the same period, where the single period balances are given by:

$$B_{ERF,t} = \sum_{i=1}^{N} \alpha_i Y_{it} - r_{ERF,t} D_{ERF,t-1} \qquad \forall t$$

i.e. they are given by the difference between the interest *(r_{ERF})* paid on the ERF's debt and the sum of the annual payments ($\sum_{i=1}^{N} \alpha Y_{it}$) received by all countries.[19]

The overall gain/loss over the chosen time horizon is simply given by:

$$\sum_{i=1}^{N} A_{it} - \sum_{t=1}^{T} \frac{B_{ERF,t}}{(1+R)^t}$$

All the metrics above are normalized by the 2019 GDP (national GDP for individual countries and the total GDP for the ERF). For the discount rate we have chosen r_{ERF}. Table 2 displays the results for the baseline scenario in terms of NPV over the years 2019-28: the neutrality of the calibration is

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[18] The drop in national debt in 2019 reflects the drop in the share of debt to be refinanced by each country. The statistical treatment of the transferred share is uncertain, as it could be recorded either as national debt (as in the EFSF case), or as the debt of a supranational institution (as in the case of the ESM). In our simulations, we stick to the second interpretation.

[19] The solvency condition ensures that the sum of the yearly ERF balances is positive and is large enough to repay the initial ERF debt over an infinite horizon, but this is not guaranteed over a finite horizon.

confirmed by the very small size of the financial effects for each country stemming from the scheme. The change in interest spending is broadly nil for Germany, France and Italy.

**Table 2. Gains (+) / Losses (-) in the baseline-neutral scenario(*)** *(as % GDP)*

ERF-baseline *versus* No-ERF baseline					
Italy	Germany	France	Spain	ERF (surplus)	Total
0.0	0.1	-0.1	1.0	0.0	0.1

(*) Gains/losses are expressed as the NPV over the years 2019-2028 of the difference in interest spending between the ERF-baseline and the No-ERF baseline scenarios for the Member States, normalized by their respective 2019 GDP; ii) the budget balance for ERF, normalized by the total GDP for 2019 (computed by summing the GDPs of the participating countries).

The gain for Spain comes from a technical issue with the parametrization strategy: Spain and France have a similar debt level and, as such, according to our scheme, they are treated equally in terms of required annual payment α and of transferred debt γ. Nevertheless, they have a significantly different initial average cost of debt (higher in Spain, as shown in Figure 1); therefore their gains cannot be brought down to zero simultaneously.[20] While Italy has an average cost of debt similar to that of Spain, it transfers a higher share of debt and the penalization can be set so as to bring its gain to zero.

The neutral calibration of the redemption scheme in the baseline scenario ensures a broadly balanced ERF budget and a steady decline of the ERF's debt as a share of total GDP (Figure 3).

Figure 3. Projected dynamics of debt-to-GDP ratio in an ERF-baseline scenario (2018-2048)

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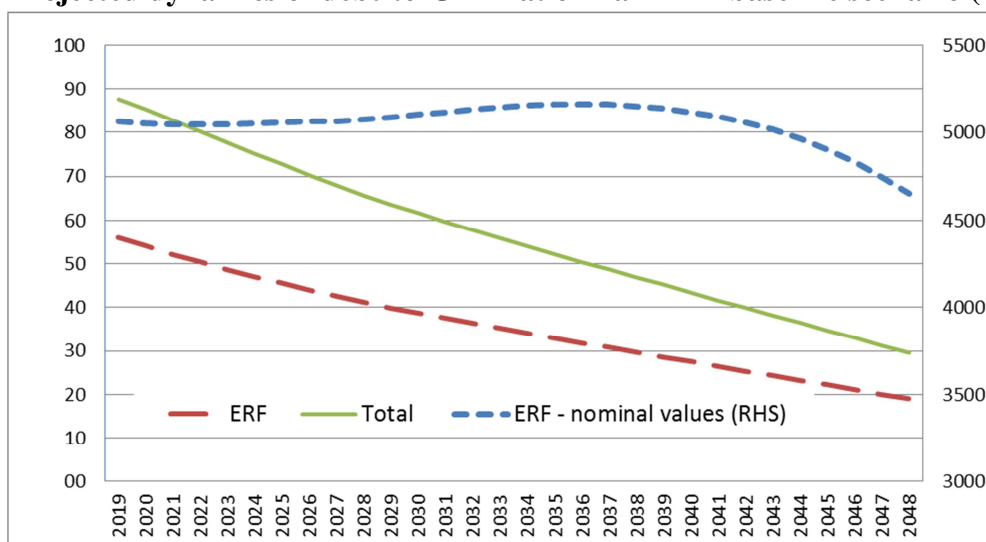
[20] Alternatively, we could have set the parameters in such a way as to shift down to zero and to a loss the financial effects respectively for Spain and for France. The calibration can also be made more detailed by modulating the annual payments also on the basis of the average interest rate paid on national debt.

Starting at around 60 per cent of total GDP, ERF debt goes down to around 40 per cent in 10 years and below 30 per cent of total GDP in 20 years (reaching zero in 2065). In nominal terms the ERF's debt remains close to its starting value for around 20 years; [21] it starts declining afterwards. The total debt of the area, given by the sum of the ERF's and the national tranches of public debt would steadily decrease from around 90 per cent of total GDP to around 30 per cent at the end of the 30-year simulation period. This dynamic is very similar to how the total debt would evolve in the baseline scenario without the ERF.

We have shown, therefore, that it is possible to design a redemption scheme that minimizes induced financial effects with respect to the No-ERF baseline scenario.

Given that the dynamics of the total debt of the area are not significantly affected, and that national debt dynamics are mostly driven by the evolution of primary balances, we might ask what difference the scheme makes. However, this critique misses two crucial points. First, the quantitatively small benefits are due to the very conservative hypotheses that we have made concerning the post-ERF evolution of the interest rates. Second, and more importantly, the primary aim of the ERF is to shield the euro area from the risk that sudden swings in market sentiment trigger a liquidity crisis in one or more high-debt member states and therefore area-wide financial turmoil. This reduction in uncertainty is a highly valuable good in itself (and would ultimately be translated into lower risk premiums).

3.3 Sensitivity analyses

As we have seen, using our baseline calibration, cross-country subsidization is negligible. It could be argued that this feature is heavily dependent on such a calibration. In this section we test the robustness of this result based on alternative, though plausible, assumptions concerning (i) economic growth rates (both in ERF and No-ERF baseline scenarios); (ii) the yield required by the market on the ERF's newly-issued debt; and (iii) the interest rate of the remaining national debt after the introduction of the ERF.

The financial effects of the ERF in the scenario based on alternative growth assumption are shown in Table 3. In column (2) it is assumed that, starting from 2019 the average nominal GDP growth rate is permanently reduced by half a percentage point (to 3 per cent) in each country (and therefore in the area as a whole); in column (3) such a reduction in growth is assumed to occur only in Italy.

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[21] The debt peaks in 2036, but the increase is marginal: a 2 per cent increase over 18 years.

Table 3. Gains (+) / Losses (-) in the alternative growth scenarios(*)

4   *(as % GDP)*

|	Baseline	Lower growth (-0.5%)	Lower growth only in Italy
	(1)	(2)	(3)
Italy	0.0	0.5	0.5
Germany	0.1	0.3	0.1
France	-0.1	0.2	-0.1
Spain	1.0	1.3	1.0
ERF (surplus)	0.0	-0.4	-0.1
Total	0.1	0.1	0.1

(*) Gains/losses are expressed as the NPV over the years 2019-2028 of the difference in interest spending between the ERF-baseline and the No-ERF baseline scenarios for the Member States, normalized by their respective 2019 GDP; ii) the budget balance for ERF, normalized by the total GDP for 2019 (computed by summing the GDPs of the participating countries).

With lower growth, the introduction of the ERF provides some gains to the countries concerned. In fact, in nominal terms the interest bill on the national tranche would be unchanged but the annual transfer to the ERF would be lower; the combined effect would determine a lower NPV for the total future interest expenditure. This feature of the scheme provides some degree of counter-cyclicality in the debt reduction plan. For the same reasons, the ERF would run annual deficits in some years. In the event that all countries grow at a slower pace ERF would therefore register a loss of almost half a percentage point of total GDP (in NPV terms) over 10 years. Yet the loss is of a limited magnitude and in order to be redressed (and therefore to downsize the gains for countries) it would be enough to slightly increase (by less than 0.1 percentage points of GDP) the countries' annual transfers, with limited impact on their implicit interest rate. Under the assumption that only Italy grows less than its partners structurally speaking, it would be enough to marginally increase its annual payment to the Fund to minimize the financial effects.

Figure 4 compares the debt dynamics of the ERF and of participating countries when growth is set at 3.5 per cent (left-hand panel) and at 3.0 per cent (right-hand panel) for all members. Obviously, in the latter scenario the reduction of the incidence of debt on GDP would be slower[22] both for countries and for the ERF (at the end of the period it would attain 25 per cent of total GDP, around 5 percentage points higher than in the baseline scenario) and the ERF's debt in nominal terms would not decrease.

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[22] This result is due both to a denominator effect, since the product is smaller, and to an increase of the numerator driven by a higher interest bill paid on the public debt that is reducing at a slower pace.

Figure 4. Debt-to-GDP ratio dynamics: ERF baseline (left) and Lower growth (right) scenario
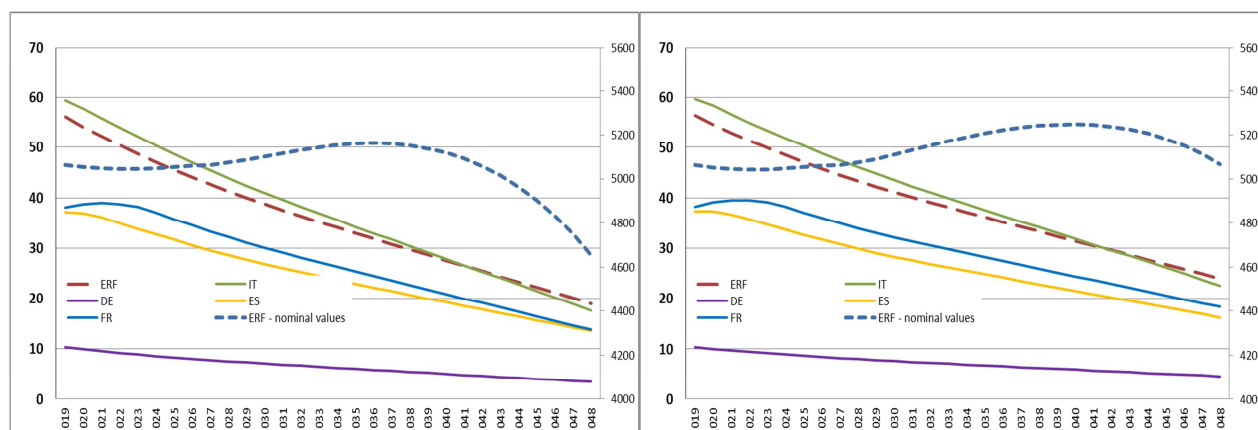
However, the pattern of ERF debt may be changed and brought to the previous declining one by simply raising the annual payment from countries to the Fund by around 0.1 percentage point of GDP. Should only Italy grow at a slower pace, at the end of the decade the ERF's debt would only be one point higher than in the baseline scenario.

Alternative assumptions on the interest rate paid by the ERF on its new debt issuances are shown in Table 4. This parameter is important because it determines the payoff of the scheme both for the participating countries and the ERF, and it is very difficult to forecast. In fact, the price at issuance of the ERF's debt will be determined by both the institutional characteristics of the scheme (e.g. the guarantee structure) and the perceived future riskiness of the participating countries and of the area as a whole. In our baseline scenario we assumed that the interest rate on the new ERF bond equals the weighted average of the current rate for the participating countries.

**Table 4. Gains (+) / Losses (-) in the alternative interest rate scenarios(*)** *(as % GDP)*

	ERF-Baseline	ERF interest rate as Germany	ERF interest rate as Italy	ERF avg. interest rate down (1%)
	(1)	(2)	(3)	(4)
Italy	0.0	0.0	0.0	0.0
Germany	0.1	0.1	0.1	0.1
France	-0.1	-0.1	-0.1	-0.1
Spain	1.0	1.0	1.0	1.0
ERF (surplus)	0.0	0.3	-1.0	5.0
Total	0.1	0.5	-0.8	5.2

(*) Gains/losses are expressed as the NPV over the years 2019-2028 of: the difference in interest spending between the ERF-baseline and the No-ERF baseline scenarios for the Member States, normalized by their respective 2019 GDP; ii) the budget balance for ERF, normalized by the total GDP for 2019 (computed by summing the GDPs of the participating countries).

It could be assumed instead that this interest rate will converge toward the issuance rate of Germany, the lowest value among the participating countries (this might be the case if markets believe that the introduction of the ERF effectively eliminates the risk of sovereign liquidity crises and of any related systemic instability in the area). At the other extreme, as argued in Balassone *et al.* (2016), the interest rate might converge to that paid on Italian bonds, i.e. 'to that of the bonds issued by the riskier countries in the pool with a debt large enough to damage the creditworthiness of the least risky countries'. In both cases, if the interest rate at issuance of the national tranches is unchanged, all participating countries are as well off as in the baseline scenario.

As for the Fund, in the former case it would benefit from a slightly lower interest expenditure and it would run a small cumulative surplus of 0.3 percentage points of total GDP over the next ten years (in NPV terms), as shown in Column (2). This scenario would be marginally more favourable than the baseline one; it would need no adjustment in parameter calibration to ensure its neutrality and it would determine a more sizeable reduction of mutualized public debt both in nominal terms (Figure 5, left vertical axis) and as a share of the total GDP (Figure 5, right vertical axis).

Figure 5. Dynamics of the ERF's debt under alternative hypotheses on the issuance rate
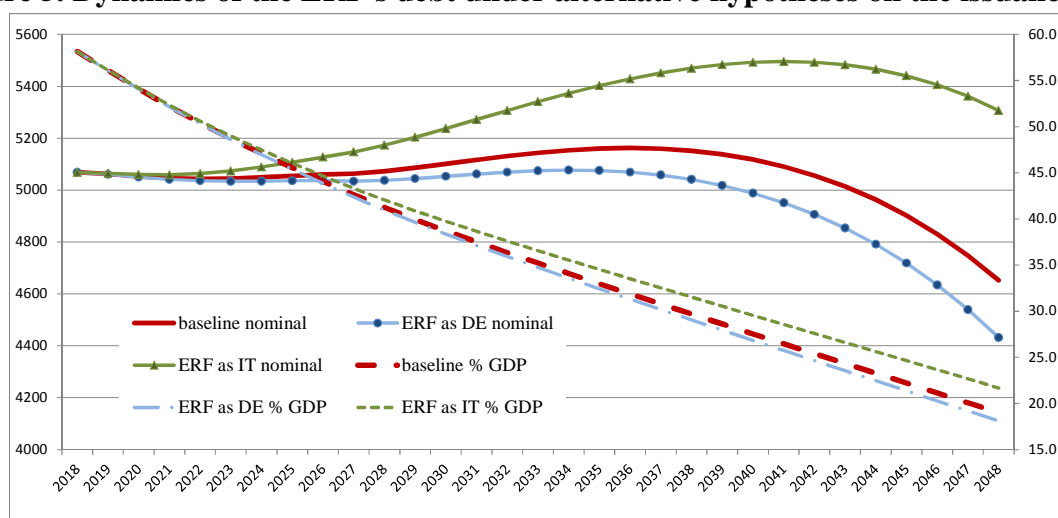
If, on the contrary, the ERF's issuance rate is in line with the Italian one (Table 3, Column 3), the ERF will run a cumulative deficit of about 1 percentage point of total GDP (0.1 percentage points per year), while the financial effects for participating countries remain close to zero (with Spain as an exception), as in the baseline. This would be a 'pessimistic' baseline scenario, with a less marked decrease in the incidence of the mutualized public debt (see again Figure 5).[23] However, in order to improve the neutrality of such a scenario and to equalize the financial effects for the participating countries and for the ERF it would be enough to marginally increase the parameter α for annual payment from all countries: in this way the cumulative deficit for the ERF would be halved over the next decade (to around 0.5 percentage points of total GDP) and the cumulative loss of the country would be about the same size (in terms of their respective GDP, with the exception of Spain).

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[23] Mutualized debt would increase in nominal terms (Figure 5, left vertical axis).

As a final exercise, in Table 5 we study what would happen if markets reacted to the introduction of the ERF by changing the risk premiums required on the remaining national public debt (the interest rates required in the No-ERF baseline scenario are unchanged). Column (2) shows the effects of a Countries up *(+1%)* scenario: over the first ten years of the simulation (2019-28) the average interest rate on the national part of the debt (with the exception of Germany) is increased by 100 basis points, while the interest rate of the ERF is unchanged with respect to the baseline scenario. This scenario can be rationalized through an adverse market perception of the national tranches (perceived as riskier) due to: (i) the reduced liquidity of these assets; and (ii) a higher risk of default stemming from the fact that the no bail-out clause might appear more credible (because national debts no longer pose systemic threats). The Countries-up scenario would have some heterogeneous financial effects: Italy would suffer the most, due to the still high tranche of national debt. Compared with the baseline scenario with ERF, the loss for France is only slightly higher than for Spain. The total area loss (compared with the ERF baseline) in NPV terms over the next ten years would equal 2.5 percentage points in cumulative terms (around 0.25 percentage points per year). Therefore, the overall effect of a change of 100 basis points on the average interest rate of national debts is about half the impact of a change of the same proportion in the ERF's debts. The dynamic of national public debt would remain unchanged under the assumption that any increase in the interest bill is compensated by an increase of the primary balance in line with the SGP until a balanced budget is reached.[24]

Table 5. Gains (+) / Losses (-) in scenarios with market reactions to the introduction of the ERF *(as % GDP)*

	ERF-Baseline	Countries up (+1%)	ERF down (1%) + Countries up (1%)
	(1)	(2)	(3)
Italy	0.0	-5.2	-5.2
Germany	0.1	0.1	0.1
France	-0.1	-4.2	-4.2
Spain	1.0	-2.5	-2.5
ERF (surplus)	0.0	0.0	5.0
Total	0.1	-2.5	2.5

(*) Gains/losses are expressed as the NPV over the years 2019-2028 of: the difference in interest spending between the ERF-baseline and the No-ERF baseline scenarios for the Member States, normalized by their respective 2019 GDP; ii) the budget balance for the ERF, normalized by the total GDP for 2019 (computed by summing the GDPs of the participating countries).

Column (3) shows the effects of an ERF down (-1%) and countries up (+1%) scenario: over the first ten years the average interest rate on ERF debt is reduced by 100 basis points while that of the

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[24] Should a country not compensate the higher interest spending by means of higher primary surpluses, the reduction of national debts would be slowed down.

national debts increases by the same amount. This scenario is a combination of the previous one and of the scenario displayed in Column (4) of Table 3 and it might also reflect a 'flight to quality', from risky national debts to 'risk-free' jointly guaranteed mutualized debt. The gain from the lower interest bill on the ERF's debt would be halved by the loss on national debts but the faster reduction of ERF's debt would be maintained.

4. The ERF and the moral hazard issue

The criticism most often raised against debt mutualization projects is that, by eliminating the risk of liquidity crises, mutualization reduces the sensitivity of the government budget to changes in government yields, and therefore it would encourage fiscal profligacy (see e.g. Issing, 2009). In the euro area this criticism is of particular concern because trust in fiscal rules has gradually faded and strengthening them is unlikely to convince the sceptics.

However, it must be stressed that, differently from other debt mutualization schemes, the ERF is limited in size and temporary in time. Each country would be left with a significant level of national public debt, to which market discipline would still apply. Actually, once the national debt level is so low that the risk of adverse equilibriums is ruled out, market yields should reflect fiscal fundamentals more closely, and therefore provide better (dis)incentives at the margin for the sovereign borrower.

It can be argued that in any case nothing guarantees that national governments, after the launch of the ERF, will not keep accumulating national debts, leaving the total unchanged if not increasing. In other words, the ERF would not solve the moral hazard problem which was apparently present in the euro area even before the crisis.

The short answer to this objection is that it is misplaced: the ERF's objective is *not* to solve the EMU moral hazard problem, but to eliminate the risk of systemic crises due to the current existence of highly-indebted (albeit fundamentally solvent) member states. It should be kept in mind that for the most part such high debt-to-GDP ratios are a mere by-product of the crisis-induced drop in GDP levels. To the extent that the problem highlighted is real, and that the ERF reaches its limited objective without significant redistributive consequences, it seems worth pursuing.

It remains true that the architecture of the euro area is incomplete and less than perfect, but this is a structural problem, which should be addressed with structural changes to EMU rules and institutions – a task which is mostly orthogonal to the introduction of the ERF.

However, the launch of the ERF could also create the conditions for *alleviating* the moral hazard problem and the related deficit bias.

First, as Delpla and Von Weizsäcker (2010) suggest, with the ERF it could be possible to give an explicit seniority structure to the stock of debt. In particular, it could be explicitly agreed that national debt would be junior to ERF debt. The very fact that national bonds have junior status should lead investors to raise their cost and in this way incentivize fiscal discipline at the margin.

Second, after the ERF has started, it would be possible, as argued by Corsetti *et al.* (2015, 2016), to introduce a Sovereign Debt Restructuring Mechanism (SDRM) in the euro area. An SDRM can be

seen as the counterpart of a 'bankruptcy code' for the public sector.[25] It defines a set of procedures and institutions spelling out 'who has the power to do what' in the event of a sovereign default. It typically envisages a series of steps and tasks, concerning several legal, economic, and financial functions: (a) identifying the relevant governing laws or jurisdictions; (b) initiating the restructuring procedure; (c) defining the perimeter of credits to be restructured; (d) verifying the eligibility of creditors' claims; (e) defining the extent of the necessary debt relief; (f) ensuring an orderly setting for the dialogue and negotiations between the debtor and its creditors; (g) possibly sanctioning a stay on creditor litigation after payments are suspended and before an SDR agreement is reached; (h) supervising/validating the voting procedures, and enabling a qualified majority of creditors to bind a dissenting minority to the terms of the agreement; and (i) possibly protecting the (de facto or de jure) seniority of any 'interim finance' provided by official or private lenders during the stay. [26]

By providing a blueprint and a timetable for crisis resolution, an SDRM reduces the delays and uncertainties surrounding a default event. This reduces the bargaining power of the debtor country – as Gros and Meyer (2010) put it, 'debtors' main negotiating asset is the threat of a disorderly default' – and, according to SDRM advocates, this in turn reinforces market-induced fiscal discipline ex ante. As investors know that there will be no bail-out in the event of default, they will require higher yields for more indebted countries, therefore discouraging overborrowing in the first place. This reasoning rests on two assumptions: a) markets are able to enforce fiscal discipline smoothly; and b) an SDRM gives full credibility to a 'no bail-out' solution.

Concerning the first point, the discussion about the role markets should play as a means to enforce fiscal discipline goes back to the early days of the EMU. The Delors report argued that at times markets might even facilitate the accumulation of large imbalances and that 'constraints imposed by market forces might either be too slow and weak or too sudden and disruptive'. By and large, the EMU experience vindicates Delors' skepticism. The introduction of an SDRM may amplify the sudden reactions of investors, especially if a high degree of automaticity is embedded in the mechanism. For example, an SDRM which rests on numerical triggers for kick-starting the insolvency procedure may make self-fulfilling debt crises more likely: runs on sovereign bonds may start as soon as debt levels get near to the thresholds.[27] More generally, it is illusory to think that

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[25] Of course, the parallel must be taken with more than a grain of salt, as - just to name one difference – States cannot be liquidated.

[26] See Committeri and Tommasino (2018) for a more thorough discussion.

[27] Some SDRM proposals show an unwarranted trust in automaticity and quantitative rules. For example, Weber et al. (2011) and Deutsche Bundesbank (2016), propose including a contractual 'trigger clause' in government bonds, whose maturity would be automatically extended by three years as soon as the country receives financial assistance from the ESM, before performing any in-depth solvency analysis. Other authors have proposed different nuances of 'automaticity' in crisis management, in an attempt to better distinguish cases of insolvency from those of temporary illiquidity. Notably, Corsetti et al. (2015), propose that restructuring should not be required unless debt is above 95 per cent of GDP and/or yearly gross financing needs are above 20 per cent of GDP and the country loses market access. Andritzky et al. (2016) propose that if a country has public debt in excess of 90 per cent of GDP, financing needs above 20 per cent of GDP and has violated the European fiscal rules several times in the previous 5 years, it can only access ESM financing in connection with a maturity extension à la Weber et al. (2010). More recently, a group of French and German economists (Bénassy-Quéré et al., 2018) have presented a comprehensive package of reforms to overhaul European economic governance. In particular, these authors argue that the ESM criteria for deciding when a sovereign

discretion and flexibility in official lending and sovereign restructuring decisions can be completely eliminated. Unforeseen contingencies can and will always arise, requiring discretionary solutions.

Concerning the second point, in order to be credible, a 'no bail-out' clause in the euro area requires that the consequences of member country defaulting are not disruptive for the area as a whole. The availability of an orderly procedure certainly reduces the contractual and legal costs of a default but it cannot avoid systemic consequences. In fact, an SDRM cannot solve the issue of sovereigns being 'too-big-to-fail'. Economic and financial integration in the euro area are so high that the credibility of any SDRM will never resist the crisis of a large and highly indebted country. The Greek case has shown that integration can make even small countries 'too-systemic-to-fail'. At worst, the mere announcement of an insolvency procedure may be perceived as a signal of an impending debt restructuring. These considerations suggest that an SDRM can only work under very carefully defined conditions, and provided that the debt problem is addressed first; henceforth the SDRM should be postponed until high-debt countries bring their debt down sufficiently (Fuest *et al.* 2016, Corsetti *et al.* 2015). In other words, the ERF is clearly a precondition for a viable SDRM.

5. Concluding remarks

The takeaway of the paper is twofold. First, an ERF which pools together a sizeable portion of national public debts and gradually redeems them could provide gains for all the participating countries. The reason is that, with the introduction of the ERF, countries with sustainable public finances but with a high legacy debt would be shielded from sudden swings in market sentiment, while low legacy debt countries would benefit from the enhanced financial stability of the euro area. In other words, the reform would immediately lead to more risk sharing *and* risk reduction. Second, it is possible to design a redemption fund which – for reasonable developments of interest rates and economic growth – does not entail significant cross-country redistribution.

The ERF is clearly not a panacea. The governance problems which plague the euro area would remain. The over-borrowing bias which was arguably at play in some countries before the crisis would not be reduced. However, with the launch of the ERF it is possible that these issues could be addressed more easily. Markets would sanction fiscal profligacy more effectively in an environment in which national debts are below the panic-prone level. The institutional reform process would also be facilitated (we have argued, for example, that no euro-area debt restructuring scheme is thinkable without first tackling the issue of legacy debt). Countries which engage in a serious fiscal consolidation would be protected in the medium run from the vagaries of financial markets, increasing the probability of their debt-reduction strategy being successful.

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is insolvent 'must be transparent and consistent across countries', and that the sustainability assessment needs to be based 'on a data-driven method that can be reproduced and checked by the public'. In any event, they stop short of spelling out a set of numerical triggers/thresholds.

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