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S.I.: RECENT DEVELOPMENTS IN FINANCIAL MODELING AND RISK MANAGEMENT

Making the Eurozone work: a risk-sharing reform of the European Stability Mechanism

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Abstract

This work presents an original proposal for the reform of the Eurozone architecture according to an approach based on risk sharing (aiming to reach in the long-term the mutualization of public debt). The proposal envisages a new role for the European Stability Mechanism (ESM) which should gradually become the guarantor of the public debts of the European Economic and Monetary Union (EMU). In this way, the new ESM would support the full transition from national debts to a single Eurozone public debt (e.g. Eurobonds) with a single yield curve for all countries. Our proposal would benefit both core and peripheral EMU countries. Indeed, the riskiest countries, which would gain from the ESM conditional debt guarantee, should give up the possibility of redenominating their national debt and would pay to the ESM the corresponding market price of the guarantee. This would strengthen the capital endowment of the ESM and also allow it to use its leverage capability to support the realignment of the economic cycles of the different countries through profitable public investment plans concentrated in the weakest regions of the EMU. Such plans would be coordinated and implemented by the European Union. After a transition period, our Insurance Fund proposal would contribute to a much more resilient monetary union, with a European fiscal policy and mutualized debt. Admittedly this proposal presupposes a political consensus at the EU level to reinterpret the no bailout rule enshrined in the treaties so that risk sharing institutions implemented with fairly priced insurance scheme can be allowed. New risk sharing institutions will foster a common vision of belonging to the same federal, political union in the making, the only one compatible with the abdication of fiscal sovereignty by national governments.

Keywords Sovereign debt · Risk-sharing · Insurance fund · ESM · ECB · OMT · QE · CDS spread · Investments' multiplier · Bond-market discipline · Safe asset

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"Those Who Reap the Benefits must Bear the Costs" (Walter Eucken, as quoted by Jens Weidmann, 2016).

1 Introduction

The issue of Eurozone overhauling is gaining more and more attention in relation with key deadlines for the transposition of the Fiscal Compact and of the European Stability Mechanism (ESM) into the EU legislative framework. Both were born in 2012 as intergovernmental agreements aimed at improving Eurozone resilience according to two arms: on the one hand the Fiscal Compact would have improved budgetary discipline in "rogue" countries, and on the other hand the ESM would have acted as a safety net for Eurozone members.

A reality check reveals that both agreements have fundamental failures. The Fiscal Compact—along with the Six Pack of late 2011—has significant pro-cyclical side effects due to the excessive limit on public spending imposed to most fragile economies. The ESM is only in theory a sovereign bailout fund for the Euro area because of an unbalanced financial structure, a governance structure with a level of discretion which may hamper full accountability to all its members and an intervention policy that is bounded to cases of overt crises.

The proposals for the revision of the Eurozone architecture currently under discussion at the EU institutional level do not show a real awareness of these failures and remain in their essence consistent with the view that the fragility of the peripheral countries must be managed with risk reduction and risk segregation. Apart from small scale initiatives towards some form of fiscal union—such as the creation of a stabilization function of the Eurozone and a European "rainy days" fund—the proposals presented by Germany, by the European Commission, by a group of 14 French-German economists (Bénassy-Quéré et al. 2018), and by the Finance Ministers of 7 Northern Eurozone countries[1] fall short of addressing in a convincing manner the key problems of the Euro area (Herr et al. 2017; De Grauwe 2013).

The main implication of current Eurozone economic problems—as many predicted, even prior the departure of the European Monetary Union (Goodhart 1997; Godley 1997)—is the worsening of difficulties in macroeconomics adjustments because the crucial complementarity between the fiscal, tax-raising and spending authority on the one hand and monetary policy authority on the other hand is not working. National fiscal policy and single monetary policy for the Euro area as a whole cannot achieve the level of coordination when it is urgently needed, especially in time of recessions and/or financial crisis. This introduces a strong constraint on national Governments in their attempt to stabilize their economy by lowering taxes and increasing spending in difficult times, as they cannot rely on the support from the central bank hence remaining exposed to financial markets' vagaries which may prove very unfavorable. The final outcome—especially in adverse scenarios—is that, in order to safeguard the solvency, government may be forced to adopt a more deflationary stance than desirable.

The present work illustrates an original proposal for the reform of the Eurozone according to an approach based on risk-sharing principles, which entail the creation of a supranational Insurance Fund with the price of risk determined by capital markets (Minenna and Aversa 2018). The proposal envisages a new role for the ESM, which should gradually become the guarantor of the public debts of the Euro bloc countries to achieve the full transition from

[1] Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, the Netherlands and Sweden.

national debts to a single Eurozone public debt with a single sovereign yield curve and, thus, reaching the goal of implementing a uniform sovereign debt price for all member States.

In exchange for the conditional guarantee provided, the ESM would be entitled to new contributions by risky countries for an amount corresponding to the market price of the guarantee. Additional equity capital to protect against unexpected loss can also be called upon to risky countries. This would strengthen the capital endowment of the Stability Mechanism consequently increasing its ability to borrow on the financial markets without having to increase its leverage and, therefore, maintaining a low risk profile under normal as well as stressed market conditions. Obviously under extremely adverse scenarios the ESM could rely on the possibility to increase its leverage according to standard market practices being eventually backed by the ECB as already happened in the recent years.

In particular, apart from extremely adverse scenarios, the new ESM could issue investment-grade liabilities appropriately spread over the various maturities of the term structure. Along with guaranteed Govies, these ESM-issued liabilities would create a genuine Eurozone safe asset eventually available to the capital markets: this would correct one of the main anomalies of the European Monetary Union. We refer to the fact that, since the eruption of the global financial crisis, the role of Eurozone safe asset has been improperly held by the German government bonds: their under-sized outstanding notional with respect to the financial and economic dimension of the Euro area implies a systematic scarcity of safe assets which contributes to drive Bund yields on the negative territory even on the medium maturities. This role—albeit reflecting a matter of fact (i.e. the outstanding credit worthiness of Germany with respect to its partners)—stems from the combination of the above mentioned Eurozone architectural fragilities with the risk segregation strategy that core countries have advocated since the beginning of this decade.

The proceeds from the placement of its liabilities (or part of them in extremely adverse scenarios) would allow the reformed Stability Mechanism to finance safe and valuable investment projects concentrated in the weakest regions of the Euro bloc. This would crucially promote the re-alignment and harmonization of the economic cycles across member countries. Indeed, the provision for a strict proportionality between the premiums paid for the guarantee by risky countries and the ESM-funded fixed capital formation within the same countries could eventually remedy the harmful pro-cyclical side effects of the Fiscal Compact, which has forced many governments to freeze de facto investment spending and, thus, to hamper growth.

On the medium-long term the reconciliation of the roles of public debt guarantor and project financer within the same supranational institution would lead to the natural transition to a single Eurozone's Finance Minister appointed for the management of a federal budget (with well-defined federal revenues) and a federal debt and entitled to rely on a cooperative monetary policy by the European Central Bank. Prospectively, once completed the phase-in period, the ESM could gradually replace its covenant on national public debts with a direct issuance of Eurozone supranational securities (Eurobonds). In the lively policy debate over the sovereign debt crisis in Europe how to "convert" public debt in the Eurozone into "Eurobonds" has been a widely discussed proposal. This proposal has been supported at political level among others by Monti (2010), Tremonti and Juncker (2010) and elaborated at a more technical level in De Grauwe and Moesen (2009), Boonstra (2010), Eijffinger (2010), Delpla and Weizsacker (2010), Baglioni and Cherubini (2011), Claessens et al. (2012), Favero and Missale (2012), Varoufakis and Holland (2012), Beetsma and Mavromatis (2014), Baglioni and Cherubini (2016), and Esteves and Tuncer (2016). The most common criticisms against these proposals involve moral hazard concerns and the Modigliani–Miller argument (Kopf 2011), which referrers to the proposals that provide for the split of public debt in several tranches with different levels of seniority and limit the joint liability of all member States to the tranche with the highest seniority. Basically, this criticism claims that liability splits would hardly be able to reduce the aggregate debt cost for highly indebted governments because of the "invariance effect" foreseen by the Modigliani–Miller theorem.

We think that both types of criticism are questionable. First, the problem of moral hazard also exists in the current structure of the Eurozone, and indeed, in part, precisely because of the imperfections of this structure that involves an over-exposure of member governments to the insolvency risk. It is therefore not at all obvious that suitable solutions for the transition to a Eurozone federal debt can—with the provision of an appropriate incentive and penalty scheme—reduce the danger of moral hazard with respect to the status quo. Berger et al. (2018) argue that a no bailout regime without risk sharing lacks credibility and entails more moral hazard than a well-designed formal fiscal risk-sharing mechanism.

As for the Modigliani–Miller argument, which applies to corporations, its relevance in relation to the debt of a sovereign State is at least questionable. As observed by De Grauwe (2011), this argument applies to the extent that the underlying risk is unchanged, which, however, is not the case if the common bond issue succeeds in shielding countries from being pushed into a bad equilibrium and, consequently, in reducing their risk profile. In addition, within our proposal, maturing uninsured debt is replaced by new insured debt; therefore, any increase in market-implied yields on insured government bonds would have a minimal effect, if any, on the cost of servicing the public debt (most of which is represented by fixed-rate securities).

Obviously, the hypothesis of a joint bond issuance by the Eurozone governments is a very delicate issue with significant implications both at the political and the fiscal level. For this reason, even recent proposals for sharing risks among member countries have figured out partial solutions (Heise and Holzhausen 2018) and temporary ones (Cioffi et al. 2019). Our proposal differs from these contributions and provides an "assisted" access to a Eurozone federal debt as a result of a gradual and disciplined convergence process of the yield curves of the various member States. The objective, therefore, is not only to provide the most indebted countries with a benefit in terms of lower interest rate burden, but also to definitively eliminate sovereign yield spreads whose presence in fact involves huge distortions and imbalances between countries joining the same currency area. Not to mention the benefits of a centralized debt management also in terms of a more controlled borrowing activity with respect to the current set-up.

Admittedly our proposal presupposes a political consensus at the EU level to reinterpret the recurrent reference to the no bailout rule enshrined in the treaties—a risk-sharing mechanism based on market prices being consistent with the no-bailout principle—and to favor a common vision of belonging to the same federal reality, the only one compatible with the abdication of fiscal sovereignty by national governments. More broadly our proposal requires a call for more coordinated behavior in the EU in taking preliminary steps towards some, admittedly loose, form of fiscal union with limited centralization which nonetheless entails further institution building. Many scholars and practitioners have proposed a Eurozone Treasury (Semmler and Young 2017). In fact, both the presidents of the German and French Central Banks, Jens Weidmann and Francois Villeroy de Galhau, have suggested a Euro-treasury (Süddeutsche Zeitung 2016).

The rest of the paper is organized as follows. Section 2 investigates the causes of the Eurozone fragility, explaining why they go well beyond the standard argument of fiscal profligacy of the periphery. Section 3 summarizes the recent developments in the debate on the Eurozone reform, while in Sect. 4 we discuss the open issues with the current ESM set-up. Section 5 outlines the rationale of our proposal: making the Stability Mechanism a supranational guarantor of the public debt of Eurozone governments. A simplified model for the cash flows associated with the proposed reform is presented in Sect. 6 and simulation results are discussed in Sect. 7. In Sect. 8, we discuss the possible moral hazard issues related to the reform. Section 9 analyzes the adequacy of the ESM capital endowment in light of its possible transformation into the sovereign debt Insurance Fund proposed by the paper. Section 10 discuss how the new ESM could issue investment-grade securities in order to fund valuable investment projects in peripheral countries. Finally, Sect. 11 concludes the paper, and gives a summary of the main *pros* and *cons* of our proposal.

2 Eurozone fragility: wrong culprits and easy scapegoats

Economic and financial integration has been at the core of the European unification process since its very beginning. The establishment of the European Monetary Union (EMU) and the harmonization of monetary policy across the member States under the umbrella of the European Central Bank (ECB) was a milestone towards the goal of a fully integrated Single European Market. The 2008 financial crisis and following Sovereign Debt Crisis did provide strong evidence that European economic and financial markets are far from being perfectly integrated. The capital outflow from the Eurozone peripheral countries to the core countries illustrated a capital retrenchment in response to a sharp increase in aggregate risk. The crisis period made clear that further advancements in the integration of the European capital markets and institutions are necessary to complement the EMU. In the evolution of pan-European markets architecture Banking and Capital Markets Union are designed to achieve a more diversified financial system through fully integrated banking and capital markets across all EU members with the goal of ensuring greater financial stability and improved funding opportunities for European companies.

While the combination of EMU with Banking and Capital Market Unions will provide a strong European market infrastructure, it remains unclear if the EU is able to progress towards a Fiscal Union. In the absence of a Fiscal Union, a true single market for capital cannot be achieved as fiscal spending will continue to depend on the solvency and fiscal policies of the respective sovereign. The overwhelming empirical evidence shows that risk-sharing in the euro area is significantly lower compared to similar federations such as the United States (e.g. Furceri and Zdzienicka 2013). According to Milano and Reichlin (2017) the lower degree of risk-sharing in the Eurozone is attributable to the absence of direct transfers from Federal Government (vis-à-vis 20% points in the US) and substantially lower factor income (some 25% points larger in the US; this latter is a proxy for the efficiency/integration of financial markets; Ioannou and Schäfer 2017). However, more integrated capital markets foster network effects and increase the mobility of capital facilitating a withdrawal of funds in times of crisis. Financial markets "imperfections"—such as contagion effects and herding behavior—in combination with self-fulfilling prophecies can contribute to the surge of massive financial instability when large borrowers—such as sovereign States—are subject to roll-over risk as a result of changes in market participants credit risk perception (De Grauwe and Ji 2013).

A large part of the debate on Eurozone overhauling moves from the shared need to overcome substantial differences between member States and increase the resilience of the Euro bloc in the event of new crises. However, there is no consensus on the causes of differences and imbalances nor—consequently—on the reforms to be adopted.

According to a view held by many commentators fiscal recklessness of Southern European countries is the basic cause of their excessive indebtedness, often significantly higher than the 60% optimal threshold enshrined in the Maastricht Treaty. In turn, the excessive size of the debt compared to that of the economy causes excessive riskiness, which—at the peak of the Sovereign Debt Crisis (2010–2012)—has spilled up the risk premium required by the markets to finance "rogue" countries and which was reflected in the significant widening of sovereign yield spreads with respect to the Bund. However, as argued forcefully by Di Cesare et al. (2012), previous analyses and their new evidence suggest that during the Sovereign Debt Crisis in the Eurozone government bond spreads for several countries have increased to levels that were well above those that could be justified on the basis of fiscal and macroeconomic fundamentals. Among the possible reasons for this gap, their analysis singles out the increasing perceived risk of a break-up of the Eurozone, as resulting also from other technical analyses focused on market indicators of the redenomination risk (Minenna 2014).

According to a view widely debated in Germany and other core countries, ECB extraordinary interventions—with the announcement of the Outright Monetary Transactions (OMTs) and, later, with the Quantitative Easing (QE)—have dampened sovereign spreads and artificially altered the perception of the sovereign risk of the peripheral countries by financial markets. These interventions—in particular the QE (OMTs have never been enforced)—have realized a surreptitious monetary financing which violates the ECB Statute. For this reason the end of the QE and proposals for risk reduction aimed at peripheral countries and based on strict domestic reforms, regardless of their manifest pro-cyclical contraindications, are seen as the only way forward for the Eurozone. The ESM—turned into a European equivalent of the International Monetary Fund—should take over from the European Commission (considered too accommodating with the periphery) as a fiscal watchdog to oversee the compliance of the budgetary policies of all member States. New solutions to carry forward the strategy of risk segregation pursued since the outbreak of the crisis are also suggested: namely, private investors should participate in any losses on government bonds and, thus, recommend the creation of a Sovereign Debt Management Mechanism (SDMM). The SDMM should provide for an automatic maturities extension of public debts above given thresholds in terms of GDP and, in any case, as necessary condition to get access to the ESM financial support. Since debt re-profiling could be not enough, Germany also spurs the replacement of current model-CACs with new Creditor Participation Clauses (CPCs) which should simplify the achievement of the majorities required for early debt restructurings and, at the same time, prevent Govies' redenomination in a new national currency in the event of exit from the euro.

Italy, in particular, appears to be the main concern. Not only for its high public debt (over 2 times the Maastricht threshold in GDP terms) but also for its large Target 2 deficit, which some commentators consider a substitute bailout.

Yet such a questionable reconstruction/interpretation of the Eurozone Sovereign Debt Crisis events ignore a number of facts which are the consequences of substantial lack of risk sharing in the EMU fabric. Large gaps and imbalances across Eurozone members were fostered by risk segregation, the same which handed over to the Bund the super-exclusive status of "safe haven" allowing the public and private sectors of core countries to finance domestic economic activity at extremely low costs and to enjoy undue competitive advantages.

During the Sovereign Debt Crisis of 2010–2012 risk segregation has occurred in the form of massive deleveraging of exposures in peripheral Govies by German (and French) banks, which has contributed to the "re-nationalization" of public debts of Eurozone's periphery within the balance sheets of the domestic banking sector.[2]

Later, the Quantitative Easing has realized a similar nationalization within National Central Banks (NCBs). Indeed, the public assets purchase program announced by the ECB on January 2015 relies almost completely on risk segregation. NCBs borrow money from the ECB to purchase sovereign bonds of their respective governments. Consequently, they are exposed to the credit risk of their own country, whereas the ECB retains its creditor's rights towards the NCBs even in the event of sovereign defaults. In addition, bonds' purchases within the QE are allocated according to the ECB's capital key: Germany gets the largest share of purchases which partly explains the abnormal negative yields on Bunds even in the medium-long term and the consequent easy reduction of the Germany's public debt servicing cost (Minenna 2016).

Now that the deleveraging of core countries banking systems has been accomplished, high in the agenda are policy proposals pushing for the introduction of concentration limits on banks' exposures to Govies although it is quite evident that this would re-ignite yield spreads and make unsustainable the public debt of peripheral countries. Unsustainability that, if such proposals were accepted, would trigger debt reprofiling (or even restructuring) and would force countries like Italy to leave capital markets and lose fundamental assets, starting from gold reserves.

3 Eurozone fragility: avoiding faux pas and/or tinkering with feeble solutions

In December 2017 the European Commission presented a proposal for a reform of the Eurozone that resumes main Germany's warhorses and gives timid room for anti-cyclical measures at the level of the European budget, also through the possible introduction of a stabilization function. In January 2018 a group of 14 influential French–German economists has released a proposal that *inter alia* recommends the creation of a European safe asset (Bénassy-Quéré et al. 2018). This latter recommendation stems from a proposal originally presented by a group of economists (Euro-nomics Group 2012) which advices the issuance of European Safe Bonds (ESBies) backed by a collateral portfolio of Eurozone Govies. Basically the ESBies proposal provides for the pooling and tranching of cross-border portfolios of national sovereign bonds; it was welcome by the European Systemic Risk Board (ESRB) which defined it as an interesting and attractive approach that could contribute to the ESRB's objective (Brunnermeier et al. 2016). In May 2018, the European Commission released on its website a proposal for regulation regarding ESBies (European Commission 2018).

Despite being marketed as a solution to the sovereign-bank doom loop (along with concentration limits) and to significantly increase the supply of safe assets within the Euro area, the proposal amounts to nothing short of a remake of sovereign spreads. Indeed, although the authors claim that junior securities would be absorbed by international speculative investors,

[2] This phenomenon is also referred to as a remarkable increase in the home country bias by banks of peripheral countries (Battistini et al. 2013) although there is not a full consensus about its causes. Some authors consider distorted incentives and/or the zero-risk weighting of sovereign exposures as the main reasons behind the re-nationalization of public debts in peripheral countries. Another hypothesis is that banks invest massively in their own countries' government bonds during the crisis in order to match the *redenomination risk* (Affinito et al. 2016). In our view, all these hypotheses have been at work, including our argument based on deleveraging and risk segregation—as opposed to the flight-to-quality towards safe assets (Croci Angelini and Farina 2015)—which is also supported by the data (Minenna 2019).

it is more likely than not that junior tranches would be purchased mainly by the banks of Eurozone periphery, whereas senior tranches (i.e. the "safe asset") would go to the banks of Northern European countries. In short, such great effort to create a pool of safe assets could end up maintaining the *status quo* or, even worsening it by multiplying the number of spreads within the Eurozone. In addition to differences between yields on Govies, there would also be those between the ESBies' tranches with different subordination degrees and those between tranches and stand-alone Govies, at the risk of making the refinancing conditions more burdensome for the Southern governments of the Euro bloc (Minenna 2017).

Also, the working hypotheses of the ESBies proposal are quite optimistic: in particular, the behavior of the correlations between the default events of the Eurozone member countries is significantly underestimated; conversely, if this key point was taken into account, the proposal would imply issuing junior tranches of very large thickness and, coherently, the supply of safe assets would be significantly reduced limiting the actual benefits compared to the no-ESBies scenario.

Ultimately, ESBies overlook the fact that stability cannot be achieved by stubbornly maintaining distinctions and preserving privileges that were largely due to the distortions of the Euro area and to the strategy of risk segregation adopted by core countries.

The proposal to create a European "safe asset" certainly stems from a noble thought but, in practice, the application of securitization techniques to Govies would safeguard the discrimination between the center and the periphery of the Euro area. German Bunds—under the new label of "senior ESBies"—would continue to be a "safe haven" whereas Italian BTPs and Spanish Bonos—under the new label of "junior ESBies"—would remain risky assets, discriminated by the markets and likely also by the ECB.[3] Market segmentation and roll-over risk in the Eurozone would basically survive intact and with it its financial fragility.

This fragility is derived from the loss of control on monetary policy at the country level, which prevents single EMU members from increasing inflation through expansionary monetary policies to ensure the payment of sovereign debt denominated in the domestic currency. While investors may incur losses through inflation, the losses realized in the case of a government default might be more severe. Sovereign bonds denoted in the domestic currency of a country were never a truly risk-free asset, as they were driven by both inflation and exchange rate risks; however these risks to a certain degree counteracted the likelihood of a full default establishing a safe asset as financing tools to standalone countries. As member States of the EMU cannot guarantee the payment of their debt at maturity through issuing their own money, they do not have access to a safe asset as a financing source and thus become more vulnerable to market fluctuations. This is the unique and existential risk of Euro area membership: monetary union exposes its member States to an insolvency risk which is absent for similar countries which have a national currency. When a country adopts the euro, its debt is redenominated from the national currency into the euro. Thus, member States are in a similar situation as emerging market economies (De Grauwe 2011) which can only borrow in a foreign currency ('original sin'). In a crisis they can no longer rely on the support of their national central bank. In such a 'gold standard without gold' (Blyth 2013, p. 184) financial markets "can force countries into a bad equilibrium characterized by increasing interest rates that trigger excessive austerity measures, which in turn lead to a deflationary spiral that aggravates the fiscal crisis." (De Grauwe 2015).

This specific risk is aggravated by an easy exit option that the single currency provides for investors. If, for example, a Japanese pension fund is no longer willing to hold Japanese

[3] Cherubini and Violi (2015) for an earlier thorough explanation as to why securitization of bond portfolios cannot deliver (credit) risk mutualization. In essence, creating a pool of "risk-free" assets does not necessarily require nor imply any risk mutualization among bond issuers.

government bonds and decides to hold US treasuries instead, it is confronted with a currency risk. For institutional investors that are required to hold safe assets, this 'currency wall' is difficult to surmount. Within the euro area this wall has been removed so that investors can exchange domestic bonds into bonds of other member States without an exchange rate risk (Bofinger 2018).

De Grauwe (2011) has well-explained this point by comparing the nature of the sovereign debt in a standalone country and in a monetary union. If investors in sovereign bonds of a standalone country fear that the issuing government might default, they would sell-off their bond-holdings. As a consequence, when they will resort to the foreign exchange market to invest the excess availability of domestic money they will face depreciation pressures on the domestic currency that will push then to keep that money within the domestic money market. Thus, the money stock in that market will likely remain unchanged, and currency depreciation will give a boost to the domestic economy and inflation. Nothing like this happens in a country joining a monetary union in response to an increased markets' perception of the default risk of that country. Indeed, the excess domestic money arising from the sell-off of sovereign bonds of that country can easily be invested abroad, in assets from other countries joining the same monetary union without getting exposed to any currency risk. This would produce a drop in the stock of money inside the domestic money market, eventually adding a liquidity problem to the solvency crisis with a consequent further increase in the default probability of the country at stake. The comparison confirms that monetary sovereignty essentially "converts" insolvency risk into inflation risk, whereas a similar dynamic does not operate for countries joining a monetary union.

The experience of the last 16 years shows that Eurozone is a more crisis-prone regime than other major currency areas like the US, Japan, or the UK. This is mainly due to its hybrid institutional architecture which relies primarily on intergovernmental and supranational elements. While monetary policy is fully integrated under the aegis of the ECB, 19 national governments are responsible for the Eurozone's fiscal policy. However, rather than being a victim of a 'design failure', the Eurozone can be better regarded as an unfinished building that needs to be completed with more coordination and more political integration.

This diagnosis can lead to two different solutions. Some economists believe that the insolvency risk is unavoidable. Therefore, institutional procedures should be developed for dealing with future insolvencies, such as some form of SDMM as mentioned above. The alternative approach is to reduce or even eliminate the insolvency risk of member States by strengthening the supranational features of the Eurozone. Thus, to deal effectively with the insolvency risk we should look for solutions that reduce or even eliminate it; just preparing for a hard landing may not be sufficient to stabilize the Eurozone.

A permanent solution to the insolvency risk problem would be the creation of a European-wide Insurance Fund which would guarantee investors in Eurozone sovereign debt, thereby restoring the paradigm of a truly single currency that requires a monetary union to have a uniform 'price-of-money' across the Eurozone sovereign issuers, a single broadly-based yield curve representative of the interest rate risk of the Euro area as a whole. And, at the same time, we have to create the right conditions to ensure that the allocation of risks among member States will converge through policy measures to stimulate growth of the peripheral countries whose economies were deeply hit by the crisis and risk segregation policies undertaken by Eurozone institutions.

Let us see how to achieve these targets by reviewing the architecture of the European Stability Mechanism.

4 Open issues with the current ESM machinery

The European Stability Mechanism (ESM) is a crisis resolution mechanism established by the euro area countries. Its mission is to provide financial assistance to ESM Members experiencing or threatened by severe financing problems in order to safeguard the financial stability of the euro area as a whole and of its Member States. The ESM—also known as Eurozone sovereign bailout fund—was established in September 2012 as Eurozone permanent firewall after the sovereign debt crisis, the swap of the Greek public debt, the related default of March 2012 and the crisis of the Spanish banking system of the same year.

The ESM raises funds by issuing debt instruments, which are purchased by institutional investors. The proceeds enable the intergovernmental institution to provide its Members the following types of financial assistance (ESM 2018):

- Loans to cover their financing needs;
- Loans and direct equity injections to recapitalize financial institutions;
- Credit lines to be used as precautionary financial assistance;
- Primary and secondary debt market purchases of Members' national bonds.

Although the financial commitment of the member States may appear as substantial in absolute terms—a total of €704.8 billion, however with paid-in capital of some €80.55 billion euro—it is relatively small compared to the size of government debt in the area. The ESM residual lending capacity currently stands at about €370 billion against a total of government debt in the area amounting to some €9.5 trillion, about 90% of the area's GDP. According to Balassone et al. (2016), it would have been barely enough to cope with the financial assistance programs launched over 2010–2012.

Its architecture faces limits that reflect the will of Northern European countries to segregate risks within the periphery and constrain the ESM effective intervention capacity within an extremely stringent set of rules. The Mechanism can provide financial support to a member country only in case of deep distress and mainly according to a loan-based scheme: the beneficiary country gets access to the different tranches of the aid program only if it has successfully implemented a list of domestic reforms defined in a Memorandum of Understanding (MoU) it has been forced to sign.

The commitment to enact the reforms listed in the MoU comes from the "*strict conditionality clause*" enshrined in art. 126, par. 3 of the Treaty on the Functioning of the European Union. This paragraph was demanded by Germany as extension/explicitness of the no bailout rule written in art. 125 of the same Treaty—which however admits exceptions in case of financing of common specific projects.

The effective contents of the domestic reforms are not agreed between the ESM and the beneficiary country, but imposed by those who retain the power within the governance of the Stability Mechanism.

Here comes another relevant point: ESM governance does not rely in full on the "democratic" principle of no-discrimination among shareholders. Under the ordinary decision-making procedure every country holds a veto right, but under the emergency procedure only the three largest shareholders—Germany, France and Italy (Fig. 1)—retain such right. Not a coincidence that the details and conditions of the aid programs that the ESM has granted to Greece over the last years were de-facto strongly influenced by core countries' policy stance and proposals.

The ESM financial structure has a two-tier configuration with subscribed capital of the Stability Mechanism set at €704.8 billion, but only the 11.4% of this amount was already paid-in (€80.55 billion); the remaining are *callable shares* that member countries have to

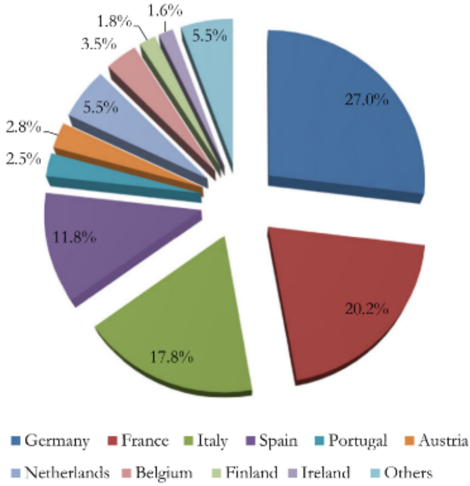

Fig. 1 ESM capital key. *Source*: ESM website (www.esm.europa.eu)

disburse *pro quota* upon the request of the ESM to be decided according to the procedure described above. Said differently: in exchange for accepting to become the largest ESM shareholders (and, hence, capital contributors), core countries have purported to limit their effective exposure (e.g. Germany to €21.7 billion). The remaining is a contingent liability whose disbursement requires the prior approval of the Bundestag. It is a peculiar capital composition: the International Monetary Fund—which has an institutional mandate comparable to the ESM—requires the full payment of the capital share as preliminary condition to join the Fund.

The large gap between subscribed and paid-in capital exposes the Stability Mechanism to the insolvency risk of individual countries at the moment of greatest need, which also explains why the maximum amount of financial support that the ESM is allowed to provide is €500bn, €200bn lower than the subscribed capital (Fig. 2).

The ESM can raise funds by issuing investment-grade bonds and other liabilities. According to the Annual Report 2017, the Mechanism has issued debt securities for a total of €89.2 billion, an amount comparable to the paid-in capital. With this moderate leverage, the ESM has provided its financial assistance in the context of relatively small crises occurred in the Euro area: Greece and Cyprus received targeted loans at concessional yields but conditioned upon the implementation of strict domestic reforms. The Mechanism was also involved in the indirect recapitalization of Spanish banks when they were going to end disrupted in 2012.

But in the event of a large shock hitting some major economy, the Mechanism could face a liquidity squeeze. Germany makes no secret that an ESM intervention in support of a big country such as Italy in front of a sovereign debt crisis would be far from obvious (German Council of Economic Experts 2016).

The current machinery does not allow the ESM to concretely contribute to increase the resilience of the Eurozone. Rather, the Mechanism represents an additional cost, especially for those countries—such as Italy—which have been called for significant financial contributions at the time they were committed to fiscal consolidation programs and which remain exposed to the risk of a ESM failure to intervene in case of need. Put it differently: in return for its larger contribution to the ESM capital, Germany controls the decisions of the Mechanism

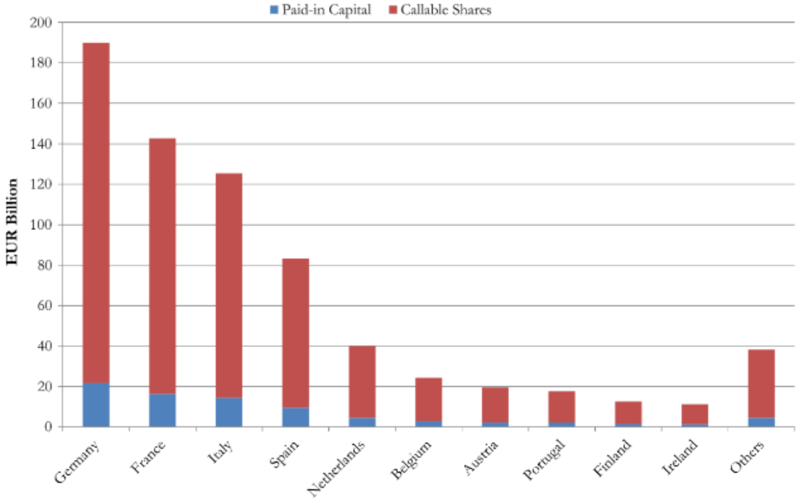

Fig. 2 ESM capital composition: paid-in shares versus callable shares. *Source*: ESM website (www.esm.europa.eu)

due to the veto right; conversely Italy—which has already disbursed €14.3bn—holds a veto right which is basically useless and has no guarantee of help in an adverse scenario.

More in general, the ESM conformation is not in a position to foster stability to the extent that would be needed: it can only give a limited financial support of last resort, but does not play any preventive and/or counter-cyclical role that instead is indispensable to ensure long-term stability. And this is because the current governance structure of the EU delegates to the individual countries the implementation of domestic reforms in the misguided belief that the causes of problems are to be found exclusively in the fiscal profligacy of "rogue" countries, and not in the incompleteness and/or in the architectural flaws of the Monetary Union.

5 Moving to a risk-sharing mechanism for Eurozone public debt consistent with capital market prices

Classic Eurobond proposals (European Commission 2011) were systematically opposed by core EU countries, which, to put it bluntly, perceived the mutualization of sovereign debts as a free-lunch to the periphery paid for by North European taxpayers.

The risk-sharing mechanism presented in this paper excludes free lunches, is consistent with capital market constraints and makes moral hazard essentially vanishing. To this aim, the ESM should abandon the current loan-based approach in favor of an insurance-based structure in which it becomes the guarantor of the public debts and the countries which get a direct and immediate benefit from its guarantee pay an annual premium calculated at market prices.

The presence of the ESM guarantee would be ratified by new risk sharing clauses included in the Govies issued each year to refinance the maturing debt and would protect each member

State against its own default risk provided that it fulfils some "well-behaving" conditions as described later on. It is important to stress that the ESM guarantee and the related mutualization of sovereign risks of Eurozone members do not mean a transfer of public debts from risky issuers to safe ones: each country would remain the only entity responsible for the payment duties owned to the holders of its government bonds.

The involvement of the Insurance Fund is only provided in conditions of high distress, and in any case only after the country concerned has tried to solve its financial problems by intervening on the debt still not guaranteed. Should this intervention not be sufficient, the country concerned could resort to the guarantee of the Stability Mechanism which will draw the funds needed from a suitable mix of equity and debt capital. Eventually, should this waterfall still not be enough, the ECB would be called upon to intervene, provided that specific conditions are satisfied. Its support could be given by accepting bonds issued by the ESM as collateral in monetary policy operations and/or by including ESM securities in the context of its purchase intervention programs, including some form of OMTs (already conditioned upon the beneficiary country having received a financial support from the ESM) whose conditions would have to properly fit to the needs of the new Stability Mechanism.

It is worth observing that the waterfall just described includes some of the "well-behaving" conditions required to guaranteed countries: indeed, the risk-sharing clauses would provide for a seniority of government bonds covered by the guarantee with respect to those still uncovered. Thus, in case of default a member State would be required to hit first the portion of debt which does not embed risk-sharing clauses; only if such a move would not be enough to solve the financial troubles of the country under pressure, the Stability Mechanism would intervene with its financial resources and would be legitimized to increase its leverage in order to collect the funds necessary to cover the losses, including the access to the ECB purchase programs and collateral refinancing policies as above said.

Under the new set-up the securities embedding risk-sharing clauses would become perfect substitutes and, therefore, would have the same yield, which would be representative of the riskiness of the Eurozone as a whole.

The ESM-guaranteed government bonds would represent a proper amount of Eurozone safe assets with respect to the needs of the financial system of the monetary union: at the end of the phase-in period, their outstanding notional amount would be almost five times that of Bunds. This fact, obviously, would contribute to the convergence of the Eurozone sovereign interest rate term structures, by removing the phenomenon of negative yields which still affects a wide region of the German term structure.

As it is known, the current ESM machinery foresees the progressive introduction in the government bonds of the Eurozone member of the so-called "model-CACs", that are collective action clauses which are aimed at making the management of the holdout problem easier in case of restructuring. Actually, these clauses also give a qualified minority of bondholders the possibility to counter the conversion of payments associated to a given security into a new currency (other than the euro), hence hindering the willingness of a sovereign issuer to get a debt relief from the redenomination into an eventual new (weaker) national currency by applying the principle known as *Lex Monetae*. However, CACs only represent a potential hurdle to redenomination: indeed, it is more reasonable to expect that a given State could dare a redenomination also of Local-Law bonds embedding CACs albeit incurring in some litigation risk. For this reason, several influential German economists (German Council of Economic Experts 2016) suggested to replace model-CACs with Creditor Participation Clauses (CPCs), the latter explicitly forbidding debt redenomination.

But, such a provision could make sense only provided there is a common commitment of all the countries of the Euro bloc in favor of a wide-spread sustainability of the membership into the monetary union. Said differently: within a common currency area the prohibition of debt redenomination can coexist only with a full risk-sharing. Accordingly, our proposal to transform the ESM into a supranational umbrella for all EMU members meets German requests and provides for a ban on debt redenomination within the risk-sharing clauses. The rationale is straightforward: if core countries accept a new set-up where sovereign risks are mutualized, it comes naturally that risky countries have to undertake a credible (and, thus, irreversible) commitment to the single currency and related duties, also in fiscal terms.

In order to prevent moral hazard by risky countries—e.g. increasing their default risk by running a less prudent fiscal policy to the detriment of most virtuous countries—they would be required to make new cash contributions to the capital of the ESM equal to the difference between their specific sovereign risk and the Eurozone's average sovereign risk. As in a standard Credit Default Swap (CDS), the ESM (and, through it, low-risk countries) would sell protection to risky countries against their own excess-sovereign-risk and receive the annual premium for such insurance. At first glance, it might seem that the overall cost of debt for risky countries does not change with respect to the current situation since savings on interest expenditure for risk-shared debt would be offset by the cost of the guarantee paid to the Stability Mechanism. However, it should be emphasized that in the new set-up each country would pay an insurance premium which, ultimately, facilitates it to access a new equilibrium in which it will not have to pay extra-yields to the market compared to other sovereign issuers in the same currency area.[4]

Always to minimize the convenience in opportunistic conducts, we propose to set ex-ante limits on the maximum admissible increase of public debt compared to the initial stock and to provide very severe penalties in the event of exceeding these limits. In detail, each year the admissible nominal deficit for risky countries should not exceed the amount allowed by the Fiscal Compact plus the annual premium paid to the Stability Mechanism in exchange for the guarantee. As better described in the next sections, this latter component is a golden rule on investments: for each euro of premiums paid to the Insurance Fund risky countries would receive funds for new targeted investments by the Fund it-self which, as a financial vehicle, is allowed to use leverage and raise liquidity from standard bond-issuing activity in the financial market.

Breaching such covenants and restrictions—including provisions on admissible defaults on outstanding debt (first the uninsured and then the insured one)—would result in the immediate loss of the supranational guarantee and the exit from the risk-sharing program with all consequences in terms of debt sustainability and membership in the monetary union. In addition, during the transition period, admissible defaults on the (insured) outstanding debt, triggering payments from the Insurance Fund to bondholders, would automatically result in new debt owed to the ESM for an amount corresponding to the money paid out by the Fund. Once the transition period has expired, the ESM default would become a remote option: it could only occur after the attempt of the ESM to fund its imbalances through an increase of its leverage (i.e. by issuing bonds) and the eventual involvement of the ECB in order to keep under control the level of the Eurozone interest rates that at this stage would be represented by the cost of the debt.

Safest Eurozone countries—such as Germany or France—would not be required to increase their cash contributions to the ESM capital because they do not get an immediate and direct benefit from the guarantee and, as ESM shareholders, they have to bear a worsening of their credit standing and a consequent increase on the expenditure for interests

[4] The argument is similar to De Grauwe (2011): the ultimate goal of risk sharing is to escape bad equilibria and to access a new and better equilibrium with a mitigated risk profile compared to the one before mutualisation.

on debt. Indeed, because of risk-sharing, they would be required to pay a higher coupon on the part of their public debt rolled over each year under the ESM guarantee. Approximately (except for carry over effects over time), the higher interest expenditure for safe countries is equal to the (positive) difference between the average sovereign credit risk of the Euro area and their country-specific credit risk. However the Insurance Fund design is flexible enough, as we shall see in the next sections, to allow for a level of ESM credit risk consistent with the best sovereign credit worthiness in so far as a sufficient level of equity capital were to be underwritten by Eurozone members to support the unexpected losses of the debt guarantee.

6 Modelling insurance fund and government budget cash flows

The problem of an insufficient ESM backstop facility cannot be solved by the more prosperous nation taking on a blanket liability for paying back country j's bond because that will lead to reckless lending to j. However, it is possible to design joint, inter-government liability that can mitigate drastically this problem. Moreover, it is possible to design this in ways such that the more indebted nations as well as the countries taking on some of the Insurance Fund liability can both gain.[5] Credit insurance contracts and joint liability insurance schemes are well established institutions of our modern financial sector. Banks' deposit insurance scheme, such as the FDIC Agency run insurance program (Pennacchi 2009) as well as the (soon to be launched) EDIS Fund in the Eurozone, the reinsurance market for catastrophic risk with pooling of risks taken up by insurance companies and issuance of CAT bonds, the large credit default swap market with several trillion worth of Corporates and Government names insured against default risk (BIS 2017; Oehmke and Zawadowski 2017), monoline US Insurance Companies guaranteeing Municipal Bonds holders against default and thereby allowing issuers to obtain a AAA rating. More broadly, US based Government Sponsored Enterprise (GSE)—such as Fannie and Freddie—and Agency (such as the FHA) guaranteeing trillion of bond issues against home mortgages default.

In this section we expose a simplified model for the cash-flows associated with our reform proposal of the ESM aiming at creating a Eurozone sovereigns' Insurance Fund. For the sake of streamlining the exposition we adopt the following simplifying assumptions:

1. The risk-less interest rate is constant over time;
2. The CDS-Bond basis is set at zero, namely there are no arbitrage opportunities across the CDS and Bond markets;
3. The speed of convergence towards the uniform level of CDS premium in the Eurozone is controlled by a given (increasing) function $\gamma(t)$ of time, whereas the full version of the simulated model adopts a more complex path-dependent function which depends on the cumulated share of public debt insured by the Fund;
4. Under the reference scenario (no Insurance Fund) the sovereign credit risk of all countries remains constant over time;
5. For the purposes of calculating government spending, the extended version of our model includes the payment of insurance premiums not only on the annual increase in the shared debt but also on the stock data updated to the previous period. However, given the assumptions of convergence provided by the model, to make the exposition simple, we

[5] See Basu and Stiglitz (2015) for an economic model showing how joint liability for sovereign debt can be Pareto superior to the *status quo* by entering into the appropriately designed insurance contract. Also, Tirole (2015) and Claessens et al. (2012) for an analysis of borrower solidarity in the Eurozone in the wake of the sovereign crisis.

have reported here a version in which insurance premiums are paid exclusively on the annual flow of new debt guaranteed by the ESM.

The Insurance Fund implementation brings about a change in Government expenditure as a result of the following provisions:

- Insurance premia to be paid to the Insurance Fund (increasing expenditure for risky countries)
- Lower interest rates for the insured debt as a result of the ESM joint debt guarantee (reducing expenditure for risky countries)
- Gradual convergence of the interest rate on the uninsured debt towards the level of insured prevailing at the end of the transition period (reducing expenditure).

We define the reference budgeted government spending flow related to public debt service without the ESM Insurance Fund as:

$$G_i^* \equiv \rho_i^* D_i^*, \quad i = 1, N \tag{1}$$

where D_i^* is the total amount of public debt outstanding at the beginning of the transition period for each country i (N denotes the number of countries), and ρ_i^* the level of interest rates (cost of debt) prevailing without the ESM Insurance Fund. We decompose the level of interest rates in its two basic components:

$$\rho_i^* = r + CDS_i^*, \quad i = 1, N \tag{2}$$

where CDS_i^* stands for the initial CDS premium quoted in the market and implied by the credit risk perceived by bondholders of sovereign (uninsured) debt for country i and r denotes the level of risk-less interest rate.

With the introduction of the Insurance Fund Government spending has to be adjusted as follows:

$$G_i(t) \equiv \rho_i^U D_i^U(t) + \rho_i^I(t) D_i^I(t) + IP_i(t) d_i^I(t), \quad i = 1, N \tag{3}$$

where the superscripts U and I refer to the uninsured and insured debt component respectively,$d_i^I(t)$ is the flow of debt which is rolled over and thereby insured and $IP_i(t)$ the amount of insurance premium—per euro of notional value, $d_i^I(t)$—to be paid out to the Insurance Fund. Notice that the assumption that the flow of debt rolled over each year is fully risk shared implies that the cost of uninsured debt is constant over time and, precisely, the following equality holds:

$$\rho_i^U = \rho_i^*, \quad i = 1, N \tag{4}$$

Namely, uninsured debt cost stays the same as the cost of debt under the reference scenario of no Insurance Fund implementation.

By construction the uninsured debt component is equal to the total debt outstanding before the transition starts and declines as a result of its roll-over into the insurance scheme,

$$D_i^U(t_j) = D_i^U(t_{j-1}) - d_i^I(t_j), \sum_{j=1}^{\tau} d_i^I(t_j) = D_i^U(0) = D_i^*, \quad i = 1, N; j = 1, \tau; t_\tau = T, \tag{5}$$

where $\{t_j\}$ is the set of maturity dates and T is the end date of the transition.

The insurance premium is assumed to be proportional to the CDS premium with a minimum threshold,

$$\max_i CDS_i(t) > \overline{CDS}(t) \geq \min_i CDS_i(t) \geq 0 \tag{6}$$

below which no premium is paid,

$$IP_i(t) = [CDS_i(t) - \overline{CDS}(t)]_+ \geq 0 \tag{7}$$

where $[.]_+$ stands for the positive part of the argument.

In our simulations the threshold level $\overline{CDS}(t)$ is set to correspond to the observed average level of the CDS premium on (uninsured) sovereign debt. Of course, other assumptions can be adopted regarding the uniform level of credit risk, $\overline{CDS}(t)$, that the Insurance Fund could guarantee to its members.

The level of insured debt changes over time as a result of the flow of new debt issued, $d_i^I(t_j)$, and the total amount of insurance premia, $d_i^I(t_j)IP_i(t_j)$, disbursed to the Fund

$$D_i^I(t_j) = D_i^I(t_{j-1}) + d_i^I(t_j)\left[1 + IP_i(t_j)\right], \quad j = 1, \tau; \quad i = 1, N \tag{8}$$

The model assumes that the level of interest rate for all insured debt is given by

$$\rho_i^I(t) = r + \overline{CDS}(t), \quad i = 1, N \tag{9}$$

Hence, the implied credit risk premium for the insured debt would be equalized across countries to level $\overline{CDS}(t)$, as a result of the (uniform) value of the ESM guarantee. Therefore the value of the threshold, $\overline{CDS}(t)$, can be thought of as the level of the CDS premium written on the ESM credit name. However it is clear that countries with a lower CDS premium level than $\overline{CDS}(t)$ would suffer an increase in their cost of debt.

We close the model with the specification of the CDS premium quoted in the market for any given country i at any given time $t>0$,

$$\begin{aligned} CDS_i(t) &= (1-\gamma(t))CDS_i(t-1) + \gamma(t)\overline{CDS}(t-1), \\ \gamma(t) &\in [0,1], \gamma(0) = 0, \gamma(T) = 1, \gamma'(t) \geq 0 \end{aligned} \tag{10}$$

with $CDS_i(0) = CDS_i^*$ and where $\gamma(t)$ is a given increasing function of time regulating the speed of convergence towards the uniform level of CDS premium in the Eurozone. In essence, the CDS premium on uninsured debt converges gradually over the transition period to the same level as the insured debt. Of course, the uninsured debt component is gradually replaced over the transition period by the issuance of insured debt and it will be fully substituted at time T. For the sake of simplicity we assume that the speed of converge, $\gamma(t)$, is uniform across countries.

We now take the difference between (3) and (1) to get the impact on the government budget expenditure as a result of participating into the Insurance Fund,

$$G_i(t) - G_i^* = \rho_i^U D_i^U(t) + \rho_i^I(t)D_i^I(t) + IP_i(t)d_i^I(t) - \rho_i^* D_i^*, t = [0, T] \tag{11}$$

Adding and subtracting $\rho_i^* D_i^I$ from the right-hand-side of (11), substituting (4) and rearranging the terms we get

$$G_i(t) - G_i^* = \rho_i^*\left[D_i(t) - D_i^*\right] + \left[\rho_i^I(t) - \rho_i^*\right]D_i^I(t) + IP_i(t)d_i^I(t), t = [0, T] \tag{12}$$

with

$$D_i(t) \equiv D_i^I(t) + D_i^U(t), D_i(0) = D_i^* \tag{13}$$

denoting total outstanding debt, insured as well as uninsured.

Substituting (2), (5), (7) and (9) into (12), we get the following expression

$$G_i(t) - G_i^* = \left[r + CDS_i^*\right][D_i(t) - D_i(0)] + \left[\overline{CDS}(t) - CDS_i^*\right]D_i^I(t) \\ + [CDS_i(t) - \overline{CDS}(t)]_+ d_i^I(t), \quad t = [0, T] \tag{14}$$

Then, substituting (10) into (14) we have a measure of the Insurance Fund impact on the Government budget spending during the transition period,

$$G_i(t) - G_i^* = \left[r + CDS_i^*\right][D_i(t) - D_i(0)] + \left(\overline{CDS}(t) - CDS_i^*\right)D_i^I(t) \\ + [(1 - \gamma(t))CDS_i(t-1) + \gamma(t)\overline{CDS}(t-1) - \overline{CDS}(t)]_+ d_i^I(t), \\ t = [0, T] \tag{15}$$

which depends on

(1) The level of credit risk measures and risk-less rate, e.g. CDS_i^*, $\overline{CDS}(t)$ and r;
(2) The change in total debt, $[D_i(t) - D_i(0)]$;
(3) The level of insured debt, $D_i^I(t)$;
(4) The speed of credit risk convergence, $\gamma(t)$ to the uniform level implied by the insurance guarantee;

Notice that the change in total debt level during the transition period is constrained by the amount of insurance premia paid into the Fund pool and therefore we have,

$$D_i(t) = D_i(0) + \sum_{\tau=0}^{\tau=t} d_i^I(\tau) IP_i(\tau) \quad i = 1, N \tag{16}$$

When the transition is completed, all outstanding debt would be insured debt and there is no more insurance to be purchased:

$$D_i^I(t) = D_i(t), \quad d_i^I(t) = 0, \quad t > T \tag{17}$$

As a result, substituting (17) into (15) the latter would be simplified as follows,

$$G_i(t) - G_i^* = \left[r + CDS_i^*\right][D_i(t) - D_i(0)] + \left(\overline{CDS}(t) - CDS_i^*\right)D_i(t) \\ = \left[r + \overline{CDS}(t)\right]D_i(t) - \left[r + CDS_i^*\right]D_i(0), \; t > T \tag{18}$$

If total debt has not changed much over the transition period,

$$D_i(t) \cong D_i(0), \quad t \in [0, T] \tag{19}$$

Equation (18) can then be reasonably approximated by the following expression,

$$G_i(t) - G_i^* \cong \left[\overline{CDS}(t) - CDS_i^*\right]D_i(0), \; t > T \tag{20}$$

Thus, the (steady state) change in credit risk spread over the transition period becomes the determinant of budgetary savings (or costs) induced by the insurance scheme operations. A shrinking spread entails lower budget spending as a result of interest rate decline and vice versa.

It is also interesting to investigate the budget implications during the transition for sovereign debt with lower credit risk—which would entail no insurance premium to be paid—and relatively stable debt, such as north European countries (e.g. Germany). In this case we can find a good approximation of (15) can be obtained by assuming

$$D_i(t) \cong D_i(0), \quad IP_i(t) = 0, \quad t \in [0, T] \tag{21}$$

which yields,

$$G_i(t) - G_i^* \cong \left(\overline{CDS}(t) - CDS_i^*\right) D_i^I(t), \quad t \in [0, T] \tag{22}$$

For the lowest sovereign credit spread it is very likely that (22) would be positive—e.g. budget spending would increase as a result of participating into the insurance scheme—because it should normally be expected that the risk-shared Eurozone credit spread staying above the best credit levels,

$$\overline{CDS}(t) > CDS_i^* \tag{23}$$

That said, however, nothing (in principle) would prevent the ESM to be sufficiently well capitalized to target a lower level of risk—e.g. ruin probability of the Insurance Fund—which could be very close to that of the best sovereign credit names in the Eurozone,

$$\overline{CDS}(t) \cong \min_i CDS_i^* \tag{24}$$

Let us consider the case where (24) holds and imagine that, for the sake of exposition, Germany (denoted with subscript DE) being the best credit name in the pool permanently,

$$\overline{CDS}(t) = CDS_{DE}(t) = arg \min_i CDS_i^* \tag{25}$$

No insurance premium would therefore be charged,

$$[CDS_{DE}(t) - \overline{CDS}(t)]_+ = 0 \tag{26}$$

We know from (16) that total debt would stay constant over the transition if insurance premia are not disbursed, therefor it turns out that

$$D_{DE}(t) - D_{DE}(0) = 0 \tag{27}$$

Substituting (26) and (27) into (14) we get the change of Government spending for Germany as

$$G_{DE}(t) - G_{DE}^* = \left[\overline{CDS}(t) - CDS_{DE}^*\right] D_{DE}^I(t) = 0, \quad t \in [0, T] \tag{28}$$

Because being Germany assumed to be the best credit at the inception of the transition, namely

$$CDS_{DE}^* \equiv arg \min_i CDS_i^* \tag{29}$$

replacing (26) and (29) into (28) the term in the square bracket is zero. Same expression (28) applies if we consider budget spending after the transition is completed as in (18).

Thus, we can conclude that participating into the Insurance Fund would not cost a penny to the German fiscal budget if the targeted credit risk of the Fund matches the best credit name.

We now turn to the question what would happen to a sovereign budget of a weaker credit name, say Italy (subscript, IT), in the same scenario. To simplify the exposition it is convenient to assume that the targeted credit risk is, realistically, sufficiently close to zero (say just few basis points),

$$\overline{CDS}(t) \cong 0 \tag{30}$$

We can use (30) to simplify insurance premium payment (7) as

$$IP_{IT}(t) \equiv [CDS_{IT}(t) - \overline{CDS}(t)]_+ \cong CDS_{IT}(t) \tag{31}$$

We can substitute (30) and (31) into (14) and use (16) to get the budget spending change for Italy,

$$G_{IT}(t) - G^*_{IT} \cong \left[r + CDS^*_{IT}\right] \sum_{\tau=0}^{\tau=t} CDS_{IT}(\tau) d^I_i(\tau) - CDS^*_{IT} D^I_{IT}(t) + \\ + CDS_{IT}(t) d^I_{IT}(t), \quad t = [0, T] \tag{32}$$

Notice that the first term of the right-hand side of (32), which is positive, turns out to be small since one of the terms of the product, namely

$$\left[r + CDS^*_{IT}\right] CDS_{IT}(t) \cong 0, \quad t \in [0, T] \tag{33}$$

could be estimated at around 3–4 basis points. Thus we are left with the expression (32)

$$G_{IT}(t) - G^*_{IT} \cong -CDS^*_{IT} D^I_{IT}(t) + CDS_{IT}(t) d^I_{IT}(t) < 0, \quad t = [0, T] \tag{34}$$

which is negative, since it must be the case that in light of (16) we have,

$$D^I_{IT}(t) > d^I_{IT}(t), t = (0, T] \tag{35}$$

while (10), coupled with the constraint that Italy's CDS starts at higher level than the Eurozone target credit spread,

$$CDS^*_{IT} > \overline{CDS}(t) \cong 0 \tag{36}$$

it implies that,

$$CDS^*_{IT} > CDS_{IT}(t), \quad t = (0, T] \tag{37}$$

As the transition ends, insurance purchases stop (see, 17) and therefore budget spending (34) change declines further to

$$G_{IT}(t) - G^*_{IT} \cong -CDS^*_{IT} D^I_{IT}(t) = -CDS^*_{IT} D_{IT}(t) < 0, \quad t > T \tag{38}$$

which would correspond to the full impact of the convergence towards (near) zero of Italy's CDS spread—as assumed in (30)—reducing interest payments to bondholders accordingly.

7 Simulating insurance fund and government budget cash flows

Table 1 shows the estimated annual evolution of the differential interest expenditure on the debt borne by the various countries assuming the proposed reform is implemented.[6] For risky countries such as Italy, Spain and Portugal, the data in the table also take into account the premiums to be paid annually to the Stability Mechanism.[7]

The above table suggests different considerations. First, the benefit from the reform for risky countries is increasing over time. The phenomenon can be grasped at a glance for Italy, Spain and Portugal, and—at a closer look—also for countries with an intermediate level of risk such as Belgium and Ireland.

The case of Italy is particularly interesting: in the first year the saving of interests on the debt is lower than the premium to be paid to the ESM but already from the second year the situation is reversed and the country begins to get a net benefit because of the reduction in the annual premium to be disbursed (Fig. 3).

[6] Input data as of September 2017.

[7] Estimates exhibited in Table 1 refer to average data, also because the term structure of sovereign bonds includes securities whose residual maturity is longer than 10 years.

Table 1 Estimated impact of the ESM reform on the interest expenditure, net of the premium paid for the guarantee on debt shared (EUR billion). *Source*: Authors' calculations

Country	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Germany	1.8	3.2	4.2	5.0	5.7	6.3	6.9	7.4	7.9	8.3	56.8
France	1.0	1.7	2.1	2.3	2.3	2.1	1.9	1.5	1.0	0.4	16.3
Italy	0.5	− 0.1	− 1.6	− 4.0	− 7.2	− 10.8	− 14.7	− 18.8	− 23.1	− 27.7	− 107.4
Spain	− 0.4	− 1.1	− 2.1	− 3.5	− 5.0	− 6.7	− 8.5	− 10.4	− 12.4	− 14.5	− 64.4
Portugal	0.0	− 0.2	− 0.5	− 1.0	− 1.5	− 2.1	− 2.7	− 3.3	− 4.0	− 4.7	− 20
Austria	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.1	2.7
Netherlands	0.3	0.5	0.7	0.8	1.0	1.1	1.2	1.3	1.3	1.4	9.6
Belgium	0.2	0.3	0.3	0.2	0.1	0.0	− 0.1	− 0.3	− 0.4	− 0.6	− 0.2
Finland	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	3.9
Ireland	0.1	0.1	0.1	0.1	0.0	− 0.1	− 0.1	− 0.2	− 0.2	− 0.3	− 0.5

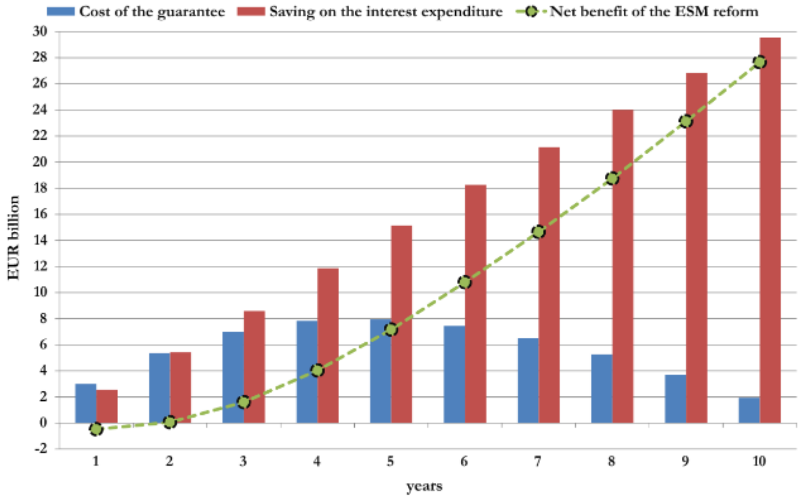

Fig. 3 Costs and benefits of the ESM reform for Italy (Input data as of September 2017). *Source*: Authors' calculations

This premium depends on two conflicting forces: the increasing amount of guaranteed debt and the reduction of the percentage premium produced by the progressive convergence between the various countries. Initially, the first component prevails but then it is more than offset by the second.

At this point it is useful to delve into the dynamics that would lead to the convergence between the yield curves of the different Eurozone members and, therefore, to the zeroing of the sovereign spreads. These dynamics are connected to the revision of the expectations of the market agents who, in view of the commitment of all countries to share their sovereign risks, over time update their risk attitude in favor of countries with large debt-to-GDP ratios. We expect that the agreement on the ESM guarantee paid at market price would trigger large *convergence trades*. These are global macro strategies played by hedge funds and other institutional investors which—expecting the alignment of the credit risk across Eurozone members produced by risk sharing—try to make profits from the anticipation of such market movements by selling expensive low-yield Govies (such as German bonds) and buying cheap high-yield Govies (such as Italian bonds).

Convergence trades occurred between the end of the 1990s and the early 2000s, when the widespread perception that the risks of the Euro countries were shared pushed several global macro funds to participate in the convergence phenomenon and allowed them to pocket significant gains (Curto et al. 2012; Lhabitant 2015).

Similar dynamics explain why until 2007 there was no clear relationship between the debt-to-GDP ratio of the various Eurozone countries and long-term yields on government bonds (Fig. 4).

The onset of the global crisis and the strategy of risk segregation applied by core countries have subverted markets' sentiment, fueling *divergence trades* on Eurozone Govies (e.g. sell BTP to buy Bund).

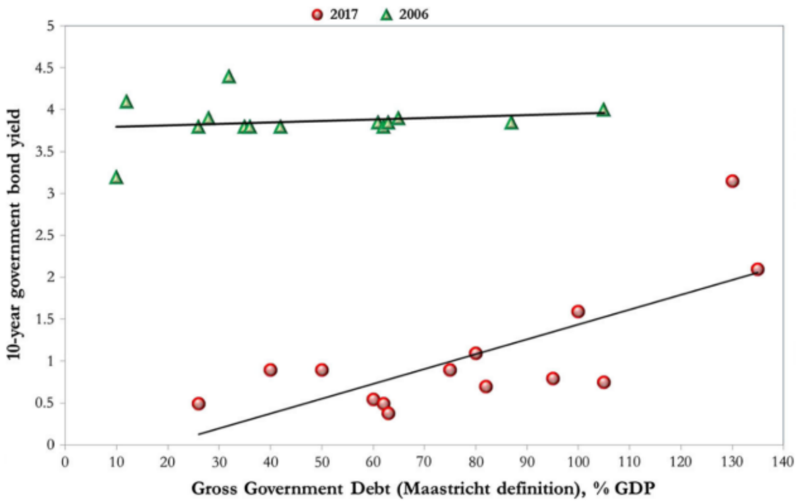

Fig. 4 Long-term yields on Eurozone Govies today better reflect differences in government debt than prior the crisis. *Note*: only OECD EU-area member countries, excluding Greece. *Source*: OECD

Coming back to the proposal of this work, we reasonably expect that—even if, at first, markets should exhibit some inertia in updating their expectations—the worsening of the risk perception should be bounded to outstanding Govies as they do not embed risk sharing provisions and are subordinated to bonds covered by the ESM guarantee. However, such uncomfortable scenario (which would fade away in front of the gradual increase in the portion of public debt with risk-sharing clauses) should not be too critical. Most of the public debt of Eurozone countries pays fixed coupons, meaning that its cost for the public budget would be almost insensitive to an increase of the implied yields. On the other hand, from the standpoint of bondholders, these Govies would become an investment to hold up to maturity in order to avoid any capital losses. Moreover, hopefully the implementation of our proposal should improve markets' sentiment about the resilience of the Euro area and, thus, reduce the perceived risk of a Euro break-up (in terms of default probabilities and, consequently, of expected losses) that would benefit also the yields on Govies not covered by the guarantee, partially offsetting the premium associated with subordination clauses on such bonds.

Obviously, any additional provision intended to strengthen markets' confidence in the risk sharing commitment of the Euro countries would speed up the convergence of their yield curves. In this perspective, the monetary financing prohibition written in the ECB's Statute would become less of constraint. Indeed, the mutualization of sovereign risks achieved through risk-sharing clauses would make virtually redundant this prohibition.

The described convergent dynamics would also gradually reduce the additional burden of the proposed ESM reform for low-risk countries, although only as second order effect. In fact, the larger and larger amount of public debt enclosing risk-sharing clauses would necessarily increase year by year the additional interest expenditure of these countries; however, thanks to the convergence of the yield curves, the marginal increase would be descending over time (Fig. 5).

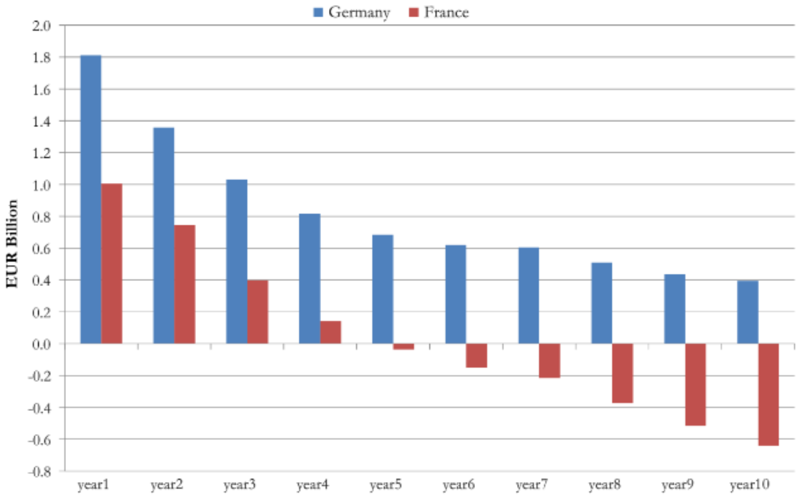

Fig. 5 Second order effect of the ESM reform on the interest expenditure of Germany and France. *Source*: Authors' calculations

It remains understood that data in Table 1 confirm the redistributive impact of the reform. Countries like Germany and France would have to bear a higher debt cost of €56.8 billion of €6.3 billion respectively in cumulative terms over 10 years, while risky countries would realize significant cost savings:—€107.4 billion Italy,—€64.4 billion Spain and so on.

It would be a complete reversal with respect to the direction of intra-Eurozone financial flows since the eruption of the crisis. In fact, systematic risk segregation has allowed core countries—especially Germany—to attract resources from the periphery as happened, for example, in the redistribution of ECB profits from the Securities Markets Programme or in the Quantitative Easing where the capital key criterion has enabled Germany to make large profits from the refinancing of its public debt. To get an idea of this "magnet-effect" one should consider that from 2008 to 2016 the interest expenditure on the Italian public debt was €150 billion over that of Germany although the sizes of the two debts are comparable in absolute terms (Bundesbank 2017).

Nor should we underestimate the implications of the greater stability assured to the Eurozone by the new structure of the ESM. The presence of a supra-national guarantor such as the sovereign bailout fund, the homogenization and, therefore, the convergence of the interest rates of the various member countries towards common values would increase the resilience of the Eurozone and reduce the tail risk, meant as the risk of an emergency involvement of the Stability Mechanism in the bailout of a State. Conversely, under the old ESM fabric, each country remains subject to the risk of having to shell out additional contributions to the ESM capital if it had been asked to monetize its callable shares.

Table 2 compares, for each country, the contingent liability represented by the quota of callable shares of the current ESM with the cumulative net cost/benefit[8] under the new structure based on risk sharing. The estimated savings would exceed €100 billion for each of the 4 larger countries.

[8] Benefits are displayed with the minus sign.

Table 2 Estimated savings associated with the shift from the current ESM capital structure to the new regime with risk sharing (EUR billion). *Source*: Authors' calculations

Country	Contingent liability from callable shares	Net cost (benefit) under the *new* ESM	Estimated saving from shifting to the *new* ESM
Germany	168.3	56.8	111.5
France	126.4	16.3	110.1
Italy	111.1	– 107.4	218.5
Spain	73.8	– 64.4	138.2
Portugal	15.6	– 20	35.6
Austria	17.3	2.7	14.6
Netherlands	35.6	9.6	26.0
Belgium	21.6	– 0.2	21.8
Finland	11.1	3.9	7.2
Ireland	9.9	– 0.5	10.4

The proposed overhauling of the Stability Mechanism would also fix the liquidity risk which is currently embedded in its capital structure. The entire ESM capital would become immediately available because the annual premiums due by risky countries would be paid cash: by the end of the tenth year, the paid capital of the Stability Mechanism would reach a total amount of about €200 billion. It would mean more than 2 times the most solid form of financial backing available to the ESM with respect to today's framework in which the Mechanism can rely on slightly more than €80 billion cash, the remaining €625 billion being a contingent claim.

The transition to an insurance-based contributory mechanism should necessarily be paired with a more democratic ESM governance, at least removing the veto right of the 3 larger shareholders under the emergency voting procedure. Such a novelty would matter mainly for Germany, which so far has threatened its veto any time it was unsatisfied with the conditions of the aid programs to distressed countries. Hopefully, the larger stability granted by the new set-up should make the Eurozone crisis-proof and make less likely the need for new financial assistance programs to individual member countries, making the loss of supremacy more acceptable to Germany.

Moreover, as already argued, the issuance of ESM bonds over the entire interest rate term structure would eventually contribute to create an authentic Eurozone safe-asset, which is a corner stone for any stable currency area. This would eliminate the distortion that sees the Bund playing this role with the related anomaly of negative yields—as a result of a spurious scarcity effect—that hare hurting balance-sheets of banks, insurance companies and pension/mutual funds. These new ESM bonds in fact will flank the guaranteed Eurozone Govies in the role of safe collateral within the financial markets by strengthening, as a result, the Capital Markets Union.

Indeed, the ultimate aim of the reform is to share risks in order to significantly increase the overall distance to default of all members of the Euro bloc and make the ESM an authentic stability guarantor (free from the constraint of preventive approval by the political institutions of certain member States).

We estimate that the shift to the risk-sharing clauses would deliver a generalized reduction of the debt-to-GDP ratios and a consequent improvement of the debt sustainability for any State. On average, even most indebted countries such as Italy and Portugal would reach a

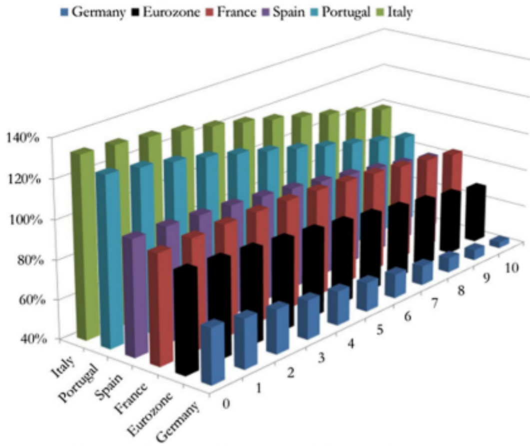

Fig. 6 Estimated path of the debt-to-GDP ratio over the 10-year convergence period (Input data as of September 2017) *Source*: Authors' calculations

ratio below 100% at the end of the 10th year, while the ratio would approach the Maastricht threshold of 60% (Fig. 6).

It remains understood that we refer to average values; depending on the remaining life of government bonds, it may happen that after 10 years we are still left with a residual portion of bonds still not under the ESM umbrella and, therefore, it may be the case that yield curves of Eurozone Govies are not yet fully overlapped. If this was the case, it is clear that countries with an excess-sovereign risk with respect to the average of the Euro area would have to continue to pay (albeit low) annual premiums to the ESM until the complete overlapping would be achieved.

We want to stress that, in any case, Fig. 6 reports only a theoretical situation as over time an increasing part of the debt of each country falls under risk-sharing provisions. A graphical representation of such dynamics is provided in Fig. 7.

Given the scheme of incentives and penalties associated with the proposed reform, we reasonably expect a progressive synchronization of key financial and economic indicators across members countries, such as the primary balance, the average coupon paid on government bonds and the spread on sovereign CDS contracts. Figures 8, 9 and 10[9] report the expected patterns of these indicators for selected Eurozone countries up to 10 years from the launch of the revised Stability Mechanism.

During the transition period the Stability Mechanism could use its leverage capability to issue investment-grade liabilities appropriately distributed along the key maturities of the term structure. Along with Govies embedding risk-sharing clauses, these supranational bonds would make available—at least in an embryonic version—an authentic Eurozone safe asset to capital markets. This would correct one of the main EMU anomalies, namely the fact that, since the eruption of the global financial crisis, the role of Eurozone safe asset has been improperly played by German Bunds with all the unintended consequences related to the scarcity of these securities. This role—albeit reflecting a matter of fact (i.e. the outstanding credit worthiness of Germany with respect to its partners)—stems from the combination of

[9] Input data as of September 2017.

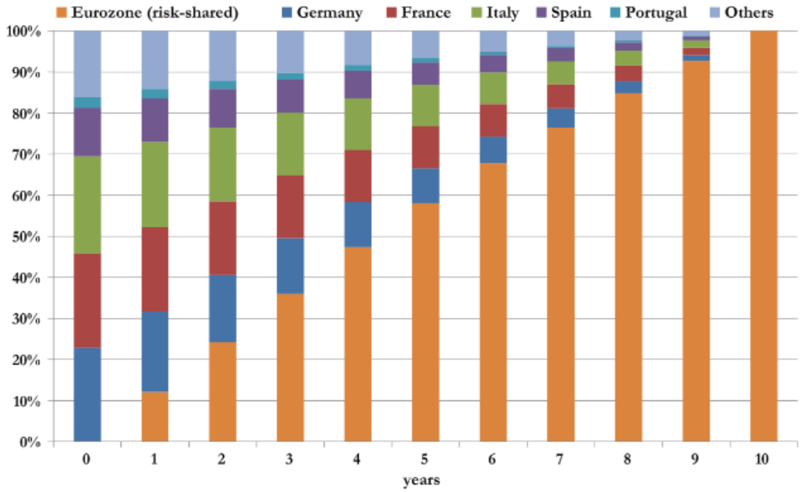

Fig. 7 Estimated time evolution of risk-shared and not risk shared public debt. *Source*: Authors' calculations

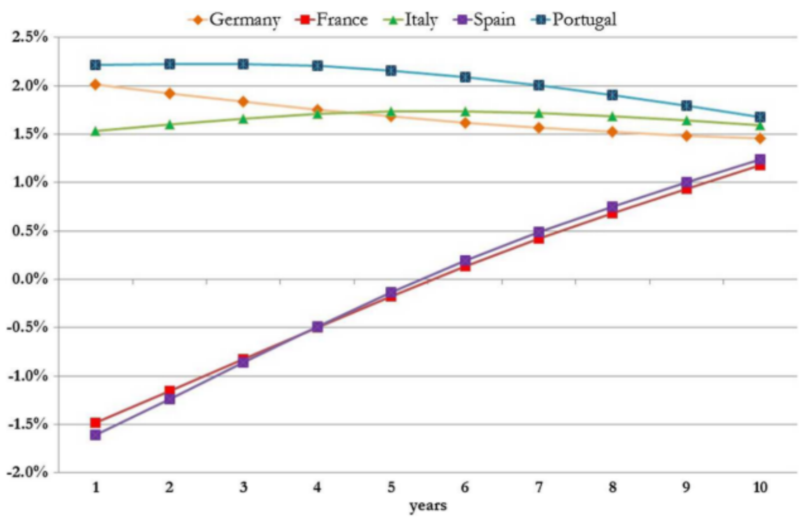

Fig. 8 Estimated time evolution of the primary balance for selected Eurozone countries. *Source*: Authors' calculations

the Eurozone architectural fragilities with the risk segregation strategy that core countries have carried on at least since the beginning of this decade.

The convergence targets that the proposed reform aims to achieve would create a robust ground for the shift to a federal debt of the Euro area as a whole at the end of the phase-in

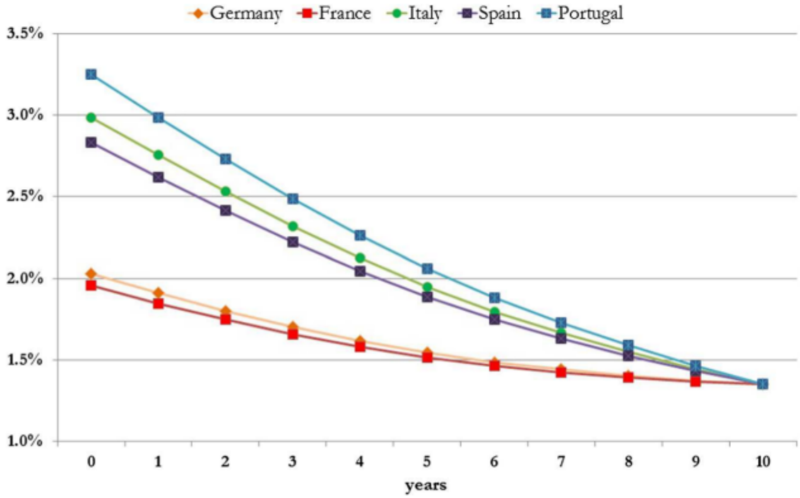

Fig. 9 Estimated time evolution of the average coupon on public debt for selected Eurozone countries. *Source*: Authors' calculations

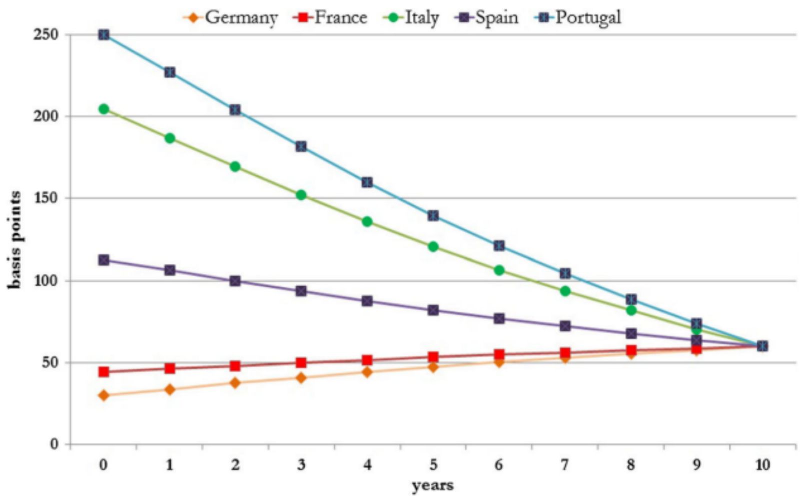

Fig. 10 Estimated time evolution of the sovereign CDS spreads for selected Eurozone countries. *Source*: Authors' calculations

period. Indeed, the reconciliation of the roles of public debt guarantor and project financer[10] within the same supranational institution would lead to the natural transition to a single Eurozone's Finance Minister appointed for the management of a federal budget and a federal debt and entitled to rely on a cooperative monetary policy by the European Central Bank.

[10] See Sect. 10.

As for the federal budget, obviously it would also entail the provision for federal revenues, for instance in the form of a proportional share of the tax income of each member country; whereas, with regard to the federal debt, we envisage the gradual shift of the ESM from the role of covenant-provider to that of direct issuer of supranational bonds of the Euro area as a whole (Eurobonds).

The benefits associated with a similar medium-long term landscape are numerous. Apart from the key result of restoring a single broadly-based yield curve common to all Eurozone members, the bank-sovereign doom loop would be solved. In fact, the shift to a federal public debt would make obsolete the debate on the home bias in the sovereign exposures of Eurozone banks, avoiding to adopt simplistic remedies—such the ESBies—and the introduction of risk-weights and/or exposure limits on Govies.[11] Remedies that greatly underestimate their implications in terms of discrimination across bonds issued by different governments.

A further benefit would be the upgrading to a much wider and more liquid market of public debt securities than today, and thus also more competitive on international financial markets and able to attract much capitals with a view to improving the competitiveness of the euro against the other currency blocs on the global playing field.

8 ESM insurance fund, government debt default, moral hazard and bond market discipline

In principle risk-sharing benefits from the introduction of insurance schemes can be severely undermined by moral hazard distortions as a result of the risk transfer mechanism from the insured to the insurer party. The argument here can be put in the following simple terms:

1. lower interest costs on debt servicing—as a result of the Insurance Fund guarantee—induce a national government to run higher deficit and thereby increasing its debt leading to higher sovereign risk of default;
2. debt insured by a third party is more likely to trigger outright (strategic) default on the very same debt as the brunt of the cost is borne by the insurer and therefore the insured party gets a free ride.

The first argument basically does not apply to our insurance scheme in that the covenants attached to the debt guarantee forbid the insurance of any form of excess debt. Constraints on admissible deficit (the one currently allowed by the Fiscal Compact plus an amount which is equal to the annual premium paid to the ESM in exchange for its guarantee and which is related to the golden rule on investments explained in Sect. 10) would be binding. Sure enough, the national Government can issue excess debt if it so wishes, but it would have to shoulder the associated higher cost for its credit risk, namely bond market discipline would be fully in operation to guard against fiscal excesses. Well within our framework we could even strengthen the role of bond market discipline if we were to make any excess debt junior vis-à-vis insured debt. In order to better enforce the market discipline, in the above described scenario we also provided for an additional penalty for non-compliant countries: the loss of the ESM guarantee and of the premiums paid up to that time (hence, premiums would remain with the ESM).

[11] See Lanotte et al. (2016) for a thorough critical assessment of the overall desirability of reforming the favorable treatment of banks' sovereign exposures allowed by the current banking supervision prudential rules in Europe. They conclude that the microeconomic and macroeconomic costs of a reform could be sizeable, while the benefits are uncertain. Furthermore, they highlight considerable implementation issues.

Such draconian measures not only would they increase significantly the cost of issuing excess debt but they would also prevent the dilution of the debt guarantee value.

The second argument is more subtle in that the event of default does not hurt investors holding insured debt as the insurer (ESM Insurance Fund) would pay them back in full. Basically, the rogue government can declare default de-facto without "taxing" its bondholders as they are fully reimbursed by the debt insurer. Arguably, even if investors were not damaged by such debt default, they are very likely to become suspicious if the same sovereign borrower were to come again to the market trying to raise funds, of course without any debt guarantee (a debt default would disqualify at the outset such government for accessing the ESM Insurance Fund). Hence, the cost of losing market access to new borrowing after default would not differ in practice compared to the case of defaulting with uninsured debt. Anyhow, the fact that the sovereign issuer can avoid "taxing" its bondholders as it declares bankruptcy may weaken, at least to some extent, the incentive to keep on servicing its debt. To contain the impact of such adverse incentive, the ESM covenants should be designed such that a member State in case of default would be required to hit first the portion of debt which does not include risk-sharing clauses. Only in the event that such a move would not be enough to overcome its financial troubles, the Stability Mechanism would intervene with its financial resources and would be legitimized to increase its leverage in order to find the funds necessary to cover the losses, including the access to the ECB programs and collateral refinancing policies as above said.

Moreover, in order to re-inforce the discipline of the above described mechanism, it could be provided the right to recover whatever assets/cash-flows have not been settled by the defaulting sovereign State. More specifically, the ESM would become a creditor of the defaulting sovereign State for the amount of funds disbursed to bondholders, net of any sum of money recovered from the defaulting sovereign. Such credit could also be made senior to any other debt owed by the defaulting sovereign. In addition, if the defaulting sovereign were to remain in the EU, a fiscal adjustment program, administered by the Troika, could be included into the package, in order to speed up the residual debt repayment to the ESM. Moreover, if the defaulting sovereign were to leave the Eurozone (Europe) such debt denominated in Euro, would therefore become foreign currency debt for the sovereign debtor because of the prohibition of redenomination on the insured debt. If such foreign currency debt to the ESM—e.g. a European Union Institution—were to be repudiated, then economic sanctions or other form of political pressure can also be envisaged. Ultimately, such very strict ESM covenants would make virtually as costly for the sovereign State to declare default for its insured debt as for its non-insured debt. Not to mention the loss of the incommensurable benefits associated with the shift to a framework based on risk-sharing, which on the medium-long term would deliver a convergence across member countries both on the financial and the economic ground, precisely the one required to grant durable stability and well-functioning of any common currency area.

Of course, all these aspects cannot rule out losses for the ESM in case of sovereign default nor can one dismiss altogether the possibility that a defaulting sovereign country may end up—willy-nilly—becoming a pariah State in the international community.

In addition to the foregoing, it should be stressed that the danger of moral hazard associated with the scheme proposed in this paper should be compared with the incentive to moral hazard that is already present in the current Eurozone architecture, where member governments issue debt in a currency over which they have no control and are exposed to the risk of self-fulfilling traps. Tamborini (2015) notes how hard is for a government to escape from the default attraction domain by its own means and how the original EMU institutional setup has been part of the problem rather than of the solution, except perhaps the OMT, though untested.

By similar arguments, Nicolini (2016) concludes that if a sufficiently large institution is willing to lend to the country, these self-fulfilling traps can be eliminated. Also Berger et al. (2018) have made a similar point, arguing that a no bailout regime without risk sharing lacks credibility and, consequently, entails more moral hazard than a well-designed formal fiscal risk-sharing mechanism. This is due to a time-inconsistency problem: once the debt of a currency union member becomes unsustainable, bailout can be policymakers' best choice as it allows them to avoid the repercussions across the currency area in terms of economic, financial, migration and political spillovers. Conversely, a formal arrangement to share some fiscal risk would limit the negative consequences of a default for the other currency union members, making it more acceptable for an economic and political standpoint.

Our proposal moves on the wake of these contributions and aims to offer a viable solution to the fragility of the current Eurozone setup with regard to the excessive and undue exposure of member States to the insolvency risk. The success of such an architectural reform will depend on its credibility and, thus, on the ability to favorably modify the distribution of investors' beliefs and achieve a good equilibrium. In this perspective, the credibility of the proposed scheme arises—apart from the supranational guarantee of the ESM (backed by the ECB)—also from the commitment of the countries whose sovereign risk exceeds the Eurozone average to pay insurance premiums that are commensurate with their own risk profile as assessed by the financial markets. This aspect is a hallmark of our proposal compared to other proposals for sovereign risk sharing, including those that have suggested the introduction of Eurobonds (Kopf 2011). In the long run, also our proposal aims at a transition to a Eurozone federal debt, but only after a convergence phase during which, hopefully, yields on the government bonds of the different member countries will re-align and the prerequisites for a fiscal union (as well as a political and a banking union) will be met.

As for the transition period, the renewed markets' confidence in the compactness of the euro area, the tight limits to debt increase, the penalties provided for the strategic default and the fact that the coexistence of two types of public debt (insured and uninsured) is only temporary will mitigate the Modigliani–Miller effect—if any—[12] and support the convergence of the sovereign yield curves. De Grauwe (2011) observes that the Modigliani–Miller argument applies to the extent that the underlying risk is unchanged. But if the common bond issue succeeds in shielding countries from being pushed into a bad equilibrium the underlying risk of the bonds of these countries does indeed decline and these countries are able to enjoy a lower average borrowing cost. In addition, our proposal implies that the maturing debt is fully rolled over with the ESM guarantee, while the uninsured debt is a (decreasing) portion of the outstanding debt. Thus, even a possible increase in the implied yields of uninsured debt would not lead to a higher cost of that part of the debt for the issuing State as envisaged

[12] The Modigliani–Miller theorem states that the structure how a corporation finances itself is irrelevant for how to much it is worth. By extension, some authors (Kopf 2011) claim that, in case of liability split, the weighted average interest rate of the two different tranches in which the debt is partitioned (and of which, only the senior enjoys the joint liability of all member States) should be identical to the interest rate before the split. Building on this argument they conclude that implementing split proposals—such as the Blue/Red bonds proposal of Delpla and Weizsacker (2010)—would immediately force most peripheral euro area countries into a partial sovereign default. Varoufakis (2012) argues that the Modigliani–Miller effect is irrelevant to a debate on restructuring the Eurozone public debt for two reasons. First, because some of the underlying assumptions (prices follow a Brownian motion, same information set for all relevant decision makers, etc.) do not apply to the case of the Euro area. Secondly, because Eurozone's member States are not corporations, which in turn implies: (a) their financing is not based on equity all but, rather only on different debt instruments (consequently, there may well be better debt solutions than the existing ones); and (b) member States' revenues (i.e. tax take) cannot be deemed independent of their expenditure (unlike it holds for corporations).

Table 3 Credit ratings and sovereign risk weights under the standardised approach (%). *Source*: BIS (2013), p. 11

Credit ratings	AAA to AA−	A+ to A−	BBB+ to BBB−	BB+ to B−	Below B−	Unrated
Risk weight	0	20	50	100	150	100

by Modigliani–Miller's theorem.[13] In the light of these points, we reasonably expect that the standard argument against the liability split does not apply to the insurance scheme presented in this paper.

9 ESM insurance fund regulatory and economic capital requirement

The Insurance Fund operations require a supporting equity capital which should be financed primarily by retaining and investing insurance premia paid for by sovereign issuers as well as the existing equity capital endowment of the ESM. In principle, the treatment of sovereign risk in the Basel Committee capital framework (Basel II and Basel III) calls for minimum capital requirements commensurate with the underlying credit risk, in line with the objective of ensuring risk sensitivity. In practice, it is well known that there are significant differences in the application of the Basel rules across jurisdictions. In the European Union (EU), authorities have allowed supervisors to permit banks that follow the IRB (Internal Rating Based) approach to stay permanently on the Standardized Approach for their sovereign exposures. In applying the Standardized Approach, in turn, EU authorities have set a zero risk weight not just to sovereign exposures denominated and funded in the currency of the corresponding Member State, but also to such exposures denominated and funded in the currencies of any other Member State.[14] Assuming that the current EU authorities provisions were to be applied the Insurance Fund sovereign exposures would not require any additional equity capital.[15] However such provisions are to be (gradually) phased out by 2020 and the sovereign exposures will therefore rely on credit rating agencies' assessments with credit ratings and sovereign risk weights rules as established under the Standardized Approach (Table 3).

Assuming that the current level of credit ratings holds and the pattern of sovereign risk weights implied by the current Basel II–III Standardized Approach it turns out that the regulatory minimum capital requirement would be set at 1.45% the notional value of the guaranteed debt. With a total level of public debt that in the Eurozone that could be insured reckoned at around 10.000 billion, the required minimum regulatory capital would be equal to some 145 billion. As explained in our comments on Table 2 regarding the ESM new ESM capital structure, the estimated total cash proceeds raised by the Insurance Fund at the end of

[13] At the most there could be an increase in the outstanding floating-rate debt that, however, represents a small portion of the debt of Eurozone governments. Thus, not enough to produce the invariance effect on the aggregate interest expenditure as provided by the Modigliani–Miller theorem.

[14] This provision will be phased out gradually between 2017 and 2020. The new framework, governed by the Capital Requirements Directive IV (CRD IV) entered into force since January 2014, supersedes the treatment enshrined in CRD III. It requires that, following the phasing-out, the corresponding exposures rely on credit rating agencies' assessments (BIS 2013, pp. 10–11).

[15] Obviously, since the ESM Insurance Fund is not a bank, the considerations of this Section are valid at a hypothetical level. In addition, it is worth to observe that the specific role envisaged for the reformed ESM under the present proposal implies that the Mechanism does not properly have a sovereign exposure to the insured debt, but only a contingent liability that would materialize only if well-defined states of world should occur.

the 10 year transition period is reckoned at about 100 billion euro, which would be added to the current paid-in capital of the ESM (just above 80 billion). Even if only partially, current cash capital is held against safe exposures on the assets side (both Cyprus and Spain having already exited from the financial assistance programs granted in the past). Thus, we estimate a foreseeable level of total cushion capital that would be consistent with forthcoming Basel requirements on sovereign exposures. If the Regulator were not satisfied with such level of cushion capital an additional capital buffer, for precautionary reason, may be added on top. This additional capital buffer could be raised from the member countries as additional insurance contributions (equity capital) to be paid out to the ESM, and it would expand the amount of resources that the Fund can raise on the bond market through its routine issuance activity without compromising its target leverage.

10 ESM leverage as key driver for profitable project financing to peripheral countries

Mainstream argument about the need for risk reduction is not wrong at all. The problem is that its supporters pretend that the only way to pursue this goal is to intervene on the numerator of the debt-to-GDP ratio through harsh domestic reforms.

But spending review—especially when applied to economies battered by a prolonged downturn and by the nefarious consequences of risk segregation—has a negative impact on growth. In turn, excessive cuts on public spending have perverse effects on the debt-to-GDP ratio simply because the drop in GDP (or its lower growth rate) tends to offset—or even cancel—the progress achieved in terms of public debt reduction.

So far these pro-cyclical effects have been largely ignored by the Euro-bureaucracy. The 2011 revision of the Stability and Growth Pact (Six Pack) and the Fiscal Compact signed in March 2012 were introduced—or, better, imposed—by the European institutions in the questionable belief that fiscal consolidation is the right recipe to increase stability and resilience of the euro area.

Compared with the Maastricht Treaty, the rules adopted in late 2011 and early 2012 rely on a new fiscal indicator: the *structural balance* which is defined as the nominal balance net of the cyclical component and *one-off* measures. The European Commission periodically establishes a country-specific *Medium-Term Objective* (MTO) in terms of structural balance. In addition, the Fiscal Compact also introduces a fixed ceiling to the structural deficit whose size is linked to the level of the debt-to-GDP ratio.

Yet, structural balance is a theoretical quantity whose estimation comes mainly from the discretionary measurement of the cyclical component which is based on the estimate of the so-called *output gap*, i.e. the difference between the actual GDP and the potential GDP of an economy. In turn, the potential GDP is defined as the output that would be obtained in the hypothesis of full use of the productive factors. No surprise that the evident arbitrariness in the quantification of potential GDP is the subject of an incessant diatribe between peripheral governments and the European Commission, given the important implications for fiscal policy decisions.

These budgetary constraints have forced several governments in the Eurozone to sharply cut public spending, including a large investments' shortfall (Buti and Mohl 2014; European Central Bank 2016), despite the golden rule which states that good investments pay off for themselves as their fiscal multiplier is well above 1, especially if located in less developed regions (International Monetary Fund 2014).

Figure 11 gives an idea of the investments' drop which occurred since 2008 and the related reversal of the trends exhibited until that moment (Minenna 2018). Looking at the total gross

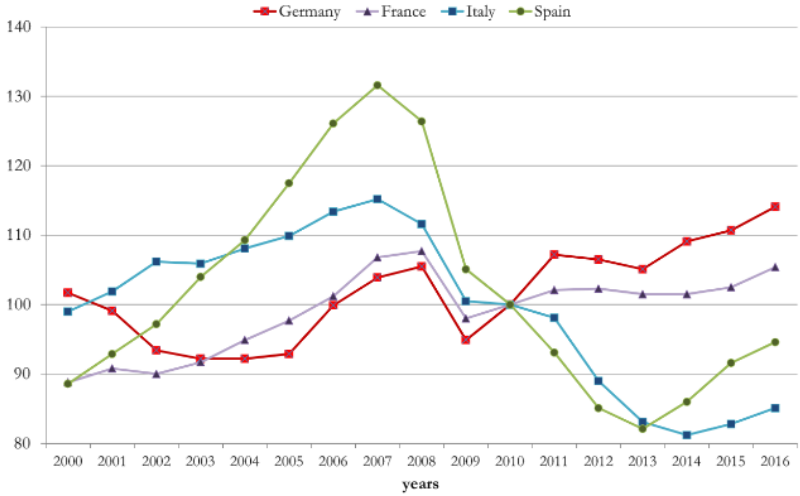

Fig. 11 Gross fixed capital formation—all sectors (Chain linked volumes, index 2010 = 100). *Source*: AMECO database

fixed capital formation of the 4 larger Eurozone economies (index 100 = 2010), we see that from 2000 to 2008, investments have experienced a positive trend: actually Germany's performance has not been particularly good until 2005, with a recovery during the period 2006–2008. But, impressively, after the worst year (2009), Germany has returned to the same path of growth in investments seen prior 2009, as if nothing had happened, and—taking 2010 as reference year—it is now leader across the 4 larger Euro members.

It is worth observing that prior to the crisis, leaders were Spain (also due to the mounting real estate speculation) and Italy, the same two countries that still have not fully recovered their past performance, as confirmed by 2016 data below 100 for both.

Figure 12 displays the above described dynamics with regard to the total gross fixed capital formation at current prices (millions of euros), showing the overwhelming size of investments in Germany, and also how the crisis and the subsequent tightening of fiscal rules have favored divergent trends between Germany (and, at a lesser extent, France) on the one hand and Italy and Spain on the other hand.

In a recent study Boitani and Pierdichizzi (2018) have found that, in times of subdued/recessionary economic performance, positive expenditure shocks tend to have larger fiscal multipliers and to be more effective in boosting aggregate demand than in expansions. Their findings (based on an analysis of the empirical evidence for 12 Euro countries over the period 1985–2015) also highlight that "expenditure multipliers, in a recession, are larger in high debt/deficit countries than in low debt/deficit countries"[16] and that "in a recession fiscal consolidation based on expenditure cuts would have both short and medium run contractionary effects".

[16] The underlying rationale is that "in a recession monetary policy may keep the interest rate very low whilst inflation is subdued, which implies that an additional aggregate demand will trigger higher real output growth and lower price increases" (Boitani and Pierdichizzi 2018).

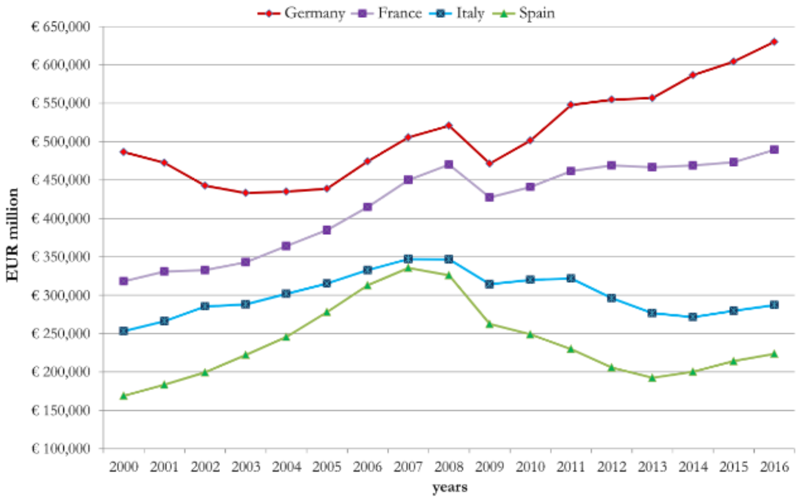

Fig. 12 Gross fixed capital formation—all sectors (Current prices, EUR Million). *Source*: AMECO database

On the light of these arguments we believe that the right way to address the issue of re-aligning the economic cycles of Eurozone countries is to support valuable and safe investment projects within the periphery.

This is the only way to spur growth, also because—despite of the improvements exhibited all over the Eurozone in 2017—the performances of the different States display a large variability which contrasts with the principle of shared growth and development stated in the EU Treaties. Moreover, in some cases, the economic landscape and the robustness of the recovery remain quite controversial.

The reformed ESM could prove crucial on this field. Our idea is re-thinking the key destinations of the resources that the Stability Mechanism raises on financial markets, mainly by issuing low-yield securities. Since the establishment in 2012, ESM has used its leverage capability to provide financial assistance to deeply distressed countries, such as Greece and Cyprus. All of these aids were granted taking care of keeping a moderate leverage: the amount of outstanding ESM liabilities is comparable to the paid-in capital of the Mechanism.

We propose to modify the nature of the support programs that benefit from ESM funding without modifying the current low-leverage attitude (apart from the case of extraordinary funding needs related to the activation of its guarantee on sovereign debts). Rather than using money to intervene in overt crisis contexts and pretending beneficiary countries to make strict domestic reforms, the ESM should use those funds to finance projects within peripheral countries.

A simple way to realize a similar policy change would be as follows: the Stability Mechanism would have to finance investment plans for the same amount as the one received annually from risky countries as premiums for the guarantee. If, for example, in a given year the ESM receives new contributions for 10 billion euros from Italy, on the same year it issues 10 billion euros of supranational bonds to fund investments in Italy itself. Of course, this is a simplified example, because in reality the Mechanism would have to carefully manage its assets-liabilities profile in order to balance funding needs and their costs. However, it makes

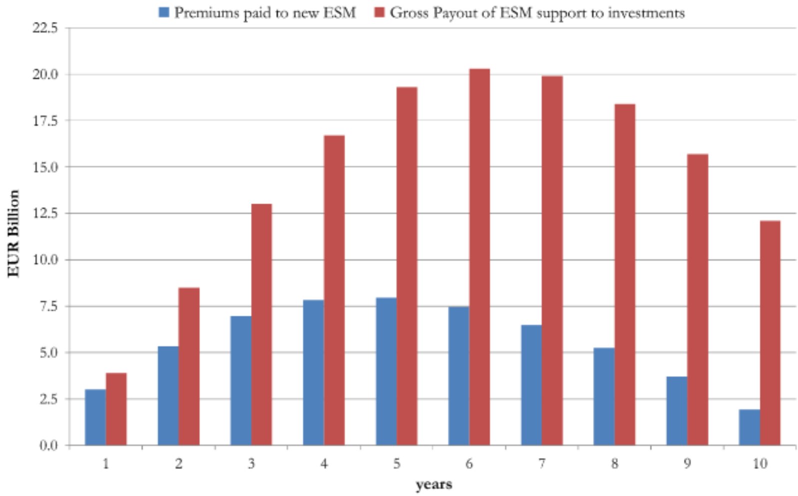

Fig. 13 Comparison of the estimated premiums paid to ESM and the estimated Gross Payout of ESM funded investments: Italy. *Source*: Authors' calculations

clear the idea that ESM issuing policy should be closely linked to the size of the premiums collected from guaranteed member countries.

This would create a strong connection between the financial effort required by the peripheral countries to benefit from the risk sharing on the public debt and the positive stimulus provided to their economies by the ESM project financing. In addition, since under normal conditions the annual increase in the debt stock could not exceed the amounts currently admitted by the Fiscal Compact plus those allocated to new investments through the ESM support, de facto there would be a clear correspondence between greater indebtedness and greater investments, to the benefit of transparency and reputation of the peripheral governments.

With regard to the financial position of the ESM, thanks to the large fiscal multipliers of the investment spending, the Mechanism would get repaid and would also receive interesting returns. In order to minimize the likelihood of wastes and malinvestments and preserve a prudential profile, the entire process of projects' selection and ongoing monitoring should be assigned to a European Agency, which prospectively could become a EU Minister of Infrastructures and Economic Development. The legislative and judiciary apparatus needed to enforce this investment plans—including the law governing procurement/tender procedures and the jurisdiction appointed for litigations—should be defined at the European level without involvement of the country where the project is located.

Figure 13 compares the estimated annual cost of the guarantee paid to ESM with the estimated gross payout of new investments funded with ESM-issued liabilities in the case of Italy, and allows to appreciate the benefit of the proposed reforms in terms to profitable returns on investments in peripheral countries.

11 Conclusions

This work has presented a proposal for Eurozone overhauling that relies on reforms of the European Stability Mechanism. So far the Mechanism has played only a limited emergency role in front of critical episodes related to minor economies or very specific problems (as in the case of Spanish banks). By contrast, several arguments suggest that the current set-up of the Mechanism along with the risk segregation strategy enacted by core countries would make quite unlikely an intervention of the ESM in the event of large shocks hitting major Eurozone members.

Unlike the proposals drawn up by Germany, the European Commission and some French and German economists who continue to see risk segregation and domestic reforms as the only solution to the problems of the peripheral countries, our proposal is based on risk sharing and on supranational facilities to support the recovery of investments in the most fragile economies.

The ESM should turn into a guarantor of the public debts of the different member countries and—in order to preserve market standards and prevent moral hazard to creep into the insurance scheme—it should receive new capital contributions from the countries that get a net benefit from such conditional guarantee. These contributions should come in the form of annual insurance premiums valued at fair market price conditions, and they should be flanked by strict covenants attached to the exercise of the debt guarantee. Equity capital contributions to the Insurance Fund would also be based on the incremental risk brought in by each country debt. Such provisions aim at keeping under control the (temporary) increase in the interest expenditure on debt faced by core countries because of the proposed reform.

Our insurance scheme challenges the widespread assumption that the provision of a guarantee for another sovereign's risk is for taxpayers of the bigger nation to have to shoulder the burden of the borrowing sovereign's excesses (Sinn 2014, Ch. 8). Although drawing from the recent development in the theory of Eurobonds, our proposed Insurance Fund embedded in the ESM it's a genuinely new scheme and an institutional innovation which is not far, with its financial engineering content and structure, from traditional technological innovations which relies on scientific discovery. Thus the argument that "since such Insurance Fund has not been tried before its alleged viability can only be a fluke" must be faulty.

The key implication of our proposed Insurance Fund is the consequent reversal in the expectations of market participants which would lead to the zeroing of sovereign yield spreads, allowing the Eurozone to achieve the ultimate goal of sharing a federal debt with a single yield curve for all of its members, as in the golden age of the European Monetary Union.

The new ESM—by constituting a stable and significant federal budget—would also have a critical mission in reviving large, sustainable and profitable investments within peripheral countries whose economic recovery is still uncertain and ailing. This could be achieved through targeted financing of valuable projects and would be an effective way to enact a growth-based risk reduction taking advantage of the high fiscal multiplier of the expenditure in gross fixed capital formation, which was seriously penalized over the last decade. Such ESM support would provide more fragile countries with stronger antibodies to immunize from new shocks and reposition themselves on a durable path of growth. Indeed, only closing the gap between strong-core countries and weak-peripheral countries would make the shift to a common public debt sustainable on the medium-long term the better answer to the neoliberal argument that pretends all problems, differences and imbalances of the Euro area being exclusively due to fiscal profligacy of the periphery rather than to the Eurozone incompleteness and the undue discrepancies delivered by persisting risk segregation.

With respect to the *status quo*—where risk nationalizations are prevailing and consequently the European Monetary Union is moving towards a fixed-exchange rate regime—our proposal would deliver peripheral countries a significant benefit both in terms of default probabilities and in terms of expected losses and would support the financial system with a notional

Table 4 Summary of the main *pros* and *cons* of the proposed ESM reform

Pros	Cons
The Eurozone sovereigns' bailout Fund would become, through a gradual process which is compliant with market logics, the guarantor of the Eurozone public debt.	During the convergence process core countries would see interest spending on public debt increase
Elimination of redenomination risk: the debt guaranteed by the Insurance Fund would be subject to the prohibition of conversion into another currency	
Reduction of moral hazard gains that a member country could achieve by leaving the Eurozone	
Elimination of yield spreads between government bonds issued by the different EMU member countries	
Creation of a Eurozone safe asset with an outstanding notional appropriate to the needs of the economic and financial system of the Euro-area	
Elimination of the phenomenon of negative interest rates and its known consequences on pension funds and, more generally, on the profitability of the financial system	
Normalization of the existing unbalances on the Target 2 system	
Adoption of a golden rule for public investments	
Elimination of the callable shares envisaged by the current ESM financial structure	
In place of callable shares, the European Stability Mechanism Fund would be recapitalized at the expense of the member countries whose sovereign risk exceeds the Eurozone average	
Use of market pricing techniques for the creation of the financial structure of the Insurance Fund	
Provision of a 10-year or more transition period for the creation of: 1. A Eurozone public debt, 2. Eurobonds, 3. A federal budget of adequate size, 4. A European harmonized framework for the management of contracts and litigations	
Eased tapering: the deflation of the assets' side of the ECB balance sheet for the part represented by the government bonds purchased with Quantitative Easing would be made easier by the sounder marketability environment of such bonds arising from the ESM guarantee	

amount of safe-assets compatible with its needs and consequently able to free the potential of the industrial system.

Table 4 here above summarizes the main *pros* and *cons* of our proposal adopting the standpoint of a comparative statics' analysis.

In synthesis this proposal would lay the foundations for an organic and harmonic development of the United States of Europe as prescribed in the European Treaties.

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