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Debt Mutualization in the Euro Area: A Quantitative Exploration

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ABSTRACT: This paper explores the feasibility of an idea proposed first by the German Council of Economic Experts in 2011 and revisited by Italian and French authorities in 2021: the one-off mutualization of *some* European legacy debt through the creation of a European Debt Management Agency (EDMA). The paper does not argue in favor or against these proposals or make a proposal of its own. Rather it outlines a conceptual framework that can be used to quantify the contours of mutualization proposals and draws lessons from the debt assumption in the United States in 1790. The framework suggests that by capitalizing the convenience yield on European-wide safe assets, the EDMA could issue up to 15 percent of euro area GDP, helping to put national debts on a sounder trajectory. The analysis suggests that, without mutualization, some euro area countries are likely to experience decreasing debt-to-GDP ratios over the forecast period. This is not the case for Belgium, Finland, France, Italy, and Spain, where further fiscal consolidation would be needed. For these countries, we consider the effects of a debt mutualization equivalent to 26 percent of their GDP. For Italy, this operation alone is enough to ensure a decreasing debt-to-GDP path. For the others, the news is more mixed: while the additional fiscal consolidation is smaller, 1.3 to 2.3 percent of GDP are still required to reduce debt with 95 percent probability.

Debt Mutualization in the Euro Area: A Quantitative Exploration

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Introduction

In response to the COVID-19 crisis, both advanced and emerging market economies have implemented large fiscal stimulus programs that have pushed public debt to historically high levels. In the euro area, fiscal rules were suspended, and the lockdown-driven contraction and associated policy response led sovereign debt to new heights. Further, while large increases in debt-to-GDP ratios were widespread, these were not symmetric, with some countries suffering more than others. Some relief on COVID related debts has been provided by NextGenerationEU, but these countries remain in an asymmetric situation.

The swift post-COVID recovery and surprise inflation, together with the discontinuation of several costly crisis-related measures have led to a stabilization and in some cases reduction in debt ratios. However, some countries' debt remains at a level at which sustainability can be questioned in the future, leaving them potentially exposed to self-fulfilling runs. This is especially relevant since real interest rates are rising and likely to remain relatively higher for some time. Put differently, elevated debt levels and higher interest rates move debt dynamics in the 'danger zone' where liquidity runs are more likely and could morph into solvency problems (Calvo, 1988; Lorenzoni and Werning, 2019). Indeed, sovereign spreads, while remaining well below the levels experienced during the GFC, have started to rise and become more volatile.

In practice, central banks have a critical role to play to prevent liquidity runs on domestic debt via temporary interventions—preferably 'off the equilibrium path,' coupled with a strong institutional setting that enshrines monetary independence and prevents fiscal dominance. In the euro area, the ECB provides this safety net, which is critical to ensure smooth transmission of monetary impulses and prevent financial fragmentation.

Such a task is harder to implement when a single monetary authority is facing twenty national fiscal authorities as is the case in the euro area. Yet, since Mario Draghi's "whatever it takes" announcement in 2012, the ECB has been remarkably successful in preventing fragmentation, including during the COVID-19 pandemic. The current environment of high inflation may cast doubts about the ECB's ability to continue preventing fragmentation. In a low inflation environment, a loose policy stance consistent with "whatever it takes" was also the best conjunctural response to maintain price stability. Today, the two objectives—price stability and anti-fragmentation—may require opposite stances. The ECB's response has been to unveil a new instrument, the TPI, as of yet untested and whose contours remain vague. These developments have exacerbated the need to plan for future debt reduction strategies, especially in those euro area countries whose debt levels were already elevated prior to the pandemic and where debt service could start rising (Figure 1).

There is also a common realization that, while there is a need for a strong EU-wide fiscal architecture, the previous framework has not lived up to its promises. Since the European Commission launched the review of the EU economic governance framework in February 2020, there has been a lively debate about the main shortcomings of the current setup and on how to address them (Friis et al, 2022; Caselli et all, 2022). Some of the key challenges include how to tackle: (i) Hight public debt ratios to ensure their gradual but realistic reduction; (ii) The complexity of the EU framework; and (iii) The lack of ownership and low enforcement of current fiscal rules. IMF (2022a) documents that the existing fiscal framework has failed to

contain risks and points to the large heterogeneity in debt levels as the fundamental reason behind the lack of progress in addressing these shortcomings.[1]

Figure 1. Debt and interest expense-to-GDP.
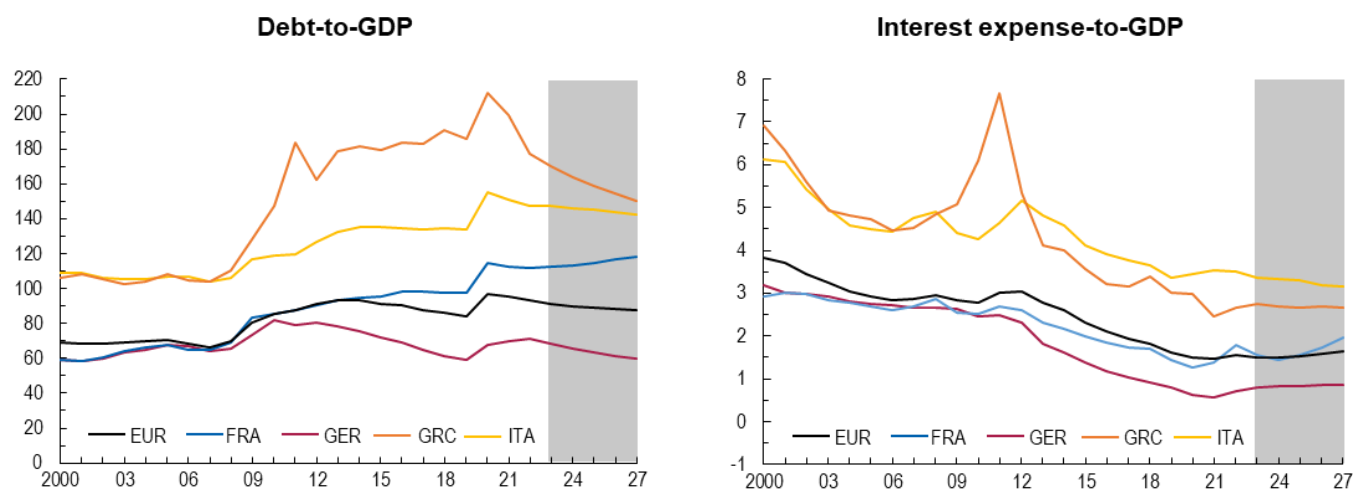
Source: WEO Oct 2022 and IMF staff calculations.

In this regard, the analysis suggests that debt mutualization could enhance the sustainability of public finances of several euro area countries, under some key assumptions, including that the interest rate - growth differential is favorable and moral hazard can be contained. The case for debt assumption (especially some of the historical debt unrelated to past fiscal profligacy) becomes stronger when considering that a deleveraging strategy that relies only on fiscal consolidation is likely to be challenging, both economically and politically (WEO 2023, Chapter 3).

More broadly, recent proposals for EU governance reforms have brought the treatment of pandemic-related and other legacy sovereign debt to the forefront of policy debates. Advocates of legacy debt mutualization (D'Amico et. al., 2021) argue that it would enhance the incentives for compliance with revamped fiscal rules and stricter enforcement by establishing more favorable starting positions for public finances for all member countries and reducing debt-service cost for high-debt countries.[2]

Note that for legacy debt mutualization to be more than a zero-sum game that simply redistributes costs across countries, a political non-starter, some non-linearities need to be present in the relationship between debt levels and spreads. These may allow for a reduction in the overall cost of debt by transferring some

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[1] See Berger et al. (2019) and Allard et al. (2013) for earlier analyses of the Euro Area fiscal architecture.

[2] There has been a wide range of related proposals. Two close precedents to the scheme discussed here are in Ubide (2015) and Avgouleas and Micossi (2021). Leandro and Zettlemeyer (2019) offer a broad review of different proposals for the creation of a European safe assets.

of the debt of more highly indebted countries to a less indebted (and hence safer) centralized entity. Put differently, the reduction in service cost due to the reduced riskiness of the highly indebted country's debt needs to exceed the increase in the same cost for the centralized entity. This may, for instance, result from default costs not fully priced in or, under multiple equilibria when mutualization helps eliminating the high interest rate equilibrium and associated risk premia. In addition, this centralized entity, by issuing a European safe asset, may offer a desirable asset to bond holders. The associated convenience yield constitutes implicitly a new common fiscal resource that would help service the centralized debt.

Against this background, this paper provides a framework to quantify the potential contours of a radical idea first proposed by the German Council of Economic Experts in 2011 and brought back to life by Italian and French authorities in 2021 (Draghi and Macron, 2021). The core idea is to exploit the latent market appetite for a European safe asset to put national debt on a sounder trajectory. Because the idea is radical, it may receive a lot of criticism on principles. These are important. There are thorny political and governance-related issues that would have to be resolved before implementing any debt mutualization (not least how to ensure that individual countries' debts remain permanently on a safe trajectory afterwards). Any serious proposal in this direction would have to address these concerns. But the purpose of this paper lies elsewhere: it is not to answer whether this should be done. Rather it is to explore, under reasonable assumptions, how much could be done. The answer is: quite a bit.

Operationally, a one-off mutualization of some legacy debt could be achieved through the creation of a European Debt Management Agency (EDMA) that would issue common debt and acquire a fraction of debt that individual countries issued beyond the 60 percent threshold established in the current treaties. Of course, preventing the moral hazard associated with the mutualization of legacy debt is a key aspect for both the feasibility and the success of any mutualization proposal. Focusing exclusively on the debt accrued due to an exogenous common shock (e.g., the COVID-19 shock) could assuage concerns on this front by neatly circumscribing mutualization to an extreme situation entirely outside the control of fiscal authorities. That was the spirit of the Funding Act of 1790 in the US: Treasury secretary Hamilton mutualized the debt incurred by states during the wars of Independence and no other bailout was granted since then.

We should be clear at the outset that the debt mutualization studied in this paper should not be seen as undermining the need for fiscal consolidation and the importance of strengthening fiscal frameworks. This means proper incentives to prevent future fiscal profligacy that may bring back high debts and sustainability risks need to be implemented in parallel, by upgrading the fiscal architecture to a stronger, incentive compatible and sustainable system. This may require a more risk based-approach design for fiscal rules, revamped medium term fiscal frameworks, and a stronger role for independent national fiscal councils, as further discussed in IMF (2022a). Removing any remaining implicit bailout guarantee in the EU context may require re-thinking the process of sovereign debt restructuring, including by making it possible without leaving the union. This, in turn, requires the protection of national banking systems to avoid doom-loop scenarios as experienced during the eurozone crisis, by completing the banking union. How to strengthen the preventive arm of the EU fiscal architecture and how to handle crises once they emerge are important and challenging issues to consider, but they are not the purpose of the current paper—even if we will provide some elements of discussion in conclusion. Instead, this paper provides a quantitative evaluation of a one-off debt mutualization operation aimed at putting national debt trajectories on a sounder path.

Formally, we conduct such an experiment using stochastic simulations, allowing for serial correlation, natural in macroeconomic series. We consider a one-time debt issuance by EDMA that is used to purchase and cancel/forgive part of individual countries outstanding debt. Importantly, the debt issued by EDMA is simply rolled over: no fiscal resource is transferred from the national to the European level. We explore the conditions under which the debt will nevertheless shrink over time, due to a favorable interest-growth differential, on average.

As with any security, the interest rate of EDMA debt (r) is influenced by its risk and convenience yields. We consider scenarios that ensure EDMA debt remains risk-free and enjoys a convenience yield that we calibrate under reasonable assumptions. Recognizing this risk-free status, the EDMA debt would be eligible for ECB purchases. In the current environment (with zero EDMA debt), the EDMA rate r is below the euro area's growth rate (g), ensuring favorable debt dynamics. Using empirical estimates of the interest elasticity of risk-free assets, we compute the maximum amount of EDMA debt issuance such that in the following years the EDMA debt declines, as a ratio to European GDP, with very high probability. Conceptually, this implies that the EDMA is capitalizing a new (and largely unexploited) fiscal revenue: the convenience yield on EA safe assets.

The second part of the exercise turns around and asks how the debt assumption would alter national debt dynamics. Following previous debt mutualization proposals (e.g., German Council of Economic Experts, 2011), we focus on countries with debt levels above the 60 percent threshold mandated in the European treaties. For these countries, we first focus on a debt reduction based on the amount of debt accrued due to COVID-19. As discussed above, this approach may encounter less political resistance due to the exogenous and common nature of the shock. Second, given that debt mutualization proposals have been in policy circles before the pandemic, we analyze the feasibility and implications of a broader debt mutualization operation based on the GDP of individual countries. In both cases, we evaluate the probability that the remaining national debt would decrease at the forecast horizon, and—if necessary—the required adjustment in primary balances.[3]

We can summarize our findings as follows. First, the EDMA could issue up to 15 percent of euro area GDP without transfer of national fiscal resources, and that debt would decrease with high probability at the forecast horizon.[4][5] Second, for most countries in the euro area, debt-to-GDP is expected to decrease over the forecast period with 95 percent probability, even without any debt mutualization. The exceptions are Belgium, Finland, France, Italy, and Spain. For these five countries, we consider a debt mutualization operation equivalent to 26 percent of GDP. In Italy, this debt mutualization, together with the policies embedded in the current WEO projections, would be sufficient to ensure a decreasing path for the debt-to-GDP ratio, after three years. Belgium, Finland, France, and Spain would require, relative to the current

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[3] We do not address here whether such a debt mutualization would violate the provisions of Article 125 of the TFEU (the no bailout clause) as it stands. It is possible that the debt mutualization exercises we consider may require amending the Treaties. We note, however, that the legality of the issuance of NextGen EU debt rests on article 122 of the TFEU which allows EU borrowing to counter the pandemic.

[4] All references to debt decreasing with high probability refer to a 95 percent probability with a forecast horizon of three years.

[5] It is clear that EDMA debt would have to be issued with the relevant guaranties, so that if we are outside our 95% scenario, then resources are provided by member states). Such contingency measures, together with collateral eligibility at the ECB should ensure the safe status of EDMA debt. In that sense, the assumption operation is a mutualization operation. Our analysis does not take into account how the activation of the contingency would affect national debt dynamics. Intuitively, it should require a larger primary balance since EDMA debt will be less stable in states of the world where national debt is also less stable (high interest rates and low growth). The precise impact on national debt trajectories is left to future work.

WEO baseline, and in addition to the mutualization, yearly improvements in the primary-balance-to-GDP ratio equivalent to 2.3, 1.8, 1.7, and 1.3 percent respectively, for the 95th percentile debt-to-GDP ratio to be on a decreasing path, after three years.

The rest of the article proceeds as follows. Section 2 draws lessons from the debt assumption in the United States. Section 3 lays out the conceptual framework behind the debt mutualization operation analyzed in this paper. Section 4 presents the quantitative results. Section 6 concludes and discusses policy implications.

Lessons from the US history

The creation of the United States as a political and economic union has been extensively used as a benchmark for determining the viability of European economic integration and weighing alternative policy options (see, for instance, Henning and Kesler, 2012; Sargent, 2012; James and Sinn, 2013). Advocates of debt mutualization in the euro area often point to the debt assumption of 1790 implemented by Hamilton in the US, which is considered one of the most successful financial programs in history. In this subsection, we provide a brief historical overview of the US experience to draw parallels and differences with respect to the current debt mutualization proposals.

In 1789, the United States was a new nation facing the burden of debt incurred by individual states during the Revolutionary War. Hamilton, as the first Secretary of the Treasury, proposed a plan to rearrange fiscal institutions in the union aimed at developing a well-financed, large-scale federal government. The program featured a greater degree of fiscal union. The Federal Government would assume the debt of the states by issuing new Treasury securities (hence, creating a national debt), but would also be given exclusive authority to tax US international trade (the most important source of revenue at the time). The plan was controversial, with many (e.g., prudent and self-serving states such as Virginia) opposing the idea of a national debt and the power it would give to the federal government. However, Hamilton was able to gain support for the plan by arguing that the debt incurred by the states was for the shared goal of fighting the war and achieving independence.[6] It is also worth noting that the creation of the monetary union only took place after this new fiscal framework had been set on course.

Of similar importance for the success of the US fiscal union was the decision by Congress in the 1840s not to bail out heavily indebted states. In the 1820s and 1830s, several states embarked on ambitious infrastructure projects (railroads and canals) largely funded through debt.[7] Many of these states defaulted when the return on these investments proved much lower than expected. Congress refused to bail out states primarily on moral hazard grounds. The main argument was that the previous debt assumptions were justified due to a war that served a national purpose while the subsequent debts were incurred to finance local projects. As a result of Congress's decision, more than half of the US states revised their state constitutions in the 1840s to include a requirement for annual balanced budgets. The US has supported the no bail-out practice since then and all but one of the 50 states have a fiscal rule in place.

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[6] Incidentally, the deal also entailed moving the capital of the union from Philadelphia to Washington DC, closer to the southern and fiscally more prudent states, in what became known as the Compromise of 1790.

[7] See Grinath, Wallis, and Sylla (1997).

The debt assumption experience in the US and current debt mutualization proposals in Europe share a common goal: consolidate debt and reduce the risk of default. However, there are three key differences between the two. First, in the US state debts incurred to finance a widely endorsed national cause were assumed by the central government. In the case of Europe, such a case could be made for the increase in debt due to COVID-related expenses, less-so for debts incurred prior to joining the monetary union. However, debt mutualization proposals in Europe have been discussed since 2011, with much controversy about whether the legacy debts are related or unrelated to fiscal profligacy. Second, and related to the idea that the drivers behind past debt accumulation mattered for the assumption, the US established a fully credible no bail-out provision. This served as an effective source of fiscal discipline on the member states which adopted their own fiscal rules, generating greater ownership than for the common fiscal rule in the euro area. Third, the debt assumption in the US was implemented together with a nationalization of fiscal policy, while our analysis for the European Union does keeps national fiscal resources unchanged.

Conceptual Framework

The very low interest rates that prevailed in the decades before COVID-19 pandemic and the expectation of real interest rates remaining low (e.g., IMF 2023, Chapter 2) have led economists and policymakers to re-evaluate the textbook view of deficits and debts. A "free lunch" may exist when increased current deficits and debts do not need to be offset by lower future spending and/or higher taxes. This can happen if the government debt interest rate lies below the growth rate of the economy (Blanchard, 2023).

Mian, Straub and Sufi (2022) developed a model to study the conditions for this to happen, which can be represented in the deficit-debt-phase diagram in Figure 2. The diagram depicts the set of primary deficit and debt-to-GDP ratio that allows economies to grow out of debt without a need to consolidate primary balance. When the debt ratio is below a certain level, b^*, a small jump in primary deficit z from stationary points on the curve can be sustained permanently without causing explosive debt dynamics ("free lunch" region). The key ingredient of the diagram is the interest rate as an increasing function of the debt ratio. The authors model such a feature by assuming that households receive utility from holding government

Figure 2. Phase diagram of Mian, Straub & Sufi (2022).
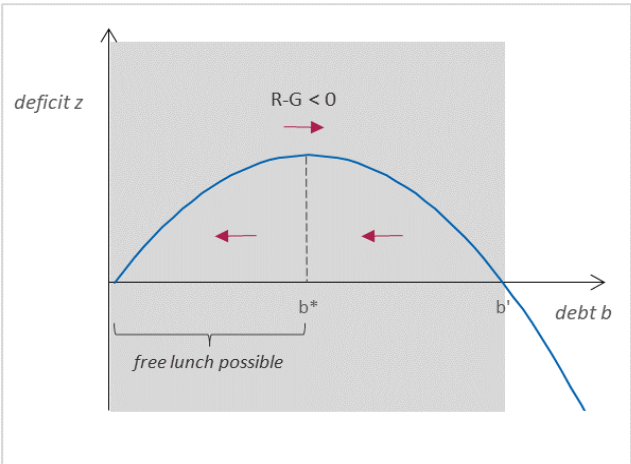
debt and interpret the resulting lower interest rate as the convenience yield of government debt. Since a higher debt ratio raises the interest rate, a higher primary balance, which raises the future debt ratio, may not be sustainable even if the current interest-growth differential is negative. As debt ratio increases, the gain from $r - g < 0$ diminishes, and eventually, the sign turns into positive where any primary deficit will increase the debt ratio and require future primary surpluses.

The previous analysis can be seen as providing analytical foundations to the debt mutualization exercise considered in this note. Issuing European debt and using the proceeds to reduce national debt could benefit individual countries by opening fiscal space when the national debt is beyond the "free lunch" region. The presence of a "free lunch" depends on the calibration of the model parameters, but the concept highlights the potential benefits of debt mutualization for individual countries. The main mechanism is the capitalization of a new (and largely unexploited) fiscal revenue: the convenience yield on Euro safe assets.

The possibility of being in the "free lunch" region does not imply in general that it is welfare improving to increase the stock of debt (Blanchard, 2023). Here, however, is a key difference: we do not consider an increase in the consolidated debt of member states. Instead, we consider a swap whereby higher interest rate debt is retired and replaced with lower interest rate debt, reducing the overall debt burden and putting national debt dynamics on a firmer footing.

Debt Mutualization: A Quantitative Evaluation

Proposals for "legacy" debt mutualization have been discussed in European policy circles at least since 2011 and have faced strident opposition in many EU countries. However, more recent debates have revolved around the increase in indebtedness resulting from the pandemic. The argument relies on the common and exogenous nature of the shock which could ease the aforementioned opposition. This section provides a quantitative evaluation of a one-off debt mutualization operation that addresses either the legacy debt related to the pandemic or legacy debt more broadly based on the GDP of individual countries.

Formally, we consider a one-time debt issuance by EDMA, that is used to purchase and cancel part of individual countries outstanding debt. The debt issued by EDMA is simply rolled over: no fiscal resource is transferred from the national to the European level. We explore the conditions under which the debt will shrink away over time, with high probability, due to a favorable interest-growth differential. In this sense, we conduct a very conservative feasibility study relative to most existing proposals that assume that either countries commit to some positive transfer to EDMA or that EDMA receives some dedicated fiscal resource. Instead, we make an extreme assumption of zero fiscal resources and shows how far one could go at "zero cost."

Using the 2022 October vintage of World Economic Outlook data, we quantify the maximum size of debt that the EDMA can issue safely and analyze the implications for national debt dynamics under either mutualization scenario (COVID or broader GDP-based debt reduction). To this end, we conduct stochastic simulations, where serial and cross-variable correlations are estimated using VAR (vector autoregression) models, and the simulated shocks are added to the WEO forecast.[8] Our stochastic simulations also incorporate conservative estimates of the impact of debt levels on interest rates from the literature (Rachel

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[8] See Appendix A for a detailed description of our methodology, which could generate a different fan chart than IMF (2022b).

and Summers, 2019; Pamies et. al., 2021). The benchmark we follow is whether the debt-to-GDP is decreasing after the 3rd year of the forecast horizon at a 95 percent confidence level. Although the specifications of the exercise (tolerance in probability for debt-to-GDP to be decreasing and the horizon after which it has to be decreasing) are ad-hoc, they provide some reasonable assurances that debt-to-GDP will decline with high probability and allow this decline to be visible within the typical policy forecast horizon of five years.

How much debt can EDMA safely issue?

Our approach is based on the assumption that EDMA's debt is risk free, and that its convenience yield at inception (with zero debt) is such that the interest rate on EDMA's debt issuance (r) is lower than the euro area's growth rate (g). We use empirical estimates of the interest elasticity of risk-free assets to determine the maximum amount of debt that can be issued, while still maintaining a negative r-g differential such that EDMA debt-to-euro area GDP ratio declines over the forecast horizon with high probability. In this way, the EDMA is capitalizing a new (and largely unexploited) fiscal revenue: the convenience yield on EA safe assets. A precise estimate of the convenience yield is not readily available. However, it can be argued that its value should be between the rate on German bunds (the blue line in Figure 3) and the weighted average of the rate paid by individual countries (the black line in Figure 3). In our baseline experiments, we assume the baseline value of EDMA debt is exactly in between (the redline) and report some sensitivity analysis.[9]

Figure 3. Effective Interest Rates.
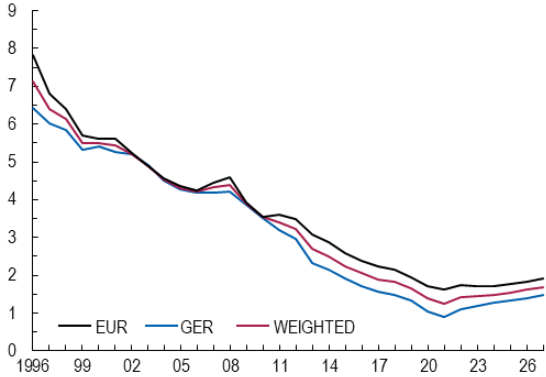
Source: WEO Oct 2022 and IMF staff calculations.

The simulation for EDMA suggests that it can absorb up to about 19 percent euro area GDP in debt without jeopardizing its safe debtor status (Figure 4). As of 2022, the NextGenerationEU debt amounts to nearly 4 percent of the Euro area GDP. Hence, the results indicate EDMA can issue an additional 15 percent GDP without hampering the Euro area's debt sustainability at the 95th percentile.[10] Since EDMA does not have fiscal operations, the debt will be simply rolled over and is projected to decline after the 3rd year of the forecast horizon. The limit on the size of the EDMA, as in Mian et. al. (2022), is that interest rates increase

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[9] If we used the 99th percentile as the criterion, the EDMA could issue an additional 4 percent of GDP. Using the 95th percentile but assuming 0 convenience yield the EDMA could issue an additional 6 percent of GDP.

[10] To get a sense for the magnitudes, if instead we were to use the 99th percentile as the criterion, the EDMA could issue an additional 4 percent of GDP. Using the 95th percentile but assuming 0 convenience yield the EDMA could issue an additional 6 percent of GDP.

with the debt level. Specifically, we assume that the interest rate increases by 6 bps for each 1 ppt increase in debt-to-GDP, which is a conservative estimate for advanced economies (Rachel and Summers, 2019).

Figure 4. Fan chart of EDMA debt-to-GDP: 15 percent debt-to-GDP increase.
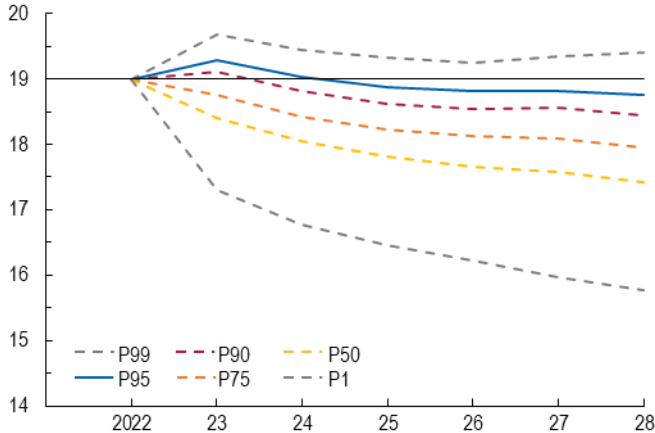
Source: WEO Oct 2022 and IMF staff calculations.

An issuance of significant magnitude by the European Debt Management Agency (EDMA), amounting to 15 percent of the euro area's GDP, is likely to have an impact on the yield faced by other euro area safe asset issuers, such as Germany. On the one hand, such an issuance and the resulting debt mutualization could help prevent the emergence of unfavorable equilibria and the implicit transfers that might be required in such a state. For instance, Gourinchas et. al. (2022) document implicit transfers from the European Union in the range of roughly 0.4 percent of output for Ireland or Spain, to roughly 3 percent of output for Cyprus and Portugal and a very substantial 43.7 percent of output for Greece during the Eurozone crisis of 2010-2015, Reducing the likelihood of these transfers could lower the Bund's rate. Similarly, the markets for European safe assets are very illiquid, as a result of their limited size. Increasing market liquidity could help drive down yields on the asset class. On the other hand, the increased supply of the euro area safe asset may drive down the price of close substitutes such as the Bund, leading to a higher rate. The first two effects are challenging to quantify, but simulations based on the third effect (see Appendix B) suggest a manageable impact on German public finances.

The exact operational details regarding the timing and implementation of the issuance of EDMA debt and its use for the eventual cancellation of the mutualized debt are beyond the scope of this paper. However, it is crucial to consider the potential impacts of such a significant operation on the monetary and financial system, taking into account its effects on the transmission of monetary policy. For instance, a one-off operation may impact liquidity in some sovereign bond markets and could require some offsetting transactions from the ECB from its large asset portfolio.

How much can the proceeds improve individual countries' debt sustainability?

We now analyze how such a debt assumption would alter national debt dynamics. Following previous debt mutualization proposals (e.g., German Council of Economic Experts, 2011), we focus on countries with debt levels above the 60 percent threshold mandated in European treaties. For these countries, first we present the baseline debt dynamics without debt mutualization. Second, we study a debt mutualization that addresses the legacy debt related to the pandemic. Finally, we consider a broader debt reduction based on individual countries' GDP weight in the euro area.

Baseline without debt mutualization

Table 1 shows the 95th percentile confidence band of debt-to-GDP in the scenario without debt mutualization (we refer to it as the 'baseline scenario'). The results suggest that most euro area countries will experience decreasing debt-to-GDP ratios over the forecast period. The shaded rows correspond to the countries whose 95th percentile is not decreasing after the 3rd year of the forecast horizon. In the baseline scenario without debt reduction, five countries (Belgium, Finland, France, Italy, and Spain) exhibit non-decreasing debt-to-GDP at the 95th percentile.[11] These countries tend to have high primary deficits over the forecast horizon except for Italy, and the simulations indicate they would require additional fiscal consolidation to place their debt on a decreasing path with high probability. Table 2 presents the primary balance paths for these countries under the WEO baseline, and, in the last column, the constant yearly additional consolidation (relative to the WEO baseline) required to put debt to GDP on a declining path with 95 percent probability. The additional consolidation ranges from 0.7 percent of GDP (Italy) to 2.7 percent (Belgium).

Table 1. 95th percentile scenario without debt mutualization ('baseline scenario') .

	Est.	95th percentile projections					
	2022	2023	2024	2025	2026	2027	2028
Austria	78.5	80.9	79.5	77.8	76.8	75.9	74.6
Belgium	103.9	109.1	111.1	113.4	116.2	119.1	121.6
Cyprus	93.6	94.0	91.0	86.5	81.9	77.2	72.6
Finland	66.7	71.1	74.3	75.7	76.6	77.7	79.4
France	111.8	117.5	118.8	120.4	123.1	125.1	127.3
Greece	177.6	181.4	178.3	177.3	176.2	175.2	174.6
Italy	147.2	153.6	153.4	153.0	152.5	153.2	153.8
Portugal	114.7	116.3	112.9	110.4	108.2	106.3	104.2
Slovenia	69.5	72.7	72.1	71.1	70.8	69.9	69.3
Spain	113.6	118.6	118.1	118.9	120.3	122.7	123.7

Note: 95th percentile of debt-to-GDP
Source: WEO Oct 2022 and IMF staff calculations.

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[11] For the rest of this section, all references to debt sustainability with high probability refer to the 95 percent confidence interval.

Table 2. Baseline primary balances and required additional fiscal consolidation.

	Est.	Projections						Yearly additional consolidation
	2022	2023	2024	2025	2026	2027	2028	
Belgium	-3.4	-3.4	-3.5	-3.3	-3.5	-3.4	-3.4	2.7
Finland	-1.5	-1.2	-1.5	-1.9	-1.7	-1.8	-1.8	1.8
France	-3.3	-4.0	-3.5	-3.4	-3.2	-3.0	-3.2	2.1
Italy	-1.9	-0.5	-0.2	0.3	0.2	0.2	0.2	0.7
Spain	-2.7	-2.2	-1.9	-1.7	-1.8	-1.8	-1.8	1.8

Source: WEO Oct 2022 and IMF staff calculations.

Debt mutualization for pandemic legacy debt

We now illustrate the effects of a debt reduction based on the amount of debt accrued due to COVID-19 (Table 3).[12] We find that the proceeds of the EDMA debt issuance calculated above (15 percent of EU GDP) are enough to cover such debt reductions (10.6 percent of EU GDP). The argument behind this approach lies on the common and exogenous nature of the shock which could ease political resistance (in a way resembling the debt mutualization of legacy debt related to the war of independence in the US).

Table 3. Increase in debt due to COVID-19.

	% of country GDP	% of EUR GDP
Austria	12.7	0.4
Belgium	15.1	0.6
Cyprus	23.9	0.0
Finland	9.4	0.2
France	17.2	3.4
Greece	26.8	0.4
Italy	21.2	3.0
Portugal	18.6	0.3
Slovenia	14.2	0.1
Spain	21.6	2.2

Source: WEO Oct 2022 and IMF staff calculations.

Table 4 presents the impacts on debt dynamics of the debt assumption for the countries above the 60 percent threshold. As expected, the resulting debt reduction further improves debt dynamics in those countries where debt was already sustainable with high probability under the baseline. Among the countries with debts increasing under the baseline (Belgium, Finland, France, Italy, and Spain), only Italy's debt is firmly placed on a downward trend with high probability after the debt reduction, and without the need of additional fiscal consolidation. The other countries in shaded rows continue to exhibit non-decreasing debt-to-GDP. These countries have high primary deficits in the forecast horizon, so the debt reduction alone is not sufficient to bring down the debt-to-GDP dynamics with high probability and, thus, would require additional fiscal consolidation. Table 5 presents the constant yearly additional consolidation required to

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[12] We assume the increase in debt-to-GDP from 2019 to 2020 is in response to the pandemic. This is an upper bound to what may be reasonably considered to be COVID-related debt as, for example, part of the change in the ratio simply reflects movements in the denominator (output).
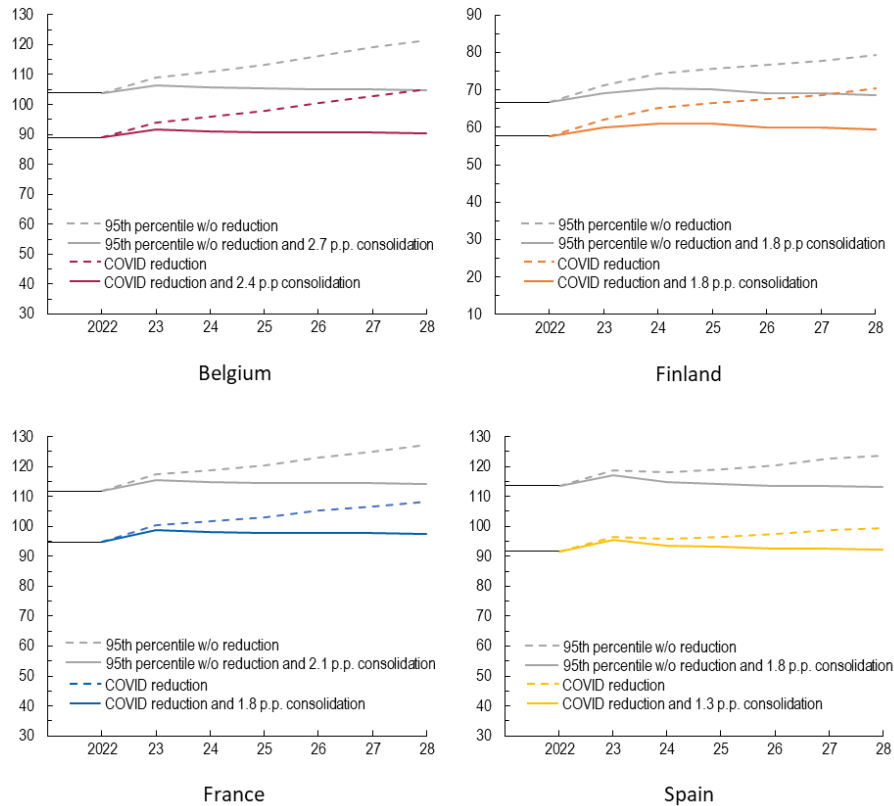
place debt-to-GDP ratios on a declining path with high probability, with and without mutualization. Relative to the baseline, this operation provides greater fiscal space for Belgium and Spain given that the required fiscal consolidation decreases by 0.3 and 0.5 ppts, respectively. Figure 5 shows that, for Belgium, Finland, France, and Spain, 2.4, 1.8, 1.8, and 1.3 percent points of improvement in primary balance in percent of GDP are needed over the forecast horizon for the debt-to-GDP to be decreasing after 3 years with 95 percent probability.

Table 4. 95th Percentile of debt-to-GDP: Debt reduction in proportion to COVID-19 amount.

	Est.	95th percentile projections						Debt reduction
	2022	2023	2024	2025	2026	2027	2028	in 2022
Austria	65.5	67.9	66.7	65.2	64.2	63.4	62.3	13.0
Belgium	88.9	94.1	95.9	97.9	100.4	102.9	105.0	15.0
Cyprus	69.6	69.9	66.9	62.7	58.7	54.5	50.3	24.0
Finland	57.7	62.1	65.1	66.6	67.5	68.6	70.3	9.0
France	94.8	100.5	101.7	102.9	105.2	106.7	108.3	17.0
Greece	150.6	154.1	148.5	144.6	140.4	136.7	132.9	27.0
Italy	126.2	132.0	130.3	128.5	126.5	125.4	123.5	21.0
Portugal	95.7	97.2	93.7	91.0	88.7	86.3	84.1	19.0
Slovenia	55.5	59.2	58.8	58.4	58.2	57.6	57.3	14.0
Spain	91.6	96.5	95.9	96.5	97.3	98.9	99.4	22.0

Source: WEO Oct 2022 and IMF staff calculations.

Figure 5. Debt reduction based on COVID debt and additional consolidation.

Belgium

Finland

France

Spain

Note: 95th percentile of debt-to-GDP
Source: WEO Oct 2022 and IMF staff calculations.

Table 5. Additional Fiscal Consolidation under COVID debt reduction.

	Baseline	COVID
Belgium	2.7	2.4
Finland	1.8	1.8
France	2.1	1.8
Italy	0.7	0.0
Spain	1.8	1.3

Note: This table presents the constant yearly additional (relative to the WEO Oct 22 forecast) consolidation required to place debt-to-GDP ratios on a declining path with high probability, with and without mutualization.
Source: WEO Oct 2022 and IMF staff calculations.

Debt mutualization in proportion to GDP

Given that debt mutualization proposals have been in policy circles before the pandemic, we analyze the feasibility and implications of a more ambitious debt mutualization operation. One simple approach is to distribute the proceeds of the EDMA debt issuance in proportion to individual countries' GDP. Table 6

shows the counterfactual in which the EDMA issues 15 percent of euro-area GDP and distribute the proceeds to the 10 countries with debt-to-GDP ratios currently above 60 percent.

Table 6. 95th Percentile of debt-to-GDP: Debt reduction in proportion to GDP.

	Est.	95th percentile projections						Debt reduction
	2022	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**in 2022**
Austria	52.5	54.7	54.1	52.8	51.8	51.5	50.4	26.0
Belgium	77.9	83.0	84.9	87.0	89.3	91.7	93.7	26.0
Cyprus	67.6	68.0	65.0	60.5	56.6	52.4	48.9	26.0
Finland	40.7	44.6	47.5	49.4	50.5	52.4	53.9	26.0
France	85.8	91.4	92.7	94.2	95.9	97.6	99.1	26.0
Greece	151.6	154.9	149.8	145.5	141.4	137.9	134.0	26.0
Italy	121.2	126.7	125.0	123.0	120.7	119.2	117.4	26.0
Portugal	88.7	90.4	87.1	84.2	82.0	80.1	77.9	26.0
Slovenia	43.5	47.4	47.9	47.8	48.1	48.0	47.8	26.0
Spain	87.6	92.6	92.3	92.9	93.9	95.1	95.9	26.0

 Source: WEO Oct 2022 and IMF staff calculations.

As in Table 4, Table 6 shows that Italy's debt dynamics become more favorable, although the other four countries in shaded rows continue to exhibit non-decreasing debt-to-GDP after the 3rd year of the forecast horizon. These four countries have large primary deficit in the forecast horizon, so debt reduction alone cannot bring down the debt-to-GDP dynamics with high probability and, thus, would require additional fiscal consolidation. Table 7 presents the constant yearly additional consolidation required to bring debt-to-GDP on a decreasing path with high probability, with and without mutualization. Relative to the baseline, this operation provides greater fiscal space for Belgium and Spain given that the required fiscal consolidation decreases by 0.4 and 0.5 ppts, respectively. Figure 6 shows that, for Belgium, Finland, France, and Spain, 2.3, 1.8, 1.7, and 1.3 percent points of improvement in primary balance in percent of GDP are needed over the forecast horizon for the debt-to-GDP to be decreasing after 3 years with 95 percent probability.

Finally, one could reasonably argue that mutualization would lead to reduced expectations of future bailouts and, hence, may push interest rates up for new national debt. This would not be a consequence of the juniorization of existing national debt since no fiscal resource is transferred from the countries to EDMA in our analysis. Instead, it would arise from the removal of implicit bailout guarantees. Appendix C considers such a scenario. It assumes a 50bp premium on new issuances of national debt. We find that this would erase most of the improvements in primary balance from the debt operation, except for Italy. However, we view such an increase in spreads as very conservative given that debt-to-gdp would initially fall below 100 percent for all countries except Italy and Greece, yet both countries would remain on a significantly decreasing debt trajectory with high probability. Hence this is meant mostly as a robustness analysis.

Table 7. Additional fiscal consolidation under debt reduction in proportion to GDP

	Baseline	GDP-weighted
Belgium	2.7	2.3
Finland	1.8	1.8
France	2.1	1.7
Italy	0.7	0.0
Spain	1.8	1.3

Note: This table presents the constant yearly additional (relative to the WEO Oct 22 forecast) consolidation required to place debt-to-GDP ratios on a declining path with high probability, with and without mutualization.

Source: WEO Oct 2022 and IMF staff calculations.

Figure 6. Debt reduction in proportion to GDP and additional consolidation.
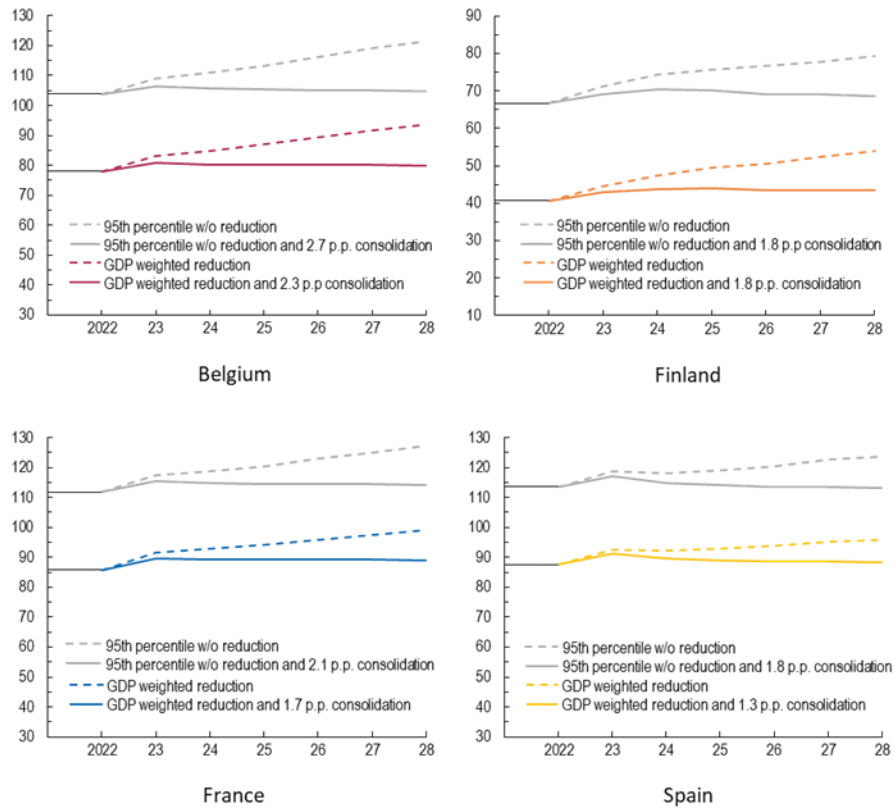
Note: 95th percentile of debt-to-GDP.
Source: WEO Oct 2022 and IMF staff calculations.

Conclusions

This paper provides a quantitative evaluation of a one-off debt mutualization, based either on countries' debt accrued due to COVID-19 or relative GDP size, for the euro area. Our results suggest that for most countries in the euro area, the debt-to-GDP ratio is expected, under the baseline scenario, to decrease over the forecast period with 95 percent probability, even without debt mutualization. The exceptions are Belgium, Finland, France, Italy, and Spain.

In the case of Italy, debt mutualization, together with the policies embedded in the current projections, would be sufficient to ensure a decreasing path for the debt-to-GDP ratio, after three years. For Belgium, Finland, France, and Spain, in addition to the debt mutualization, yearly improvements in the primary-balance-to-GDP ratio equivalent to 2.3, 1.8, 1.7, and 1.3 percent respectively, are needed for the debt-to-GDP ratio to be on a decreasing path, after three years with 95 percent probability.

Our analysis based on stochastic simulations highlights the importance of considering the initial reduction in debt when evaluating the impact of debt mutualization proposals. Our results suggest that EDMA can safely absorb up to 15 percent of euro area GDP in debt without jeopardizing its safe debtor status.

Overall, the analysis in this paper illustrates that some legacy debt mutualization can help in reducing debt levels and enhancing the sustainability of public finances in some euro area countries, even if it does not eliminate the need for high-debt countries to maintain high primary surpluses or further increase their primary balance over the forecast horizon. We conclude with a few additional considerations.

First, the benefits of the mutualization operation depend on the real rate being lower than the growth rate with sufficiently high probability. With the recent tightening of monetary policy, real rates have increased, potentially reducing the scope for a self-funded debt issuance. Does this mean that one should wait until real rates have declined back to their natural level? The answer is not clear. On the one hand, higher rates do reduce the fiscal space for issuing a European safe asset, a consideration that is already embedded in our calculations. More importantly, higher interest rates and lower growth make debt dynamics less favorable for all high debt level countries. If anything, the case for such a scheme may be stronger now.

Second, there is an intriguing and recent corollary to the previous argument. Of late, the debt issued by European *supras* has carried a higher yield than the weighted average of the underlying national yields, suggesting that European *supras* carry an "inconvenience yield" (Bonfanti and Garicano, 2022). This, in our view, reflects two possible anomalies in the markets. First, *supras* debt is still quite illiquid and may lack natural buyers as a result, so that the safety yield from a European safe asset may be offset by an illiquidity premium. As the market grows and becomes deeper, this illiquidity premium should disappear. Second, and more importantly, markets may doubt whether the ECB will continue purchasing *supras* in the future, which may affect their future "safeness".[13] Clearly, EDMA debt should be eligible for ECB purchases, without any risk weight. In short, properly designed, EDMA debt should carry a lower yield than the underlying basket of national yields. The difference, the convenience yield on national debt, is at the core of our analysis.

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[13] Net purchases of all assets by the ECB (regardless of issuer) were stopped in June 2022. However, going forward, the Eurosystem will maintain the 10 percent allocation to supranational debt (i.e., it can still roll over the maturing ones).

Third, our approach works because EDMA capitalizes a common fiscal resource—the latent appetite for a euro area safe asset. That common resource could be used to fund multiple european-wide objectives: investing in the climate transition, ensuring energy sufficiency etc. A sound and stable euro area fiscal architecture is one such common good and is the focus of the current analysis, which keeps consolidated debt levels unchanged when the one-off mutualization occurs.

Lastly, feasibility on the fiscal side is not the only criterion. It can be done, but should it be done? Answering this question is beyond the scope of this analysis, but we can offer a few remarks. First, the relevant safeguards need to be put in place so that national debts remain on a sound trajectory from that point forward. In 1840, states learned the hard way that the U.S. Congress was not willing to bail them out a second time. The critical point is to make the no bailout rule more credible. For this purpose, lowering debt levels may help as it reduces the probability that a bailout would ever be needed and, by reducing the cost for individual countries to reach the "safe" debt zone, it improves incentives for fiscal consolidation. But at the same time, it may reduce market discipline should it be perceived as a potentially repeated game. Thus, reforms that would contain the costs of debt crises should they occur, such as completing the banking union and imposing concentration limits on banks' sovereign bond holdings, would need to accompany any mutualization plan.

This would need to be part of the fiscal compact. Second, a proper fiscal framework would also need to be implemented, as outlined in IMF (2022a).

In short, the debt mutualization operation explored in this paper is not a magic bullet and does not stand alone. It requires a package of complementary reforms that would need to be carefully calibrated and implemented. None of these would be easy, but it points to a different path towards long term fiscal sustainability. Our purpose here is not take a stand on desirability, but to point out what is feasible.

Appendix A. Methodology

Simulation Procedure for EDMA

1. Detrend nominal effective interest and growth rates (i_t, γ_t) using HP filter with smoother parameter 6.25.

2. Fit the cyclical parts to VAR (1).

$$i_t = \beta^i + \beta_i^i i_{t-1} + \beta_\gamma^i \gamma_{t-1} + \epsilon_t^i,$$

$$\gamma_t = \beta^\gamma + \beta_i^\gamma i_{t-1} + \beta_\gamma^\gamma \gamma_{t-1} + \epsilon_t^\gamma.$$

3. Use the estimated coefficients and residuals drawn from a normal distribution with the empirical covariance matrix to simulate $(i_t^{shock}, \gamma_t^{shock})$.

4. Using the WEO forecast $(i_t^{WEO}, \gamma_t^{WEO})$, the dynamics of debt-to-GDP can be constructed as

$$d_t = d_{t-1} \frac{1 + \frac{i_t^{WEO} + 0.06 d_{t-2} + i_t^{shock}}{100}}{1 + \frac{\gamma_t^{WEO} + \gamma_t^{shock}}{100}},$$

where the interest rate is assumed to increase by 6 bps for a 1 ppt increase in debt-to-GDP, which is a conservative estimate for advanced economies. (Rachel and Summers, 2019)

Note that the WEO forecast is up to 2027, so we extend the horizon by taking 3-year moving average

$$x_h = \frac{1}{3}(x_{h-1} + x_{h-2} + x_{h-3}), \qquad h \geq 2028, \qquad x \in \{i^{WEO}, \gamma^{WEO}\}$$

The simulation gives threshold $\bar{d}^{EDMA}$ where the 95 percentiles of d_t decreases after 3 years.

Simulation Procedure for Individual Countries

1. Detrend nominal effective interest rate, nominal growth, and primary balance in percent of GDP (i_t, γ_t, pb_t) using HP filter with smoother parameter 6.25.
2. Fit the cyclical parts to VAR (1)

$$i_t = \beta^i + \beta_i^i i_{t-1} + \beta_\gamma^i \gamma_{t-1} + \beta_{pb}^i pb_{t-1} + \epsilon_t^i,$$

$$\gamma_t = \beta^\gamma + \beta_i^\gamma i_{t-1} + \beta_\gamma^\gamma \gamma_{t-1} + \beta_{pb}^\gamma pb_{t-1} + \epsilon_t^\gamma,$$

$$pb_t = \beta^{pb} + \beta_i^{pb} i_{t-1} + \beta_\gamma^{pb} \gamma_{t-1} + \beta_{pb}^{pb} pb_{t-1} + \epsilon_t^{pb}.$$

3. Use the estimated coefficients and residuals drawn from a normal distribution with the empirical covariance matrix to simulate $(i_t^{shock}, \gamma_t^{shock}, pb^{shock})$.
4. Using the WEO forecast $(i_t^{WEO}, \gamma_t^{WEO}, pb_t^{WEO})$, the dynamics of debt-to-GDP can be constructed as

$$d_t = d_{t-1} \frac{1 + \dfrac{i_t^{WEO} + 0.0003\{(d_{t-2} - 46.8)^2 - (d_{t-2}^{WEO} - 46.8)^2\} 1_{d_{t-2} \geq 46.8} + i_t^{shock}}{100}}{1 + \dfrac{\gamma_t^{WEO} + \gamma_t^{shock}}{100}} - (pb_t^{WEO} + pb_t^{shock}),$$

where the nonlinearity coefficient is taken from Pamies et al (2021), which study euro area countries. Since the effective interest rate is composed of the interest rates of different debt issued at different time, we assume that the debt-to-GDP affects the effective interest rate with a lag. We also assume that the WEO forecast already incorporates the impact of debt-to-GDP in the interest rate dynamics.

Note that the WEO forecast is up to 2027, so we extend the horizon by taking 3-year moving average

$$x_h = \frac{1}{3}(x_{h-1} + x_{h-2} + x_{h-3}), \qquad h \geq 2028, \qquad x \in \{i^{WEO}, \gamma^{WEO}, pb^{WEO}\}.$$

When adjustment in primary balance is needed, we derive the time-constant amount of consolidation $\overline{pb}$ by replacing the last term of the debt dynamics with

$$pb_t^{WEO} + pb_t^{shock} + \overline{pb}.$$

Appendix B. Impact on German Debt Dynamics

In the spirit of remaining conservative, we acknowledge that the operation studied in this paper could affect debt dynamics in countries currently issuing euro safe assets, such as Germany, through changes in the underlying interest rates. On the one hand, such an issuance and the resulting debt mutualization can prevent the emergence of unfavorable equilibria and implicit transfers, which could lower the Bund's rate. It could also increase the overall liquidity in the market for euro safe assets, contributing to a decrease in yields on the asset class. On the other hand, the increased supply of the asset may drive down its price, leading to a higher rate. We incorporate into the sustainability analysis only the third (negative) effect to capture a worst-case scenario. To do so, we assume that the EDMA issuance raises German effective interest rate by 100bps (we continue using the conservative estimates for advanced economies in Rachel and Summers, 2019). Table 8 shows the debt dynamics under the baseline and after assuming the 100 bps increase. We find that debt dynamics remain qualitatively similar under both scenarios, and the effects on German public finances are manageable.

Table 8. Debt Dynamics in Germany.

	Est.	Projections					
	2022	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Germany	71.1	73.5	72.6	70.8	69.3	68.2	67.0
+100 bps	71.1	74.2	74.0	72.8	72.0	71.5	70.9

Source: WEO Oct 2022 and IMF staff calculations.

Appendix C. Premium on National Debt Post-Reform

For robustness, we consider a scenario where national debt could still be eligible for asset purchase and repo at the ECB, but with risk weights. Specifically, we build on the debt mutualization based on GDP and augment it by allowing national interest rates to be higher after the operation is implemented. It is not obvious how to estimate the size of the implicit subsidy individual countries may be currently receiving under the current ECB policy. In other words, Italy may currently have a lower interest rate (for a given level of debt) than when the subsidy is removed (strict no bailout rule). To this end, we conduct the same debt sustainability analysis of the debt mutualization but introducing a 50 bps premium into our simulations to account for the removal of the implicit subsidy (a conservative assumption).[14] Table 9 shows the counterfactual in which the EDMA issues 15 percent of euro-area GDP and distributes the proceeds to the 10 countries with debt-to-GDP ratios currently above 60 percent.

Table 9. 95th Percentile of debt-to-GDP: Debt reduction in proportion to GDP.

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[14] We also studied the difference between the spread on ESM bonds, and a synthetic spread constructed from the euro area member state yields (with weights corresponding to their GDP levels) as a measure of the yield compression from the recent end of QE by the ECB in June 9, 2022. The estimate of this exercise yields an implicit subsidy of around 30 basis points.

| | Est. | Projections | | | | | | | | | | | | | Debt |
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	reduction
Austria	52.5	54.9	54.6	53.6	52.8	52.7	51.8	50.9	50.5	50.1	49.4	48.8	48.2	26.0
Belgium	77.9	83.4	85.7	88.2	90.9	93.8	96.2	98.7	101.4	104.3	106.9	109.2	112.0	26.0
Cyprus	67.6	68.3	65.6	61.4	57.8	53.8	50.5	46.8	42.7	39.4	36.1	32.8	29.2	26.0
Finland	40.7	44.8	47.9	50.0	51.4	53.5	55.3	56.8	58.4	59.8	61.3	63.1	64.9	26.0
France	85.8	91.8	93.6	95.5	97.7	99.8	101.8	103.8	105.9	108.0	109.7	111.7	114.1	26.0
Greece	151.6	155.7	151.3	147.7	144.5	141.8	138.8	135.1	131.4	127.8	124.2	120.1	115.8	26.0
Italy	121.2	127.3	126.2	124.8	123.1	122.4	121.2	120.3	119.0	117.6	116.6	114.7	113.5	26.0
Portugal	88.7	90.8	88.0	85.4	83.7	82.1	80.3	78.5	76.3	74.6	73.1	70.8	68.9	26.0
Slovenia	43.5	47.6	48.3	48.5	49.0	49.1	49.0	49.5	49.2	48.9	49.1	49.1	49.4	26.0
Spain	87.6	93.0	93.1	94.2	95.6	97.3	98.6	100.4	102.1	103.6	104.8	106.4	107.7	26.0

Source: WEO Oct 2022 and IMF staff calculations.

As in Table 6, Table 9 shows that Italy's debt sustainability improves, while the countries in grey shaded rows (Belgium, Finland, France and Spain) continue to exhibit non-decreasing debt-to-GDP after the 3rd year of the forecast horizon. Relative to Table 6, now Slovenia (shaded in pink) is also part of the group of countries that would require additional fiscal consolidation to feature a decreasing debt path after three years. However, note that in the case of Slovenia debt remains below the 60 percent threshold over the forecast horizon and, thus, the additional fiscal consolidation would not be justified. Table 10 presents the constant yearly additional consolidation required to restore debt sustainability with high probability, with and without mutualization. Figure 8 shows that, for Belgium, Finland, France, and Spain, 2.7, 2.2, 2.1, and 1.7 percent points of improvement in primary balance in percent of GDP are needed over the forecast horizon for the debt-to-GDP to be decreasing after 3 years.
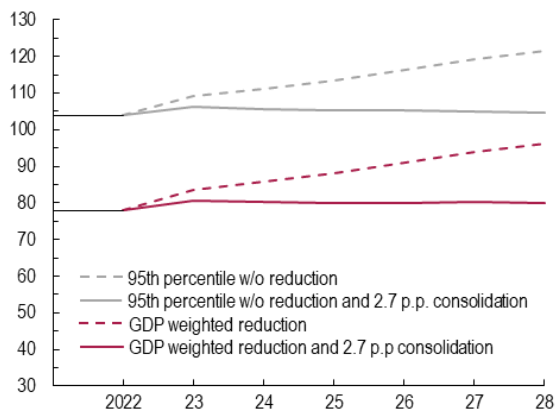
Table 10. Additional fiscal consolidation under debt reduction in proportion to GDP.

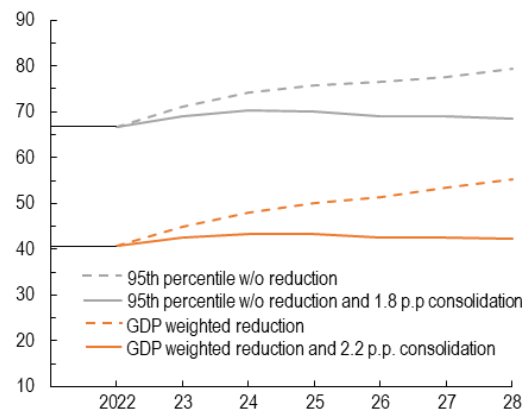|	Baseline	GDP-weighted plus 50 bps
Belgium	2.7	2.7
Finland	1.8	2.2
France	2.1	2.1
Italy	0.7	0.0
Spain	1.8	1.7

Note: This table presents the constant yearly additional (relative to the WEO Oct 22 forecast) consolidation required to place debt-to-GDP ratios on a declining path with high probability, with and without mutualization.
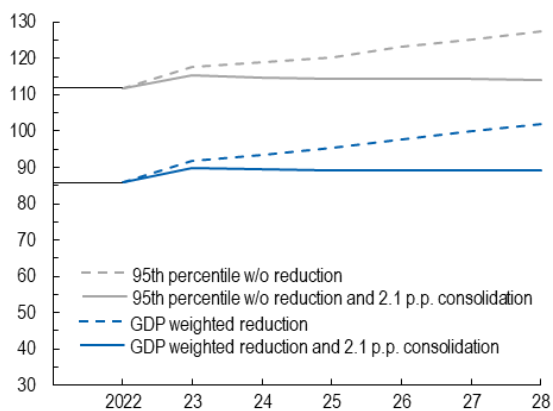Source: WEO Oct 2022 and IMF staff calculations.

Figure 7. Debt reduction in proportion to GDP and additional consolidation.
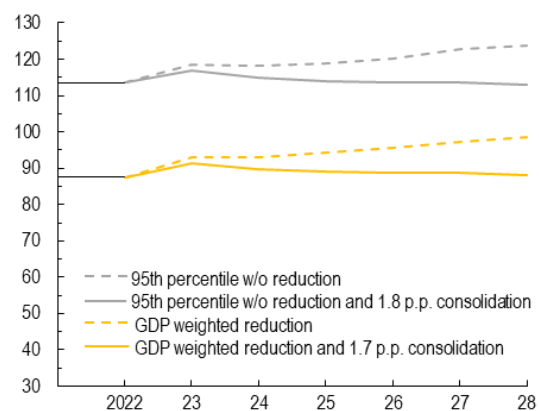
Belgium

Legend (Belgium):
- 95th percentile w/o reduction
- 95th percentile w/o reduction and 2.7 p.p. consolidation
- GDP weighted reduction
- GDP weighted reduction and 2.7 p.p consolidation

Finland

Legend (Finland):
- 95th percentile w/o reduction
- 95th percentile w/o reduction and 1.8 p.p consolidation
- GDP weighted reduction
- GDP weighted reduction and 2.2 p.p. consolidation

France

Legend (France):
- 95th percentile w/o reduction
- 95th percentile w/o reduction and 2.1 p.p. consolidation
- GDP weighted reduction
- GDP weighted reduction and 2.1 p.p. consolidation

Spain

Legend (Spain):
- 95th percentile w/o reduction
- 95th percentile w/o reduction and 1.8 p.p. consolidation
- GDP weighted reduction
- GDP weighted reduction and 1.7 p.p. consolidation

Note: 95th percentile of debt-to-GDP.
Source: WEO Oct 2022 and IMF staff calculations.

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PUBLICATIONS

Debt Mutualization in the Euro Area: A Quantitative Exploration

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