Bond Mispricing and Debt Dynamics, the Role of a European Debt Agency

Carlo A. Favero*

November 27, 2024

Contents

*Bocconi University & Innocenzo Gasparini Institute for Economic Research (IGIER) & Centre for Economic Policy Research (CEPR), Bocconi University, Department of Economics via Roentgen 1, 20136 Milano, Italy, carlo.favero@unibocconi.it. Website: https://mypage.unibocconi.eu/carloambrogiofavero/.

Lecture Notes for the course Fiscal Macroeconomics 2024/25.

1 The Sources of Risk for European Sovereign Debt

There are two main sources of risk for sovereign debt: roll-over risk and sustainability risk.

Sovereign debt roll-over risk refers to the risk that a government may be unable to refinance its existing debt obligations (roll them over into new debt) as they come due. This risk materializes very rapidly with a collapse in the price of sovereign bonds. Roll-over risk can serve as a tool to deter excessive debt when bond prices are firmly linked to underlying fundamentals. However, its efficiency as a discipline device is hampered when bond prices diverge from these fundamentals. Roll-over risk could be fully neutralized if the central bank were allowed to buy back government debt at maturity. This is not a feasible option for the ECB.

Sustainability risk refers to the risk that the government debt to GDP ratio gets on an explosive path. This risk materializes when the primary surplus to GDP ratio is permanently lower than the debt-stabilizing primary surplus. The debt stabilizing primary surplus is calculated by multiplying two factors: the debt-to-GDP ratio, and the difference between the average cost of financing the government's debt and the rate of GDP growth. Sustainability risk builds more slowly than roll-over risk as it takes time for fluctuations in bond prices to be reflected in the average cost of financing the debt.

Both risks are very relevant in the current European macroeconomic scenarios. The pandemic, along with the suspension of the Stability and Growth Pact (SGP) (Council of the European Union 2020), has led to record-high deficits and public debts in Europe. As a result, reducing the debt stock and bringing deficits back to acceptable levels have become critical objectives for European policymakers. The challenge of sustainability is further heightened by the potential increase in spending related to the ongoing geopolitical crisis, such as investments in energy to decrease reliance on Russian gas, to strengthen the European grid and promote the transition to renewable energy, and investments for common defense.

When public debts are perceived to be riskier than in "normal times", the emergence of the risk of multiple equilibria with a collapse in bond prices leading to a sudden spike in roll-over risk may require a faster adjustment path, as already happened during the European sovereign debt crisis. In this context, a severe misalignment between the credit risk of Member States (MSs) and the yields paid on their respective sovereign debts was observed.

In crisis time the financial system faces a shortage of safe assets and traders have to "accommodate" themselves with quasi-safe assets[1]. In these periods "flight to quality" causes a shift of portfolios from peripheral to core sovereign securities in the eurozone and the yield

[1] Gorton and Ordonez (2014); Barro et al. (2022); Krishnamurthy and Vissing-Jorgensen (2012)

spreads widens not only because the price of riskier euro area government bonds decreases but also because the price of safer bonds rises. Moreover, in absence of a European safe asset, banks and insurance companies have been over-exposed to domestic government bonds and the value of their balance sheet has been considerably correlated with the value of government bonds. In this scenario a government debt crises induces a contraction of the supply of bank loans that increases the probability of a recession and of a downward spiral labelled as "doom loop" (Brunnermeier et al. (2017); Alogoskoufis and Langfield (2019)). The risk of a down loop might in turn induce governments to introduce bail-out possibilities that convey risk from the banking system to government bonds, despite in place regulatory provisions on banking resolution (e.g. the Bank recovery and Resolution Directive).[2]

Sustainability risk can be controlled by the adoption of stabilizing fiscal rules. The challenge here lies in identifying the optimal policy mix, which can implement a deleveraging process without jeopardizing the growth path of European economies that began in 2021. On the one hand, attempting to reduce high public debt through a long series of primary surpluses could be self-defeating when GDP growth rates (g) exceed the average cost of financing the debt (r). On the other hand, the difference between r and g may become non-negative, making fiscal policy incapable of implementing "tearless" deleveraging, especially in contexts characterized by high inflation and high debt.[3]

There is an ongoing broad debate on the changes to be implemented to the Stability and Growth Pact (SGP) in order to prevent these phenomena.

In order to manage such a delicate situation, several proposals have been put forward to introduce schemes of collaboration and coordination between Member States and European institutions and a debate has emerged on the reform of the current framework for fiscal rules[4].

2 Government Bond Prices and Fundamentals.

Figure 1 illustrates the time-series of government bond yields in euro area since inception. Fluctuations are important, and calm periods of convergence alternate with crises periods of wild divergence. The initial convergence process following the inception of the euro in 2001, had been substituted by a process of divergence beginning after the US subprime lending crisis, reaching its peak during the sovereign debt crisis of 2011-2012. In fact, a "divergent symmetry" ("symmetrical divergence") emerges between countries with high credit

[2] Bolton and Jeanne (2011); Gennaioli et al. (2014)

[3] See ERSB (2021); Eichengreen and Panizza (2016); Lian et al. (2020)

[4] See Giavazzi et al. (2021)

rating (primarily Germany) and countries with a tight budget constraint (especially Italy and Greece). This pattern becomes inefficient if the resulting cost of debt service for MSs were different than the cost of debt service consistent with their fundamental risk. The effects of this inefficiency are worsened when member states banking system bond holdings are affected by home bias: in this case a "doom loop" emerges when falling government bond prices causes a reduction in bank loans that in turn increases roll-over risk via its recessionary impact. The empirical literature on the misalignment between government bond prices and fundamentals in the euro area is abundant.[5]. The possibility of misalignments between bond prices and fundamental has been explicitly recognized institutionally. The official press release of 21 July 2022 (ECB (2022a)) announcing the establishment of the Transmission Protection Instrument (TPI) enunciates the principle of an ECB market intervention conditional on the macroeconomic compliance of the Member States to the existing rules and the presence of fluctuations in yields not justified by fundamentals. The TPI is explicitly intended to counter the formation of bad equilibria characterized by misalignments between expectations and MSs' fundamentals.

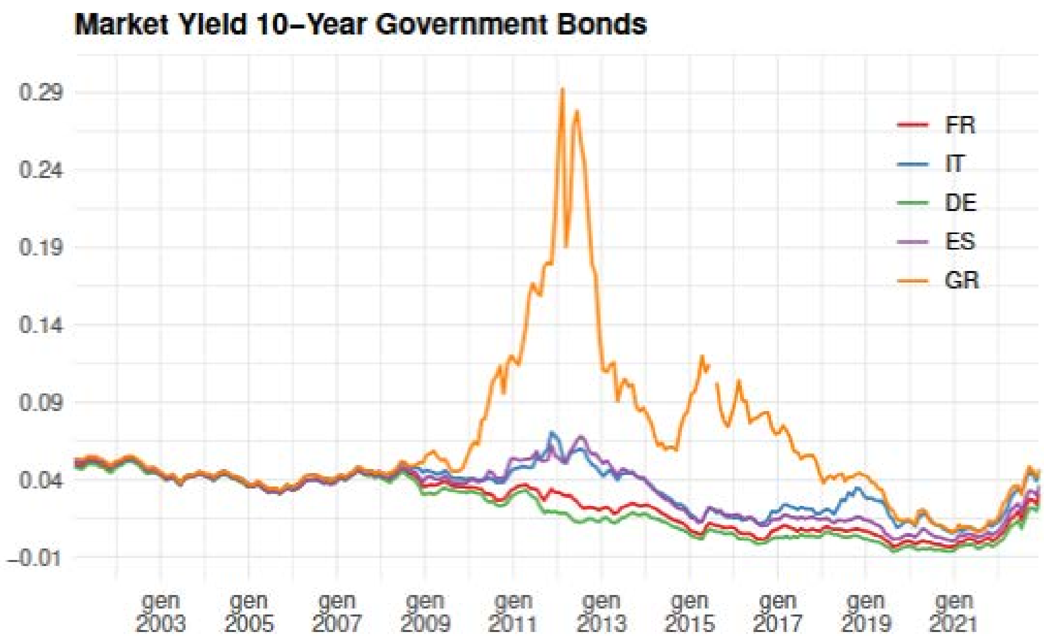

Figure 1: Yields on 10-Year Government Bonds

[5] Afonso et al. (2014); Corsetti et al. (2014); Favero and Missale (2012); Lane (2012); Lorenzoni and Werning (2019)

2.1 The Possibility of Multiple Equilibria

Fluctuations in government yields way from fundamentals can be generated by th existence of multiple equilibria. The same fundamentals might generate different equilibria. When government debt is considered safe a "good equilibrium" emerges and the government can thus borrow at the safe rate, and, under these conditions, its debt is considered sustainable. If, however, investors start to worry about default risk – or worry that other investors worry – and start asking for a risk premium to hold the debt, the higher interest rates and the worsening of the debt dynamics may well increase the probability of default, potentially triggering the very outcome they feared. As a matter of theory, the bad equilibrium can happen without any change in fundamentals (and thus is often referred to as a "sunspot equilibrium"). In reality, the bad equilibrium is likely to be triggered by some deterioration of fundamentals, not necessarily those of a specific country but also of a country with similar credit rating. The possibility of multiple equilibria has been used as an argument to implement austerity and keep the level of the debt low. Lower debt implies a smaller adverse effect of a given interest rate increase on debt dynamics. If debt is sufficiently low, then, even if investors were to worry and require a higher risk premium, this may not be enough to make debt unsustainable and justify the investors' worries. Thus, the bad equilibrium could be avoided. The relevant question is how low should be the debt ratio to avoid sunspots ? Blanchard (2023) provides a simple model that illustrates the possibility of multiple equilibria and the necessity to keep the debt level very low to avoid them.

2.1.1 A Simple Model

Assume that the government defaults if debt to GDP next period, $b(+1)$ exceeds some threshold level, b^*. When the government default investors do not lose the entire amount but there is an haircut x, with $0 < x < 1$, and they recover $1 - x$ of the value of their investment.

Let p be the probability of default, and let R denote the interest rate paid by the government on its debt. The expected value of investing one unit of wealth in government debt t is given by:

$$(1 - p)(1 + R) + p(1 + R)(1 - x)$$

If investors are risk neutral, the safe rate is equal to r, no arbitrage allows to pin down the interest rate on government bonds by eqauting the expected value of one unit of wealth invesed in the safe asset to the expected value of one unit of wealth invested in the risky government debt :

$$(1+r) = (1-p)(1+R) + p(1+R)(1-x)$$

Solving for R gives:

$$(1+R) = \frac{1+r}{1-px}$$

Note that the spread of the return on government bond on the safe asset will be the higher, the higher the default probability and the higher the haircut.

Consider, for simplicity a situation in which there is no growth, so $g = 0$ and no uncertainty about the next period surplus, so $s(+1) = s$, the dynamics of the debt to GDP ratio is then :

$$b(+1) = \frac{1+r}{1-px}\, b - s \tag{1}$$

The equilibrium values for the debt to GDP ratio a time $t+1$ and the probability of default is determined by two equations.

Equation (1) above, giving $b(+1)$ as a function of p, and the equation giving p as a function of $b(+1)$ and b^*:

$$p = 0 \text{ if } b(+1) \leq b^*, \; p = 1 \text{ if } b(+1) > b^* \tag{2}$$

Figure 4.4 in Blanchard (2023) represents the two equations with $b(+1)$ on the vertical axis, and p on the horizontal axis.

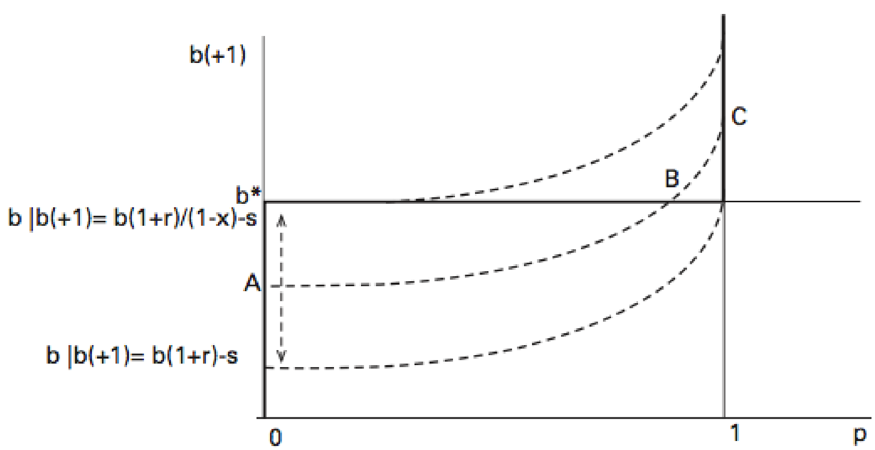

Figure 4.4
The scope for multiple equilibria

$b(+1)$ is an increasing convex function of p. The value of $b(+1)$ when p=0 is $(1+r)b - s$. The value of $b(+1)$ when $p = 1$ is $((1+r)/(1-x))b - s$.

p is a step function of $b(+1)$, equal to zero for $b(+1) \leq b^*$, equal to 1 if $b(+1) > b^*$.

Depending on the value of debt today, b, there is either one or three equilibria.

If $b(+1) \leq b^*$ even if investors expect default for sure and set $p = 1$, as in the lower dashed line, then the only equilibrium is $p = 0$.

To derive the condition on the level of the debt to GDP in which the only equilibrium is $p = 0$, use Equation (1) setting $p = 1$

$$\begin{aligned} \frac{1+r}{1-x}\, b - s &\leq b^* \\ b &\leq (b^* + s)\frac{1-x}{1+r} \end{aligned}$$

Conversely If $b(+1) > b^*$ even if investors set $p = 0$, as in the upper dashed line, then the only equilibrium is $p = 1$. To derive the condition on the level of the debt to GDP in which the only equilibrium is $p = 1$, use Equation (1) setting $p = 0$

$$\begin{aligned} (1+r)\, b - s &> b^* \\ b &> (b^* + s)\frac{1}{1+r} \end{aligned}$$

In the case in which $(b^* + s)\frac{1-x}{1+r} < b \leq (b^* + s)\frac{1}{1+r}$

there are three equilibria, A, B and C in Figure 4.4. However, B can be excluded on the ground of stability (If investors assume a value of p close to the value of p_B, compute the new probability this implies, they will move away from B towards either A or C). This leaves two equilibria, A and C.

Consider the case in which $b^* = 1$, and $r = s = 3\%$, and the haircut, x, is 30%, then range of values of debt for which there are multiple equilibria goes from 0.7 to 1.

This one-period example is however too optimistic.

Suppose we move to a multi-period model. In this case b^* will also evolve dynamically

$$b^*_{t+1} = \frac{1+r}{1-x} b^*_t - s$$

the steady state solution for this equation is

$$\frac{b^*}{1+r} = \frac{b^*}{1-x} - \frac{s}{1+r}$$

Or solving out:

$$b^* = (1-x)s/(r+x)$$

Using the above values gives $b^* = 0.7 * 3\%/(33\%) = 0.07$, a very low value, delivering a very large range of multiple equilibria, from 0.07 to 1.00.

This result has an important practical implication: there is very little hope to decrease debt ratios to the low levels necessary to rule out bad equilibria any time soon. Thus, austerity per se is not practical and alternative institutional solutions are necessary.

3 Eurobonds and a European Debt Agency

A potential solution to prevent debt crises in the euro area is the establishment of a European Debt Agency. This agency could issue eurobonds to finance public interventions by Member States in key areas aimed at reigniting sustainable growth. These areas include bridging the innovation gap with the US and China—particularly in advanced technologies—pursuing decarbonization and enhancing competitiveness, as well as improving security and reducing dependencies. Draghi (2024)

Two crucial issues are relevant for designing a common European safe asset, with or without establishing a Debt Agency.

The first one is the avoidance of debt mutualization, i.e. the pooling of national government debt within the euro area, which allows for joint liability among member countries, expressed by Article 125 TFEU, according to which "a Member State shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of another Member State". Debt mutualization helps reduce the borrowing costs for countries with higher debt levels, as the risk is shared across the entire euro area, but it also makes irresponsible behaviour profitable, as national government would not anymore subject to market discipline. Mutualization is currently considered as politically acceptable for a limited ('una tantum') number of common issues for special purposes.

The second issue is the avoidance of the "juniority effect", which occurs whenever debt is tranched in "senior" and "junior". The junior part is exposed to risk of mis-pricing and speculative attacks and the safety of the senior tranche could be jeopardized in the event of a systemic crisis.[6]

3.1 The Working of an European Debt Agency

Amato et al. (2024) propose an operational model for the EDA that exhibits the following key characteristics:

i) The Agency collects liquid funds on the market by issuing bonds with finite maturity and by continuously rolling them over to pay principal and capitalized interests.

ii) The Agency provides credit to MSs in the form of perpetual loans, entailing for the Agency a commitment to renew the loans perpetually ("perpetuity option clause") unless a MS partially refunds them through primary budget surpluses.

iii) The perpetual loans are priced using a risk-adjusted unit cost differentiated according to the MS's creditworthiness. The perpetuity is computed following a perpetual-amortization scheme. The EDA amortizes its loans by recording a liability on its balance sheet corresponding to the expected credit loss that has been priced in the perpetuity.

iv) The deferred perpetuities charged to MSs are collected annually by the EDA and accumulated under an "accrued interest reserve" item, intended to cover the Agency's future liabilities (EDA bond principal, bond accrued interests and expected losses). The reserve takes the form of a "Central Bank interest-bearing liability"; the interest rates used in revaluing the reserves are in line with the capitalized interests payable on the EDA bonds. Also, the agency is initially endowed with a seed capital injection.

v) The dynamics of assets and liabilities pin down solvency capital. This capital could be measured in terms of the number of forbearance years of a "stressed" annuity payment that it allows to each MS. The annuity payment is stressed in the sense that it is computed for credit grade "next to default".

MSs cannot issue perpetuities directly, as these do not easily complement the liability structure prevailing in the market (according to a logic of liquidity preference), which implies a portfolio offering of assets with finite duration. This is why the EDA intermediation is needed, in order to decouple perpetuity and the issuance portfolio by offering bonds with

[6] De Grauwe and Ji (2018))

finite duration and leveraging mechanisms to roll over issues while minimising repricing risks thanks to a high credit rating. EDA creditworthiness leverages on three key elements: 1) portfolio diversification, 2) solvency capital and 3) repricing of the perpetuity to address interest rate risk (change in the prevailing level of interest rates for relevant durations relative to the issuance portfolio). The scheme of the EDA balance sheet is summarized in Table 1.

Assets	Liabilities
Perpetual Loans to Member States (L^{EDA})	EDA Bonds (B^{EDA})
Reserves (R^{EDA})	Expected Loss Provisions (EL^{EDA})
	Solvency Capital (SC^{EDA})

Table 1: EDA - stylized balance sheet

Bonds issued by EDA are traded on the markets and the availability of solvency capital and reserves gives them the status of European safe asset. Instead, there is no market for the perpetual loans, perpetuities are priced by EDA with a risk risk-adjusted interest rate made up of two basic components: the average cost of servicing the EDA issued bonds and an add-on cost reflecting the riskiness of each MS in line with its specific creditworthiness, i.e. proportional to its degree of compliance to the agreed EU rules. The cost of perpetuities for each MS is a function of the market cost of the EDA's issuing portfolio, plus a differential cost reflecting the MS's specific creditworthiness. This allows the EDA to avoid any component of mutuality in prices.

3.2 Pricing of the irredeemable mortgage scheme by EDA

To price the irredeemable mortgage scheme EDA computes the present value of an infinite stream of payments using the yield r_t^B as a discount rate, reflecting its annual cost of debt. Future payments are not deterministic but they occur only if MSs are not in "default". The probability with which a given MS enters the state of default in each future period is computed by i) assigning each MS to a specific *credit risk class j* based on its creditworthiness, from the safest (conventionally labelled AAA) to the default class (labelled D) ii) assuming that a country defaults only when it reaches state D, and modelling the transition from one state to the other via a transition matrix that depends on the state of the economic cycle iii) taking into account that, as the business cycle is stationary the predicted point-in-time transition matrix at each period in the future converges rapidly to a constant through-the-cycle transition matrix. Given the discount factor and the credit risk migration model the present value of a unitary perpetual annuity for a country i initially in credit risk class j can be then computed as $\tilde{a}_{ij,t}$ and the interest on the perpetual annuity is then set to $\frac{1}{\tilde{a}_{ij,t}}$.

Given the unitary perpetual annuity value, the annual instalment cost for each country, labelled as "idiomatic cost", is computed in order to preserve the intertemporal financial equilibrium of the EDA. To this end each country should pay an annual instalment, $c_{ij,t}$ that ensures the match between the present value of the perpetuity's payment and the difference between the value of bonds issued by EDA to finance the country,$B_{i,t}^{EDA}$, and reserves accumulated by the country with EDA,$R_{i,t}^{EDA}$:

$$c_{ij,t} = \frac{B_{i,t}^{EDA} - R_{i,t}^{EDA}}{\tilde{a}_{ij,t}}. \tag{3}$$

It is immediate to verify that the above formula guarantees that, for each country, the present value of total assets with EDA $\tilde{a}_{j,t} c_{ij,t}$ is equal to the total of current net liabilities with EDA $(B_{i,t}^{EDA} - R_{i,t}^{EDA})$.

"Idiomatic cost"has several important features.

1. Each Member State pays for the risk inherent to the specific credit risk class j to which it is assigned, without involving any form of solidarity or mutuality among Member States of different credit risk classes. Thanks to the irredeemable nature of the loan granted by the Debt Agency, the instalment corresponds to the risk-adjusted interest that a Member State of credit risk class j has to pay annually to finance its debt based on its creditworthiness.

2. The annual instalment cost is repriced in each period so that EDA's assets are shielded from interest rate risk and upgrades and downgrades in the merit credit of Member States are timely fully priced.

3. Each Member State debt is priced independently. Pricing the debt of each country independently generates a total payment to EDA higher than the case in which the Debt Agency prices at time t its loans portfolio using an average annuity cost computed as the weighted average of the annuities of the credit risk classes, with weigths determined by the relative loan exposure for each class. Average pricing assures in expectation the agency intertemporal equilibrium exploiting a "pooling effect" that it is not present under idiomatic pricing. Therefore, idiomatic fundamental pricing scheme generates a total payment that is structurally higher than the one implied by average pricing. Under idiomatic pricing EDA will accumulate reserves that can be precisely attributed to each country. The sum of reserves and loans will exceed the value of bonds and

will form the expected losses component of the balance sheet. Under the pricing scheme adopted, all countries are expected to default on a given debt proportion at a (differently distant) finite time in the future, however, EDA has always positive equity. In fact, at the time in which a country is expected to default, reserves will match bonds issued and expected losses will match outstanding loans. Note that the accumulation of reserves and expected losses will be related to the credit risk class to which countries are assigned. The worse the credit risk class, the faster the accumulation of reserves and expected losses.

3.3 Pricing a perpetual annuity

To illustrate the pricing of a perpetual loan issued to a Member states by EDA, we conder the simple case in which there is no recovery given default and countries are assigned by credi rating aggencies to a credit rating class. The first bloc of the pricing scheme is a transition matrix,TA, of which the generic element a_{ji} represents the annual probability that an obligor of the credit risk class j will pass to a credit risk class i in the following year. The matrix has dimension $n \times n$ and the elements of row j, $a_{j1}, ..., a_{jn}$ must sum to unity, since every obligor with rating j will certainly be assigned to some credit risk class $z \in \{1, ..., j, ...n\}$ in the year, including the case of being reassigned to the same class j. As a convention, the rows and the columns of the matrix are ordered according to safety class, from the safest (conventionally labeled AAA) to the default (label D: default state).

The transition matrix T was estimated using publicly available data[7] of rating grades assigned to sovereign debts by Credit Rating Agencies in the period 1993-2015. This period has been chosen to include aspects of major institutional changes (e.g. events such as the introduction of the euro or the euro zone sovereign debt crisis).

The estimated T matrix is reported in Table 2.

The **expected cumulative default probability** in the interval $[t, t + \tau]$ is the linear operator given by:

[7]Standard & Poor's Sovereigns Ratings have been downloaded from Bloomberg using a query with parameters:

- RTG_SP_LT_LC_ISSUER_CREDIT
- RATING_AS_OF_DATE_OVERRIDE
- Sovereign Issuer Ticker.

	AAA	AA	A	BBB	BB	B	CCC	D
AAA	0.96	0.04	0	0	0	0	0	0
AA	0.02	0.91	0.06	0.01	0	0	0	0
A	0	0.03	0.9	0.07	0	0	0	0
BBB	0	0	0.05	0.87	0.06	0.01	0	0
BB	0	0	0	0.05	0.85	0.08	0.01	0.01
B	0	0	0	0	0.07	0.89	0.03	0.01
CCC	0	0	0	0	0	0.38	0.42	0.19
D	0	0	0	0	0	0	0	1

Table 2: Estimated TTC transition matrix

$$\begin{aligned} \mathbf{cdp}(t,t+1) &= T\mathbf{v} \\ \mathbf{cdp}(t,t+2) &= T^2\mathbf{v} \\ \mathbf{cdp}(t,t+\tau) &= T^{t+\tau}\mathbf{v} \end{aligned} \tag{4}$$

where $\mathbf{cdp}(t,t+T)$, with $T \in [t,\tau]$, is an n-components stochastic process, the j-th element of which, $cdp_{\mathbf{j}}(t,t+T)$, represents the cumulative default probability that an obligor of rating grade class $j = 1,...,n$ will have defaulted by time $t+T$, with $\mathbf{cdp}(t,t) = 0$ and $\mathbf{v}$ a null vector apart its last element equal to 1.

Given the process $\mathbf{cdp}((t,t+\tau))$ in equations (4), the survival probability in the interval $\tau \in [t,t+\tau]$ of an obligor not in default is:

$$\mathbf{sp}(t,t+\tau) = [\mathbf{1} - \mathbf{cdp}(t,t+\tau)] \quad for \quad \tau > 1 \tag{5}$$

where $\mathbf{1}$ is the unit vector.

The expected present value of a vector of unitary annuity maturing at time $t+\tau$ can be written as:

$$\mathbf{a}(t,t+\tau) = \sum_{j=1,...\tau} \frac{1}{(1+r^B)^j}\mathbf{sp}(t,t+j) \tag{6}$$

where r^B represents a common appropriate financial discount rate[8].

Note that the components of vector $\mathbf{a}(t,t+\tau)$ are ordered decreasingly, with the highest rating grades corresponding to higher annuity values since the present value of a unitary

[8]For simplicity's sake, it has been assumed that the purely financial rate does not exhibit a term structure. This hypothesis represents a mere simplification for calculation purposes which can easily be removed.

annuity is proportional to the survival probability of the corresponding credit risk class and a null value for the vector's last component. Using the eq. (5) and eq. (4), we can rewrite eq. (6) as follows:

$$\mathbf{a}(t, t+\tau) = \sum_{j=1,\dots\tau} \frac{1}{(1+r^B)^j} \left(\mathbf{1} - T^j \mathbf{v}\right) \tag{7}$$

3.4 EDA and Roll-over Risk

What would have happened if the cost of servicing the debt of these Member States had been calculated on the basis of the idiomatic pricing scheme for EDA loans? Given a discount factor represented by the 10-year fixed interest rate swap in the euro area, the historical rating grades assigned by Credit Rating Agencies to MS's over the period 2001-2022, and the estimated point-in time- and through-the-cycle transition matrices of our credit risk migration model, we have simulated the idiomatic costs of loans with EDA for each Member States. Figure 2 shows the simulated series of idiomatic costs for Italy, Germany and a hypothetical country with the credit grade "next to default" together with the observed yields of 10-year Government Bonds for Germany and Italy.

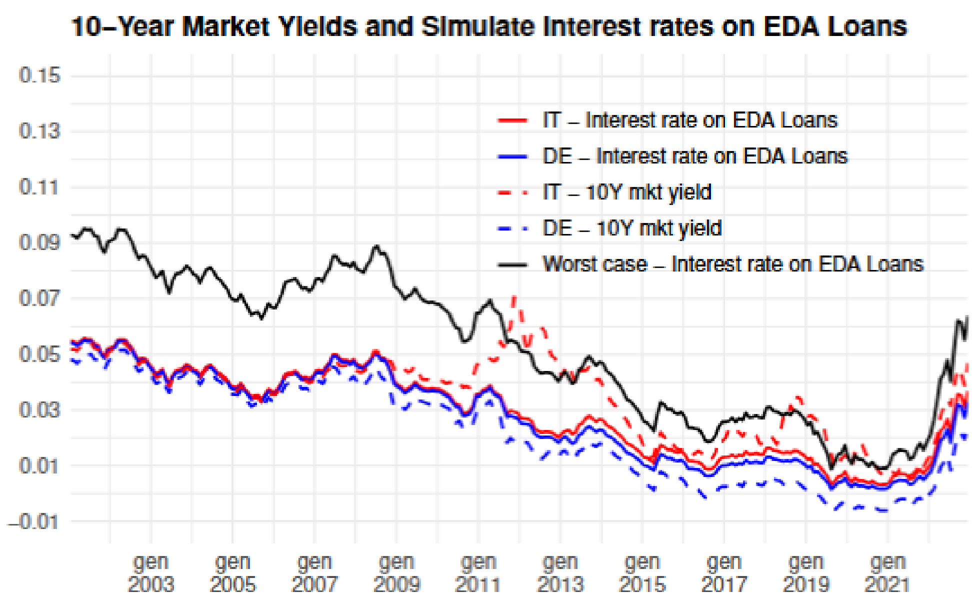

Figure 2: Yields on 10-year government bonds and simulated interest rate on perpetual EDA loans

These costs are "risk sensitive", but the idiomatic pricing of risk is very different from the pricing observed in 10-year bond yields for Germany and Italy during the simulation sample. Importantly, idiomatic costs do not manifest "diverging symmetries" in favour or against a particular Member State, since they are calculated on the assumption that a "systemic risk factor" operates at the level of the entire eurozone. Note also that there are several episodes in which the observed 10-year bond yield for Italy is much higher than the idiomatic cost for a country with a credit grade "next to default" despite the fact the rating grades assigned to Italy never went any close to it. Although 10-year yields and idiomatic costs are not directly comparable because of the different duration of the underlying investment, their different fluctuations would eventually be reflected in different average costs of government debt servicing. The evidence suggests that the cost of debt service for MSs has been inefficient, i.e. different from the one consistent with their fundamentals.

3.5 EDA and Sustainability Risk

The interaction between fiscal rules to ensure debt sustainability and a European Debt Agency to ensure efficient debt management without mutualization could play a key role in giving flexibility to fiscal policy while preserving debt sustainability. Giavazzi et al. (2021) take a step in this direction pairing their proposal for a European Debt Agency with a new fiscal framework. Their plan maintains the 60 percent debt reference value as a long-term objective, but it introduces a medium-term target driving the expenditure rule and different speeds of adjustment for different type of debts: slow speed of adjustment and fast speed of adjustment. Slow speed debt is the results of the deficits accumulated in response to crises and to finance spending for the future. Crisis over the sample 2001-2021 are identified as years in which the escape clause is active (the Covid period and recessions in 2008-2009 and 2011-13). As part of the golden rule scheme, any spending with positive impact on medium-term growth and benefiting future generations is also included in the slow-speed debt. The fast-speed part is the residual stock of debt.

Amato et al. (2024) assess the potential role of EDA in the implementation of flexible fiscal rules by simulating over the period 2023-2040 two scenarios for debt stabilization: a benchmark without EDA and an alternate scenario in which EDA is introduced. Fiscal rules are first simulated without EDA to assess the pattern of debt stabilization and of primary surpluses necessary to achieve it. Then an alternative scenario is built in which EDA acquires progressively the slow debt and it takes 5 years to complete this operation. In the simulations EDA begins operating in 2022, by issuing bonds to make loans to MS's to acquire progressively their entire current and past slow debt. An initial capital, equal to a share of the ESM capital determined by the ratio of the total "slow" debt to total debt of MS's when EDA becomes operational is conferred to EDA via the ESM and it can be attributed within EDA to member countries according to the ESM weights (https://www.esm.europa.eu/esmgovernance).

From the inception of EDA the fiscal rule is modified to take in account that the government debt is made of a mixture of Bonds and Loans with EDA and loans with EDA are treated as slow-debt.

Stabilization is achieved by the adopted fiscal rules both in the baseline and the alternative scenario. However, stabilisation costs are very similar in the two scenarios for low-debt countries. Still, they are much smaller when EDA is present for high-debt countries as the primary surpluses needed to stabilize the debt-to-GDP ratio are smaller and less volatile. Stochastic simulations also show that the upper bounds of the 95 per cent confidence intervals for primary surpluses implied by the fiscal rules in the worst-case scenario are much smaller when the debt agency is operational. This evidence depends on the importance of EDA loans to reduce the level and the volatility of the cost of financing the debt and witnesses the importance of EDA in reducing the risk associated with fiscal rules for debt stabilization. Importantly, Pareto efficiency is achieved within EDA in the sense that no MSs are worse off and some are better off.

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