Domestic vs. Foreign Law: Portfolio Dynamics of Sovereign Debt *

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Abstract

The aftermath of recent debt restructuring events has highlighted the critical role of legal protection in sovereign financing strategies. This paper provides a framework to quantitatively evaluate the trade-offs between two debt instruments: domestic and foreign law bonds. Foreign-law bonds offer higher legal safeguards for investors and, therefore, trade at a higher price. In contrast, domestic law bonds are easier to restructure after default. Using Cyprus as a case study, we document differences in the maturity structures of both types of debt. Then, we disentangle and understand the effects of differences in maturities and recovery rates in shaping the composition of the sovereign's portfolio. Our model suggests that given similar recoveries, the sovereign tilts the portfolio towards shorter maturity. Given different recoveries, the sovereign chooses more of the high-recovery asset. The prevailing effect depends on the difference in recovery rates between foreign and domestic-law-denominated debt.

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1. Introduction

In October 2012, NML Capital, an American hedge fund, successfully had a Ghanaian court detain a ship belonging to the Argentine navy. This was one of many attempts by international investors who held foreign-law-denominated debt to seize Argentine assets held overseas following Argentina's 2001 default and its failed debt restructuring attempts in 2005 and 2010.

The possibility of issuing debt under different legal frameworks, which entail varying levels of enforcement, can be advantageous for sovereigns aiming to influence their borrowing costs. For instance, under a domestic-law framework, sovereigns have the ability to retroactively modify debt terms through local parliamentary decisions. This flexibility can encompass changes in currency denomination, payment terms, and voting procedures for potential restructuring, offering significant control to the issuing country. Conversely, debt issued under foreign-law frameworks, such as English or U.S. law, places limitations on the sovereign's unilateral authority. The local parliament has no power beyond domestic borders, and any litigation or enforcement related to the debt takes place in foreign courts. This can provide investors with a higher sense of security and predictability, potentially lowering borrowing costs for the sovereign due to the enhanced legal protections offered by the foreign jurisdiction.

For instance, bonds issued under local law can have collective action clauses (CACs) added retroactively. CACs are provisions in bond contracts that allow a specified majority of bondholders to make decisions that bind all holders, such as agreeing to a debt restructuring proposal. This was crucial during the Greek debt restructuring of 2012, where more than 50% of bonds denominated in foreign law were not restructured and were paid in full. In contrast, domestic-law bonds that had collective action clauses (CACs) added retroactively experienced a 65% haircut in net present value terms. These differences underscore the impact of legal frameworks on sovereign debt restructuring outcomes, highlighting the potential advantages and disadvantages for issuing countries depending on the chosen legal jurisdiction.

Although the international finance literature has explored the existence of a "legal safety premium" priced into sovereign bond yields and its behavior during periods of distress (see Chamon et al., 2018), to the best of our knowledge, no paper has studied how sovereigns can leverage this premium when choosing a financing strategy and determining the legal composition of their debt. We aim to fill this gap by constructing a quantitative sovereign default model that incorporates an endogenous choice of legal frameworks. Foreign-law bonds offer higher legal protection and, therefore, trade at a higher price. In contrast, domestic-law bonds are easier to restructure, which we model with lower recovery rates after default episodes.

We study the Cyprus case. Cyprus relies on both foreign and domestic-law bonds as sources of finance and has annual reports with detailed information regarding the law denomination of outstanding securities. We use releases from the Public Debt Management Office to complement data extracted from Bloomberg. We document the difference in the maturity structure between the two instruments: domestic-law bonds are, on average, shorter than foreign-law ones. This empirical observation motivates a model with heterogeneity not only in recovery rates but also in the maturity structure, allowing our model to capture the interaction between maturities and recovery rates in the sovereign's portfolio choice.

To disentangle the effects of maturity and recoveries in the sovereign's choice, we perform three comparative statics exercises with our model. The main findings of our numerical exercises are: *(i)* if short and long bonds have similar recoveries, the sovereign's portfolio puts less weight on longer bonds, and this weight increases with the recovery rate; *(ii)* when recovery rates between the two bonds are significantly different, the sovereign's portfolio shifts drastically towards the higher recovery bond, regardless of the maturities; *(iii)* using empirically relevant differences in recovery rates allows for both forces to be present in the model. Our results indicate that the legal framework, modeled as higher recovery rates, plays a central role in a government's financing strategy, even when accounting for maturity differences.

Related Literature. This paper contributes to two strands of literature. First, we extend the quantitative literature on sovereign default, pioneered by Aguiar and Gopinath (2006) and Arellano (2008), by endogenizing the sovereign's choice of jurisdiction under which debt is issued. We distinguish between domestic and foreign law debt, accounting for their differing characteristics. The primary distinction between these two types of debt lies in their treatment during restructuring after a default episode, though empirically for the Cypriot economy, they also exhibit different maturities. Similar to the works of Chatterjee and Eyigungor (2012), Arellano and Ramanarayanan (2012), Hatchondo et al. (2016), Aguiar et al. (2019), and others on long-term debt, our model includes a debt-dilution effect, given that the government cannot commit to future issuances. As in Passadore and Xu (2022), after defaulting on its existing debt, a sovereign that regains access to credit markets, carries a positive debt level as a result of a restructuring process. This approach requires tracking debt prices during exclusion periods, although it abstracts from the micro-foundations of the renegotiation process[1].

[1] For a model with an endogenous renegotiation process, see Yue (2010).

Second, our paper relates to the empirical literature that estimates a "legal safety premium" for bonds issued under foreign jurisdictions, such as Chamon et al. (2018) and Choi et al. (2011). While this literature is predominantly empirical, our paper provides a structural model that allows us to disentangle the importance of maturity and recovery rates in the sovereign's choice.

The remainder of this paper is organized as follows. Section (2) presents data on Cyprus' financing strategies since 2015 and the dynamics of the composition between domestic and foreign law debt, and the foreign-law yield. In Section (3), we propose a quantitative model of sovereign default. Section (4) showcases our comparative statics results. Finally, Section (5) concludes.

2. Empirical Analysis

2.1. Brief Historical Background

Cyprus was one of the countries most affected by the European Debt Crisis and the Greek restructuring. When Greece underwent a major debt restructuring in 2012, Cypriot banks incurred substantial losses due to their significant exposure to Greek debt. This financial strain rendered the banks insolvent. The disproportionately large size of the banking sector relative to Cyprus' GDP made it impossible for the government to rescue the banks on its own. To prevent a bank run and further destabilization of the financial system, the Cypriot government temporarily closed the banks.

Faced with a dire economic situation and unable to raise funds through debt issuance, Cyprus turned to international institutions for assistance. The country requested a bailout from the International Monetary Fund (IMF), the European Central Bank (ECB), and the European Commission. In March 2013, a €10 billion bailout package was agreed upon to stabilize the economy and recapitalize the banks. Following the implementation of the bailout measures and significant economic adjustments, Cyprus gradually restored its financial stability. The country successfully returned to the financial markets in June 2014, marking the beginning of its economic recovery and the re-establishment of investor confidence.

Throughout this section, we will use data from Bloomberg and the Cyprus Debt Management Office on bonds issued from 2015 onwards, which was approximately 7 months after Cyprus regained access to international financial markets following the bailout in 2013.

2.2. Data

Our dataset contains information on issuance dates, maturity dates, coupon rates, currency denomination, amount issued, amount outstanding, ISINs, governing law, and yield to maturity.

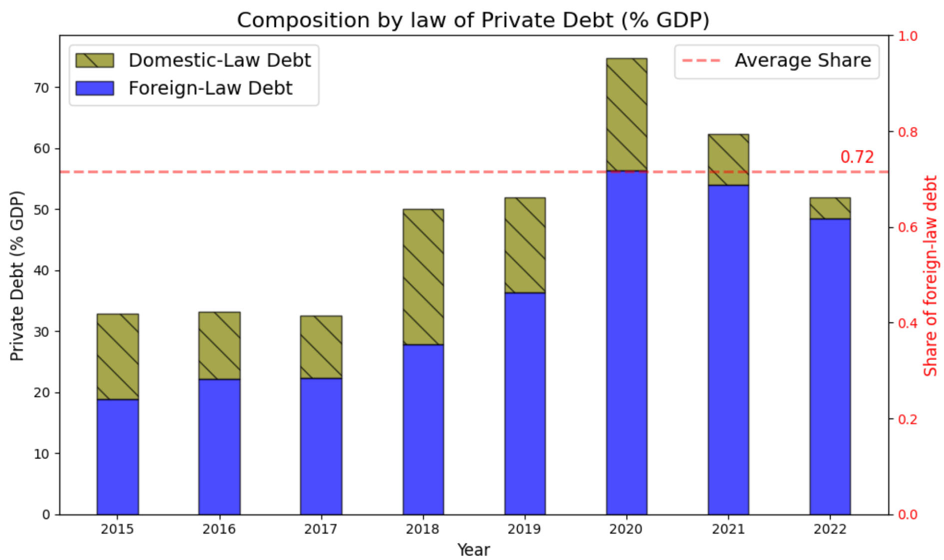


Figure 1: Share of foreign and domestic-law debt as % of GDP.

Figure (1) and (2) were constructed using Cyprus' Public Debt Management Office annual reports. Figure (1) shows the total private outstanding stock of debt to GDP for each year from 2015 to 2022 for Cyprus. The height of each bar (left-axis) represents the stock of debt in each specific year, while the composition between foreign law and domestic law can be inferred from the highlighted areas. On average, 72% of Cyprus' debt has been denominated in foreign currency or under foreign law since 2015.

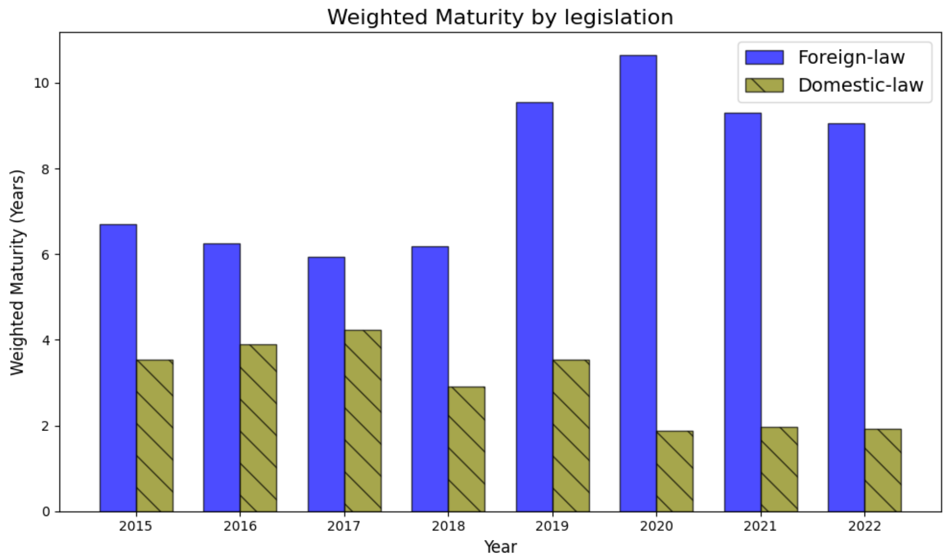


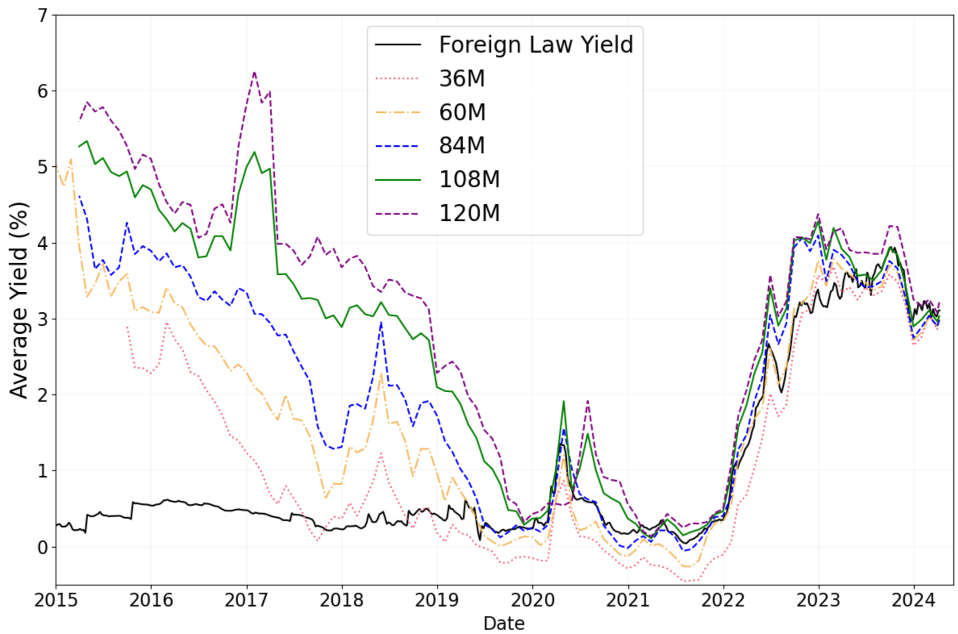
Figure 2: Maturities for domestic and foreign-law bonds, weighted by amount outstanding.

Figure (2) highlights a discrepancy in the maturity profiles of domestic and foreign-law debt. For each year, we calculated the average maturity of both domestic-law and foreign-law debt, weighted by the outstanding amounts. Since 2015, foreign-law debt has had a longer maturity than domestic-law debt. On average, domestic-law debt matures in 3 years, while foreign-law debt matures, on average, in 8 years.

Next, leveraging Bloomberg data, using the yield to maturity of the foreign-law bonds outstanding in each period we construct a "foreign-law yield". In our sample, all 17 foreign-law bonds considered were denominated in EUR, simplifying the analysis as no exchange rate risk filtering was necessary. The "foreign-law yield" is an average of the yields of foreign law bonds, weighted by the amounts outstanding. For comparison, we plot it along with multiple tenors of the Cypriot yield curve in Figure (3). Note that the different tenors of the Cypriot yield curve obtained from Bloomberg are constructed using domestic-law securities, this serves as a counterpart to highlight the spread in interest rates arising from differences in legislation.

At the beginning of the sample, Figure (3) shows a noticeable difference between the rates paid by foreign-law bonds and the benchmark tenors. This pattern aligns with the findings of Chamon et al. (2018), which indicates that the legal safety premium is higher in moments of distress. Even though the most critical moment in Cyprus' banking crisis had passed with the bailout in 2013, the country was still issuing its first bonds after reentering financial markets in June of 2014.

Figure 3: Yield-to-Maturity of foreign-law bonds and Cyprus yield curve for different tenors.



3. Model

In this section, we present a long-term debt model of sovereign default with two assets and heterogeneous recovery rates after default. Section 3.1 describes the macroeconomic environment, section 3.2 describes the timing, 3.3 characterizes the decisions of the government given prices, section 3.4 defines bond prices and section 3.5 defines the equilibrium.

3.1. Small open Economy

Time is discrete and denoted by $t \in \{0, 1, 2, \ldots.\}$. The small open economy receives a stochastic stream of income denoted by y_t. Income follows a first-order Markov process $\mathbb{P}(y_{t+1} = y' \mid y_t = y)$. The government is benevolent and trades foreign-law and domestic-law bonds to smooth the household's consumption. The household evaluates consumption streams, c_t, according to:

$$\mathbb{E}\left[\sum_{t=0}^{\infty} \beta^t u(c_t)\right],$$

with time-preference $\beta \in (0,1)$ and utility function $u(\cdot)$, with $u'(\cdot) > 0$ and $u''(\cdot) < 0$.

The sovereign issues foreign-law and domestic-law debt when it is not under default. As in Chatterjee and Eyigungor (2012) and Hatchondo and Martinez (2009) each unit of domestic (foreign) law debt matures with probability λ_D (λ_F). Bonds are issued at prices $q^{ND}_{D,t}$ and $q^{ND}_{F,t}$ at period t, and in equilibrium, those prices will depend on the current income and the vector of the next period's bond position $(y, b_{D,t+1}, b_{F,t+1})$. The sovereign's budget constraint is:

$$c_t + \lambda_D b_{D,t} + \lambda_F b_{F,t} = y_t + q_{F,t}[b_{F,t+1} - (1-\lambda_F)b_{F,t}] + q_{D,t}[b_{D,t+1} - (1-\lambda_D)b_{D,t}],$$

where $\lambda_D b_{D,t}$ ($\lambda_F b_{F,t}$) are the total principal payments due corresponding to domestic-law (foreign-law) debt and $q_{j,t}[b_{j,t+1} - (1-\lambda_j)b_{j,t}]$ are the corresponding new debt issuances for debt under jurisdiction $j = D, F$.

3.2. Timing

The timing for the government is as follows and is summarized in Figure (4). There is limited enforcement of debt; thus, the sovereign defaults if it is optimal. When in default, the government loses access to the international lending market and incurs an output cost of $\phi(y)$ for each period it remains excluded. Consumption under exclusion c^D is exogenously determined by the budget constraint. During each period under exclusion, the sovereign might regain access to credit markets with probability θ.

In our model, debt does not erase after default. This means that we have to keep track of debt prices during the default episode since defaulted debt has a positive recovery value. In a given period, before θ has been realized, domestic-law defaulted bonds are valued according to q^D_D, while foreign-law bonds are valued according to q^D_F.

Let $b_{t,j}$ represent the total amount of debt defaulted in the past under legislation j. A fraction $(1-\nu_j)$ of defaulted debt under legislation j is written off when the government regains access to credit markets. Thus, after a favorable draw of θ the restructured outstanding debt for the next period under each legislation becomes $\nu_j b_{t,j}$.

Bondholders of defaulted debt of jurisdiction j receive a fraction $\nu_j < 1$ identical replacement bonds for each unit they hold during exclusion. At the time of restructuring, the newly issued domestic-law bonds are evaluated at $q^{ND}_D(y, \nu_D b_{t,D}, \nu_F b_{t,F})$ while their foreign-law counterparts are evaluated at $q^{ND}_F(y, \nu_D b_{t,D}, \nu_F b_{t,F})$.

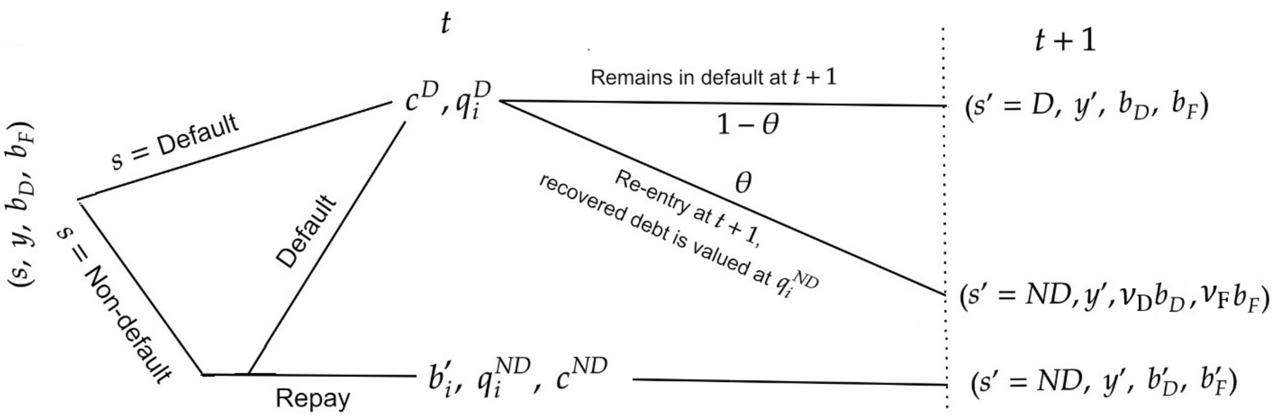


Figure 4: Timing

3.3. Recursive Formulations

Upon repayment, the sovereign takes the price schedules as given and chooses a vector of bond holdings for the next period (b'_D, b'_F). We look for a Markov equilibrium in which strategies are conditioned on (y, b_D, b_F). The unconditional value of the government is given by:

$$V(y, b_D, b_F) = \max_{d \in \{0,1\}} d V^D(y, b_D, b_F) + (1-d) V^{ND}(y, b_D, b_F). \tag{1}$$

Where the d is the sovereign's default policy:

$$d(y, b_D, b_F) = \mathbb{1}_{\{V^D(y,b_D,b_F) > V^{ND}(y,b_D,b_F)\}}. \tag{2}$$

In case of default, there is no choice in the sovereign's value:

$$V^D(y, b_D, b_F) = u\Big(y - \phi(y)\Big) + \beta \mathbb{E}_{y'|y}\left[\theta V^{ND}(y', \nu_D b_D, \nu_F b_F) + (1-\theta) V^D(y', b_D, b_F)\right] \tag{3}$$

Under repayment, the sovereign chooses the vector of new issuances b'_D, b'_F:

$$V^{ND}(y, b_D, b_F) = \max_{b^{D\prime}, b^{F\prime}} u(c) + \beta \mathbb{E}_{y'|y}\left[V^{ND}(y', b'_D, b'_F)\right] \tag{4}$$

Subject to the budget constraint and a bound in the default probability induced by the choice of debt:

$$c + \lambda_D b_D + \lambda_F b_F = y + q_F^{ND}(y, b'_D, b'_F)\left[b'_F - (1-\lambda_F) b_F\right] + q_D^{ND}(y, b'_D, b'_F)\left[b'_D - (1-\lambda_D) b_D\right], \tag{5}$$

$$\delta(y, b_D, b_F) \equiv \mathbb{E}_{y'|y}\left[d(y', b'_D, b'_F)\right] \le \bar{\delta}. \tag{6}$$

As mentioned by Chatterjee and Eyigungor (2015) equation (6) is necessary for models with positive recovery rates to prevent the government from taking unrealistic amounts of debt right before defaulting. The solution to (4) subject to (5), and (6) generates the policy functions for foreign and domestic-law debt and an endogenous composition between the two.

3.4. Prices

The value of one unit of debt when the government is not in default is given by:

$$q_D^{ND}(y, b'_D, b'_F) = \mathbb{E}_{y'|y}\left\{(1 - d(y', b'_D, b'_F))\frac{\lambda_D + (1-\lambda_D)q_D^{ND}\left(y', b'_D, b''_F\right)}{1+r}\right. \tag{7}$$

$$\left. + d(y', b'_D, b'_F)\frac{q_D^D\left(y', b'_D, b'_F\right)}{1+r}\right\},$$

$$q_F^{ND}(y, b'_D, b'_F) = \mathbb{E}_{y'|y}\left\{(1 - d(y', b'_D, b'_F))\frac{\lambda_F + (1-\lambda_F)q_F^{ND}\left(y', b''_D, b''_F\right)}{1+r}\right. \tag{8}$$

$$\left. + d(y', b'_D, b'_F)\frac{q_F^D\left(y', b'_D, b'_F\right)}{1+r}\right\}.$$

When not in default, the prices reflect the expected payoff of the lender, discounted under the risk-free rate. In particular, note that since debt lasts more than one period, the price incorporates the optimal behavior of the sovereign in the future, which we denoted as b''_j. Conditional on repayment tomorrow, the lender gets the principal for the matured fraction of debt: $\lambda_j b_j$, plus tomorrow's price for the non-matured fraction of debt $(1-\lambda_j)b_j$.

Note that in case of default, the price of one unit of debt is given by:

$$q_D^D(y, b_D, b_F) = \frac{1-\theta}{1+r}\mathbb{E}_{y'|y}\left[q_D^D(y', b_D, b_F)\right] + \theta\nu_D q_D^{ND}(y, \nu_D b_D, \nu_F b_F), \tag{9}$$

$$q_F^D(y, b_D, b_F) = \frac{1-\theta}{1+r}\mathbb{E}_{y'|y}\left[q_F^D(y', b_D, b_F)\right] + \theta\nu_F q_F^{ND}(y, \nu_D b_D, \nu_F b_F). \tag{10}$$

Consistent with Figure (4) defaulted debt prices reflect the probability of re-entering the market in the next period with probability θ. If the country receives a favorable draw, the restructured debt due is priced accordingly. Note that stated in this way, we allow for the possibility that the sovereign defaults on the restructured debt, a feature not present in models where debt gets erased upon re-entry. On the other hand, if the country remains excluded from financial markets $(1-\theta)$, it will face the same problem as today but possibly with a new income.

3.5. Equilibrium

Definition 1 *A Markov Equilibrium with state variables (y, b_D, b_F) is given by:*

(i) A set of policy functions for consumption $\hat{c}(y, b_D, b_F)$, default $\hat{d}(y, b_D, b_F)$, debt $\hat{b}'_D(y, b_D, b_F)$ and $\hat{b}'_F(y, b_D, b_F)$;

(ii) A set of value functions $\hat{V}(y, b_D, b_F)$, $\hat{V}^D(y, b_D, b_F)$, $\hat{V}^{ND}(y, b_D, b_F)$;

(iii) Price schedules $\hat{q}^D_D(y, b_D, b_F)$, $\hat{q}^D_F(y, b_D, b_F)$, $\hat{q}^{ND}_D(y, b'_D, b'_F)$, $\hat{q}^{ND}_F(y, b'_D, b'_F)$

such that:

1. *Given prices, the value functions solve:* (1), (3), *and* (4), *with associated policy functions;*

2. *Bond prices satisfy* (7), (8), (9), (10).

4. Numerical Results

This section will delve into the rationale behind the chosen functional forms, followed by the calibration. Subsequently, we will conduct exercises to comprehend the forces behind debt maturity management and recovery rates. We numerically solve a discretized version of the model using the algorithm outlined by Gordon and Guerron-Quintana (2018), which was developed as an extension of Chatterjee and Eyigungor (2012) to allow for models with multiple assets and defaultable long-term debt. Additionally, we employ techniques explained in Guerrón-Quintana (2021) to accelerate the computational speeds.

4.1. Parametrization

Preferences. As is standard in the literature, we specify household utility to be CRRA,

$$u(c) = \frac{c^{1-\gamma}}{1-\gamma},$$

where the relative risk-aversion coefficient (γ) is set to 2.

Output process. We assume output follows the usual AR(1) process:

$$\log y_t = \rho_y \log y_{t-1} + \epsilon_t, \quad \text{where } \epsilon_t \sim N(0, \sigma_y^2) \tag{11}$$

We use Cyprus' real GDP from 1990-2023 at 2015 reference prices to calibrate ρ and σ_y^2. We took the output logs and de-trended the series by regressing it against a time variable. We then used the residuals of this regression to fit Equation (11) and obtained $\rho_y = 0.91$ and $\sigma_y = 0.04$.

Default parameters. We set the output loss during default to:

$$\phi(y) = \max\left\{0, d_y y + d_{yy} y^2\right\}.$$

This loss function is proposed by Chatterjee and Eyigungor (2012) and nests several cases in the literature. When $d_y < 0$ and $d_{yy} > 0$, the loss is zero for the range $0 \leq y \leq -\frac{d_y}{d_{yy}}$ and rises more than proportionally with output for $y > -\frac{d_y}{d_{yy}}$.

We use parameters from Chatterjee and Eyigungor (2012); Passadore and Xu (2022); Cruces and Trebesch (2013) for the government's discount factor, default loss function, the re-entry probability after default, and the default probability bound. The risk-free real interest rate is set to 2% per year, as in other papers that study the European debt crisis (for example, Bocola et al. 2019).

We run comparative statics exercises on the recovery rates ν_D and ν_F. We will also vary the maturities λ_D and λ_F, taking into account that the observed maturity for Cypriot debt is 8 and 3 years, for foreign and domestic-law debt respectively as mentioned in Section (2). These parameters are not presented in the table as they will vary across different exercises.

Parameter	Value	Description	Source
β	0.95	Discount factor	Chatterjee and Eyigungor (2012)
r	0.02	Risk-free rate	Bocola et al. (2019)
γ	2.00	Risk-aversion coefficient	Standard
θ	1/6.5	Re-entry probability (6.5 years)	Cruces and Trebesch (2013)
ρ_y	0.91	Autocorrelation of output	Data
σ_y	0.04	Std. deviation of output shocks	Data
d_y	-0.19	Output costs for default	Chatterjee and Eyigungor (2012)
d_{yy}	0.24	Output costs for default	Chatterjee and Eyigungor (2012)
$\overline{\delta}$	0.75	Max. Default Probability	Passadore and Xu (2022)

Table 1: Parameters

4.2. Comparative Statics

In this subsection, we will explore the crucial trade-off between the insurance benefits of foreign law and domestic law debt. For all three exercises, we followed the same approach. We fixed the parameters, solved the model, and then simulated the optimal behavior of the sovereign by taking time averages of the relevant variables. The first exercise aims to understand the maturity composition of a sovereign that can only issue debt using one jurisdiction. In the second exercise, we explore the significance of recovery rates versus maturities. Lastly, the third exercise seeks to determine if there exists a parameter level that allows for interior solutions.

Exercise 1

In this exercise, we consider a model with two assets: short (S) and long (L) with the same recoveries. We will use these terms to distinguish between the maturities without using the Domestic and Foreign notation to prevent any confusion and ensure a clear interpretation.

We start by establishing fixed maturities based on Cyprus' debt data; $\lambda_S = \frac{1}{3}$ corresponds to a bond with an average maturity of 3 years, while $\lambda_L = \frac{1}{8}$ corresponds to a bond with an average maturity of 8 years. We assume uniform recovery rates for both maturities, represented as $\nu_L = \nu_S = \nu$. We then vary ν to gain insights into how the sovereign would react when constrained to issue debt with different maturities under the same legal jurisdiction.

No recovery, denoted as $\nu = 0$, represents the most extreme case where a sovereign issues both short and long-term debt under domestic law and has the ability to eliminate all their debt upon restructuring. Under this assumption, the results align with standard sovereign default models where debt is erased after re-entry. As the recovery rate increases, we transition to more realistic scenarios, ranging from a 50% recovery rate to an 85% recovery rate on defaulted debt. The latter parameter for the recovery rate appears optimistic for investors, especially considering the recovery rates observed during the analyzed period of the Greek debt crisis as summarized in the introduction.

Table 2: $\nu_S = \nu_L = \nu$ with $\lambda_S > \lambda_L$.

$\nu_S = \nu_L = \nu$	0.00	0.50	0.85
Default freq. (%)	1	2	3
Long-debt/Total debt (%)	0	27	42
Short-debt/Output (%)	16	19	30
Long-debt/Output (%)	0	7	22

We observe that when both bonds are issued under the same legislation (i.e., recovery rates are the same), the share of long bonds is less than 50%. This evidences the sovereign's preference for short-term instruments, everything else equal. Moreover, the share of long bonds to output increases with higher recovery rates (ν). As the recovery rate increases, accumulating short-term debt and diluting existing long-term debt, is deterred by the increased costs associated with default. Consequently, issuing short-term debt under higher recovery rates is discouraged compared to the $\nu = 0$ case. These findings highlight the impact of recovery rates on the maturity composition of sovereign debt. Additionally, we note that the level of debt to output is increasing in the recovery rates. This aligns with the classical implication of sovereign default models, where the default costs increase the amount of debt that the sovereign can sustain in equilibrium.

Exercise 2

We will now adopt the domestic and foreign notation as we allow for varying recoveries across assets. The primary objective of this exercise is to discern the relative importance of recovery rates compared to the choice of maturity.

We fix recovery rates for each type of debt: $\nu_D = 0.35$ for domestic-law debt and $\nu_F = 0.65$ for foreign-law debt. We first analyze the scenario using maturities based on Cyprus' debt data. Specifically, we assume $\lambda_D = \frac{1}{3}$, corresponding to a bond with an average maturity of 3 years for domestic-law bonds, and $\lambda_F = \frac{1}{8}$, corresponding to an average maturity of 8 years for foreign-law bonds. Next, we modify the maturities to $\lambda_D = \frac{1}{8}$ and $\lambda_F = \frac{1}{3}$, while keeping the recovery rates constant. The results from this analysis are presented in the following table:

Table 3: $\nu_D = 0.35$ and $\nu_F = 0.65$

(λ_D, λ_F)	$(1/3, 1/8)$	$(1/8, 1/3)$
Default freq. (%)	3	2
Foreign-law share (%)	97	100
Domestic-law/output (%)	1	0
Foreign-law/output (%)	38	30

The sovereign chooses a significantly higher share of the high-recovery asset, regardless of the maturity. Although dilution makes long-term less attractive for investors, increasing recovery rates improves its expected payoff. This helps understand the differences in the portfolio weight for long-term debt compared with the results presented in Table (2). In the second scenario, long-term debt denominated under domestic law is deemed useless for the sovereign. Not only is it subject to dilution, but it also has a lower recovery. Consequently, the sovereign opts not to use this asset for financing.

Exercise 3

In the previous exercises we showed that conditional on having a similar recovery for both bonds, the sovereign prefers to hold more short-term debt. Once we allowed for the bonds to have significantly different recoveries, the sovereign shifted towards the high recovery instrument.

In this exercise, we focus on exploring the implications of reducing the difference in recovery rates while maintaining longer maturity for foreign-law debt. Specifically, we consider new recoveries that keep the recovery rate for domestic debt at 35% but shrink the foreign-law recovery to 45%. This adjustment allows for a 10% difference in recovery rates, aligning closely with the findings of Erce et al. (2024). The results from this exercise are presented in the Table

(4):

Table 4: Fix $(\lambda_D, \lambda_F) = (1/3, 1/8)$ and decrease $(\nu_F - \nu_D)$

(ν_D, ν_F)	$(0.35, 0.65)$	$(0.35, 0.45)$
Default freq. (%)	3	2
Long-debt/Total debt (%)	97	56
Short-debt/Output (%)	1	11
Long-debt/Output (%)	38	14

As we reduce the difference in recovery rates, the share of foreign-law debt decreases. As we would have expected, when we decrease the difference in recovery rates, maturity matters more in the sovereign's portfolio composition decisions, tilting the new portfolio towards a higher share of the shorter debt. It's worth noting that by allowing a difference of 10% in recovery rates, we can surpass the 50% composition outlined in the first exercise, demonstrating the impact of recovery rate differentials on debt allocation. Furthermore, by decreasing the recovery rates, we observe a similar effect on the level of total debt as before.

4.3. Welfare Analysis

5. Conclusion

In this paper, we developed a model to investigate the strategic use of bonds issued in foreign jurisdictions by governments, with a particular focus on Cyprus, which issues both foreign-law and domestic-law debt. Our findings provide insights into why Cyprus holds, on average, 72% of its debt under foreign law while maintaining a shorter maturity for domestic-law debt (3 years compared to 8 years for foreign-law debt).

The model reveals several key factors influencing this composition. First, the shorter maturity of domestic-law debt incentivizes Cyprus to hold a portion of its debt domestically. Short-bonds avoid the dilution effect present in long-bonds, due to the lack of commitment of the government to future issuances. Second, higher recovery rates associated with foreign-law debt make it more attractive for Cyprus to issue a significant portion of its debt under foreign jurisdiction. The enhanced legal protection provided by foreign-law bonds results in better recovery outcomes during restructuring, thereby reducing the overall cost of borrowing for the government. Finally, the composition of Cyprus's debt portfolio is sensitive to the differences in recovery rates between domestic and foreign-law debt. As the recovery advantage of foreign-law debt increases, Cyprus tends to issue a higher fraction of its debt under foreign law. This strategic issuance reflects a careful balance between leveraging legal protections to ensure favorable recovery rates and managing the maturity structure of debt.

Our model thus offers a comprehensive framework to understand the decisions behind Cyprus's debt issuance. The preference for foreign-law debt with longer maturities and higher recovery rates, alongside the use of shorter-maturity domestic-law debt, highlights the nuanced trade-offs that influence sovereign debt management. Future research could further explore the demand side implications of each type of debt. Understanding more about investor preferences and behavior regarding domestic versus foreign-law debt could provide deeper insights into market dynamics and the cost of borrowing for governments.

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