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

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March 16, 2026

Abstract

The aftermath of sovereign default episodes in emerging and advanced economies since the 1980s underscores the crucial role of the legal jurisdiction under which debt is issued. This paper develops a quantitative framework to evaluate the trade-offs faced by sovereigns when issuing domestic and foreign-law bonds. While foreign-law bonds offer stronger legal protections for investors and therefore command higher prices, domestic-law bonds are typically associated with lower recovery values following default. We document systematic differences in the maturity structures of these two types of debt across a set of emerging market economies. We then disentangle the roles of maturity and recovery rate differences in shaping the composition of the sovereign's debt portfolio. The model shows that when recovery rates are similar, the sovereign favors shorter-maturity bonds, whereas when recovery rates diverge, it prefers to issue the instrument with the higher recovery rate. Which force dominates depends on the magnitude of post-default recovery rate differences between domestic- and foreign-law debt.

*We thank Manuel Amador, and Tim Kehoe for their guidance during this project. We also thank Marco Bassetto, Javier Bianchi, Dean Corbae, Agustín Gutiérrez, Jason Hall, and seminar participants at the University of Minnesota Trade and Development Workshop, the Minnesota-Wisconsin International Macro Workshop, the Minnesota Research Computing Exhibition, and the 46th Meeting of the Brazilian Econometric Society for their valuable comments.

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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, each entailing varying levels of enforcement, can be advantageous for sovereigns seeking to influence their borrowing costs. For instance, when countries issue debt under domestic law, they can retroactively modify debt terms through local parliamentary decisions. This flexibility may include changes in currency denomination, payment terms, and voting procedures for potential restructuring, granting the issuing country significant control. Conversely, debt issued under foreign law, such as English or U.S. law, places limitations on the sovereign's unilateral authority. The local parliament holds no power beyond domestic borders, and any litigation or enforcement related to the debt occurs in foreign courts. This provides investors with a greater sense of security and predictability, potentially lowering borrowing costs for the sovereign due to the enhanced legal protections offered by the foreign jurisdiction.

A clear example of these dynamics was observed during the 2012 Greek debt restructuring. Bonds issued under local law had collective action clauses (CACs) added retroactively, allowing a specified majority of bondholders to make decisions that bind all holders, such as agreeing to a debt restructuring proposal. As a result of this modification, more than 50% of bonds denominated in foreign law were not restructured and were paid in full. In contrast, domestic-law bonds with retroactively added collective action clauses (CACs) faced a 65% haircut in net present value terms (Choi et al., 2011; Gulati and Zettelmeyer, 2012; Zettelmeyer et al., 2013). 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.

Empirical evidence reveals a nuanced landscape of sovereign debt issuance. The international finance literature has focused on documenting the "legal safety premium" —a gap in yields between domestic and foreign-law bonds of the same maturity. This premium comes from the enhanced legal protections that foreign-law bonds offer to investors. Conventional quantitative models of sovereign default predict that, given these superior protections, countries should issue only foreign-law debt due to its higher pricing and better creditor recovery rates.

Using data from Dealogic Capital Markets (DCM) from 2004 to 2024, we document that emerging market economies maintain a significant portion of their debt under domestic law, with the median share typically ranging between 15% and 40% — a pattern consistent with Chamon et al. (2018). What explains this seemingly paradoxical behavior? We uncover a critical dimension overlooked by existing models: substantial differences in maturity profiles between domestic and foreign-law bonds. We document that while foreign-law bonds typically offer higher recovery rates and better investor protections, they also exhibit longer maturities, averaging 10-12 years, compared to domestic-law bonds, which mature in 5-7 years. Importantly, we find no significant differences in coupon rates between these two types of instruments. This maturity difference introduces a crucial trade-off for sovereigns. Longer-maturity foreign-law bonds become more vulnerable to debt dilution risks, as shown by Aguiar et al. (2019), potentially offsetting their initial pricing advantages.

We develop a quantitative sovereign default model that endogenizes the choice of legal framework, incorporating both recovery rate differences and maturity heterogeneity. Our model captures the interaction between recovery rates and maturities, allowing us to reconcile the empirical observation of mixed debt issuance strategies with theoretical predictions about sovereign borrowing. In doing so, we provide a more comprehensive framework that can explain why countries maintain a mixed portfolio of domestic and foreign-law debt. To disentangle the effects of maturity and recoveries in the sovereign's portfolio choice, we perform four comparative static 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 more weight on shorter bonds due to a dilution effect; *(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)* Incorporating recovery rate differences based on empirical evidence allows both forces to be present in the model.

[TBA]

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. While Erce et al. (2024) documents that the main distinction between these two types of debt lies in their treatment following a default episode, we also show that, across emerging market economies, bonds issued under different legal frameworks exhibit systematically varying maturities. Similar to 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. We contribute to these papers by studying how differences in recovery rates interact with maturity in the government's problem. Our paper is also connected to the literature that studies countries' renegotiation processes after defaulting. While Yue (2010) and Mihalache (2020) endogeneize the renegotiation process and focus on maturity extension as its result, we focus on an ex-ante portfolio choice between different legal frameworks. 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 due to a restructuring process. This approach requires tracking debt prices during exclusion periods, although it abstracts from the micro-foundations of the renegotiation process.

Second, our paper relates to the predominantly empirical literature that estimates a "legal safety premium" for bonds issued under foreign jurisdictions. Chamon et al. (2018) apply standard fixed income valuation techniques to a large sample of bonds to understand whether foreign-law debt is indeed priced at a premium, and how this premium varies across countries through time. Several studies leverage natural experiments to identify the legal safety premium. Choi et al. (2011) use the Greek restructuring to compare foreign and domestic law instruments and their respective premia, highlighting the differences in legal protection. Similarly, Randl and Zechner (2018) examine Austria's addition of collective action clauses (CACs) to an Austrian wind-down entity, demonstrating that this legal modification increased the spreads between domestic and foreign instruments for Austrian government bonds. While these studies focus primarily on pricing differences, and Chamon et al. (2018) briefly address quantities in terms of shares of domestic and foreign-law bonds, our paper makes several distinct contributions. First, we document a novel empirical regularity: significant and systematic differences in maturity profiles between domestic and foreign-law bonds across emerging markets. Second, we develop a quantitative framework, absent from the existing empirical literature, that explains the observed mixed portfolio choices of sovereigns. Our structural model allows us to disentangle the relative importance of maturity differences and recovery rates in the sovereign's optimal debt composition.

The remainder of this paper is organized as follows. Section (2) presents our empirical analysis of debt issuance patterns across emerging market economies. In Section (3), we propose a quantitative model of sovereign default that endogenizes legal framework choice. Section (4) showcases our comparative statics results. Finally, Section (5) concludes the paper.

2 Empirical Analysis

We start by showing the pricing implications of different jurisdictions for the knife-edge case of Argentinian twin bonds. Figure (1) presents two complementary perspectives on the impact of default risk. The left panel shows the yields to maturity for domestic and foreign-law bonds issued by Argentina with similar characteristics (maturity date, currency, and payment structure), revealing a persistent gap in bond pricing after August 2018. The right panel displays the Credit Default Swap (CDS) rates, demonstrating a parallel increase in default probability during the same period. This aligns with the evidence presented by Chamon et al. (2018), which highlights that default risks widen the gap between the yields of foreign and domestic-law bonds.

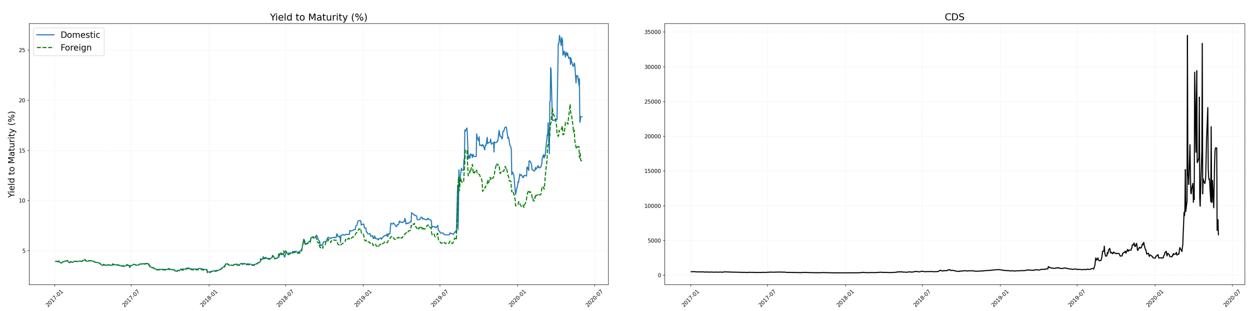

Figure 1: Left panel shows yields to maturity for domestic and foreign-law bonds, which show the emerging safety-law premium. The right panel shows credit default swap prices reflecting increasing default probability.

Next, we use data from the Dealogic Capital Markets (DCM) dataset covering 2004 to 2024. Our goal is to show: *(i)* a significant share of debt issued by emerging market economies is denominated in domestic law; *(ii)* there are considerable maturity differences between the two instruments.

For both analyses, we select debt issuances categorized as ’Sovereign, Local Authority’ under the ’Deal Type’ classification. This comprehensive dataset provides detailed information on each issuance, including the issuance date, coupon rates, maturity dates, face values, ISINs, and, most importantly, the governing law. To ensure our analysis is relevant to emerging economies, we take the intersection of countries classified as 'Emerging market countries' by the IMF and the countries in our dataset for which we have GDP information from the World Bank. We focus on the period from 2004 to 2024.

For our analysis of domestic law debt shares (Figure 2), we apply additional filtering criteria to focus specifically on countries that actively choose between legal frameworks. We drop major oil-producing countries, maintain a balanced panel across the full time period, and exclude countries that issued only one type of instrument (either exclusively domestic or foreign law) during the analysis period. This results in a sample of 26 countries[1]. For each country in each year, we compute the share of domestic law debt as the ratio between domestic law debt outstanding and total debt outstanding.

For our analysis of maturity differences (Figure 3), we use a broader sample that includes all emerging market economies in our dataset, without the additional filtering criteria applied for the domestic debt share analysis. This allows us to capture the general pattern of maturity differences across the emerging markets space.[2]

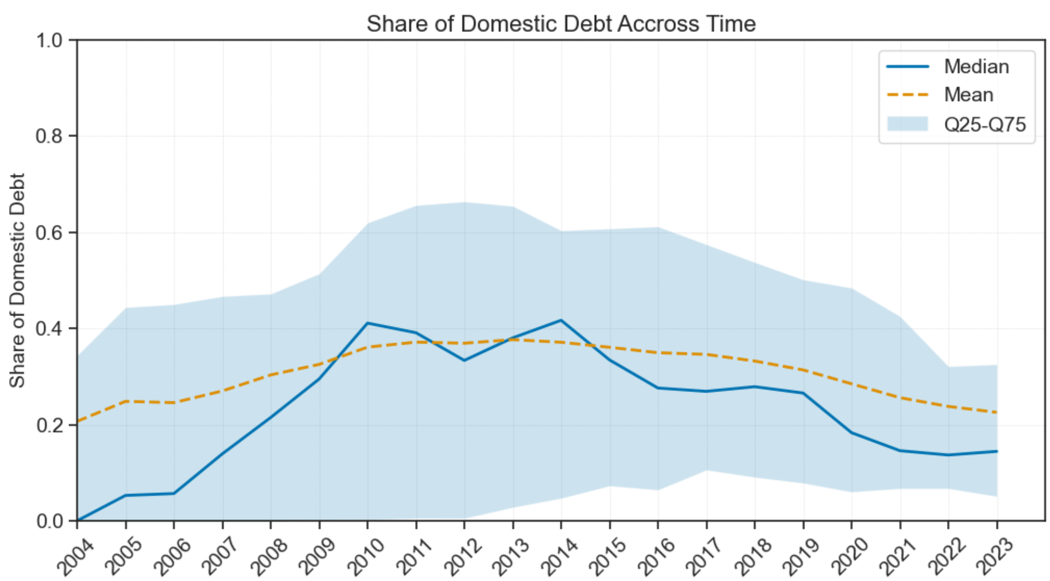

Figure 2: Share of domestic-law debt across time with mean, median, and quantiles.

[1]The countries in our balanced panel are: Argentina, Brazil, Bulgaria, Chile, Colombia, Croatia, Dominican Republic, Egypt, Guatemala, Hungary, Jamaica, Kazakhstan, Latvia, Lithuania, Malaysia, Mexico, Nigeria, Panama, Peru, Philippines, Poland, Romania, Russia, Thailand, Turkey, Ukraine

[2]We have verified that the maturity differences observed in Figure 3 are also present when restricting the analysis to the same subset of 26 countries used in the domestic debt share analysis, confirming the robustness of this pattern across different sample specifications.

Figure (2) presents the share of domestic-law debt across our sample of emerging market economies over time. The solid blue line represents the median share, while the dashed orange line shows the mean. The shaded blue area covers the interquartile range (25th to 75th percentiles). This figure reveals a key empirical pattern: countries consistently maintain a significant portion of their debt under domestic law, with the median share typically ranging between 15% and 40% over the sample period, averaging 29.6% over time. As we will show in Section (3), the standard model in which the two bonds differ exclusively in their recovery rates cannot generate such patterns.

Next, we turn the analysis to the maturity structure of the two instruments. We start by noticing that domestic and foreign-law instruments do not present a significant difference regarding their coupons, as highlighted by Table (1). Figure (3) complements this analysis by showing the average maturity of bond issuances under both legal frameworks across the sample period. The blue bars represent foreign-law bonds, while the yellow bars with diagonal patterns represent domestic-law bonds. The figure reveals a consistent and significant difference in maturity profiles: foreign-law bonds are systematically issued with longer maturities compared to domestic-law bonds. Over the sample period, foreign-law bonds have an average maturity of approximately 10-12 years, while domestic-law bonds typically mature in 5-7 years.

	Foreign-Law	Domestic-Law
Median	6.00	5.80
Mean	5.97	6.08
Std. Deviation	2.38	3.82

Table 1: Descriptive statistics for domestic and foreign-law instrument coupons.

This empirical evidence highlights two important patterns that inform our theoretical model. First, countries actively choose to issue debt under both legal frameworks rather than exclusively under foreign law, despite the price advantage of the latter. Second, there exists a systematic difference in the maturity profiles of bonds issued under different legal frameworks, with foreign-law bonds consistently having longer maturities than domestic-law bonds.

These findings suggest that a model focusing solely on recovery rate differences between foreign and domestic-law debt would be insufficient to explain observed sovereign borrowing patterns. Instead, a more comprehensive framework incorporating both recovery rate differences and maturity structure is necessary to account for the empirical regularities documented here.

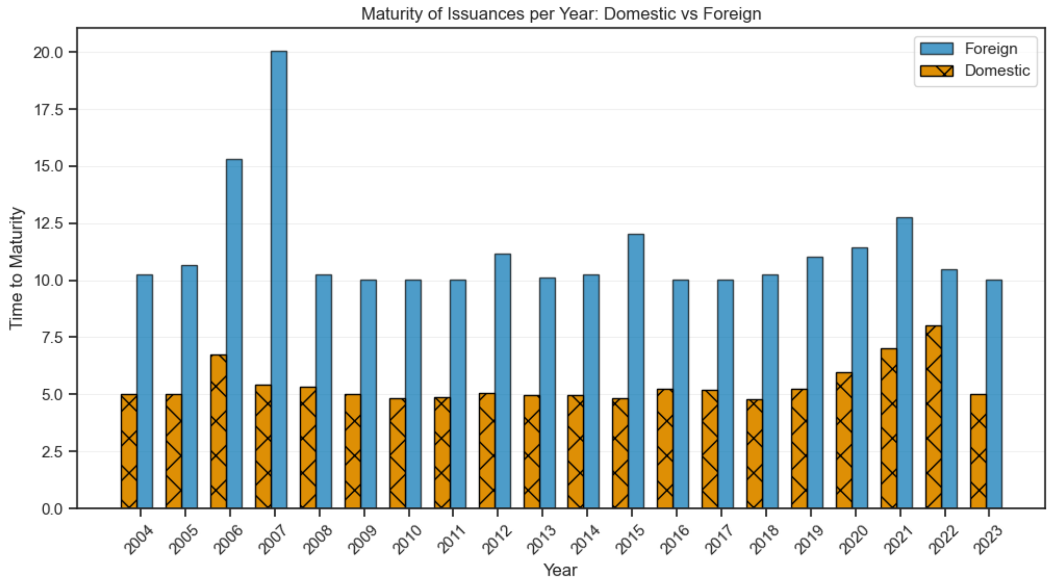

Figure 3: Maturity of domestic and foreign-law debt issuances across time

Standard sovereign default models with heterogeneous debt instruments would predict that sovereigns should exclusively issue the type of debt that commands a higher price in the market. In the context of legal frameworks, this would imply a complete preference for foreign-law debt, which typically offers better creditor protection and therefore higher recovery rates in case of default. However, our empirical findings contradict this prediction, showing that countries consistently maintain a significant portion of their debt under domestic law.

Moreover, the systematic difference in maturity profiles between foreign and domestic law bonds provides a potential explanation for this puzzle. The longer maturities associated with foreign-law debt might introduce additional considerations in the sovereign's portfolio choice, such as debt dilution concerns and rollover risks. These factors could make domestic-law debt, despite its lower price, an attractive complement to foreign-law debt in the sovereign's optimal portfolio.

The empirical evidence presented in this section motivates our theoretical model, which incorporates heterogeneity not only in recovery rates but also in maturities. This approach allows us to capture the interaction between these factors in sovereign portfolio choices and to explain why countries might optimally choose to issue debt under both legal frameworks rather than concentrating exclusively on foreign-law debt.

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_F^D.

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 recovered 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. After being allowed back to financial markets, the newly issued domestic-law bonds are evaluated at $q_D^{ND}\left(y, \nu_D b_{t,D}, \nu_F b_{t,F}\right)$ while their foreign-law counterparts are evaluated at $q_F^{ND}\left(y, \nu_D b_{t,D}, \nu_F b_{t,F}\right)$.

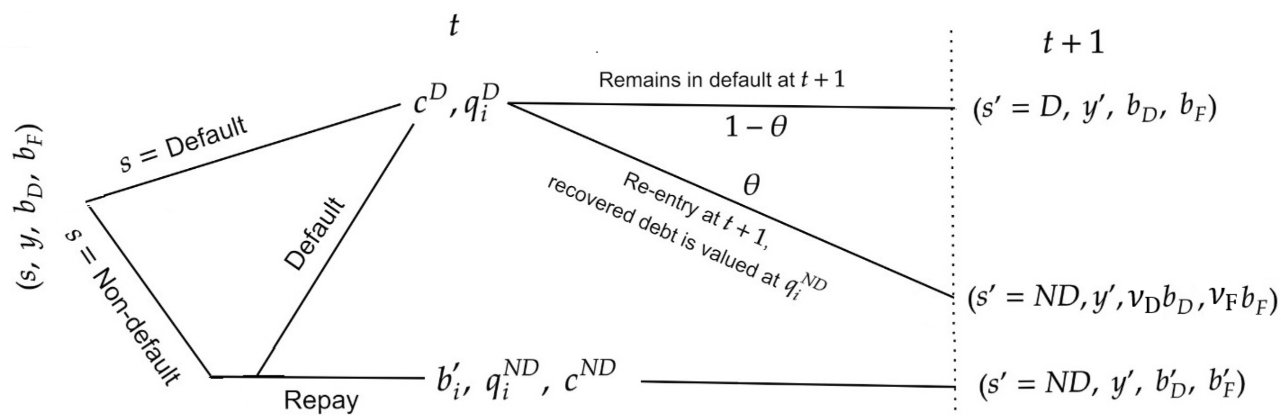

Figure 4: Timing

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:

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

Where the d is the sovereign's default policy:

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

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

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

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

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

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

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

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

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:

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

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

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

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

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:

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

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

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 recovered debt due is priced accordingly. Note that stated in this way, we allow for the possibility that the sovereign defaults on the recovered 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 $\hat{q}_D^D(y, b_D, b_F), \hat{q}_F^D(y, b_D, b_F), \hat{q}_D^{ND}(y, b'_D, b'_F), \hat{q}_F^{ND}(y, b'_D, b'_F)$

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 presents the functional forms used in our numerical analysis and examines the forces driving debt maturity management and recovery rates. We numerically solve a discretized version of the model using the algorithm developed by Gordon and Guerron-Quintana (2018), which extends Chatterjee and Eyigungor (2012) to accommodate models with multiple assets and defaultable long-term debt. We also implement techniques from Guerrón-Quintana (2021) to improve computational efficiency.

4.1 Parametrization

Since our empirical analysis uses yearly data, all parameter calibrations in our model are reported on an annual basis.

A priori set parameters. Following standard practice in the literature, we specify household utility as CRRA:

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

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

Output follows an AR(1) process:

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

To estimate ρ_y and σ_y^2, we use yearly real GDP data from the World Development Indicators database for 2004–2024, covering the same set of countries used in Figure (2). For each country, we take the natural logarithm of GDP, remove a linear trend, extract the cyclical component, and estimate the AR(1) process in Equation (11), yielding:

$$\rho_y = 0.6219, \quad \sigma_y = 0.0384.$$

We normalize coupons to zero as specified in the non-default budget constraint in Section (3). The maturities of domestic ($\lambda_D = 1/5$) and foreign-law ($\lambda_F = 1/11$) bonds are calibrated to match the values observed in Figure (3), corresponding to average durations of 5 and 11 years, respectively. We set the risk-free real interest rate to 2% per year, following Bocola et al. (2019). The re-entry probability $\theta = 1/6.5$ corresponds to a 6.5-year average exclusion from financial markets, consistent with Chatterjee and Eyigungor (2012) and Cruces and Trebesch (2013)[3].

The recovery rates ν_i represent the fraction of value recovered from bond type $i \in \{D, F\}$ in default. To estimate these parameters, we use results from Erce et al. (2024), numerically solving for recovery rates that match observed Net Present Value (NPV) losses for each debt type. This procedure, using the average default probability targeted in our calibration, yields recovery rates of $\nu_D = 0.62$ for domestic bonds and $\nu_F = 0.74$ for foreign bonds[4].

Non-selective defaults: Our model assumes non-selective default, meaning the sovereign either defaults on both domestic and foreign-law debt simultaneously or repays both types of instruments. This binary choice enhances tractability while capturing a key feature observed in many recent default episodes, where sovereigns default on all outstanding debt[5].

Calibrated parameters. We calibrate the three remaining parameters (β, d_y, d_{yy}) to match key empirical moments: the default probability, the share of foreign-law debt, and the debt-to-GDP ratio. Following Chatterjee and Eyigungor (2012), we specify the output loss during default as:

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

This loss function nests several cases in the literature. When $d_y < 0$ and $d_{yy} > 0$, the loss is zero for output levels $0 \leq y \leq -\frac{d_y}{d_{yy}}$ and increases more than proportionally with output for $y > -\frac{d_y}{d_{yy}}$. We set $d_y = -0.17$ to match the empirical default frequency of 2.98% per year, calculated as the ratio of default episodes to total periods with market

[3] Alternative estimates using data from Graf von Luckner et al. (2025) for the specific countries in our dataset are discussed in Appendix A.1.

[4] An alternative approach using default frequency data from Graf von Luckner et al. (2025) to estimate ν_i is presented in Appendix A.1.

[5] Examples include Russia (1998-1999), Ukraine (1998-2000), Ecuador (1999), Argentina (2001, 2020), Uruguay (2003), Paraguay (2004), Grenada (2004, 2013), Jamaica (2010, 2013), and Greece (2012).

access for our sample countries. The quadratic term $d_{yy} = 0.22$ is calibrated to match the average foreign-law debt share of 28.7%. Finally, the discount factor $\beta = 0.89$ targets an average debt-to-output ratio of 40.60%, based on IMF data for our sample countries from 2004-2023.

Calibration results and model fit. Table (2) summarizes our model's full calibration, combining externally and internally calibrated parameters.

Parameter	Value	Description	Source
Externally calibrated			
γ	2.00	Risk-aversion coefficient	Standard
θ	1/6.5	Re-entry probability (6.5 years)	Cruces and Trebesch (2013)
r	0.02	Risk-free rate	Bocola et al. (2019)
ρ_y	0.62	Autocorrelation of output	Data
σ_y	0.04	Std. deviation of output shocks	Data
ν_D	0.62	Recovery rate for domestic-law bonds	Data
ν_F	0.74	Recovery rate for foreign-law bonds	Data
λ_D	1/5	Maturity of domestic-law bonds	Data
λ_F	1/11	Maturity of foreign-law bonds	Data
Internally calibrated			
d_y	-0.17	Linear output cost parameter	Target: Default frequency
d_{yy}	0.22	Quadratic output cost parameter	Target: Foreign-law share
β	0.89	Discount factor	Target: Debt-to-GDP ratio

Table 2: Baseline parameters.

Table (3) compares our model's performance against targeted empirical moments. The model successfully matches the default frequency and average share of domestic-law debt, though it generates a higher debt-to-output ratio than observed in the data.

	(1)	(2)
Moment	**Data**	**Model**
Default frequency (%)	2.98	2.21
Debt to GDP (%)	40.60	75.77
Avg. share of domestic-law (%)	28.70	22.66

Table 3: Model validation

Domestic-share puzzle. A significant achievement of our model is its ability to generate an interior solution for debt composition, as shown in Table (3). This resolves an important puzzle in the sovereign debt literature. Standard one-period debt models, such as those developed by Arellano (2008) and Aguiar and Gopinath (2006), predict that a sovereign able to issue debt with different recovery rates would exclusively use the instrument with the higher recovery rate. This occurs because the sovereign internalizes its commitment problem and chooses the instrument that best addresses this limitation. Moreover, we find that a long-term debt model where bonds differ only in recovery rates still results in the higher-recovery instrument dominating the portfolio, as it strengthens the sovereign's repayment incentives. Our model's key innovation is incorporating both maturity differences and recovery rate differentials, which generates the interior debt composition observed empirically.

4.2 Comparative Statics

To disentangle the key mechanisms driving our model's solution to the domestic-share puzzle, we conduct several numerical exercises that clarify the trade-offs involved in sovereign debt portfolio composition. Specifically, we explore how debt maturity and recovery rates influence the sovereign's choice between domestic- and foreign-law debt. The central trade-off we identify is that while long-term foreign-law bonds offer stronger commitment to repayment, short-term domestic-law bonds provide better protection against dilution. This trade-off fundamentally shapes the sovereign's debt issuance strategy. Detailed results from these exercises are provided in Appendix A.2; here we summarize the main findings.

Exercise 1: Role of Debt Maturity

In this exercise, we isolate the effect of maturity differences by setting identical recovery rates for both debt types while varying their maturities. We find that for low uniform recovery rates, sovereigns strongly prefer shorter-maturity (domestic-law) instruments. As recovery rates increase, the sovereign gradually shifts toward longer-maturity (foreign-law) bonds, since higher recovery rates reduce dilution incentives and make commitment benefits more valuable.

Exercise 2: Relative Importance of Recovery Rates

Next, we examine the impact of differing recovery rates while holding maturities fixed. When we set the recovery rate for domestic-law debt to approximately half of our baseline value, the sovereign overwhelmingly favors the higher-recovery instruments, nearly eliminating lower-recovery debt from its portfolio. This occurs regardless of maturity configuration, confirming the domestic-share puzzle's persistence when only recovery rates differ.

Exercise 3: Interaction Between Recovery and Maturity

In an intermediate scenario, we reduce the recovery rate gap between domestic- and foreign-law bonds to levels similar to our baseline calibration. Under these conditions, the sovereign's optimal debt allocation shifts substantially toward lower-recovery debt. This indicates that as recovery rate differences diminish, maturity considerations become increasingly important, encouraging greater reliance on short-term instruments to mitigate dilution risk.

Exercise 4: Welfare Analysis

Finally, we evaluate welfare implications of different debt structures. We measure welfare using certainty-equivalent consumption for a sovereign starting with no initial debt, comparing scenarios where the sovereign can issue either: (1) domestic-law debt with shorter maturity than foreign-law debt, or (2) the reverse configuration. Our results demonstrate that the sovereign consistently prefers pairing lower recovery rates with shorter maturities. Issuing long-term low-recovery debt is never optimal, as this combination fails to address either the commitment problem or the dilution problem, effectively rendering such a configuration dominated by alternatives.

5 Conclusion

Our analysis provides a quantitative framework for understanding sovereigns' observed debt issuance behavior across legal jurisdictions. While traditional models suggest countries should favor foreign-law debt due to better enforcement and higher recovery rates, our model shows that when sovereigns face a trade-off between maturity and legal protections, mixed debt portfolios naturally arise. The preference for pairing shorter maturities with lower recovery instruments emerges as an optimal response to concerns about dilution and commitment. These results help reconcile the empirical patterns of significant domestic-law debt issuance, even in the presence of a legal safety premium, and underscore the importance of accounting for maturity heterogeneity when evaluating sovereign borrowing strategies.

TBA

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A Appendix

A.1 Alternative Calibration

A.2 Comparative Statics

In this subsection, we examine the crucial trade-off between the insurance benefits of foreign-law and domestic-law debt. For all four exercises, we follow a consistent approach: fixing the parameters, solving the model, and then simulating the sovereign's optimal behavior by averaging the relevant variables over time. The first exercise focuses on the maturity composition of a sovereign's portfolio. The second examines the relative importance of recovery rates. The third seeks to determine whether the model can accommodate the two forces identified in Exercises 1 and 2 in equilibrium. Finally, we analyze the optimal behavior of a sovereign that can choose among all the previously considered alternatives.

Exercise 1

In this exercise, we focus on the maturity composition of the sovereign's portfolio. To do this, we consider the limiting case where domestic-law debt has the same recovery rate as foreign-law debt. Thought this exercise, the only distinguishing factor between these assets will be their respective maturities.

We calibrate the maturities based on the average country debt data: $\lambda_D = \frac{1}{3}$ corresponds to a bond with an average maturity of 3 years, while $\lambda_F = \frac{1}{8}$ corresponds to a bond with an average maturity of 8 years. We denote the uniform recovery rates by $\nu_F = \nu_D = \nu$.

Our starting point is no recovery, denoted as $\nu = 0$. This represents the most extreme case where a sovereign can eliminate all its debt upon restructuring. Under this assumption, the results align with standard sovereign default models, where debt is erased after default. We then consider two different parameterizations with recovery rates of $\nu = 0.5$ and $\nu = 0.85$ on defaulted debt. The latter value 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.

The equilibrium moments are reported in the following table:

First, note that the level of debt to output increases with the recovery rates. This aligns with the classical implication of sovereign default models, where higher default costs increase the amount of debt that the sovereign can sustain in equilibrium.

Table 4: $\nu_D = \nu_F = \nu$ with $\lambda_D > \lambda_F$.

$\nu_D = \nu_F = \nu$	0.00	0.50	0.85
Default freq. (%)	1	2	3
Foreign-law share (%)	0	27	42
Domestic-law/Output (%)	16	19	30
Foreign-law/Output (%)	0	7	22

Next, observe that the share of foreign-law bonds (longer maturity) is less than 50% for all three specifications considered. This demonstrates the sovereign's preference for short-term instruments, everything else equal.

Finally, note that the share of foreign-law bonds relative to output increases with recovery rates (ν). As the recovery rate rises, issuing domestic-law debt and diluting existing foreign-law bonds is deterred by the increased costs associated with default. Consequently, issuing domestic-law debt under higher recovery rates is discouraged compared to the $\nu = 0$ case.

Exercise 2

We now try to discern the relative importance of recovery rates on the sovereign's portfolio. To do so we now allow recovery rates to differ across debt types. In particular, we set 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 the average country 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 5: $\nu_D = 0.35$ 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.

Finally, note that as we see in the second column of table (5), 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. However, once we allowed for the bonds to have significantly different recoveries, the sovereign shifted notably toward the instrument with the higher recovery.

In this exercise, we focus on exploring the implications of reducing the difference in recovery rates while maintaining a longer maturity for foreign-law debt. Specifically, we keep the recovery rate for domestic debt at 35% but shrink the foreign-law recovery from 65% 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 following table:

Table 6: 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
Foreign-law share (%)	97	56
Domestic-law/Output (%)	1	11
Foreign-law/Output (%)	38	14

As we reduce the difference in recovery rates, the share of foreign-law debt decreases. When the difference in recovery rates decreases, maturity matters more in the sovereign's portfolio composition decisions, tilting the new portfolio towards a higher share of the shorter debt.

Note that by allowing a difference of 10% in recovery rates, the sovereign exceeds the 50% composition outlined in the first exercise, demonstrating the impact of recovery rate differentials on debt allocation. Once again, by decreasing the recovery rates, we observe a similar effect on the level of total debt.

A.3 Welfare Analysis

How large are the welfare gains from issuing debt under different legal jurisdictions? In this section, we compute the welfare gains from issuing debt under various laws.

We first define welfare as the certainty equivalent consumption,

$$\bar{c} = u^{-1}\left(\mathbb{E}\left[V^{ND}\left(y, b_D, b_F\right)\right]\right)$$

obtained by a sovereign with no initial debt ($b_D = 0, b_F = 0$). We then consider the following scenarios: *(i)* Issuing both 3-year and 8-year debt under domestic-law (top-left), *(ii)* Issuing both 3-year and 8-year debt under foreign-law (bottom-right), *(iii)* Issuing 3-year debt under foreign-law and 8-year debt under domestic-law (bottom-left) and finally, *(iv)* Issuing 3-year debt under domestic-law and 8-year debt under foreign-law (top-right).

The results from this exercise are presented in the Table (7):

Table 7: Normalized consumption equivalent for ($\lambda_D = 1/3$, $\lambda_F = 1/8$)

	$\nu_F = 0.35$	$\nu_F = 0.65$
$\nu_D = 0.35$	99.83	99.97
$\nu_D = 0.65$	99.92	100

Although the optimal scenario for the sovereign is to issue both types of debt under high recovery rates, the welfare gains are small. A sovereign constrained to issue debt under domestic law will choose to do so by issuing long-term debt under foreign law and shorter-term debt under domestic law. This aligns with the observed behavior of the average country.

The ability to sustain more debt in equilibrium, due to higher default costs and reduced incentives to dilute long-term debt, outweighs the benefits of re-entering financial markets with the lower debt levels offered by domestic-law debt

Assessing the insurance motive of long debt

Suppose endowment is constant, that is, $y_t = y$, and the government gets iid punishment shocks $\tau \sim iid$. The problem can be rewritten such as:

$$V(\tau, b_D, b_F) = \max_{d(\tau, b_D, b_F)} \{V^D(\tau, b_D, b_F), V^{ND}(b_D, b_F)\} \tag{12}$$

Value of Default:

$$V^D(\tau, b_D, b_F) = u\big((1-\tau)y\big) + \beta \mathbb{E}_{\tau'}\Big[\theta V(\tau', \nu_D b_D, \nu_F b_F) + (1-\theta)V^D(\tau, b_D, b_F)\Big] \tag{13}$$

Value of Repayment:

$$V^{ND}(b_D, b_F) = \max_{b'_D, b'_F} u(c) + \beta \mathbb{E}_{\tau'}[V(\tau', b'_D, b'_F)] \tag{14}$$

subject to:

$$c + \lambda_D b_D + \lambda_F b_F = y + q_F^{ND}(b'_D, b'_F)[b'_F - (1-\lambda_F)b_F] + q_D^{ND}(b'_D, b'_F)[b'_D - (1-\lambda_D)b_D] \tag{15}$$

$$\delta(b'_D, b'_F) \equiv \mathbb{E}_{\tau'}[d(\tau', b'_D, b'_F)] \leq \overline{\delta} \tag{16}$$

Since τ is iid, we can drop it as a state variable from the prices and repayment value. In this world, consumption in the ND state is deterministic and driven purely by the stock of debt. Prices under default are given by:

$$q_i^D(b_D, b_F) = \frac{1-\theta}{1+r} \times q_i^D(b_D, b_F) + \theta \nu_i q_i^{ND}(\nu_D b_D, \nu_F, b_F)$$
$$q_i^D(b_D, b_F) = \frac{1+r}{\theta + r} \times \theta \nu_i q_i^{ND}(\nu_D b_D, \nu_F, b_F)$$

The following expression gives prices under non-default:

$$q_i^{ND}(b'_D, b'_F) = \big(1 - \delta(b'_D, b'_F)\big) \times \frac{\lambda_i + (1-\lambda_i) q_i^{ND}(b''_D, b''_F)}{1+r} + \delta(b'_D, b'_F) \times \frac{q_i^D(b'_D, b'_F)}{1+r}$$