The Political Economy of Domestic and External Sovereign Debt*

Tim Hermann† Almuth Scholl‡

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Abstract

This paper explores the political and distributional consequences of sovereign debt and default and studies how optimal fiscal policy choices are affected by redistributive concerns, the composition of sovereign debt, and political constraints. We develop a quantitative macroeconomic model in which heterogeneous households face idiosyncratic income risk and save in non-state-contingent government bonds. Debt contracts are not enforceable and the government is politically constrained in its policy choices: A fiscal plan is required to receive the support of the majority of households. If neither fiscal plan is approved, the government is forced to default on domestic and external debt. We highlight that debt crises are characterized by a political conflict. In the run-up to a sovereign default, the government has to reduce redistributive transfers to pay for increasing debt service costs. While wealthy households prefer the government to fulfill the debt contract as they benefit from high interest rates, poorer households are in favor of a default. Consequently, the approval of the fiscal plan decreases and raises the likelihood of a sovereign default.

Keywords: sovereign debt and default, inequality, political economy, fiscal policy

JEL Codes: F34, H63, E62, F41, D72

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†University of Konstanz and Cluster of Excellence "The Politics of Inequality", tim.hermann@uni-konstanz.de

‡University of Konstanz, CEPR, and Cluster of Excellence "The Politics of Inequality", almuth.scholl@uni-konstanz.de

1 Introduction

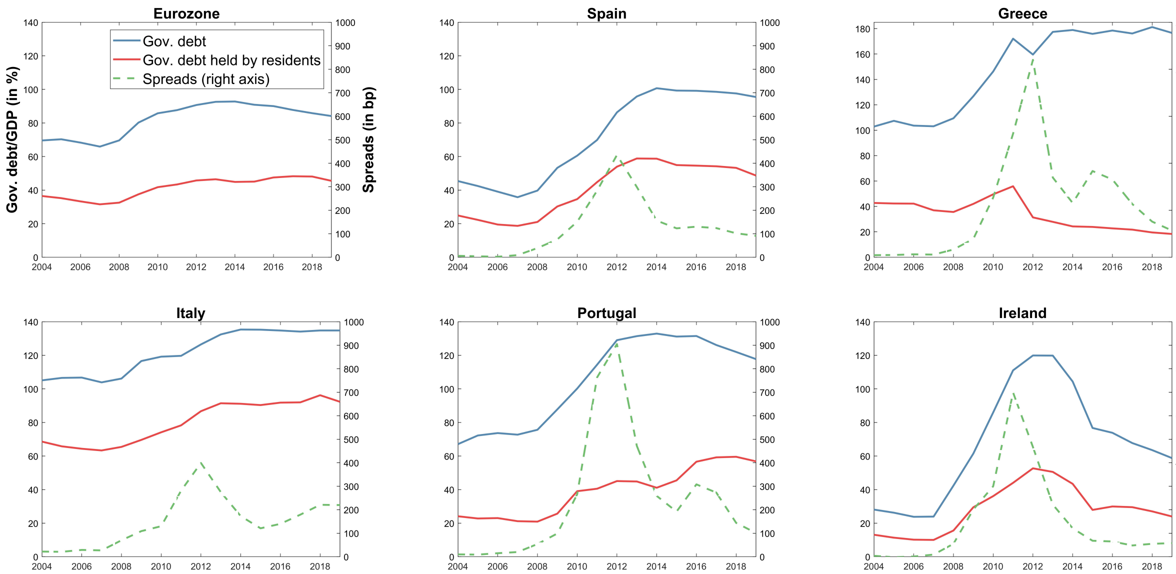
During the European sovereign debt crisis public debt to GDP ratios and interest rates on European government bonds increased substantially. Importantly, a sizable share of European public debt is held by domestic creditors (Figure 1). To pay for increasing debt service costs, governments are forced to cut spending and to raise taxation with important distributional and political implications: Wealthy households who hold government bonds support austerity measures, whereas poor households may prefer a sovereign default. This political conflict is strengthened in economies with large shares of domestic debt and high wealth inequality.

This paper aims to understand the political and distributional consequences of sovereign debt and default. Specifically, we study how optimal fiscal policy choices are affected by redistributive concerns, the composition of sovereign debt, and political constraints.

We answer the research question within a quantitative macroeconomic model of sovereign debt and default with heterogeneous households in which the government needs political support for the implementation of fiscal policies. We build on D'Erasmo and Mendoza (2021) and consider an infinite-horizon small open endowment economy inhabited by a continuum of households who face idiosyncratic income risk. Households are borrowing-constrained but can save in government bonds. The government of the small open economy finances stochastic government spending and lump-sum transfers by taxing income and by issuing non-state-contingent bonds. Debt contracts are not enforceable and are subject to sovereign default risk. In addition to domestic creditors, there is a pool of risk-neutral, perfectly competitive foreign creditors. We assume that the government cannot discriminate between between domestic and foreign creditors. The government's political preferences are characterized by weights imposed on the welfare of the individual households depending on their bond holdings. Following Andreasen et al. (2019), the government is politically constrained in its fiscal policy choices: A fiscal plan is required to receive the support of the majority of households. If neither fiscal plan is approved by the households, the government is forced to default. An individual households evaluates a fiscal plan by comparing the associated expected lifetime utility with the one associated with a sovereign default.

The aggregate approval depends on the distribution of income and wealth which itself is affected by the fiscal plan chosen by the government. To solve this issue, we assume that the government uses a forecasting rule to predict the aggregate vote share. The forecasting rule depends on two variables that are the main determinants of the individual approval: transfers and the bond price. On the one hand, individuals assess the government's fiscal plan by evaluating the size of transfers in comparison with the size of transfers in case

Figure 1. The European Sovereign Debt Crisis



of a sovereign default. On the other hand, the bond price shapes the individual approval since it captures the rate of return a household receives when saving in bonds. While poor households do not hold government bonds, for wealthier households the bond price becomes an important determinant of their individual approval of a fiscal plan. Our algorithm starts with an initial guess for the coefficients of the forecasting rule. Based on the initial guess we derive the optimal policy functions and simulate the model. Using the simulated time series, we update the coefficients iteratively until they converge.

We calibrate the model to the Italian economy motivated by the large share of public debt held by domestic creditors. To highlight the impact of political constraints on sovereign debt and default, we provide a comparison with a counterfactual economy in which the government is politically unconstrained in its fiscal policy choices. It turns out that for a given level of debt, the government finds it difficult to design a fiscal plan that gains the support of the majority of household. The political constraint makes fiscal plans infeasible already for intermediate levels of debt and substantially raises the probability of a sovereign default. The higher sovereign default risk is reflected in high credit costs imposing a severe borrowing constraint on the government. In equilibrium, the government accumulates less debt compared to the counterfactual economy, which, in turn, dampens sovereign default risk in the long run.

In the model, political conflicts generate sovereign defaults. Our model simulations suggest that prior to a typical default, the economy is characterized by favorable economic conditions allowing the government to borrow. Over time, debt is accumulated and raises the interest spread. To benefit from the higher returns, households increase their savings in government bonds. Since the domestic demand for government bonds does not fully absorb the larger bond supply, external debt increases as well. The aggregated approval rate increases prior to a default because of higher interest spreads and larger transfers. However, wealth inequality gradually increases in the run-up to the crisis. Two forces have opposing effects on wealth inequality. On the one hand, the government borrows more and redistributes progressively by providing transfers. On the other hand, higher borrowing increases the interest rate on government bonds and raises the return on household savings. Thus, households with a large bond position are becoming richer. Our quantitative findings shows that the second effect dominates such that wealth inequality increases prior to the default. The default is triggered by an adverse aggregate shock. Since the government has accumulated a substantial amount of debt, the interest spread increases strongly. Debt repayment becomes very costly implying low transfers, such that a political conflict occurs. While wealthy households prefer the government to fulfill the debt contracts, poorer households are in favor of a default. Consequently, the approval rate of the fiscal plan decreases substantially such that the government defaults.

Our paper is related to different strands of the literature. First, we build on quantitative macroeconomic models with heterogeneous agents and incomplete markets that focus on the role of public debt, see among others Aiyagari and McGrattan (1998), Flodén (2001), Heathcote (2005), Azzimonti et al. (2014), Röhrs and Winter (2017). While these studies abstract from sovereign defaults, Ferriere (2015), Jeon and Kabukcuoglu (2018) and Deng (2021) study the distributional implications of sovereign default risk within a quantitative model of sovereign debt and default pioneered by Aguiar and Gopinath (2006) and Arellano (2008). However, these papers focus on external debt and assume that domestic households are hand-to-mouth.

Tran-Xuan (2022), D'Erasmo and Mendoza (2016), and D'Erasmo and Mendoza (2021) allow for domestic creditors in models of sovereign debt with limited commitment. While Tran-Xuan (2022) studies constrained-efficient allocations, D'Erasmo and Mendoza (2016) consider a stylized two-period setting in which a government defaults on external and domestic debt. D'Erasmo and Mendoza (2021) is a quantitative infinite-horizon version of the two-period setup of D'Erasmo and Mendoza (2016). We follow D'Erasmo and Mendoza (2021) in the main structure of the model economy and contribute by adding a political constraint that restricts the set of feasible fiscal plans. This allows us to study the rich dynamics between wealth inequality, the composition of sovereign debt, and political conflict.

Second, we contribute to the literature that studies political aspects in models of public debt pioneered by Tabellini (1991), Aghion and Bolton (1990), Dixit and Londregan (2000).

Dovis et al. (2016) consider an overlapping generation model in which current and future governments disagree on redistributive policies and debt. In their setting, boom-bust cycles arise in which the current government issues debt to redistribute via transfers, followed by a future government cutting transfers to reduce debt. Similarly, Aguiar and Amador (2011) study the interaction of political economy frictions and sovereign default risk, but as in Dovis et al. (2016), allocations are subject to enforceability constraints. In contrast, we allow the government to default on external as well as domestic debt. Guembel and Sussman (2009) analyze a stylized two-period endowment economy with domestic and external debt in which households differ in terms of income and bond savings such that a political conflict arises. In a two-party setting, the government's debt and default decisions are taken by majority voting. Guembel and Sussman (2009) highlight that debt is only supportable if the government cannot discriminate between different classes of creditors. We use this result and assume that the government cannot differentiate between domestic and foreign creditors.

Novelli (2021) and Azzimonti and Mitra (2012) analyze the role of political constraints in the form of legislative bargaining in models of external debt. Our paper is closely related to Andreasen et al. (2019) who analyze the impact of political constraints in an endowment economy with income inequality, external debt, and sovereign default risk. Andreasen et al. (2019) assume that the government's debt policy needs to be supported by the majority of households. They find that less redistribution and more income inequality reduces the political support and increases default risk. Like Andreasen et al. (2019) we assume that fiscal plans need the majority of votes but allow for domestic debt and an endogenous wealth distribution.

Our paper is also related to Hatchondo et al. (2009), Cuadra and Sapriza (2008), Scholl (2017), Chatterjee and Eyigungor (2019), Prein and Scholl (2021) who focus on the interaction between political turnover and sovereign default in models of external debt. While these studies focus on the impact of fiscal policy choices on electoral outcomes, they abstract from domestic debt and wealth inequality, which is the focus of our paper.

The remainder of the paper is structured as follows. Section 2 describes the model environment and defines the recursive equilibrium. Section 3 deals with the solution algorithm and the calibration. Section 4 presents the quantitative results and discusses the economic mechanisms and the impact of political constraints in the short and long run. Section 5 concludes.

2 A Political Economy Model

2.1 Environment

We build on D'Erasmo and Mendoza (2021) and consider an infinite-horizon small open endowment economy inhabited by a continuum of households of measure one who face idiosyncratic income risk. Households are borrowing-constrained but can save in bonds. The government of the small open economy finances government spending and lump-sum transfers by taxing income and by issuing non-state-contingent bonds. Government spending G_t is stochastic and follows a Markov process with the transition function $\psi(G_{t+1}|G_t)$ and compact support $\mathbb{G} = [\underline{G}, \bar{G}]$. Debt contracts are not enforceable and are subject to sovereign default risk. If the government defaults, the economy is hit by exogenous default costs but the government regains access to financial markets in the next period. Risk-neutral foreign creditors act in perfect competition and borrow at the risk-free rate. The government cannot discriminate between between domestic and foreign creditors. Following Andreasen et al. (2019), the government is politically constrained in its fiscal policy choices: A fiscal plan is required to receive the support of the majority of the households. An individual households evaluates a fiscal plan by comparing the associated expected lifetime utility with the one associated with a sovereign default.

The household's preferences are given by

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_t),$$

where $\beta \in (0,1)$ denotes the rate of time preference and c_t refers to consumption of an individual household. $u(c_t)$ is continuous, twice differentiable, strictly increasing and satisfies the Inada conditions. Households face stochastic idiosyncratic income y_t which follows a discrete Markov process with a transition function $\pi(y_{t+1}|y_t)$ and compact support $\mathbb{Y} = [\underline{y}, \bar{y}]$. We follow D'Erasmo and Mendoza (2021) and assume that idiosyncratic income shocks have a zero mean across households such that aggregate income Y is deterministic. Moreover, idiosyncratic income shocks and aggregate government spending shocks are assumed to be independent. To insure against idiosyncratic income fluctuations, households can save in government bonds, however, households face an exogenous borrowing constraint, $b_{t+1} \geq 0$. If the government does not default on outstanding debt, the individual budget constraint is given by

$$c_t + q_t b_{t+1} = y_t(1-\tau) + b_t + T_t,$$

where q_t denotes the price of the bond with face value b_{t+1}. The government taxes individual income at a constant proportional tax rate τ. T_t denote lump-sum transfers provided by the government. If the government defaults, the individual household faces the following budget constraint

$$c_t = y_t(1-\tau) + T_t - \phi(G_t).$$

$\phi(G_t)$ denotes exogenous default costs with $\frac{\partial \phi(G_t)}{\partial G_t} < 0$. The idiosyncratic income shocks and saving decisions generate an endogenous distribution of income and wealth denoted by $\Lambda_t(b_t, y_t)$.

The government raises the exogenous proportional tax τ on income, issues non-state-contingent one-period bonds B_{t+1}, and provides lump-sum transfers T_t. We assume the government to be a debtor such that $B_{t+1} \geq 0$. Since debt contracts are not enforceable, the government may default on its outstanding debt B_t. If debt is repaid, the government's budget constraint is given by:

$$T_t = \tau Y + q_t B_{t+1} - B_t - G_t.$$
$$B_{t+1} \geq 0$$

Aggregate income Y is constant in the economy. The government uses revenues from income taxation τY and resources from borrowing $q_t B_{t+1}$ net of debt repayment B_t and government spending G_t to finance lump-sum transfers T_t.

In case of a sovereign default, the government's budget constraint is given by:

$$T_t = \tau Y - G_t.$$

The government chooses its optimal policy as to maximize the weighted expected discounted lifetime utility of households. The welfare weighs $\omega(b_t, y_t)$ reflect the political preferences of the government and are given by:

$$\omega(b, y) = \pi^*(y) \frac{1}{\bar{\omega}} e^{-\frac{(b+z)}{\bar{\omega}}}$$

with the stationary distribution of income $\pi^*(y)$ and $z \geq 0$. The parameter $\bar{\omega} > 0$ determines the creditor bias: With increasing $\bar{\omega}$, the government gives more weight to the utility of households with larger bond savings and, thus, has a political bias towards creditors.

We follow Andreasen et al. (2019) and assume that the government faces a political constraint when choosing its fiscal policy. To get accepted, a fiscal plan needs the majority of votes of the households. We define the individual approval $p_t \in \{0, 1\}$ of a fiscal plan to be an indicator function which equals one if the associated household's discounted expected lifetime utility is greater than the one associated with a default and zero otherwise. Using the endogenous income and wealth distribution $\Lambda_t(b_t, y_t)$, the individual approvals can be aggregated to derive the population's vote share P_t supporting the fiscal plan. The fiscal plan is accepted if the aggregate approval P_t exceeds an exogenous vote threshold: $P_t \geq P^s$. If all fiscal plans are rejected, the government is forced to default.

Foreign creditors are risk-neutral, act in perfect competition, and borrow at the risk-free rate r. They have full information about the state of the economy.

2.2 Recursive Equilibrium

The timing is as follows. At the beginning of each period t, idiosyncratic and aggregate shocks are realized. Individual states (b, y), aggregate states (B, G) and the distribution $\Lambda(b, y)$ are observed. The government proposes its fiscal plan and individual voting on the fiscal plan takes place. Either the fiscal plan is implemented or a sovereign default takes place. Taking as given the government's policies, households make their savings and consumption choices.

2.2.1 Private Sector

Taking as given the government's fiscal policy, an individual household maximizes her expected discounted lifetime utilities subject to her budget constraint. B' denotes the government's debt policy and d is an indicator function that takes the value of one if the government defaults and zero otherwise. The individual household's value function is given as:

$$V(b, y, B, G; B') = (1-d)V^{d=0}(b, y, B, G; B') + dV^{d=1}(y, G)$$

$V^{d=0}(b, y, B, G; B')$ refers to the individual household's value function if the government does not default and issues new debt B', given the individual states (b, y) and the aggregate states (B, G). $V^{d=1}(y, G)$ is the household's value function if the government defaults on all outstanding debt obligations.

$V^{d=0}(b, y, B, G; B')$ solves:

$$\begin{aligned} & V^{d=0}(b, y, B, G; B') = \max_{\{c, b'\}} \; u(c) + \beta \mathbb{E}[V(b', y', B', G'; B''|y, G)] \\ & \text{s.t.} \\ & c + q(B', G)b' = y(1-\tau) + b + T \\ & b' \geq 0 \end{aligned}$$

If a default occurs, $V^{d=1}(y,G)$ solves:

$$\begin{aligned}&V^{d=1}(y,G) = u(c) + \beta\mathbb{E}[V(0,y',0,G';B'')|y,G]\\&\text{s.t.}\\&c = y(1-\tau) + T - \phi(G)\end{aligned}$$

The solution to the private sector's maximization problem yields the individual policy functions $c(b,y,B,G;B')$ and $b'(b,y,B,G;B')$.

2.2.2 Political Process

An individual household supports the government's fiscal plan (B',T) if her associated expected discounted lifetime utility is larger than her expected discounted lifetime utility if a sovereign default takes place:

$$p(b,yB,G;B') = \begin{cases}1 \text{ if } V^{d=0}(b,y,B,G;B') \geq V^{d=1}(y,G)\\0 \text{ else}\end{cases}$$

Using the distribution $\Lambda(b,y)$, the aggregate population's vote share supporting the fiscal plan can be derived as:

$$P(B,G;B') = \int_{\mathbb{Y}x\mathbb{B}} p(b,y,B,G;B')d\Lambda(b,y)$$

2.2.3 Public Sector

The government imposes the welfare weights $\omega(b,y)$ when aggregating the households' discounted lifetime utilities.

$$W^{d=0}(B,G;B') = \sum_{y\in\mathbb{Y}}\int_{\mathbb{B}} V^{d=0}(b,y,B,G;B')\omega(b,y)\ db,$$

where $W^{d=0}(B,G;B')$ refers to the government's welfare functions conditional on debt repayment.

The government chooses its optimal fiscal plan taking into account the political constraint and the private sector policy functions $c(b, y, B, G; B')$ and $b' = b'(b, y, B, G; B')$

$$\begin{aligned}
&\max_{B'} \; W^{d=0}(B, G; B') \\
&\text{s.t.} \\
&T = \tau Y + q(B', G)B' - B - G, \\
&B' \geq 0, \\
&P(B, G; B') \geq P^s \\
&c(b, y, B, G; B') \text{ and } b'(y, B, G; B')
\end{aligned}$$

Given the aggregate states and the distribution of wealth and income, when designing the fiscal plan, the government takes into account that its fiscal plan needs to receive a majority of votes in the population. A sovereign default takes place when the government cannot propose any fiscal plan such that $P(B, G; B') \geq P^s$. The solution to the public sector's maximization problem yields the default decision $d(B, G)$ and debt policy $B'(B, G)$.

Let $D(B)$ be the set of government spending realizations $G \in \mathbb{G}$ such that a default occurs.

$$D(B) = \{G \in \mathbb{G} : d(B, G) = 1\}$$

The default probability is given by:

$$\delta(B', G) = \sum_{G' \in \mathbb{G}} d(B', G')\psi(G'|G)$$

2.2.4 Foreign Creditors

Apart from domestic households, the government borrows from a large number of identical risk-neutral foreign creditors who have full information on the state of the economy and act in perfect competition. They can borrow or lend at risk free rate r. The zero expected profit condition implies:

$$q(B', G) = \frac{1 - \delta(B', G)}{1 + r},$$

where $\delta(B', G)$ denotes the default probability given B' and G.

3 Solution Method and Calibration

3.1 Solution Method

The government's aggregate approval P depends on the wealth distribution $\Lambda(b, y)$, which itself is affected by the fiscal plan chosen by the government. Inspired by the solution method proposed in Krusell and Smith (1998), we assume that the government uses a forecasting rule F to predict the aggregate vote share P. We assume that the forecasting rule depends on two variables that are the main determinants of the individual approval: transfers T and the bond price q. On the one hand, individuals assess the government's fiscal plan by evaluating the size of the transfers in comparison with the size of transfers in case of a sovereign default. On the other hand, q shapes the individual approval since it captures the rate of return a household receives when saving in bonds. While poor households do not hold government bonds, for wealthier households the bond price becomes an important determinant of their individual approval of a fiscal plan.

We use a fractional response model to specify the forecasting rule F as an approximation of the approval rate $P \in (0, 1)$. Following Papke and Wooldridge (1996), the fractional response model with $j = 1, \ldots, n$ observations is given by:

$$P_j = F(x_j'\alpha) + \epsilon_j, \ j = 1, \ldots, n$$

where the dependent variable P_j is the aggregate approval rate. $0 \leq F(x_j'\beta) \leq 1$ is a cumulative distribution function, x_j contains the independent variables T_j and q_j, α is the vector of regression coefficients, and ϵ_j is the error term. Following Papke and Wooldridge (1996), we choose the logistic function $F(z) = \frac{\exp(z)}{1+\exp(z)}$ and determine α by maximizing the log-likelihood function:

$$\mathbb{L}(\alpha) = \sum_{j}^{n} y_j \log(F(x_j'\alpha)) + (1 - y_j)\log(1 - F(x_j'\alpha))$$

To solve the model we apply the following algorithm:

1. Start with an initial guess for the forecasting coefficients α.

2. Given the forecasting rule $F(x_j'\alpha)$, apply standard value function iteration techniques to solve for the optimal policy functions of the public and private sector.

3. Given the policy functions, simulate the model economy to derive the wealth distribution, individual voting, and the aggregate approval.

4. Use the simulated time series to estimate the coefficients α of the fractional response model.

5. Update the coefficients α and go back to step 1.

6. Iterate until the coefficients α converge.

Our results show that this solution strategy and the parsimonious specification of the forecast rule captures the main drivers of P and delivers a suitable approximation.

3.2 Calibration

In the quantitative analysis, we calibrate the model to the Italian economy. We choose Italy as an example of a country that was particularly hit by the Eurozone debt crisis while exhibiting a substantial amount of domestic public debt. In the following, we specify the functional forms and calibrate the parameter values on an annual basis. A subset of parameters is calibrated externally whereas the remaining parameters are calibrated internally to match specific empirical targets. Table 1 summarizes the set of parameters and its targets.

Table 1. Benchmark calibration

Parameter			Target
External			
Risk-free rate	r	0.013	German bond yields
Risk aversion	σ	2	Standard value
Idiosyncratic income	ρ_y	0.5	Autocorrelation income
	μ_y	1.0	Average income
	σ_υ	0.274	Standard deviation income
Government spending	ρ_G	0.82	Autocorrelation government spending
	μ_G	0.189	Average government spending
	σ_ϵ	0.024	Standard deviation government spending
Voting threshold	P^s	0.5	Simple majority
Internal			
Time preference	β	0.795	Average domestic debt ratio
Default cost: level	ϕ_1	1.8	Average bond spreads vs. Germany
Default cost: shape	ϕ_2	0.5	Average bond spreads vs. Germany
Income tax	τ	0.28	Tax revenues as share of GDP
Pareto weight	$\bar{\omega}$	0.1	Total debt as share of GDP

The utility function is assumed to have a constant relative risk aversion (CRRA):

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

where $\sigma > 0$ denotes the parameter of relative risk aversion. We set $\sigma = 2$ which is a standard value in the literature on sovereign debt. We calibrate the time preference β to match the domestic debt ratio of 62.5%. The risk-free rate r is set to 1.3% based on the average long-term bond yields of Germany. We follow D'Erasmo and Mendoza (2021) and assume asymmetric default costs:

$$\phi(G) = \begin{cases} \phi_1(\mu_g - G)^{\phi_2} \text{ if } G \leq \mu_G \\ 0 \text{ else} \end{cases}$$

where $\phi_1 > 0$ and $\phi_2 > 0$ determine the level and shape of the cost, respectively. Since $\frac{\partial \phi(G)}{\partial G} \leq 0$ if $G \leq \mu_G$, default becomes more costly for lower realizations of government spending. We set $\phi_1 = 1.8$ and $\phi_2 = 0.5$ to match the average spreads of Italy vs. Germany of 1.21%. Income and government spending shocks are assumed to follow AR(1) processes:

$$\log(y') = (1 - \rho_y)\log(\mu_y) + \rho_y \log(y) + \upsilon$$
$$\log(G') = (1 - \rho_G)\log(\mu_G) + \rho_G \log(G) + \epsilon$$

where υ and ϵ are i.i.d $N(0, \sigma_\upsilon^2)$ and $N(0, \sigma_\epsilon^2)$, respectively. We estimate the AR(1) process for G using data for government final consumption expenditures. For y, we rely on parameters used in the macroeconomic literature and choose $\rho_y = 0.5$ and $Var(\log(y)) = 0.1$ such that $\sigma_\upsilon = \sqrt{Var(\log(y))(1 - \rho_y^2)} = 0.274$. We normalize $\mu_y = 1$ such that aggregate income $Y = 1$. Given the normalization, all variables are measured as GDP ratios. We discretize both Markov processes using Tauchen's method (Tauchen and Hussey (1991)).

The proportional tax τ is set such that tax revenues τY match the average tax revenue collected from individual labor and consumption taxes as share of GDP (27.95%). Thus, the tax rate does not consider any form of capital income taxation.

The political preferences are given by:

$$\omega(b, y) = \pi^*(y)\frac{1}{\bar{\omega}}e^{-\frac{(b+z)}{\bar{\omega}}}$$

In the benchmark, we set $z = 0$. The weight $\bar{\omega}$ is calibrated to match the total debt to GDP ratio of 13.72%. We choose the required vote share $P^s = 0.5$ such that the government requires a simple majority of votes for approval of its fiscal program.

4 Results

4.1 Understanding the Mechanisms

In a first step, we study the properties of the policy functions to understand the economic mechanisms behind the dynamic interaction between sovereign default risk, political constraints, and the distribution of income and wealth. We facilitate a comparison of our benchmark political economy with a counterfactual economy in which the government does not require approval for a fiscal plan. The counterfactual economy corresponds to the one proposed by D'Erasmo and Mendoza (2021) in which the government optimally decides whether to repay outstanding debt obligations or to default. In this economy, the government's debt and default policy is determined by the government's preferences reflected in the exogenous welfare weights $\omega(b, y)$.

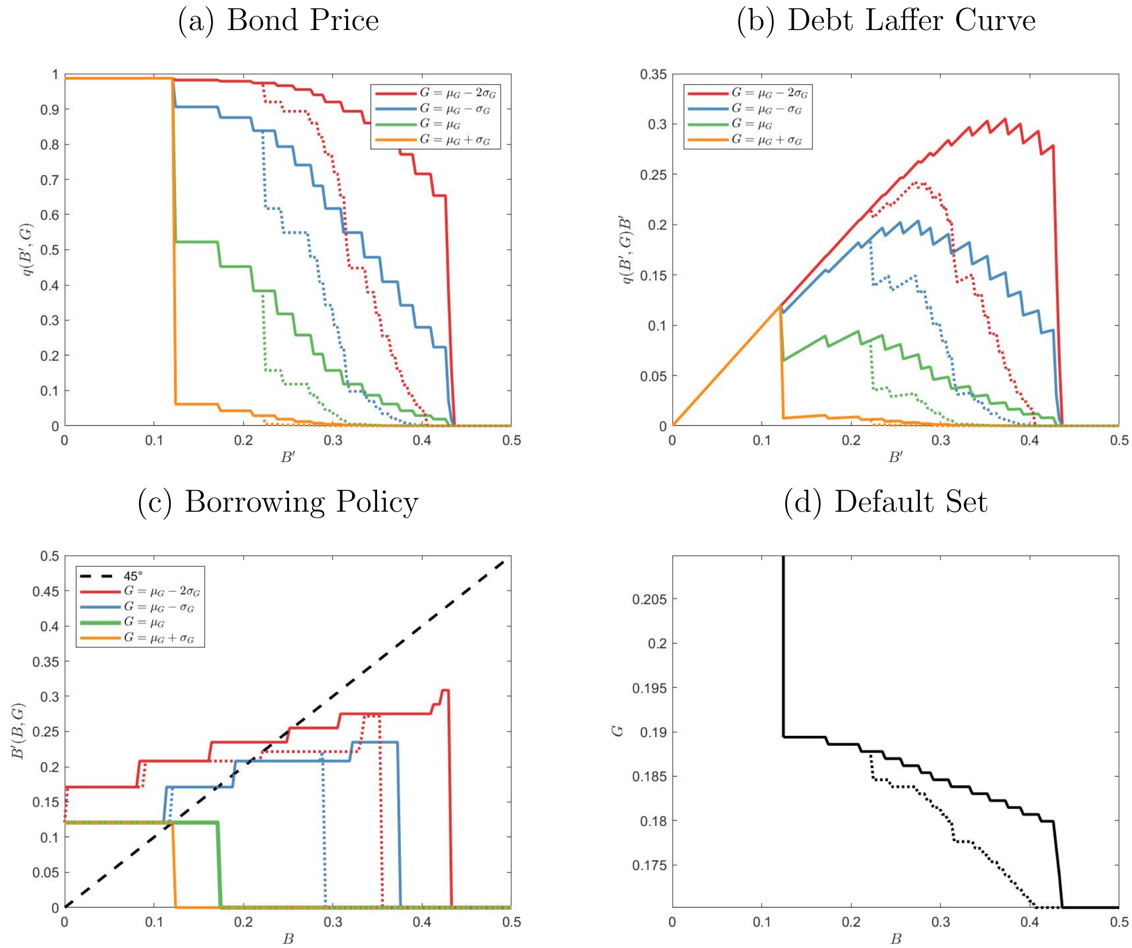
Figure 2 show the government's policy functions for the counterfactual economy (solid line) and the benchmark political economy (dotted line). Specifically, the figure depicts the bond price $q(B', G)$ as a function of B', the borrowing policy $B'(B, G)$ as a function of B, and the debt Laffer curve $q(B', G)B'$ as a function of B' for different realizations of government spending G. Furthermore, it displays the sovereign default set $d(B, G)$.

Let us first consider the counterfactual economy in which the government does not face any political constraints (solid lines in Figure 2) The bond price function (panel (a)) is decreasing in B' reflecting the government's default risk. The default set (panel (d)) highlights that default incentives are increasing in the level of debt and in government spending. For a small amount of borrowing B', the government has no incentive to default and repayment is certain. Consequently, the bond price is equal to the inverse of the risk free rate. For higher amounts of borrowing, the bond price is determined by the probability of a sovereign default. When borrowing is so large that a sovereign default occurs for any realization of the aggregate spending shock, the bond price collapses to zero. The pattern of the bond price function is reflected in the government's optimal borrowing policy function $B'(B, G)$ (panel (c)). The borrowing policy is increasing in the level of existing debt B and intersects with the 45-line. On the left of the 45-line the government accumulates debt whereas on the right of the 45-line it reduces debt. Clearly, the bond price restricts the government in the issuance of new debt. For lower realizations of government spending, the bond price function is smooth such that borrowing gradually increases up to the point where the government decides to default. For high spending realizations, default incentives are large and the bond price function is very steep. In this case, the government is severely borrowing constrained. The debt Laffer curve $q(B', G)B'$ (panel (d)) is hump-shaped in B'. First, borrowing is risk free and revenues from borrowing increase at a linear rate $\frac{1}{1+r}$. When debt becomes risky, revenues from borrowing are still increasing but at a lower rate as the interest rate on government bonds rises. At some point, revenues from borrowing are falling because of high interest spreads. These findings correspond to the ones reported in D'Erasmo and Mendoza (2021).

To evaluate the impact of the political constraint on the government's decisions, we now compare the counterfactual economy with the benchmark political economy (dotted lines in Figure 2). To implement a fiscal plan, the government needs the support of the majority of the households. It turns out that this political constraint makes fiscal plans infeasible already for intermediate levels of debt and enlarges the default set. The higher sovereign default risk is reflected in the pattern of the bond price function, which becomes much steeper. Consequently, the government becomes more borrowing-constrained and the revenues collected from borrowing decrease. Moreover, the Laffer curve peaks at a lower level of debt.

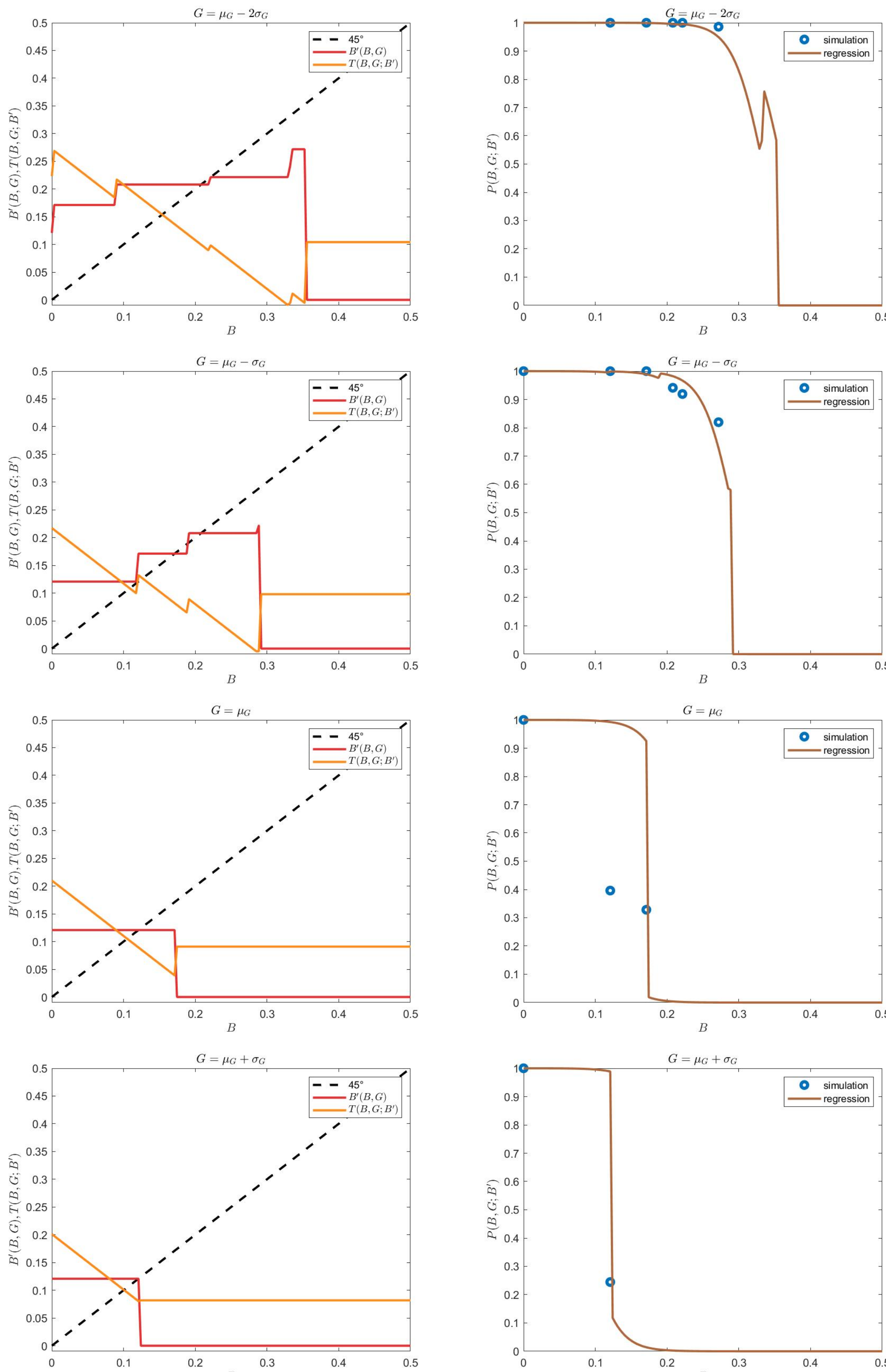
Figure 3 considers different realizations of government spending and shows the aggregate approval rate approximated by the forecasting rule F as a function of B (right panel) given the optimal borrowing decision B' and transfers T (left panel). Clearly, if sovereign indebtedness is low, the government can borrow and provide large transfers gaining high approval. With increasing debt, however, the support for fiscal plans that ensure debt repayment shrinks, as the majority of households suffer from reduced transfers. The blue circles highlight the realized approval rates observed in the simulation of the model. The specification of the forecasting rule provides a reasonable match of the simulated data.

Figure 2. Policy Functions, Debt Laffer Curve and Default Set



Notes: The upper left panel shows the bond price $q(B', G)$ as a function of B'. The lower left panel displays the borrowing policy $B'(B, G)$ as a function of B whereas the upper right panel visualizes the debt Laffer curve $q(B', G)B'$ as a function of B'. The solid lines refer the counterfactual economy in which the government is politically unconstrained. The dotted lines refer to the benchmark political economy.

Figure 3. Aggregate Approval of Fiscal Plans



Notes: The right panels show the aggregated approval P approximated by the forecasting rule F as a function of B, considering different realizations of G. The blue circles highlight the realizations observed in the simulation of 10.000 observations of the model. The left panels show the corresponding borrowing B' and transfer policy T as function of B for different realizations of G.

4.2 The Impact of Political Constraints on Sovereign Debt and Default in the Long Run

To study the impact of the political constraint on sovereign debt and default, we simulate the benchmark economy and the counterfactual economy for 10.000 periods and exclude all default events when computing the long-run statistics. Table 2 summarizes the results. First of all, the model economy provides a reasonable match of the Italian data. In particular, it matches the overall debt level as well as the domestic debt ratio in the data. It turns out that in the long run, political constraints reduce the total amount of debt and sovereign default risk. The policy functions have shown that the government finds it difficult to design a fiscal plan that gains the support of the majority of households. Consequently, for a given level of debt, sovereign default risk increases and raises the sovereign interest spread. Since debt becomes more expensive in the presence of political constraints, the government is restricted in its borrowing decisions. In the long run, the government accumulates less debt compared to the counterfactual economy, which, in turn, dampens sovereign default risk in equilibrium.

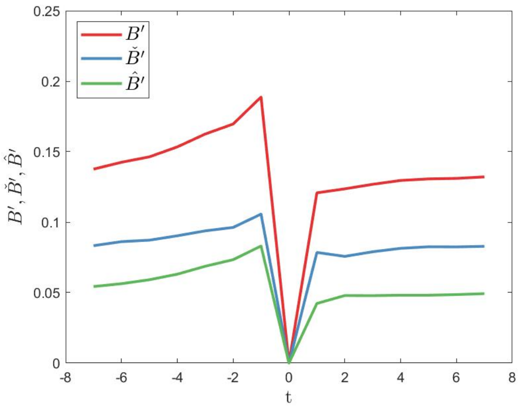
Table 2. Long-Run Statistics

Description	Variable	Counterfactual	Benchmark	Data
Total debt	B	13.57	13.4	13.72
Domestic debt	$\check{B}$	8.38	8.35	8.575
External debt	$\hat{B}$	5.19	5.05	5.145
Domestic debt ratio	$\check{B}/B$	61.76	62.29	62.5
Government spending	G	18.9	18.9	18.9
Transfers	T	8.88	8.88	4.96
Interest spread	$\frac{q(B',G)^{-1}}{1+r} - 1$	1.2	1.11	1.21
Default rate	$\frac{I_{d=1}}{10.000}$	1.1	0.98	-
Gini domestic debt	$Gini(b)$	73.68	73.9	-
Gini income	$Gini(y)$	18.66	18.66	-
Fraction at borrowing constraint	$\frac{I_{b_i=0}}{10.000}$	48.11	48.13	-

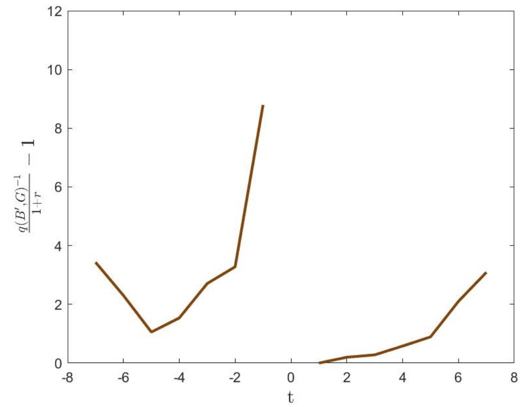
Notes: The statistics are based on average values of 10.000 simulated periods and excluding all default events. All variables are denoted in percent. Debt (total, domestic, external), government spending, and transfers are reported as GDP ratios.

Figure 4. Default Event

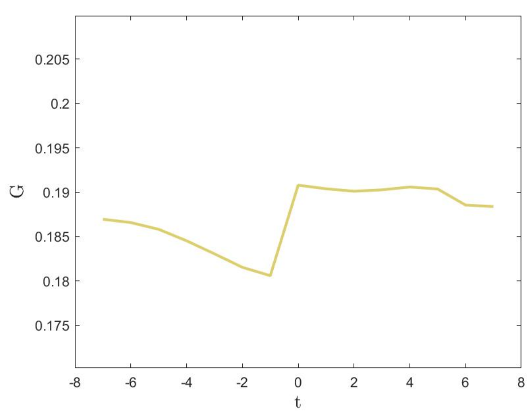
(a) Total, domestic and external debt



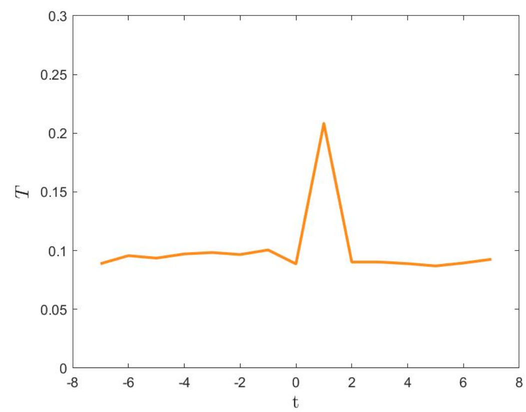
(b) Interest spread



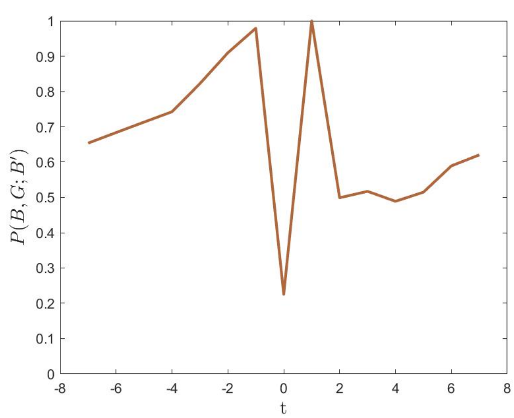
(c) Government spending



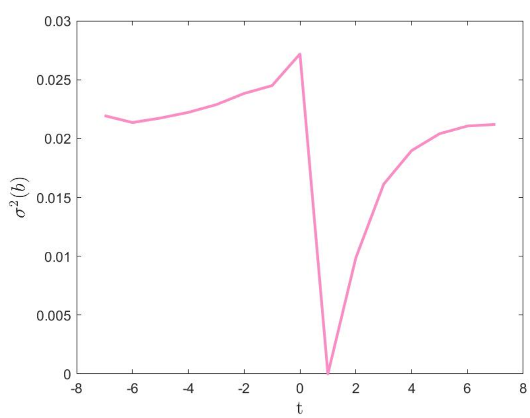
(d) Transfers



(e) Aggregated approval



(f) Variance of domestic debt



Notes: The figure shows the dynamics around an average default event taking place in period $t = 0$. We simulate the model for 10.000 periods, collect all default episodes and take the average over all default events. The panels show debt (total, domestic, external), government spending and transfers as shares of GDP. The interest spread and aggregated approval are depicted in percent.

4.3 Political Conflict and Default Events

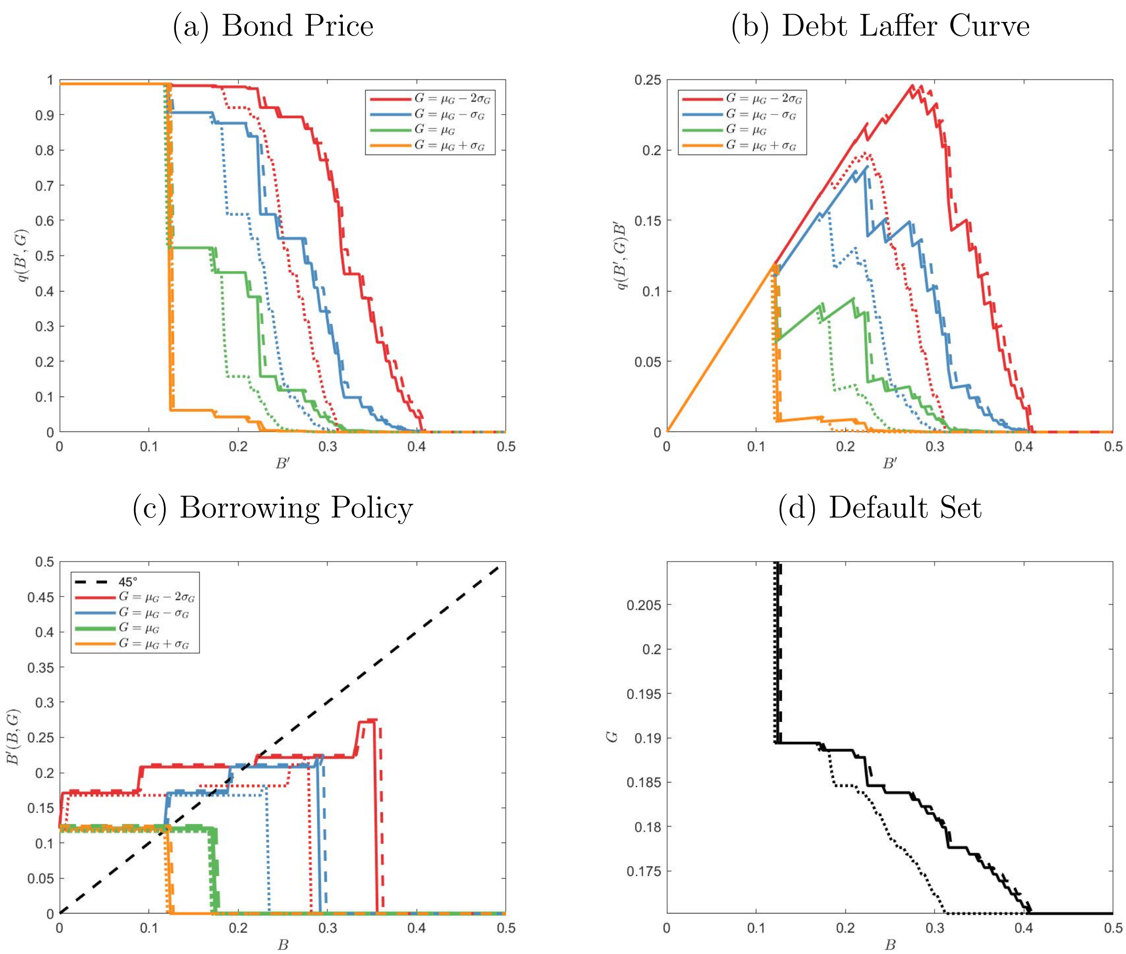
Figure 4 considers the benchmark political economy model and presents the macroeconomic dynamics around the default event at $t = 0$. It shows average debt, the composition of debt (domestic, external), the interest spread, government spending, transfers, aggregated approval, and the variance of domestic bond holdings as a measure for wealth inequality. Prior to a typical default, the economy is characterized by a series of favorable government spending shocks. In response, the government borrows and accumulates debt such that the interest spread starts to increase. Households raise their savings in government bonds because of higher returns and larger transfers. Since the domestic demand for government bonds does not fully absorb the larger government bond supply, external debt increases. The aggregated approval rate increases prior to the default because of higher interest spreads and larger transfers. Wealth inequality gradually increases in the run-up to the debt crises. Two forces have opposing effects on wealth inequality. On the one hand, the government borrows more and raises transfers. Given the proportional income tax and the lump-sum transfers, the system redistributes progressively. On the other hand, higher borrowing increases the interest rate on government bonds and raises the return on household savings. Thus, households with a large bond position become richer. The simulation shows that the second effect dominates resulting in increasing wealth inequality prior to the default. Then, in $t = 0$, the default is triggered by a large government spending shock. Since the government has accumulated a substantial amount of debt, the interest spread increases strongly. Debt repayment becomes very costly implying low transfers, such that there occurs a political conflict. While wealthy households prefer the government to fulfill the debt contracts, poorer households are in favor of a default. Consequently, the approval rate of the fiscal plan decreases substantially such that the government defaults. In $t = 1$, after the default, the government regains access to financial markets and starts borrowing again. Transfers increase sharply and the associated fiscal plans receives the full support of the population.

4.4 The Role of Income Volatility

In this section, we highlight the interaction between the volatility of the income process and the political constraint.

Figure 5 and Table 3 consider the benchmark economy and display the policy functions and the long-run statistics for a larger and a smaller variance of the income process in comparison to the benchmark specification. Increasing the variance of the income process has two effects. On the one hand, it raises income inequality such that more households are poor and not invested in government bonds. These households do not support fiscal plans to repay sovereign debt. On the other hand, if the income process is more volatile, households have an incentive to save more out of precautionary reasons. Table 3 reveals that the share of domestic debt increases substantially if the variance of the income process is raised. The default set shown in panel (d) in Figure 5 highlights that the second effect dominates quantitatively. The default set is larger for a lower variance of the income process. The larger sovereign default risk is reflected in the bond price. In the long run, the steep pattern of the bond price constraints the government's borrowing and results in a lower general equilibrium interest spread.

Figure 5. Policy Functions, Debt Laffer Curve, and Default Set for Varying Variance of Income Process



Notes: The upper left panel shows the bond price $q(B', G)$ as a function of B'. The lower left panel displays the borrowing policy $B'(B, G)$ as a function of B whereas the upper right panel visualizes the debt Laffer curve $q(B', G)B'$ as a function of B'. The solid lines refer the benchmark economy The dotted and dashed lines refer to the economy with with $Var(log(y)) = 0.07$ and $Var(log(y)) = 0.13$, respectively.

Table 3. Long-Run Statistics with Varying Variance of Income Process

Description	Variable	Low Inequality $Var(log(y)) = 0.07$	Benchmark $Var(log(y)) = 0.1$	High Inequality $Var(log(y)) = 0.13$
Total debt	B	12.60	13.41	13.74
Domestic debt	$\check{B}$	4.51	8.35	12.63
External debt	$\hat{B}$	8.10	5.05	1.12
Domestic debt ratio	$\check{B}/B$	35.76	62.29	91.88
Government spending	G	18.9	18.9	18.9
Transfers	T	8.89	8.88	8.87
Interest spread	$\frac{q(B',G)^{-1}}{1+r} - 1$	0.69	1.11	1.11
Default rate	$\frac{I_{d=1}}{10.000}$	0.54	0.98	0.98
Gini domestic debt	$Gini(b)$	76.14	73.9	72.02
Gini income	$Gini(y)$	15.89	18.66	21.05
Fraction at borrowing constraint	$\frac{I_{b_i=0}}{10.000}$	57.5	48.13	40.4

Notes: The statistics are based on average values of 10.000 simulated periods and excluding all default events. All variables are denoted in percent. Debt (total, domestic, external), government spending, and transfers are reported as GDP ratios.

5 Conclusions

This paper has explored the political and distributional consequences of sovereign debt and default. Specifically, we have analyzed how optimal fiscal policy choices are affected by redistributive concerns, the composition of sovereign debt, and political constraints.

We have studied the research question within a quantitative macroeconomic model of sovereign debt and default in which heterogeneous households face idiosyncratic income risk and save in non-state-contingent government bonds. Debt contracts are not enforecable and the government is politically constrained in its policy choices: A fiscal plan is required to receive the support of the majority of households. If neither fiscal plan is approved, the government is forced to default.

We highlight that debt crises are characterized by a political conflict. In the run-up to a sovereign default, the government has to reduce redistributive transfers to pay for increasing debt service costs. While wealthy households prefer the government to fulfill the debt contract as they benefit from high interest rates, poorer households are in favor of a default. Consequently, the approval of the fiscal plan decreases and raises the likelihood of a sovereign default.

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