

Debt, Defaults and Dogma: politics and the dynamics of sovereign debt markets*

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Abstract

We combine three international datasets containing information on the political leanings of the ruling government, sovereign debt yields, and key macroeconomic quantities. This yields new stylized facts regarding the influence of the political leanings of a country's government on their international borrowing costs as well as on fiscal policy. First, left wing governments, on average, pay 134 basis points more than right wing governments to borrow on international debt markets. Second, interest rates on left-wing government debt are 50 percent more volatile than their right-wing counterparts and 40 percent less negatively correlated with output. Third, government spending is very highly correlated with GDP with left governments showing a lower positive correlation and much less volatility than right wing governments. We proceed to build a sovereign default model in which elections determine which one of two politically heterogeneous policy makers will be in charge of the government. When the two policy makers differ in the marginal impact of their fiscal choices on their re-election probabilities, our model delivers the above-mentioned features of the data. In addition, in keeping with the data, right-wing governments display lower tax rates and government consumption to GDP shares than left-wing governments in our calibrated model. Left governments systematically default at higher income levels than right governments leading to political default events when the left replaces the right as well as higher average borrowing costs for the left government. The model implies that re-election probabilities are increasing in good times. These results are obtained without assuming any differences in the preferences of the two types of policy makers.

JEL classification: D72, E62, E32, F34, F41.

Keywords: Sovereign default, Interest rate spreads, Politics, Elections, Left-wing, Right-wing, Cyclicalilty of fiscal policy.

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1 Introduction

This paper explores the impact of the political affiliation (left vs. right) of governments on sovereign debt markets. We begin by amalgamating three data sets covering 63 countries over 23 years in order to uncover a set of stylized facts regarding the differing patterns of left-wing and right-wing governments with regard to borrowing costs, debt levels and fiscal policy. We then build a sovereign default model with elections in order to explain these facts.

Our data combines information on fiscal measures from the World Development Indicators Database, information on country spreads (the difference between the yield on a nation's debt and the equivalent US treasury) from J.P. Morgan's EMBI Global Index, and information on the political affiliation of national governments from the IDB's Database of Political Institutions. Left wing governments, on average, incur higher borrowing costs on world financial markets than their right wing counter-parts. Left wing governments face spreads of 564 basis points (bps.) while right wing government bonds yield spreads of only 430 bps.¹ Moreover, nations with left wing governments face much more volatile spreads than those with right wing governments - our dataset reveals a standard deviation of 148 bps. for left compared to 101 bps. for right governments. These differences in the volatility of spreads can have serious consequences for emerging nation business cycles as has been highlighted in the work of Neumeyer and Perri (2005) and Uribe and Yue (2006). Consistent with previous evidence, country spreads are negatively correlated with output but this correlation is somewhat stronger for right governments as compared to left governments.

Turning to fiscal policy, as expected, left governments spend slightly more on government consumption and collect more tax revenue as a fraction of GDP than right governments. In our sample of 434 left government years, the average government spending to GDP is 16% while the corresponding number in our sample of 323 right government years is 13%. Tax revenue numbers are 18% for the left vs. 16% for the right. Left wing governments implement a smoother path for government spending than right wing governments. The standard deviation of the ratio of government spending to GDP is .78 for the left and 1.04 for the right. Government spending by the left also shows a somewhat lower correlation with output than the right while being pro-

¹We define Left-wing and Right-wing parties following the IDB's Database of Political Institutions (see Cruz et al., 2001). We call Right-wing parties (R) those defined as conservative, Christian democratic, or right-wing. We call Left-wing parties (L) those defined as communist, socialist, social democratic, or left-wing.

cyclical in both cases. Moreover, the correlation between spreads and government spending is negative in the data with the right showing a higher negative correlation than the left. Finally our data suggests that elections that result in political turnover are often accompanied with changes in country spreads.

In order to explain these stylized facts, we build a model of a small open economy where a benevolent government funds spending through taxation and by borrowing from international lenders using one period debt that is subject to default. The government is formed by one of two political parties that face uncertain election outcomes every four years. Our point of departure from similar models such as Cuadra et al. (2010) is the presence of a re-election process that makes each parties probability of winning elections a function of their fiscal choices. The re-election process implies that the incumbent's probability of getting re-elected is increasing in government spending as well as in household consumption (in other words it is decreasing in taxes). Consistent with the political science literature discussed below, the left and right parties differ in the marginal gain from changes in these variables - the left gains more from delivering higher government spending while the right gains more from delivering higher private consumption. These political differences between the parties are reflected in their equilibrium decisions around the level of taxation, government spending, and more interestingly, the level of international debt to carry as well as their choice of when to default. Our model, calibrated to our international data, suggests that left governments systematically default at higher income levels than right governments.

Differences in the equilibrium debt levels and the probability of default chosen by left and right parties are reflected in the equilibrium price of government bonds. The two parties decisions regarding debt levels, government spending, taxes and whether to default or not vary with shocks to the level of output. Our calibrated model delivers a mean spread difference between left and right governments of 124 bps. which compares very well with the observed value of 134 bps. Our model also delivers a jump in spread (96 bps.) when a right party is replaced by a left party in government, consistent with the results in the data (45 bps.). In keeping with the new stylized facts discussed above, our model generates a more volatile spread when the left is in power which is less negatively correlated with output than when the right is in power. Left governments in the model implement a much less volatile path of government spending which is less correlated with output than right governments.

A feature of the model that is consistent with the data is that the probability of reelection is increasing in the output shock. Unlike papers such as Chatterjee and Eyigungor (2017), we do not build this result into our re-election process. Rather it emerges from the interaction of politics with the costs of international borrowing. When times are good, the costs of borrowing fall, this allows the incumbent to borrow more and either reduce taxes or increase government spending as a fraction of output or both. These fiscal actions raise the probability of reelection for the incumbent government.

An interesting implication of our results is that some governments may appear to be more ‘Keynesian’ than others but this feature is driven by the interaction of our calibrated re-election process with the endogenous cost of international borrowing implied by sovereign default models. Briefly, when income varies, the relative cost of funding government spending from the domestic tax base versus international borrowing also changes. The governing party responds to the changing cost landscape by re-optimizing over the two sources of funding. Political differences built into the election technology imply that right wing governments prefer to cut government spending strongly when domestic income falls while left wing governments prefer a relatively smooth path. Beyond party differences, the model results in pro-cyclical government spending behavior by both parties. This is not directly built into the model but results from mechanisms which are similar to Cuadra et al. (2010). Basically, when times are good, the probability of default is low so spreads shrink, lowering borrowing costs thus allowing an expansion of government spending relative to income.

Our results regarding the different behavior of left and right wing governments does not come at the expense of standard results from the sovereign default literature. Private and public consumption are both more volatile than output and positively correlated with it. The trade balance is negatively correlated with GDP.

Finally, our model is also consistent with standard results from the sovereign default literature, namely that the simulated small open economy is able to sustain empirically plausible levels of debt with borrowing costs that are also in line with the data. Spreads are volatile and countercyclical. Default incentives increase with the size of foreign indebtedness and decrease with the level of domestic income.

Related literature. Our paper relates to the vast empirical literature that try and account for the observed variation in world credit markets. Edwards (1984) as well as Cline and Barnes (1997) find that the spread depends on a nation’s growth in gross domestic product and exports. Cantor and Packer (1996) as well as Eichengreen and Mody (2000) also document that the cost of borrowing is highly dependent on domestic economic conditions through the credit rating channel. On the other hand, González-Rozada and Yeyati (2008) find that high correlations in borrowing costs of nations all across the world, which suggests that a set of common factors beyond domestic economic conditions also have a great impact on the spread. However, none of these studies include the political stance of the government as an independent variable in their analysis, which we find to be relevant and significant.

This study considers a dynamic stochastic small open economy with incomplete markets, endogenous political turnover, and default risk. It builds on the seminal study on international lending and sovereign default by Eaton and Gersovitz (1981), and on the more recent quantitative models by Aguiar and Gopinath (2006), Arellano (2008), and Cuadra et al. (2010), among others. Most studies in this literature abstract from political uncertainty. Notable exceptions include Cuadra and Sapriza (2008) and Hatchondo et al. (2009) who introduce exogenous political turnover and study the role of political instability on debt accumulation and default risk. Another noteworthy exception is the recent study by Scholl (2017), who introduces elections and heterogeneous policymakers in this class of models in order to analyze the interplay of sovereign default risk and political turnover. We contribute to the literature by studying the impact of endogenous electoral outcomes on interest rates and sovereign default risk. The framework provides the opportunity to quantitatively analyze the interactions of heterogeneous governments, fiscal policies, and sovereign spreads. It also allows us to determine their impact on other macroeconomic variables.

Layout. The rest of the article proceeds as follows. Section 2 presents our empirical findings. Section 3 introduces a quantitative model of sovereign borrowing, default and political elections. Section 4 dicusses the calibration of the model, and section 5 studies the main results and quantitative implications of the theory. Section 6 concludes.

2 Empirical findings

Sovereign spreads, tax revenue, and government spending vary substantially with the type of political party in office, as Table 1 documents. When a nation is ruled by a left-wing (L) government, it faces on average an interest rate spread that is 125 bps. higher and 47 bps. more volatile, than when a nation is governed by a right-wing (R) party. Tax revenues and government spending are also notably higher under L ruling.

Table 1: Spreads, fiscal policy and politics.

Political party in power	Left	Right
EMBI Spread (in bps.)	564	430
Tax revenue / GDP	18%	16%
Gov. spending / GDP	16%	13%
$\rho(GDP, G)$	0.90	0.81
$\rho(GDP, s)$	-0.34	-0.26
$\sigma(G/GDP)$	0.79	1.04
$\sigma(Spread)$ (in bps.)	148	101

A notable difference between L and R governments is in the cyclicality of their fiscal stance. L governments are more procyclical than R governments: the correlation between output and government spending is larger for L governments. At the same time, R governments seem to be more willing to change the level of government spending (or, alternatively, L governments seem to be more focused on smoothing government spending).

We proceed with an empirical analysis to determine how much of the difference in interest rates is due to the political stance of the governing party, and how much can be explained by other macroeconomic variables. The data set consists of yearly series (1993–2015) on 63 economies, and it is obtained from the World Development Indicators Database, J.P. Morgan’s EMBI Global Index, and from the Database of Political Institutions ².

As our theoretical model illustrates, the spread reflects the probability of default of a particular country. In turn, default likelihood depends on a nation’s debt level and potential output

²The Appendix provides details on each source of data in the sample.

realizations. Hence, observed data on the spread can be used to formally analyze the way in which the debt-to-GDP ratio, the GDP growth rate, and the political stance affect the level of this perceived probability:

$$s = \beta_0 + \sum_{i=1}^k \beta_i X_i + \epsilon \quad (1)$$

where the s stands for the country spread, X_i 's are the determinants of the probability of default, and the β_i 's are the coefficients of interest. We also check whether our coefficients are robust to the inclusion of yearly and country-specific fixed effects.

Table 2 illustrates the coefficients from the estimation procedures discussed. In line with the conditional means, the coefficient for “Political index” (which is increasing in a country’s orientation towards L parties) is positive and significant in all specifications of the empirical regression model. The coefficients for “Debt-to-GDP” and “GDP growth” have the expected signs (positive and negative, respectively) and are in line with our theoretical predictions.

Table 2: OLS Estimation.

	(I)	(II)	(III)
Constant	18.65	-302.0	587
Debt-to-GDP	15.26***	18.16***	26.6***
GDP growth	-115.7	-340.1	375.2
Political index	172.8**	217.3*	230.3**
Country and year FE	no	yes	no
Add. macro controls	no	no	yes
Adj. R^2	0.27	0.63	0.54
Sample size	290	290	175

Note: Statistical significance is denoted by *** 0.001, ** 0.01, and * 0.05. Additional macro controls include: debt service as a fraction of exports, total foreign reserves as a fraction of the external debt stock, the current account to GDP ratio, net investment in non-financial assets, and the country’s propensity to import (as a measure of economic openness).

3 The Model

We consider a small open economy populated by a continuum of households. There are also two political parties (L and R) which alternate in power. When in power, each party behaves benevolently trying to maximize the households lifetime utility. The economy trades bonds with a mass of competitive foreign lenders.

We use recursive notation, where *un-primed* variables (e.g. x) represent current values, while *primed* variables (e.g. x') represent next-period values. Time is discrete and goes on forever: $t = 0, 1, 2, \dots$

3.1 Households

The representative household derives utility from the consumption of both private (c) and public (g) goods according to the following per-period utility function:

$$U(c, g) = \alpha u(c) + (1 - \alpha) u(g), \quad (2)$$

where the function $u(\cdot)$ is of the CRRA type:

$$u(x) = \frac{x^{1-\gamma} - 1}{1 - \gamma}, \quad \text{for } x = \{c, g\}. \quad (3)$$

The parameter γ controls the degree of relative risk aversion, which is common across goods. This feature where government spending gives utility is also present in Cuadra et al. (2010) and Scholl (2017).

Households receive a stochastic stream of tradable income $y \in \mathcal{Y}$, which is assumed to follow a Markov process with a Markov transition function $\mu(y', y)$, and faces a proportional income tax rate, τ . As it is typical in the models following Eaton and Gersovitz (1981), the households are hand-to-mouth agents: the government does all the intertemporal smoothing for them and implements the desired allocation via changes in the tax rate. The budget constraint of the households is then:

$$c = (1 - \tau)y,$$

which just states that households consume their after-tax income every period. In case of a government default the households suffer an income loss, and hence their budget constraint is:

$$c = (1 - \tau)y_a,$$

where y_a represents the reduced income level.³

3.2 Political Turnover

An election may occur in every period of our model with exogenous probability π . This is similar to the way elections are modeled in Chatterjee and Eyigungor (2017) and Scholl (2017). If an election occurs, the incumbent party may be replaced by the other party. We endogenize political turnover by introducing a technology that governs the probability of winning elections into the model (i.e., we introduce a re-election process). In this we are guided by evidence illustrating that the re-election probability of the incumbent is dependent on their choice of taxation (with higher taxes decreasing re-election chances) and government spending (with higher spending increasing re-election chances).

Evidence on the role of taxes. Several studies have concluded that an increase in real taxes has negative effects on the incumbent’s probability of re-election in the US. Most notably, Besley and Case (1995) show that for each income group, increases in a state’s own taxes increase the probability of incumbent defeat. This impact of tax variables on election results have also been found in studies in the UK, in Belgium, in Canada, in Spain, and in Sweden.⁴ Furthermore, Tillman and Park (2009) study 102 national elections between 1990 and 2006 in 19 countries and find that: a 1 percentage point increase in the basic income tax rate reduces the incumbent’s vote share by over 0.5%. They also provide evidence that right-wing incumbents are more strongly affected by changes in basic income tax levels than left-wing governing parties.

³At this point in the model exposition it suffices to state that $y_a \leq y \forall y$. See section 3.4 for further details.

⁴Niemi et al. (1995) incorporate large-scale surveys and aggregate data on state tax increases in the UK and conclude that state governors are held accountable for increasing taxes. In Belgium, incumbents are also found to be punished for higher taxes via an analysis of municipal elections in Flanders during the period 1982 to 2000 (Vermeir and Heyndels (2006)). Happy (1992) use aggregate economic data for Canadian federal elections from 1953 to 1988 to examine the effect of incorporating taxation into the incumbency voting model. Their results illustrate that the relationship between between taxation and incumbency voting is negative, both through its effect on after-tax income and also independent of income. Bosch and Solé-Ollé (2007) use a database of nearly 3,000 Spanish municipalities and analyze three local elections (1995, 1999 and 2003) to conclude that increases in the property tax rate entail significant electoral costs for local governments. In Sweden, Hibbs and Madsen (1981) investigate the impact of macroeconomic conditions and fiscal choices on political support for governing parties over the period 1967-1978, and find that voters react favorably to sharp reductions in direct taxation.

Evidence on the role of public spending. Other empirical studies show that incumbent parties gain support through strategic government spending. Levitt and Snyder (1997) find strong evidence that federal spending benefits congressional incumbents in the US, estimating that \$100 per capita in spending is worth as much as 2 percent of the popular vote. Evidence of strategic government spending has also been noted in Canada, Chile, India, Mexico, and Sweden.⁵ Furthermore, Shin (2016) examines 197 lower chamber elections in 31 OECD countries from approximately 1980 to 2013, and finds that incumbent parties gain benefits from expansionary welfare spending. Moreover, they conclude that as the ideology of government moves closer to the right, the effects of welfare spending on the incumbent’s vote share become weaker.

Re-election process. Grounded on the above empirical evidence, we modeled the incumbent’s re-election probability as a function $P_i(\tau, g)$, where $i \in \{L, R\}$. This re-election function has the following properties:

- i-* increasing taxes lowers the probability of re-election for the incumbent,
- ii-* increasing government spending increases the probability of re-election for the incumbent,
- iii-* the L party gains more support from increasing government spending than the R , and
- iv-* the R party gains more support from lowering taxes than the L .

Namely,

$$P_i(\tau, g) = \left(\frac{c(\tau)}{y} - \kappa \right)^{\phi_i} + \left(\frac{g}{y} \right)^{\omega_i}, \quad (4)$$

where we make explicit the functional dependence of private consumption on taxes, $c(\tau)$.

The only difference between parties is in the exponents of the tax and the spending components

⁵ Landon and Ryan (1997) conclude that government spending on goods and services is shown to reduce both the probability of incumbent defeat and the percentage of vote going to the opposition in their study on political costs of taxes in Canada. In Chile, incumbents are found to have higher votes in counties which receive a larger share of government subsidies (Cerdeira and Vergara, 2008). Arulampalam et al. (2009) also find that government funds are used strategically on the basis of political consideration in India. Experimental data show that targeted programs in Mexico led to substantive increases in voter turnout and in the incumbent’s vote share in the 2000 presidential election (De La and Ana, 2013). Furthermore, incumbent governments are also found to be using grant programs in order to win votes in Sweden (Dahlberg and Johansson, 2002; Johansson, 2003).

of the function: parameters ϕ_i and ω_i govern the relative probability gains of the different parties from decreasing taxes and increasing spending, respectively. It is important to note that what really matters for re-election are taxes and spending relative to income, and not the levels per se.

3.3 Government finances

The incumbent party chooses fiscal policy instruments in order to maximize the welfare of the households. Given an initial level of debt (b), the incumbent government has two distinct fiscal decisions to make: (i) how much public consumption to provide (g), and (ii) how to finance total expenditures ($b + g$) – that is to choose the best combination of taxes (τ) and borrowing (b'). Therefore, the government budget constraint is:

$$g + b = \tau y + b'q(b', y) \quad (5)$$

where $q(b', y)$ is the per-bond price of the one-period non-state-contingent government debt. Given that there is lack of commitment to financial obligations, the government may choose to default on its debt. If so, it will face financial exclusion for a random number of periods, and its budget constraint while in autarky is:

$$g = \tau y_a \quad (6)$$

where y_a represents the reduced income level due to the income loss of default.

3.4 Determination of government policies

Each period, conditional on being in good financial standing, incumbent $i \in \{L, R\}$ chooses whether to honor its outstanding foreign debt or default. Hence, the political party in power compares the cost of temporary exclusion from international financial markets against the direct costs of repayment. This intertemporal problem can be written as a dynamic programming problem. Let $V_i(b, y)$ denote incumbent i 's value function when the government has access to credit markets, begins the period with a level of assets b , and endowment y is realized. Also, let $V^R(b, y)$ represent the value associated with the government's decision to repay its debt,

and $V_i^D(y)$ the value function when the incumbent decides to default. The problem can be expressed as follow:

$$V_i(b, y) = \max\{V_i^R(b, y), V_i^D(y)\}. \quad (7)$$

When incumbent i has access to financial markets it chooses public spending, the tax rate and foreign debt in order to maximize the households' lifetime utility, taking into account the government's and household's budget constraints:

$$V_i^R(b, y) = \max_{g, \tau, b'} \left\{ U(c, g) + \beta(1 - \pi) \int_{y'} V_i(b', y') \mu(y', y) dy' + \beta\pi \left[P_i(\tau, g) \int_{y'} V_i(b', y') \mu(y', y) dy' + (1 - P_i(\tau, g)) \int_{y'} \bar{V}_i(b', y') \mu(y', y) dy' \right] \right\} \quad (8)$$

subject to

$$\begin{aligned} c &= (1 - \tau)y, \\ g &= \tau y + q_i(b', z)b' - b. \end{aligned}$$

The value function of political party i when it is not in power and the government is in good standing is $\bar{V}_i(b, y)$, and will be defined shortly. When the government defaults on its debt obligations the country is excluded from international financial markets and the economy suffers an income loss. The problem is:

$$V_i^D(y) = \max_{g, \tau} \left\{ U(c, g) + \beta(1 - \pi) \left(\theta \int_{y'} V_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} V_i^D(y') \mu(y', y) dy' \right) + \beta\pi \left[P_i(\tau, g) \left(\theta \int_{y'} V_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} V_i^D(y') \mu(y', y) dy' \right) + (1 - P_i(\tau, g)) \left(\theta \int_{y'} \bar{V}_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} \bar{V}_i^D(y') \mu(y', y) dy' \right) \right] \right\} \quad (9)$$

subject to

$$\begin{aligned} c &= (1 - \tau)y_a, \\ g &= \tau y_a, \end{aligned}$$

with

$$y_a = \begin{cases} y & \text{if } y \leq \psi \bar{y}, \\ \psi \bar{y} & \text{otherwise,} \end{cases}$$

where \bar{y} is the mean income level, and parameter ψ controls the income loss in periods of financial autarky. This formulation generates an asymmetric income cost of default, as in Arellano (2008), which has been shown to be critical to match the counter-cyclicality of sovereign spreads.

The economy gets excluded from international credit markets in the default period, but it could regain access in the following period with probability θ . When the economy returns to credit markets, it does so without a debt burden, which is captured by the value functions $V_i(0, y')$ and $\bar{V}_i(0, y')$. Alternatively, the economy may remain in autarky with probability $1 - \theta$.

The default policy of incumbent i is characterized by

$$d_i(b, y) = \begin{cases} 0 & \text{if } V_i^R(b, y) \geq V_i^D(y) \\ 1 & \text{otherwise.} \end{cases} \quad (10)$$

Let $\mathcal{D}_i(b)$ represent the set of income realizations y for which default is optimal for incumbent i : $\mathcal{D}_i(b) = \{y \in \mathcal{Y} : d_i(b, y) = 1\}$. Hence, the next-period default probability of the political party in power is $\lambda_i(b', y) = \int_{\mathcal{D}_i(b)} \mu(y', y) dy'$.

If political party i is not in power, then $\bar{V}_i(b, y)$ depends on the opponent's decision. Let $\bar{V}_i^R(b, y)$ represent the the value function of party i when the incumbent fulfills the government's debt obligations and $\bar{V}_i^D(y)$ denote the value function when the incumbent defaults. Optimal decisions of the opponent are marked by $-i$. Hence, the value functions of the party that is not in office are given by:

$$\begin{aligned} \bar{V}_i^R(b, y) &= \beta(1 - \pi) \int_{y'} \bar{V}_i(b'_{-i}, y') \mu(y', y) dy' \\ &+ \beta\pi \left[(1 - P_{-i}(\tau_{-i}, g_{-i})) \int_{y'} V_i(b'_{-i}, y') \mu(y', y) dy' + P_{-i}(\tau_{-i}, g_{-i}) \int_{y'} \bar{V}_i(b'_{-i}, y') \mu(y', y) dy' \right] \end{aligned} \quad (11)$$

$$\begin{aligned} \bar{V}_i^D(y) &= \beta(1 - \pi) \left(\theta \int_{y'} \bar{V}_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} \bar{V}_i^D(y') \mu(y', y) dy' \right) \\ &+ \beta\pi \left[(1 - P_{-i}(\tau_{-i}, g_{-i})) \left(\theta \int_{y'} V_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} V_i^D(y') \mu(y', y) dy' \right) \right. \\ &\quad \left. + P_{-i}(\tau_{-i}, g_{-i}) \left(\theta \int_{y'} \bar{V}_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} \bar{V}_i^D(y') \mu(y', y) dy' \right) \right] \end{aligned} \quad (12)$$

$$\bar{V}_i(b_{-i}, y) = \begin{cases} \bar{V}_i^R(b_{-i}, y) & \text{if } d_{-i}(b_{-i}, y) = 0 \\ \bar{V}_i^D(y) & \text{if } d_{-i}(b_{-i}, y) = 1 \end{cases} \quad (13)$$

3.5 Foreign Lenders

Foreign lenders are risk neutral and assign the value $1/(1+r^*)$ to payoffs received in the next period, where r^* is the international risk-free interest rate. Lenders have perfect information about the endowment stream and each party's re-election function. Bonds are priced in a competitive market inhabited by a large number of identical lenders, which implies that bond prices are pinned down by a zero expected profit condition. The risk of default (of both the incumbent and the other party) and the re-election probability of the current incumbent i are both taken into consideration by foreign lenders when determining the price of the bond:

$$q_i(b', y) = \pi \left[P_i(\tau, g) \left(\frac{1 - \lambda_i(b', y)}{1 + r^*} \right) + (1 - P_i(\tau, g)) \left(\frac{1 - \lambda_{-i}(b', y)}{1 + r^*} \right) \right] + (1 - \pi) \left(\frac{1 - \lambda_i(b', y)}{1 + r^*} \right). \quad (14)$$

As equation (14) shows, the bond price is now a weighted average of the different next-period repayment probabilities (of the different potential parties in office in the next-period). In that sense, the pricing function is a natural extension of the ones found in standard models à la Eaton and Gersovitz (1981).

4 Calibration

We solve the model numerically using value function iteration with a discrete state space. The calibration of the model involves assigning values to 12 parameters, and we are guided by annual panel data evidence on 63 countries for the period 1993–2015 (we calibrate the model to an annual frequency). Two of these parameters relate to the endowment process (ρ, σ), two to household preferences (β, γ), three to international financial markets (r^*, θ, ψ) and five to politics ($\pi, \alpha, \kappa, \phi_R, \omega_L$).

Table 3 presents all of the parameter values. We assume the stochastic endowment process

Table 3: Parameter values.

Domestic income autocorrelation coefficient	ρ	0.753	Estimation
Standard deviation of domestic innovations	σ	.113	Estimation
Borrower's risk aversion	γ	2	Prior literature
Risk-free rate	r^*	0.04	Prior literature
Duration of defaults	θ	0.154	Prior literature
Probability of elections	π	0.25	Prior literature
Discount factor	β	0.75	Calibration
Income losses	ψ	0.74	Calibration
Weight on government spending	α	0.0175	Calibration
Political parameter	κ	0.475	Calibration
Political parameter	ϕ_R	0.65	Calibration
Political parameter	ω_L	0.625	Calibration

follows a lognormal AR(1) process: $\log(y') = \rho \log(y) + \epsilon'$ with $E[\epsilon] = 0$ and $E[\epsilon^2] = \sigma^2$. The persistence and volatility parameters are estimated on linearly de-trended yearly real GDP (current US) for each country in our panel. We then compute the mean of these values.

Next, we assume a coefficient of relative risk aversion of 2, which is the standard value in studies of real business cycles in small open economies. Regarding the financial market parameters, the risk-free rate was set to 4 percent, the standard value in literature. The probability of re-entry was set to 15.4%, so that the government remains in exclusion for a period of six and a half years after a default episode, on average. Of the political parameters, the probability of elections is the only one that we set independently: it takes a value of 0.25 which implies elections every 4 years, on average (the median presidential/general election frequency in our dataset).

We now turn to the calibration of parameters that are set jointly to match certain moments in the data. Generally speaking, the choice of any parameter in this collection will affect all moments of the model to some degree. However, there is always one moment that is affected most for any given parameter. First, the discount factor (β) of all of the agents is set so that the mean spread generated by the model matches the one computed from the data. Next, the

parameter governing the income cost during autarky (ψ) is set to match the observed debt-to-income ratio. In our model, a default results in creditors receiving nothing, which is far from reality. In order to adjust for this, we calibrate the output loss parameter so that the level of debt in the model is on average equal to the level of unsecured debt in the data. The average haircut imposed on creditors in the post-1980 defaults is about 37% (Cruces and Trebesch, 2013). Thus, we target a debt-to-income ratio that is 37% of the average ratio for all countries in our data set.

Regarding the political parameters, the majority of them have been calibrated to match moments in the data. The welfare weight on public consumption (α) has been set to match mean government spending in the data. κ is set to match the average probability of re-election of the incumbent. The parameter that determines the relative curvature of the probability of re-election function due to taxes of the R with respect to the one of the left-wing party, ϕ_R , is set to match the mean government spending of right-wing parties in the dataset. The final parameter, ω_L , is set to match the mean government spending of the L party. It determines the relative curvature of the probability of re-election function due to government spending of the L party with respect to the one of the R party.⁶

5 Results

First, we show the ability of the simulations of the model to account for salient features of business cycle dynamics observed in our panel dataset. Secondly, we examine the dynamics in the sovereign debt market. Thirdly, we discuss the cyclical behavior of fiscal policy. Fourthly, we analyze the rich dynamics between politics and default incentives. Fifthly, we explore the quantitative relevance of having endogenous re-election probabilities.

5.1 Business cycle moments

Here we present the simulation results and statistical properties of the model economy. Table 4 shows the business cycle moments of several macroeconomic variables for the panel data and

⁶Parameters ϕ_R and ω_L are both thought of as “relative parameters,” in the sense that their actual values matter only in how they relate to the other party’s value. To keep the number of calibrated parameters manageable we set ϕ_L and ω_L to one.

Table 4: Simulation moments and data.

	Panel Data (1993-2015)	Model
Targeted moments:		
s (in bps.)	505	505
Mean debt-to-income	14%	14%
Re-election prob.	68%	68%
G	15%	15%
G_L	16%	16%
G_R	13%	13%
Non-targeted moments:		
s_L (in bps.)	564	572
s_R (in bps.)	430	448
$\sigma(C)/\sigma(GDP)$	1.05	1.24
$\sigma(G_L/GDP_L)$	0.78	1.06
$\sigma(G_R/GDP_R)$	1.04	1.45
$\sigma(s_L)$ (in bps.)	148	230
$\sigma(s_R)$ (in bps.)	101	185
$\rho(GDP, C)$	0.96	0.96
$\rho(GDP_L, G_L)$	0.90	0.97
$\rho(GDP_R, G_R)$	0.81	0.91
$\rho(GDP_L, s_L)$	-0.34	-0.59
$\rho(GDP_R, s_R)$	-0.26	-0.55
$\rho(GDP, TB/GDP)$	-0.49	-0.55

our model's simulations. Business cycle statistics are averages over 1000 simulations samples of 23 periods each. ⁷ All simulated series are HP-filtered using a smoothing parameter of 100. ⁸

Overall, the benchmark calibration of the model is able to account for several salient facts in our panel of emerging economies, as well as to approximate remarkably well the targeted

⁷The sample period length is chosen to match the data.

⁸Output, public consumption, and government expenditure series are first logged and then filtered.

moments. As in the data, in simulations of the model consumption and output are positively and highly correlated, and the consumption volatility is higher than the output volatility. Interest rates and the trade-balance are negatively correlated with output. None of these moments were targeted by the calibration process, but they are all, nonetheless, reproduced in the model.

5.2 Dynamics of the sovereign bonds market

As hinted above, the model performs quite well with respect to the sovereign bond market dynamics: it produces defaults in bad times and therefore countercyclical spreads. Figure 1 plots each party's bond price schedule $q(b', y)$ as a function of debt choice b' for two endowment levels.

Given an income level, it is clear that the bond price is a decreasing function of the level of external debt. At low levels of debt, default is never optimal so the government borrows at the international risk free rate. As foreign debt increases, so does the incentive to default. Creditors incorporate the default probability into the pricing function, so an increase in risk premia results in lower bond prices.

The bond price schedule also illustrates that the bond price is lower (the spread is higher) when the economy is hit by an adverse income realization for all foreign debt positions and for both type of governments. The presence of incomplete asset markets in the model makes defaulting on foreign debt more attractive when income realizations are low, and leads to countercyclical interest rates (and a countercyclical trade balance). Foreign lenders respond to improvements in domestic economic conditions with lower premia, which entices government to borrow more at lower interest rates. Additionally, persistent endowments increase the probability of higher future income providing even more incentive to borrow. On the other hand, when the economy is hit by an adverse income realization, the probability of default increases and drives up the spreads, which inhibits the government's ability to borrow.

Finally, and related to the dynamics between politics and spreads (which we elaborate on further in section 5.4), it is evident that the L party faces lower prices at all debt and income levels, a result consistent with the data. In our baseline model, the incumbent's re-election probability depends on their choices of taxation and government spending. The L party's likelihood to remain in office relies more heavily on public expenditure, and it is decreasing in

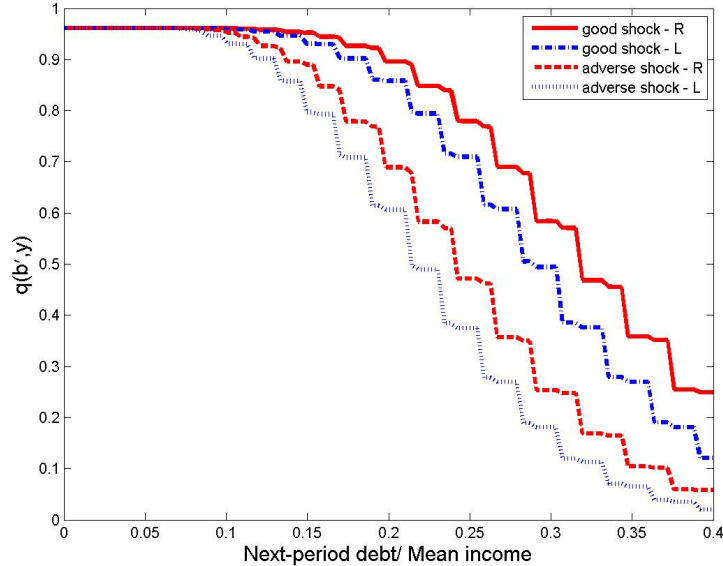


Figure 1: Bond price schedule.

the country’s debt position. Hence, the L party’s re-election probability decreases faster as the government increases its debt, leading it to be more short-sighted. Foreign lenders take this into consideration and charge them higher premia, resulting in larger spreads.

5.3 Fiscal policy over the cycle

The left panel of Figure 2 plots the deviations from trend for income, private consumption, and public expenditure in typical simulation sample path. The positive correlation among all of these variables is clear. In periods where endowment is above trend, the price of borrowing is low, allowing governments to fund their spending through debt and rely less on tax revenue. In contrast, when output realizations are below trend, borrowing is limited by high bond prices. Hence governments dependence on taxes is heightened. This explains both the procyclicality and the increased volatility in private consumption and public spending.

The right panel of Figure 2 shows the clear negative correlation between taxes and income. This result has been dubbed “optimal procyclical fiscal policy” for emerging economies, in the sense that the fiscal policy (in this case the tax rate) amplifies the cycle. Why is the tax rate “procyclical” in our model? Because when income is high, it is cheaper to borrow and postpone taxation, whereas when income is low, the reverse is true. Thus, we expect periods

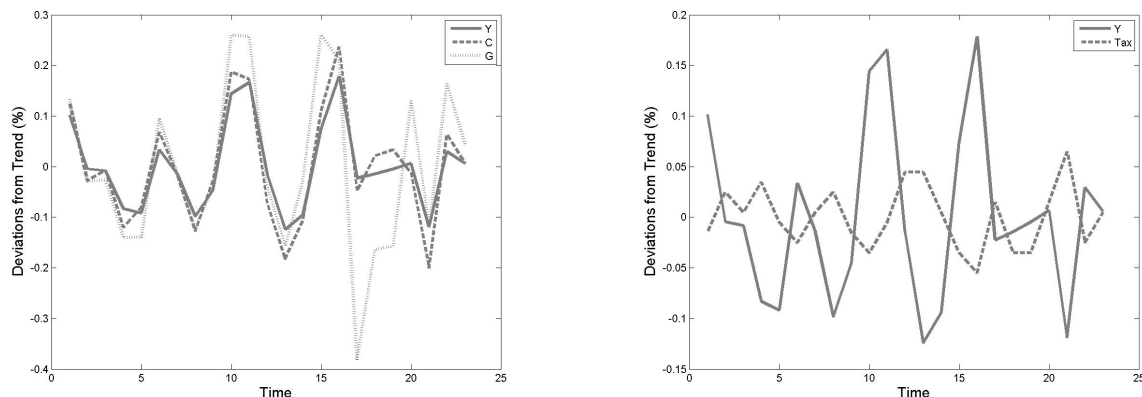


Figure 2: Cyclical behavior of fiscal policy. The left panel shows the dynamics of income, private consumption and government spending. The right panel has the behavior of income and taxes.

of high income to be associated with lower tax rates and vice versa. Moreover, when the government defaults it is left with only taxation in order to finance spending, which leads to even more fiscal procyclicality.⁹

5.4 Politics and default incentives

In this section we deal with the rich equilibrium dynamics that emerge between political events and default incentives. We first start by discussing the properties of the equilibrium re-election probabilities. Then, we discuss differences in default sets that derive, in equilibrium, from political differences.

Equilibrium re-elections. A key feature of our re-election function is that it depends positively on the spending-to-income ratio and negatively on the tax rate. However, both variables are endogenous to the problem of the government. We find that, in equilibrium, the election probability of the incumbent ($P_i(\tau, g)$) is increasing in income growth.

In developing countries that elect their leaders, there is a strong positive link between rate of GDP growth during the leader's tenure and the probability of his or her re-election (Brender and Drazen (2008)). The authors document that a 1 percentage point increase in economic growth during the leader's term in office leads to a 6 to 9 percentage points increase in the probability of their re-election. Their study included elections in 74 different countries over the period 1960-2003. Figure 3 shows the incumbent's likelihood of being re-elected, conditional on an election

⁹This result is by no means new in the literature and it is in fact a consequence of more general capital market imperfections. See Cuadra et al. (2010) and Riascos and Vegh (2003).

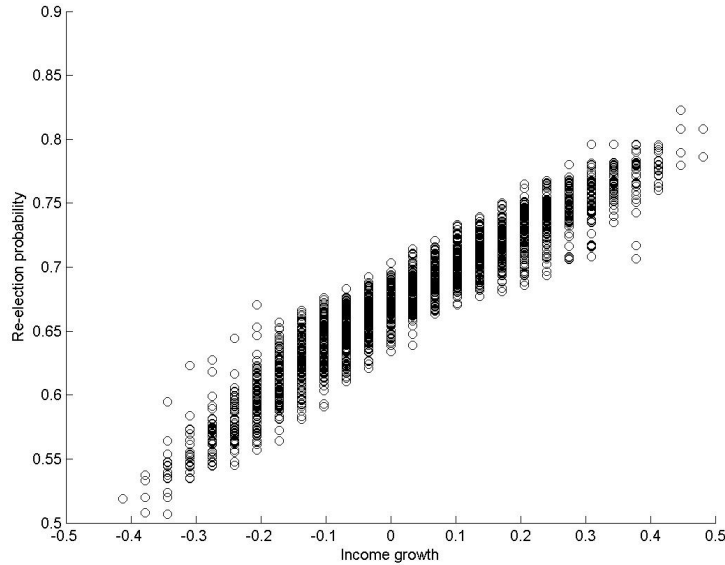


Figure 3: Re-election probability and income growth.

occurring, over the change in GDP growth rate for our entire simulation. The plot clearly illustrates that as economic growth increases, so does the incumbent’s re-election probability. When the economy experiences increases in the endowment levels, the cost borrowing drops. This entices the government to rely more on the international credit channel and less on tax revenue in order to fund public expenditure, which increases their likelihood of remaining in power.

Political defaults. Recent default episodes, both in emerging economies and in peripheral European countries, have been widely understood as a combination of “bad economics” and “bad politics.” A perennial example of such a “political default” is the 2001-02 Argentina default. The political events surrounding the aforementioned default suggest that the change in governing party was a key contributor to the government’s moratorium declaration on its debt. Hatchondo and Martinez (2010) state that in the presidential campaign of 1999, the two main candidates expressed opposing positions on whether the future government should repay its foreign debt. The Economist (1999) wrote that “while Eduardo Duhalde, his Peronist opponent, has made rash public-spending promises, and suggested that Argentina should default on its foreign debt, it has been Mr. de la Rúa who has responsibly promised to maintain the main thrust of current economic policies, including convertibility.” After winning elections,

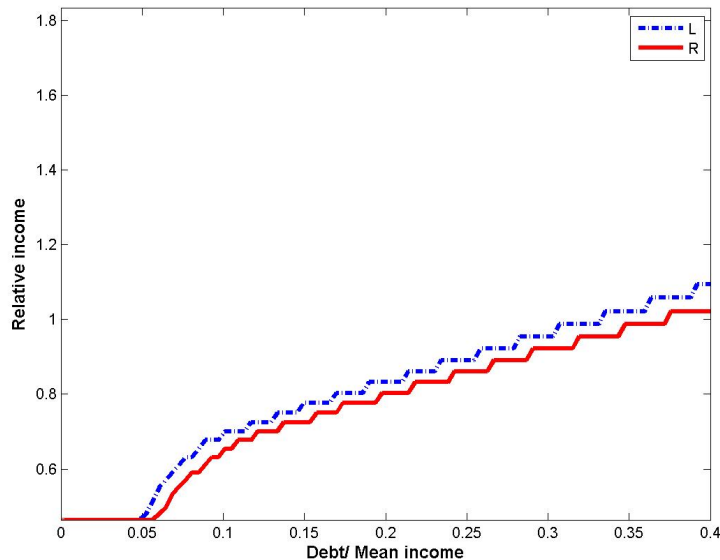


Figure 4: Default sets. The lines show the boundaries of the default sets for both L (dashed blue) and R (solid red) parties. Any point to the South-East of the boundary is one where default is chosen. Relative income refers to the income level as a fraction of mean income.

Fernando de la Rúa attempted to impose drastic austerity measures to balance the budget, which included cuts of up to 13 percent in public sector wages and pensions. However, after losing political support even from members of his own party, de la Rúa resigned on December 19, 2001. He was eventually replaced by Eduardo Duhalde, who confirmed the interim government’s decision to default.

Our baseline economy captures the key elements described in Argentina’s 2001-02 default. The left-wing party in the model represents the government under the lead of president Duhalde, who supports higher levels of public expenditure, while Fernando de la Rúa’s choices to impose austerity measures are embodied in the right party’s agenda to lower taxes and government spending. Just like in the scenario presented, a political default may occur in the model: under similar economic conditions, when a right government is replaced by a left party with plans for high public expenditure.

Figure 4 plots the default sets of the policymakers in the model for all debt and endowment levels. These default sets have the expected shape: for a given level of debt-to-income ratio, the country is more likely to default when it gets low realizations of income; for a given level of income, the country is more likely to default when facing higher indebtedness. We can see from this figure that the default set expands when moving from the R party to L party: there

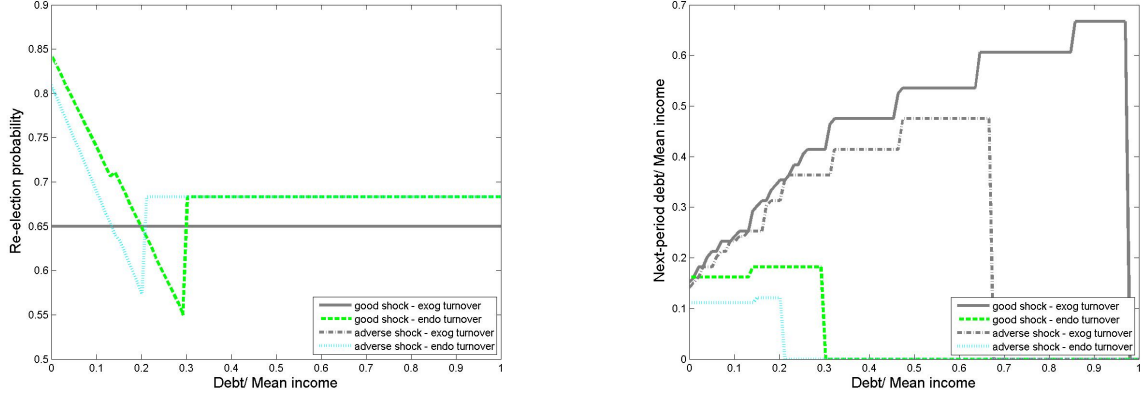


Figure 5: Endogenous vs. exogenous political turnover. The left panel shows the re-election probabilities as a function the current debt-to-income ratio. The right panel shows the borrowing policy functions.

are more states of the world where an L government will prefer to default. This figure helps us understand the role that political uncertainty plays on default incentives and explains in part why L governments face on average higher spreads than R governments.

5.5 Disentangling the effects of political turnover

As we have shown above, political events (elections, re-elections by the incumbents, changes in ruling parties) interact with the fiscal policy making and the default incentives in interesting ways, generating rich dynamics for the bond markets and the cyclical behavior of fiscal policy. It is natural then to examine how our model re-acts to modifications in the political process. We are interested in this exercise as a way of shading light on the relative quantitative importance of two forces: *(i)* the different dynamics generated by endogenous versus exogenous turnover, and *(ii)* the mere presence of political turn-over.

Endogenous vs. exogenous turnover. In order to study the differences arising from endogenous turnovers we define an “exogenous-turnover” economy in which we set $P_i(\tau, g) = \bar{P} = 0.68$ to match the average re-election probability in our dataset (conditional on an election occurring), but we leave all other parameters unchanged.

In the presence of endogenous political turnover, the incumbent’s re-election probability depends on the choices of taxation and government spending. The latter relies on the government’s foreign assets position, which plays a key role in their ability to borrow. The left panel of Figure 5 plots the incumbent’s likelihood to remain in power, conditional on elections occurring

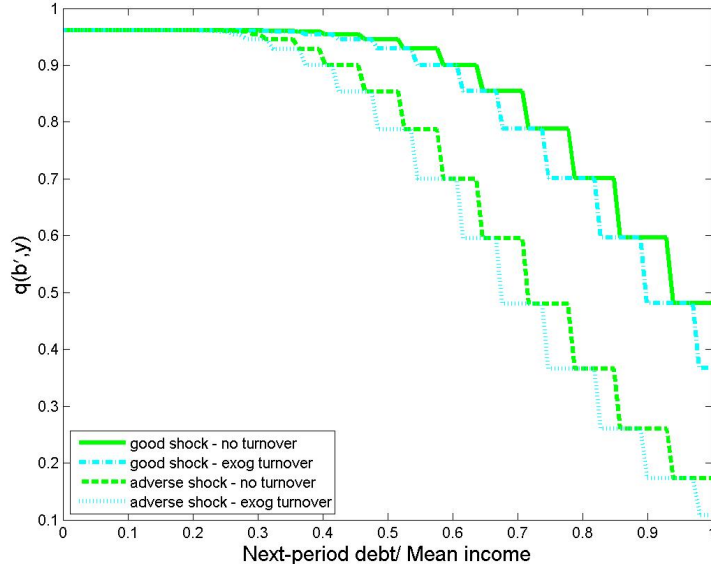


Figure 6: Bond price schedule for “exogenous-turnover” and “no-turnover” economies.

that period, and the right panel shows the equilibrium next-period debt choice as a function of current debt level for two endowment levels. It is evident that endogenizing turnover has a substantial effect on the government’s ability to borrow. The incumbent’s re-election probability is decreasing in debt $\left(\frac{\partial P_i(\tau, g)}{\partial b} = -\frac{1}{y} \gamma_i \left(\frac{\tau y + q_i(b', z) b' - b}{y}\right) \gamma_i^{-1} < 0\right)$, conditional on not defaulting. However, the likelihood of retaining power increases with the decision to repudiate on its debt. The funds freed up from debt servicing can now be used to increase public expenditure, which also gives the government the opportunity to lower taxes. Hence, this increases the incumbent’s re-election probability and induces them to default at much lower debt levels (i.e., this generates political-default incentives). Creditors incorporate this into their pricing function and the decrease in bond prices limits the government from borrowing.

Abstracting from turnover. To isolate the effect of political turnover we define an “no-turnover” economy in which we set $P_i(\tau, g) = \bar{P} = 1$, so that parties never alternate in power. As with the previous exercise, we leave all other parameters unchanged. The resulting theoretical framework is similar to the one studied by Cuadra et al. (2010). A notable difference is that we consider an endowment economy rather than endogenizing production.

In order to have a sensible comparative statics exercise (and move only one thing at the time) we study the effect of the mere presence of political turnover by comparing the “no-

turnover” economy with the “exogenous-turnover” economy. Figure 6 plots the bond price schedule $q(b', y)$ as a function of next-period debt-to-mean income ratio, for two endowment levels. The introduction of exogenous political turnover into the model leads to a decrease in bond prices. The probability of losing office induces short-sighted behavior by the policymakers, providing incentives to take on higher risk and receive lower prices for its bonds. This result is consistent with the findings in Cuadra and Saprizza (2008) and Hatchondo et al. (2009).

6 Conclusions

Combining three international datasets respectively containing information on the political leanings of the ruling government in 63 nations; the spreads paid on their sovereign debt; and key macroeconomic quantities, yields a number of new stylized facts regarding the influence of the political leanings of a country’s government on their international borrowing costs. First, left wing governments, on average, pay 134 basis points more than right wing governments to borrow on international debt markets. Second, interest rates on left-wing government debt are 50 percent more volatile than their right-wing counterparts and 40 percent more negatively correlated with output. Third, government spending is very highly correlated with GDP with left governments showing a higher positive correlation and much less volatility than right wing governments.

To explain the above stylized facts, we built a sovereign default model in which elections determine which one of two politically heterogeneous policy makers will be in charge of the government. When the two policy makers differ in the marginal impact of their fiscal choices on their re-election probabilities, our model delivers the above-mentioned features of the data. In addition, and in line with the data, right-wing governments display lower tax rates and government consumption to GDP shares than left-wing governments in our calibrated model. Left governments systematically default at higher income levels than right governments leading to political default events when the left replaces the right as well as higher average borrowing costs for the left government. The model implies that re-election probabilities are increasing in good times. These results are obtained without assuming any differences in the preferences of the two types of policy makers.

We uncovered rich dynamics between politics, borrowing costs and default decisions, both

in the data and in our theoretical model. These dynamics require both that parties alternate in power, and that this alternation is endogenous to their fiscal policy choices.

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