Lebanon: The Politics of Sovereign Debt Default

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Abstract

Bulow and Rogoff (1989) show that a country that has access to a sufficiently rich asset market cannot commit to repay its debts and therefore should be unable to borrow. This is because for any debt contract, there exists a time at which the country is made better off by defaulting and replicating the payoffs of the debt contract through savings in the asset market. This article provides an answer to this paradox based on a political economy model of debt. It shows that the presence of political uncertainty reduces the ability of a country to save and, hence, replicate the original debt contract after default. In a model where different parties alternate in power, an incumbent party with a low probability of remaining in power has a high short-term discount rate and is, therefore, unwilling to save. The current incumbent party realizes that whoever gains power in the future will also be impatient, making the asset accumulation unsustainable. This time-inconsistency is shown to be equivalent to the problem faced by a hyperbolic consumer. Because of their inability to save, politicians demand debt ex-post and the desire to borrow again in the future enforces repayment today. This enforcement mechanism is moot for autocratic regimes.

Introduction

The history of sovereign lending os characterized by three broad facts: governments have at times been able to borrow substantial amounts of funds abroad; much of what they borrowed was eventually repaid; and repayment was often complicated, involving delay, renegotiation, public intervention, and default.[1]

Sovereign debt is fundamentally different from private debt because a government cannot generally pledge valuable collateral and the ability to enforce a judgment is extremely limited. This gives rise to the question: Why do sovereign debtors pay back their debts?

The oldest explanation is that they must maintain a good reputation in the international capital markets in order to be able to borrow more in the future. Eaton and Gersowitz (1981) formalize this idea in the context of a small country subject to income shocks.[2] A defaulting government loses access to the international capital markets and default is costly because the country will be unable to smooth consumption later on. Therefore, the desire to borrow in the future induces the country to pay back its debts today.

This explanation was revisited by Bulow and Rogoff (1989). They show that if countries are able to save in rich asset markets, then reputation considerations alone cannot enforce repayment and countries will eventually default on any debt contract. The idea behind their argument is simple and illuminating: in any debt contract there is a point in time where a country's borrowing capacity is (or comes very close to being) maximized. At that point, the country would default and start a sequence of savings in a way that perfectly replicates the original debt contract but generates extra income (the interest that is not paid). This sequence of savings is possible as long as the capital markets offer a menu of assets indexed on the same contingencies as the original debt contract. So, if international asset markets are rich enough, countries will always default on their debts. Bulow and Rogoff conclude: "loans to LDCs are possible only if the creditors have either political rights, which enable them to threaten the debtor's interests outside the borrowing relationship, or legal rights."

Several other explanations of why countries repay their debts have been proposed. Researchers have studied the possibility that reputation spillovers to other valuable relationships may be costly enough to enforce repayment (Cole and Kehoe (1995), (1996)). Another approach looks at the assets available to the country after default. Technological restrictions (Kletzer and Wright (2000)) or collusion among banks (Wright (2002)) might reduce the range of savings mechanisms available to the country after default. Another branch of the literature studies the punishments available to creditors, from military intervention to trade embargoes.[3]

This article takes another look at the reputation models of sovereign credit. I will argue

[1] Eaton and Fernandez (1995)

[2] Several authors have extended the reputation approach to sovereign debt. See, for example, Atkeson (1991), Grossman and Van Huyck (1988), Worrall (1990).

[3] Rose (2002) shows that a country's international trade is significantly reduced after default, thus identifying a channel through which international creditors might be punishing the defaulting country.

that even when international capital markets are quite complete, political considerations restrain a country from implementing the saving sequence that the Bulow and Rogoff argument requires.

This article builds on the simple insight that politicians are (generally) not continuously in power. Because the nature of the political process does not assure the incumbent politician that they will be in power again tomorrow, the politician is impatient. This impatience has already been used to explain politicians' reluctance to save (Alesina and Tabellini (1990)). Incumbent politicians have a bias towards the present but this bias does not affect the discount rates between dates in the distant future. They are more patient in the distant future than they are today because the uncertainty over who will be in power in the future has yet to be revealed. They know, however, that when tomorrow arrives, whoever is in power will be impatient in the short-run as well. This time-inconsistency can generate strong differences in the savings done by governments. I argue that it can also explain two seemingly contradictory facts:

- Politicians don't save and they spend too much.
- Most of the time, politicians pay back their debts even in the absence of punishments or clear political costs.

This article shows that political uncertainty generates inefficient savings and makes the replication strategies of Bulow and Rogoff (1989) not possible. I present a political economy model with political turnover which defines the politicians' equilibrium behavior. I show that when political turnover is positive, politicians tend to consume too much of the country's stock of assets.

In the Bulow and Rogoff (1989) model the country is always better off by defaulting on any debt contract. The country can save in the asset markets and generate the same consumption allocation that was being generated by the debt contract (without incurring interest expense). However, the presence of political uncertainty reduces the country's ability to keep the assets around for long. The politicians in power realize that, if they were to default, future governments will inefficiently overspend and the country will run out of assets too fast. Because the incumbent might be in power again in the future, this inefficient overspending lowers the assets' utility today.

Debt reduces this inefficiency. The reason is that the incumbents can borrow from foreigners as long as the stock is low enough. This, in turn, implies that, by repaying their debts, they don't need to keep a large stock of assets for smoothing purposes (they can borrow when times are bad), thus reducing the temptation of future governments to inefficiently overspend from accumulated savings. This improvement in the allocation of resources can be valuable enough for the politicians today to enforce the repayment of previous debts.

This article relies on the political economy literature on fiscal deficits (Alesina and Tabellini (1990), Persson and Svensson (1989)). However, these papers do not consider the possibility of default. Tabellini (1991), and Dixit and Londregan (2000) present models of domestic debt sustainability.[4] In these models, the creditors are citizens and thus have political rights (e.g., they can vote). In the sovereign debt model I analyze in this article, the creditors are non-residents and, therefore, have no political rights.

Finally, this article builds on the techniques developed by Harris and Laibson (2001) in their characterization of the hyperbolic consumer problem. These techniques proved very useful in the analysis of the political game.

This article is organized as follows. Section 1 is a quick review of the idiosyncracies of the Lebanese case. Section 2 is a brief review of the relevant empirical literature. In Section 3, I set up a model without debt. The model consists of a small economy with different political parties subject to endowment and political shocks. I define the equilibrium and characterize some of its main properties. Section 4 analyzes the model at the limit when the political shocks are very likely. For this case, I have closed form solutions for the equilibrium and a uniqueness result. Section 5 introduces the possibility of borrowing from non-residents and characterizes the equilibrium behavior of the politicians when they have access to the international capital markets. In Section 6 I introduce the concept of debt sustainability; characterizing the the conditions under which the country will repay its debts and those where it will default. I show that the Bulow-Rogoff argument does not hold, except in the particular case when there is no political turnover. Section 7 highlights the differences in debt sustainability that can be expected across political systems. Section 8 concludes.

1 The Case of Lebanon

Many factors were identified as the origin of Lebanon's external default and ongoing threat of internal default. While those factors are extrinsic to this analysis, they can be grouped into macro-financial and behavioral as follows:

- Macro-financial: For decades, Lebanon ran large and growing twin deficits, leading to an unsustainable debt burden. The continued inability to deliver material primary surpluses, combined with a rigid foreign exchange policy, led to a sudden-stop which transmitted to a run on domestic banks due to their sovereign exposure. The Lebanese Parliament's failure to enact in 2019 a ministerial resolution capable of delivering the primary surpluses required to restore the country's debt sustainability sealed the fate of the Lebanese economy.

- Behavioral: The Lebanese sovereign debt crisis became irreversible upon the rejection of one Pareto-optimal decision (the above-mentioned ministerial resolution) and spun of control after the rejection of another (pre-default engagement with creditors).

[4]For other papers on intergenerational redistribution, see Rotemberg (1990), Grossman and Helpman (1998), and Mulligan and Sala-i-Martin (1999).

Beginning with Pareto himself (1935), many researchers have speculated that personal sentiments, including envy and malice play a dominant role in the rejection of Pareto-optimal solutions. Beckman, Formby, Smith, and Zheng (2000) where the first to empirically study Pareto's conjecture and managed to prove it: Pareto-rejection occurs in 18% of the cases when the recipient occupies a lower income position than the decision-maker/rejecter (malice), and 34% in the opposite case (envy). The magnitudes are not so important as is the fact that they're statistically significant. Therefore, malice and envy (by the ruling organization) are the likely behavioral markers of both the decision to default and that of making the default one of the "hard" variety.

From an economic standpoint, which is the focus of this article, Lebanon's decision to default externally and its inextricably-linked announced intention to default internally are consistent with Bulow-Rogoff. As will be shown in Section 7 below, Lebanon's governance structure, an autocracy, inevitably leads to Bulow-Rogoff-style default. In fact, from at least late 2019, Lebanon's political system has been characterized by the control of the sum of public power by one organization (Hezbollah) that controls Lebanon's "three presidencies": the President of the Republic, the Prime Minister, and the Speaker of Parliament. While Lebanon possesses the institutions and trappings of a democratic republic, its politics is dominated by an armed group designated (depending on the jurisdiction) as either a transnational criminal organization, a terrorist organization, or both. Hezbollah, the group in question, exerts its dominion over the two executive and one legislative branches of government through a combination of soft (money, radicalization, mutual political and/or economic interests) and hard power (intimidation, assassinations). Hezbollah's control of Lebanon's government institutions is independent of its relatively small parliamentary representation and, thus, not at risk by events on the democratic process (elections, etc.). As the autocratic power, Hezbollah's control over Lebanon will continue uninterrupted by democratic events until it ends. According with my model, once overthrown, Hezbollah will no longer participate in Lebanese politics.

2 Empirical Evidence

In their analysis of international reserve-holding behavior of developing countries, Aizenmann and Marion (2002) provide evidence that countries with higher political uncertainty (measured as the probability of a leadership change) tend to accumulate lower levels of reserves. Their argument is that higher political uncertainty reduces the optimal size of buffer stocks held by a government because it increases the opportunistic behavior of the policy maker.

Political uncertainty has been associated to other fiscal problems. For example, Cukierman, Edwards and Tabellini (1992) show that political uncertainty is positively correlated to seigniorage. They argue that, while seigniorage reflects the high cost of administering and enforcing the collection of regular taxes, the evolution of a country's tax structure depends on the political system. When there is high political turnover, incumbent politicians may choose to maintain an inefficient tax system so as to constrain the behavior of future governments, if such anticipated behavior is inconsistent with the incumbent's views.

Political uncertainty tends to be associated with inefficient fiscal behavior. The higher the political uncertainty facing an incumbent, the lower the government's ability to save, the more inefficient the tax system, and the greater problems controlling spending. In this article I argue that these inefficiencies[5], in particular the savings one, might be the reason why governments repay their foreign debts even in the absence of sanctions or direct political costs.

3 The Model

I first analyze the equilibrium behavior of competing political parties without debt. Sovereign lending is allowed for is later sections.

Consider a small economy which has m political parties, indexed by i. Each party has the following utility defined over the continuous flow of consumption provided by the government at every instant t.

$$U_0^i = \Big[\int_0^\infty r^{-rt} u(c_t^i) dt\Big]$$

where c_t^i is the consumption provided by the government to party i at time t.

Assume the CRRA utility representation:

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

with[6] $0 < \rho < 1$.

For notation purposes, all stock variables are uppercase, while flow variable are lowercase.

The party in power decides how much to provide to different parties and how much to save in an asset market at every instant.

The government finances its spending flows as follows.

[5]Lane (2000) finds that better government anti-diversion policies (policies that reduce rent-seeking behavior by politicians) in emerging markets are associated with lower amounts of sovereign borrowing. This negative correlation weakens as other controls are added but never becomes positive.

[6]Under this condition ($0 < \rho < 1$) we have that $u(0) = 0$. This is important because parties do not always consume in the equilibrium, and utilities cannot be compared unless $u(0) > -\infty$.

- There is an endowment shock with Poisson probability λ.
- Immediately after the shock, the country receives a stock Y of income.
- The rest of the time, the country does not receive any endowment and spends out its previous savings.

At every point in time, a given party controls the government. I proceed now to characterize how power is allocated among the different parties. I assume the following simple political structure:

- There is a political shock with Poisson probability γ.
- Immediately after the shock, a party is randomly chosen to govern.
- The probability that a party is selected[7] is $\alpha \in (0, 1)$.

I assume that the political shock and the endowment shock are independent.

Let p_t be the party in power at time t.

Note that the politicians consume only through government provision. This is the case if the government is the only entity that can provide the public goods (e.g., roads, schools, dams, etc.) that the politicians desire.

Political shocks could be the outcome of elections, social unrest that forces a change in government, variability of the bargaining power of the different parties within the governing coalition, the possibility of impeachment/removal, or just the breakdown of the ruling coalition. The current incumbent always faces this risk and this uncertainty leads to impatience about the future; i.e., the incumbent never knows for sure if they will be governing again the next day.

Assumption 1. *There is political turnover:* $\gamma(1 - \alpha) > 0$ *and* $\alpha > 0$*.*

From standard concave utility arguments the politicians have a desire to smooth the consumption flow through time, and they would like to save some of the government's income for the future. However, there is a chance that current incumbents won't be in power tomorrow to consume what they save today, which reduces the incentive to save. Savings are shown to be inefficient from the perspective of the politicians and they consume too large a share of their stock of assets.

The savings options available to the government are discussed in the next section.

[7] We can think of α as continuous from 0 to 1. Politically, this can be interpreted as a coalitional set up where α can take any value.

3.1 (Cash-in-Advance) Asset Market

There is a foreign spot asset market populated by foreign investors that are risk neutral and share the same discount rate r. The government can save in the foreign spot asset market.

There is a risk-free bond that returns a constant flow of r (note that the parties and the foreigners share the same discount rate). Let B_t denote the country's holdings of bond B at time t.

The other relevant asset is a Lucas tree. The return on this tree is assumed to be contingent on the realization of the country's endowment shock. This asset is introduced for consistency with the Bulow-Rogoff (1989) argument[8], which states that if a country has access to an asset market that provides contracts (assets) indexed by the same contingencies as a debt contract, then the country will at some time default on its debt and start saving in the asset market.

My goal in this article is to show how the country's ability to sustain debt changes when political risk is introduced into a model where the Bulow-Rogoff result would otherwise hold (something that is expected to happen with the introduction of this contingent asset).

Let A_t be the holdings of the Lucas tree at time t, and A_{t+dt} be the holdings of the tree at time $t + dt$. Then:

$$A_{t+dt} = \begin{cases} 0 & \text{;if the endowment shock happens} \\ (1 + (r + \lambda)dt)A_t & \text{;if the endowment shock doesn't happen} \end{cases}$$

The return from holding the tree is $r + \lambda$ when there is no endowment shock.[9]

The contingent Lucas tree can be thought as the ability of foreign investors to make instantaneous commitments contingent on the aggregate endowment shock. In any interval Δt, the foreign investors can write a short-term contract (i.e., one that lasts only one Δt period) contingent on the realization of the endowment shock. Competition on the investors' side will converge the return on the asset to the zero-profit condition, and we get the instantaneous Lucas tree as Δt converges to zero.

The assumption underlying this contingent Lucas tree is that foreigners have a commitment technology that allows them to credibly offer these instantaneous cash-in-advance contracts[10] to the country. The interesting case is when the country *cannot*

[8] For the readers familiar with the Bulow-Rogoff (1989) argument, this Lucas tree represents the cash-in-advance contracts available to the country upon default.

[9] This can be proven as follows. Let W be the value of holding T units of the contingent tree for a risk-neutral investor. W is given by the equation $rW = \hat{r}T + \lambda(-T)$; where $\hat{r}$ is the return on the tree. Given that the asset is unit-priced and a zero-profit condition holds, we have that $W = T$ (the value of holding T units of the tree for a foreign investor is equal to its price). From this, we obtain that $\hat{r} = r + \lambda$.

[10] These are contracts where the country pays upfront and receives non-negative payments ex-post

commit to repay its outstanding obligations with the foreigners and can default on a contract that requires it to make a payment ex-post. I first examine the case where the government cannot borrow from foreign investors and I leave for later sections the analysis of the country's repayment capability.

Let W_t denote the country's total income from assets and let's assume the following:

Assumption 2. *The country cannot short the risk-free bond: $A_t \leq W_t$*

$B_t = W_t - A_t$ represents the investments done in the risk-free bond at time t. The, the amount that is invested in the risk-free bond, B_t, cannot be negative. This assumption will be relaxed in Section 5, once the possibility of borrowing from abroad is introduced.

Summing up, the country is subject to two types of shocks: endowment and political ones. The endowment shocks create a desire for smoothing the government's provision flow. In the next section, I characterize how the political forces interact with the politicians' smoothing needs.

3.2 The Political Equilibrium

Let a provision profile $\hat{c}_t$ be the vector of spending allocations to every party at time t, $\hat{c}_t = (c_t^1, c_t^2, ..., c_t^m)$. Then any point in time is characterized by the vector $h_t = \{p_t, \hat{c}_t, A_t\}$ describing the ruling party, the spending allocation executed, and the savings (portfolio) decision A_t. A history is then a correspondence from the $[0, T)$ to possible vectors h_t.

A strategy for party i at time t is a mapping from all possible histories up to time t and states at time t where party i is in power to instantaneous spending allocations and spending decisions.

The nature of this dynamic game allows for multiple sub-game perfect equilibria.

Definition 1. *A **Stationary Markov strategy** for party i is a profile of consumption $\hat{c}_i(W) = (c_i^1(W), C_i^2(W), ..., c_i^m(W))$ and an investment function $A_i(W)$.*

The correspondence $\hat{c}_i(W)$ determines the consumption allocation to all parties that party i will choose if it is in power at some time with an asset level of W. A consumption allocation $C_i^j(W)$ is the consumption that party i will provide to party j if it were in power with W assets. The function $A_i(W)$ details how much of the savings are done in the contingent Lucas tree if party i is in power with W assets.

Assumption 3. *Parties play only stationary Markov strategies.*

So, politicians play strategies that are a function of the payoff-relevant variables at any given point in time. There is no reputation-building under this assumption: whatever happened in the past that does not affect current and future income is irrelevant to politicians' behavior. This article focuses on Markov perfect equilibria; i.e., subgame perfect equilibria that use Markov strategies.

Suppose that party i is in power. Let t_1 be the time of the first political shock. Then, the utility of party i today is:

$$V(W_0) = E_{t_0}\Big[\int_0^{T_1} e^{-rt}u\Big(C_i^i(W(t))\Big)dt + e^{-rt_1}[\alpha V(W(t_1)) + (1-\alpha)V_0(W(t_1))]\Big]$$

where V is the expected utility of the incumbent at time 0 with asset level W_0, and V_0 is the expected utility of the party once out of power. This equation tells us that the party in power consumes up to the time of the political shock (t_1). At that time, with probability α, the party in power remains as the incumbent and receives a value of V; and is ousted from power with probability $(1-\alpha)$ and receives V_0 (I discuss the value function in more detail below).

In the absence of an endowment shock, party i is bound by the following instantaneous budget constraint:

$$dW = \left((r - (W - A_i) + (r + \lambda)A_i) - c_i^i - \sum_{j \neq i} c_i^j\right)dt$$

and if $W = 0$, then $c_i^j = 0$ for all j.

To understand this equation, note that $r(W - A_i) + (r + \lambda)A_i$ is the return on the country's asset holdings if A_i is the amount invested in the contingent Lucas tree: the return on the risk-free bond is $r(W - A)$ and the return on the contingent tree is $(r + \lambda)A$. The total spending executed by the government is $c_i^i(W) + \sum_{j \neq i} c_i^j(W)$. The change in wealth ($dW$) is then the return from holding the assets minus the spending executed in that instant. When there is an endowment shock, the asset stock W_t will jump to $(Y + W - A)$.

Only total wealth matters upon the occurrence of a political shock. Past sharing of spending is irrelevant for future play. So, the incumbent maximizes $V(W)$ and, for a given amount of spending, spends everything on its own consumption. There is no reason to share with the outsiders if tomorrow's play will nit be affected by such sharing, as stated by the following proposition:

Proposition 1. *In a Markov equilibrium, for any $i \neq j$, $c_i^j = 0$ for almost all W.*

This proposition considerably reduces the complexity of the problem: the party in power always gives zero provision to the outsiders. The only decision left to be made at time t is the amount of total spending c_t, subject to the budget constraint. The symmetry of the game implies that any party in power at time t faces exactly the same problem. Therefore, I concentrate on symmetric equilibria.

Definition 2. *A control $x = (c, A)$ is **feasible** if c and A are such that:*

- $c : [0, \infty) \to [0, \infty)$ *with* $c(0) = 0$
- $A : [0, \infty) \to (-\infty, \infty)$ *with* $A(W) \leq W$

This definition tells us that a control is feasible if it satisfies the short-sale constraint ($A(W) \leq W$) and the politicians cannot consume when there is no wealth ($c(0) = 0$).

Given a control x the evolution of wealth is defined as follows:

Definition 3. *For a given control $x = (c, A)$, wealth is a function of x, with origin W_0, if when the endowment shock does not occur the country's asset level follows*

$$dW = (rW + \lambda A(W) - c(W))dt \tag{1}$$

where $W(t)$ jumps to $(Y + W(t) - A(W(t)))$ when the endowment shock occurs and $W_0 = 0$.

For a given control (c, A), every instant the country receives a flow of income equal to $rW + \lambda A$; where rW is the return from all the country's asset holdings, and λA is the extra return from the holdings of the Lucas tree. This flow of income minus the consumption flow is equal to the instantaneous change in wealth.

Let W_x^y denote the case where W is evolving according to x from y.

For two feasible controls $x = (c, A)$ and $x_1 = (c_1, A_1)$, the value $V(W|x_1, x)$ is defined to be the expected value for an incumbent if it follows (C_1, A_1) and everybody else follows (c, A)

$$\begin{aligned} V(W_0|x_1, x) = E\Big[&\int_0^{t_1} e^{-rt} u(c_1(W_{W_0}^{x_1}(t)))dt \\ &+ e^{-rt_1}(\alpha V(W_{W_0}^{x}(t_1)|x_1, x) + (1-\alpha)V_0(W_{W_0}^{x_1}(t_1)|x_1, x))\Big] \end{aligned}$$

where

$$V_0(W_0|x_1, x) = E[e^{-rt_1}[\alpha V(W_{W_0}^{x}(t_1)|x_1, x) + (1-\alpha)V_0(W_{W_0}^{x}(t_1)|x_1, x)]]$$

and where t_1 is the first time after $t = 0$ when a political shock happens.

The value function $V(\cdot|x_1, x)$ reflects the value to an incumbent of following the strategy x_1 when everybody else follows x. The incumbent consumes c_1 as long as they are in power and wealth is evolving according to their strategy (x_1). When a political shock happens (at t_1), the current incumbent remains in power with probability α and loses office with probability $(1-\alpha)$. Once out of office, the former ruler receives a utility level captured by the value function $V(\cdot|x_1, x)$. This value function tells us that the former ruler does not consume while out of government and wealth evolves according to the other politicians' strategies (x).

A symmetric Markov equilibrium is defined as follows:

Definition 4. *A* ***symmetric Markov equilibrium*** *is a feasible control* $X^* = (c^*, A^*)$ *such that for any other feasible control* $x = (c, A)$*,*

$$V(W|x^*, x^*) \geq V(W|x, x^*); \qquad forW \in [0, \infty) \tag{2}$$

for all $W \in [0, \infty)$*.*

The definition tells us that a symmetric Markov equilibrium is defined by two functions c^* and A^*, such that, for any other feasible functions c and A, the value generated by the first strategies is at least as high as the value generated by following c and A while the given politician is in power and when nobody else follows c^* and A^*.

Notice that, as defined above, a symmetric Markov equilibrium is subgame perfect. It is not difficult to show that the best response to a Markov strategy is also a Markov. So, Eq. (2) is enough for perfection.

In general, there may be multiple solutions to Eq. (2). Since the solution to Eq. (2) is equivalent to a Markov solution of a well-chosen hyperbolic program, the method used to select among equilibria is the technique developed by Harris and Laibson (2001) in their study of the hyperbolic consumer problem.

3.2.1 The Hyperbolic Equivalence

To show this result, notice that $\exists W \in [0, \infty)$ such that $V(W|x_1, x) > V(W|x, x)$ if and only if:

$$\begin{aligned} &E\Big[\int_0^{t_1} e^{-rt} u(c_1(W_{W_0}^{x_1}(t)))dt + \\ &e^{-rt_1}(\alpha V(W_{W_0}^{x_1}(t_1)|x_1, x) + (1-\alpha)V_0(W_{W_0}^{x_1}(t_1)|x, x))\Big] > V(W_0|x, x) \end{aligned} \tag{3}$$

for some$W_0 \in [0, \infty)$, where the main difference between (3) and (2) is that (3) considers only deviations by incumbents during the period before the *first* political shock happens.

Now, let

$$J(W|x) = \frac{1}{\alpha}[\alpha V(W|x,x) + (1-\alpha)V_0(W|x,x)]$$

Using the value functions and solving out,

$$J(W_0|x) = E\Big[\int_0^{\infty} e^{-rt}u(c(W_{W_0}^{x}(t)))\Big]$$

So, $J(W|x)$ is the utility of a party that uses a control x and is continuously in power. Let the value function $\tilde{V}$ be defined as

$$\tilde{V}(W_0|x_1,x) = E\Big[\int_0^{t_1} e^{-rt}u(c_1(W_{W_0}^{x_1}(t)))dt + e^{-rt_1}(\alpha J(W_{W_0}^{x_1}(t_1)|x))\Big]$$

Note that $\tilde{V}$ corresponds to the lefthand side of (3). The, x^* is a symmetric Markov equilibrium if for any feasible control x,

$$V(W|x^*,x^*) \geq \tilde{V}(W|x,x^*)$$

for $W \in [0,\infty)$

The value function[11] $\tilde{V}$ is equivalent to the value function of a hyperbolic consumer who faces a vanishing "present" (from 0 to t_1), and discounts all the "future" (from t_1 onwards) by $\alpha < 1$. The Harris and Laibson (2001) technique can then be used to characterize the political equilibrium.

3.2.2 The Bellman System

The following proposition states the associated Bellman equation for a Markov equilibrium.

Proposition 2. *A Symmetric Markov Equilibrium is a feasible control $x^* = (c^*, A^*)$ such that (c^*, A^*) solves*

$$\begin{aligned} rV(W) = &\max_{(c,A)} u(c) + \lambda[V(Y+W-A) - V(W)] \\ &+ V'(W)(rW + \lambda A - c) + \gamma(1-\alpha)(V_0(W) - V(W)) \end{aligned} \tag{4}$$

where V_0 is given by

$$\begin{aligned} rV_0(W) = \lambda[V_0(Y+W-A) - V_0(W)] &+ V_0'(W)(rW + \lambda A - c) \\ &+ \gamma\alpha(V(W) - V_0(W)) \end{aligned} \tag{5}$$

[11]Note that $\tilde{V}(W|x,x) = V(W|x,x)$

The two value functions V and V_0 capture the expected utility for a party in or out of power, respectively. The Bellman equations have a very intuitive expected utility interpretation:

The first equation tells us that the current utility flow for a politician in power is equal to the consumption flow they receive, plus the probability(λ) that the endowment shock happens, times the corresponding change in the value function $(V(Y+W-A)-V(W)$, plus the change in value due to accumulation or decumulation of the asset stock $(V^{'}(W)(rW+\lambda A-c))$, and plus the probability that a political shock occurs and the incumbent leaves power $(\gamma(1-\alpha))$, times the corresponding change in value $(V_0(W)-V(W))$.

The second equation tells us that the current utility flow of being out of power is equal to the probability that an endowment shock occurs (λ) and the asset level moves from W to $Y+W-A$, times the corresponding change in value $[V_0(Y+W-A)-V_0(W)]$, plus the change in value to to accumulation or decumulation of the asset stock $(V'(W)(rW=\lambda A-c))$, and plus the probability that a political shock happens leading the politician to power $(\gamma\alpha)$, times the corresponding change in value$(V(W)-V_0(W))$.

The main differences between being and not being in power are:

- The politicians not in power do not receive a government provision; and
- The politicians not in power have no decisions to make, while the incumbent selects the instantaneous spending flow.

Taking the first-order condition of the system with respect to c when $W>0$, we get:

$$u^{'}(C^{*})=V^{'}(W)$$

The current spending flow is constrained only when $W=0$. For any $W>0$, consumption is unconstrained and the first-order condition will hold with equality. The first-order condition is also sufficient for optimality, because W is fixed at any instant and u is concave by assumption. The condition says that the marginal utility of consumption is equal to the marginal value of wealth. Differentiating this equation with respect to the state variable gives:

$$u^{''}(c^{*}(W))c^{*'}(W)=V^{''}(W)$$

Because u is concave, we have that $u^{''}<0$. As long as spending is monotonically increasing in W, $c^{*'}(W)>0$, the value function is also concave in W.

Taking the first-order condition with respect to A (for $W>0$):

$$V^{'}(Y+W-A)\leq V^{'}(W)$$

with equality for $A < W$.

Suppose now that $W \leq Y$. In this case, for any $A < W$, $Y - A > W$. If the value function is strictly concave (if $c^{*'}(W) > 0$)), then $V^*(Y + W - A) < V'(W)$. This does not satisfy the first-order condition (which holds with equality for $A < W$), so A has to be W: when $W \leq Y$, then $A^* = W$, i.e., all the savings are done in the contingent tree.

When $W > Y$, the from the first-order condition, $A^* = Y$. The following result obtains:

Result 1. *If $c^{*'}(W) > 0$ for all $W > 0$, then the following holds in equilibrium:*

$$A^*(W) = \begin{cases} W & for\, all\, W \leq Y \\ Y & for\, all\, W > Y \end{cases} \tag{6}$$

Note that A^* does not depend on either α or γ. The instantaneous portfolio decision is thus not affected by the political distortions. The political distortions affect the aggregate level of consumption and, eventually, whether or not W is less than Y, but not the way assets are allocated at any instant for a given W. This means that there are inefficiencies not because the incumbent is not doing the savings *right* (in the sense that it is not using the asset market efficiently), but rather that it will be consuming too much. This will become clear when I analyze the efficiency of the political equilibrium in the next section.

3.3 Constrained Efficiency

In this section I study the constrained efficient solution to the savings problem.

If there was no political turnover, $(\gamma(1 - \alpha) - 0)$, the incumbent party maximizes a standard exponential problem. However, when there is political turnover ($\gamma > \gamma(1 - \alpha) > 0$), a Markov equilibrium is clearly inefficient. Politicians that are not in power do not receive any provision allocation from the government. I call this inefficiency the "sharing" inefficiency. The perceived return on the savings by the incumbent today is reduced by political risk. Incumbents save too little. I call this the "savings" inefficiency.

To appreciate the intuition behind the savings inefficiency, suppose that the country just went through a political shock but the uncertainty about the ruling party has not yet been realized. From the perspective of all parties, they all have the same probability (α) of being in power. Assuming that only the political winners receive a government provision, if the politicians could commit to a provision rate (without knowing who among them will be in power), what rate would they pick? The answer assumes that the politicians maximize their ex-ante value (before knowing who will be in power).

Recall that $J = \frac{1}{\alpha}[\alpha V + (1-\alpha)V_0]$. The ex-ante value is then $\alpha J^C = \alpha V^C + (1-\alpha)V_0^C$. The optimal commitment solution (c^C, A^C) is such that:

$$rJ^C(W) = \max_{c,A} u(c) + \lambda[J^C(Y + W - A) - J^C(W)] + J^{Ct}(W)(rW + \lambda A - c) \quad (7)$$

This program is a standard exponential program. The consumption rate that all parties would like to commit to before the uncertainty about the political shock is realized is exactly the same as the one that a party continuously in power would pick. This is a constrained efficient result: it is the rate that a central planner constrained to providing consumption flows only to the politicians in power would pick. Therefore, the following holds:

$$c^C = \begin{cases} (r + \lambda)W & ; \, for \, W \in (0, Y] \\ rW + \lambda Y & ; \, for \, W > Y \end{cases} \quad (8)$$

The intuition for this result is very simple. Because the yield on the assets and the discount rate of the politicians are the same, the optimal spending is that which maintains the level of wealth constant across times and states of nature. Given that there is a borrowing constraint, this goal implies that the consumption flow is $(r+\lambda)W$ whenever wealth is below Y, where this is the return from holding the assets in this case (where $(r + \lambda)W$ is the return from holding the assets in the contingent tree). Similarly, when wealth is above Y (the amount invested in the contingent tree), the consumption flow is $rW + \lambda Y$. The constrained efficiency solution is then to maintain the asset level. Note that this will also be the aggregate spending that an unconstrained social planner[12] will pick.

Political uncertainty distorts the savings decision. Once the uncertainty about the political shock is realized, the incumbent chooses (as will be shown in the next sections) a provision flow equal to $c^*(W) > c^C(W)$. There is too much spending from the ex-ante perspective of all politicians. Note that the distortion of savings (savings inefficiency) is the result of the inability of the politicians to share the intra-instant provision flows (sharing inefficiency), but is different in nature. For example, this savings inefficiency can clearly be reduced if the government has access to an illiquid savings technology. Even if the illiquid technology could do nothing to improve the sharing within a given instant, it would constrain the politicians to an aggregate consumption flow that is smaller than the one they would otherwise choose. However, in the current setup, all assets available to the government are assumed to be liquid.

[12]A social planner that provides consumption to all parties, irrespective of whether they are in power or not

3.4 A Description of the Equilibrium

Suppose for now that the value function of being in power is concave. For the particular case of $W \leq Y$, the following results hold:

Proposition 3. *For any $\alpha < 1$,*

$$c^*(W) > c^C(W) = (r + \lambda)W$$

For $\alpha < 1$, politicians are consuming the asset stock faster than a central planner would. This means that, starting from $W \leq Y$, the wealth process never leaves the interval $[0, Y]$.

Politicians also consume faster the higher the political uncertainty.

Proposition 4. *For any $\alpha < 1$,*

$$\frac{dc^*(W)}{d\gamma} > 0$$

$$\frac{dc^*(W)}{d\alpha} < 0$$

The higher the probability of a political shock (γ), the faster the incumbent will run out of assets.

The higher the political risk (lower α), the faster the incumbent will run out of assets.

This description of the equilibrium will be valid as long as the value function V is concave over the domain of W ($W \in [0, \infty)$). However, in general there may be cases where $c'(W) < 0$ and hence V will be convex for some values of W. This implies that the optimal portfolio decision A is not in general continuous or monotonic in W. I again use the Harris and Laibson (2001) technique[13] to generalize the intuitions in this section. In my case, this implies the study of the economy as the political shock becomes very likely ($\gamma \to \infty$).

4 The Limit Economy

Next I study the equilibrium when there is a political shock at every instant ($\gamma \to \infty$). I denote the limit policy functions as the policy functions of the limit economy.

The rest of this article is based on the continuous time setup where, in same cases, we can obtain closed form solutions for the equilibria and we can derive comparative statics.

I consider two cases.

[13] In their study of the hyperbolic consumer when the "present" vanishes away.

4.1 Case 1: $\alpha + \rho - 1 > 0$

Suppose that $\alpha+\rho-1 > 0$. This assumption is satisfied when the political uncertainty and the elasticity of substitution are sufficiently small.

The first fundamental result is:

Proposition 5. *In the limit economy, the value function of being in power is concave.*

This proposition tells us the Eq. (6) characterizes the optimal investment strategy, which leads to the following proposition:

Proposition 6. *In the limit economy, the value function of being in power is, for $W \leq Y$:*

$$rV_\infty W = \frac{r}{r+\lambda}\psi^\rho[(r+\lambda)W]^{1-\rho} + \frac{\lambda}{r+\lambda}\psi^\rho[(r+\lambda)Y]^{1-\rho}$$

for $W > Y$:

$$rV_\infty(W) = \psi^\rho(rW+\lambda Y)^{1-\rho}$$

and the consumption flow is:

$$c^*(W) = \begin{cases} \psi^{-1}(r+\lambda)W & ;\, for\, W \in (0, Y] \\ \psi^{-1}(rW+\lambda Y) & ;\, for\, W > Y \end{cases}$$

where $\psi = \frac{\alpha+\rho-1}{\rho} < 1$.

We know, from section 2.3, that once a political shock happens, the efficient level of spending is $c^C(W) = (r+\lambda)W$ for $W \leq Y$ and $c^C(W) = rW + \lambda Y$ for $W > Y$. In the limit economy, political shocks happen at every instant, and it is not surprising that the optimal consumption level is $c^C(W)$. However, in the limit economy, the lack of commitment generates inefficiencies in the way the assets are managed: there is too much current provision.

Corollary 1. *In the limit economy, because parties cannot commit to a given $c(W)$, the government spends too much: $c^*(W) > c^C(W)$.*

A number of comparative statics of the limit economy are worth noting. First,

$$\frac{\partial c^*(W)}{\partial \alpha} < 0$$

As the probability of being reelected diminishes, the politicians in power spend more and save less.

Note also that,

$$\frac{\partial c^*(W)}{\partial \rho} < 0$$

As the elasticity of substitution ($\sigma = \frac{1}{\rho}$) increases, the parties consume assets faster. Note that the second-best policy calls for a constant spending flow which is independent of ρ and α. These results confirm the intuition that the inefficiency that is created by the political risk is amplified when the probability of being reelected diminishes and the intertemporal elasticity of substitution increases. In the first case, as the probability of being in power in the future decreases, the incumbent cares less about the future and consumes faster. In the second case, as the elasticity of substitution increases, the politicians have a lesser incentive to smooth their consumption flow and, hence, more of an incentive to consume today.

The following proposition posits that the politicians will eventually deplete the asset stock for any $\alpha < 1$:

Proposition 7. *For any given* $w > 0$ *and* $W_t > 0$*,*

$$\lim_{T\to\infty} P_r\left(\inf_{r\in[t,T]} \{W_T\} < w\right) = 1$$

Thus, the country will find itself in equilibrium with practically no assets.

I now consider the other case.

4.2 Case 2: $\alpha + \rho - 1 < 0$

Unlike in the previous case ($\alpha + \rho - 1 > 0$), the limit economy in this case is not well defined. In particular, the results from the previous case relied on the fact that the consumption rate converges to a finite value as γ tends to infinity. However, this is not true when $\alpha + \rho - 1 < 0$.

Proposition 8. *If* $\alpha + \rho - 1 < 0$ *the consumption function* $c * (W)$ *is such that:*

$$\lim_{\gamma\to\infty} c^*(W) = \infty$$

As $\gamma \to \infty$, the ruling party spends faster out of the stock of assets and the value functions converge to zero. At the limit, everything is spent at the instant a party takes power and, thus, the political risk has a dramatic impact on savings.

Proposition 9. *If* $\alpha + \rho - 1 < 0$*, the associated value function* $V(W)$ *satisfies:*

$$\lim_{\gamma\to\infty} rV(W) = 0$$

The reason is that the increase in the consumption rate lasts only for an instant dt. The assets are depleted during that instant and the provision is zero thereafter until and endowment shock happens.

This proposition is just an extreme case of Proposition 7. In the first case, I showed that the incumbent will deplete the asset stock in the absence of endowment shocks. The result for the second case is similar, with the only difference that it happens at a much faster rate: the incumbent depletes the asset stock in a single instant.

Remark 1. *Even when there are no savings in equilibrium, the incumbent* ***does not*** *use a zero discount factor into the future. They will still care about a future because there is a significant probability* ($\alpha > 0$) *that it may return to power. However, in equilibrium, incumbents overspend because they expect their successors to also overspend, and so on.*

5 Stationary Borrowing

We know from Proposition 7 that, faced with the possibility of political turnover, the equilibrium will be a government with practically no asset holdings. Consequently, governments will seek to borrow against future endowment shocks; i.e., they will seek to short-sell the risk-free bond.

Suppose that, at any instant, the country can short-sell the risk-free bond in an amount of $D \in (0, Y]$. I next analyze the equilibrium behavior of the politicians under that hypothesis.

Definition 5. *A control* $x = (c, A)$ *is feasible under the short-sale constraint* D *(*D*-feasible) if* c *and* A *are such that:*

- $A : [0, \infty) \to (-\infty, +\infty)$ *such that* $A(W) \leq W + D$ *for all* $W \in [0, \infty)$
- $c : [0, \infty) \to [0, \infty)$ *with* $c(0) \in [0, \lambda A(0)]$

The main difference between this definition and Definition 2 is that now A can exceed W by a maximum of D. Therefore, for any given (c, A) the wealth of the country follows:

$$dW = (rW + \lambda A - c)dt$$

in the absence of endowment shocks and where a return r is received from all investments (rW), and an extra return λ is received only from investments in the Lucas tree (λA). So, the consumption constraint becomes apparent: when there is no wealth, $dW \geq 0$ implies $\lambda A(0) \geq c$.

By constraining the parties to using only Markov strategies, a feasible equilibrium can be defined as follows:

Definition 6. *A feasible equilibrium with short-sale constraint D is a D-feasible control $x^* = (c^*, A^*)$ where c^*, A^* solve:*

$$\begin{aligned} rV(W|D) = \max_{c,A} u(c) + \lambda[V(Y+W-A|D) - V(W|D)] \\ + V^{'}(W|D)(rW + \lambda A - c) + \gamma(1-\alpha)(V_0(W|D) - V(W|D)) \end{aligned}$$

and where V_0 satisfies:

$$\begin{aligned} rV_o(W|D) = \lambda[V_0(Y+W-A|D) - V_0(W|D)] \\ + V_0^{'}(W|D)(rW + \lambda A - c) + \gamma\alpha(V(W|D) - V_0(W|D)) \end{aligned}$$

When $D = 0$, this corresponds to our previous definition of the symmetric Markov equilibrium. But now the country can short-sell the risk-free bond and $W - A$ can be negative, binding the country to repay the foreign investors out of an endowment shock.

If the value function were concave, the first-order condition for A is sufficient for optimality,

$$V^{'}(Y+W-A|D) \leq V^{'}(W|D)$$

with equality for $A < W + D$.

The optimal decision is then

$$A^* = \begin{cases} Y & for\, W > Y - D \\ W + D & for\, W \leq Y - D \end{cases} \tag{9}$$

As before, I will separate the analysis of the problem $\gamma \to \infty$ into two cases.

5.1 Case 1

As before, this is the case where $\alpha + \rho - 1 > 0$. The following theorem holds (proof available from the author):

Theorem 1. *(Representation Theorem) Under any short-sale constraint D, the value function of being in power, V_∞, in the limit economy is given by:*

$$V_\infty(W|D) = \begin{cases} \frac{\alpha}{r+\lambda}\big[(1-\rho)u((r+\lambda)W + \lambda D)v\big(ln\frac{(r+\lambda)W+\lambda D}{\lambda D}\big) + \lambda V_\infty(Y-D|D)\big] \;, & ; for\, W \in [0, Y - \\ \frac{\alpha}{r}(1-\rho)u(rW + \lambda Y)v\big(ln\frac{rW+\lambda Y}{\lambda D}\big), & ; for\, W > Y - D \end{cases}$$

where v is a function such that:

1. $v(0) = \frac{1}{1-\rho}$;
2. $v^{'} < 0 \; on \; (0, \infty)$;
3. v asymptotes to $v(\infty) = \frac{\psi^{\rho}}{\alpha} \frac{1}{1-\rho}$;
4. for a given $l, v(l)$ is independent of λ, D, and r; and
5. $(1-\rho)v + v^{'}$ is positive for any finite l and is increasing in l

We now can analyze the dynamics under a stationary short-sale constraint D. We know from before that $V^{'}_{\infty}(W|D) = u^{'}(c^{*}(W))$ for $W > 0$). Taking the first derivative of $V_{\infty}(W|D)$ with respect to W:

$$u^{'}(c^{*}) = V^{'}_{\infty} = \begin{cases} \alpha((1-\rho)v + v^{'})U^{'}((R+\lambda)W + \lambda D) & ; for \, W \in (0, Y-D] \\ \alpha((1-\rho)v + v^{'})u^{'}(rW + \lambda Y) & ; for \, W > Y - D \end{cases}$$

The sum $(1-\rho)v + v^{'}$ is increasing in W and, therefore, it converges to $(1-\rho)v(\infty) = \frac{\psi^{\rho}}{\alpha} < 1$. This implies that $(1-\rho)v + v^{'} < 1$ for all W. So, $u^{'}(c^{*}) = V^{'}_{\infty} < u^{'}((r + \lambda)W + \lambda D)$ for $W \in (0, Y-D]$ and $u^{'}(c) < u^{'}(rW + \lambda Y)$ for $W > Y - D$. Then, consumption always exceeds $(r+\lambda)W + \lambda D$ for $W \in (0, Y-D]$ and $rW + \lambda Y$ for $W > Y - D$. But $(r+\lambda)W + \lambda D$ and $rW + \lambda Y$ are the respective income flows the country gets from holding the assets, borrowing, and receiving endowment shocks. At every instant the country consumes more than the income flow it receives and the following then holds.

Proposition 10. *Under any short-sale constraint D, the country consumes more than its income flow and wealth monotonically decreases towards zero in the absence of endowment shocks.*

The politicians eventually consume their wealth down to zero. But if the country can borrow, once the wealth disappears the politicians still have the ability to borrow against the endowment shock.

5.2 Case 2

In this case, under any short-sale constraint D, the value function of being in power, $V_{\infty}(W|D)$, in the limit economy is given by:

$$\lim_{\gamma \to \infty} V(W|D) = \frac{\alpha u(\lambda D)}{r} \tag{10}$$

The politicians are unable to save, and consume all of their income in a single instant. However, they can borrow and receive a constant flow of λD. This result is again similar to Proposition 10, with the difference that all the wealth is consumed in an instant of time.

6 Sustaining Repayment

The results in Section 5 assumed that the country could not default. In this section, I relax that assumption and address the issue of sustainability. I assume the following:

Assumption 4. *(Punishment) If the party in power defaults, foreign investors will punish the country by denying it future lending.*

This is the only punishment available to foreign investors: they can negate the country's access to the capital markets but they cannot ban it from saving in the international asset markets. This is the kind of situation where the Bulow-Rogoff result is expected to hold.

A feasible equilibrium is sustainable if the incumbent has no incentive to default for any wealth level where it borrows. The value the incumbent receives after defaulting is the value characterized in the previous section, when $D = 0$.

I explore next how much the country borrows under short-sale constraint D. The country has wealth W and invests A^* in the Lucas tree. The difference, $W - A^*$, is how much the country saves (if it is positive) or borrows (if it is negative) in the risk-free bond. When $W - A^*$ is negative, the country is borrowing and promises to pay $A^* - W$ back to investors when the endowment shock happens. Upon default, the country cannot borrow again, and the equilibrium is the one described in Section 5.

Definition 7. *A feasible equilibrium under short-sale constraint D is sustainable in the limit economy if*

$$V_\infty(Y + W - A^*|D) > V_\infty(Y) \tag{11}$$

for all $W - A^* < 0$.

Like before, I analyze debt sustainability through two cases.

6.1 Debt Sustainability, Case 1

To find out how much the country borrows, we just need to compute $W - A^*$ whenever it is negative. Given the optimal decision rule given by Eq. (9), above, the following holds:

$$W - A^* = \begin{cases} W - Y & for\, W > Y - D \\ -D & for\, W \leq Y - D \end{cases}$$

Where $W - A^*$ is negative iff $W < Y$.

To predict whether the incumbent will repay the debt, we first need to ascertain whether it has an incentive to default. From Eq. (11). above, the following has to hold:

$$\begin{cases} V_\infty(Y-D|D) > V_\infty(Y) & ;\, for\, all\, W \in [0, Y-D] \\ V_\infty(W|D) > V_\infty(Y) & ;\, for\, all\, W \in (Y-D, Y] \end{cases}$$

Using the representation theorem, this results in

– For $W - Y - D$:

$$V_\infty(Y-D|D) = \frac{\alpha(1-\rho)}{r} u((r+\lambda)Y - rD) v\Big(ln\big(\frac{(r+\lambda)Y - rD}{\lambda D}\big)\Big) \tag{12}$$

– For $W \in (Y-D, Y]$:

$$V_\infty(W|D) = \frac{\alpha(1-\rho)}{r} u((r+\lambda)Y - r(Y-W)) v\Big(ln\frac{(r+\lambda)Y - r(Y-W)}{\lambda D}\Big) \tag{13}$$

And, in the case of a zero short-sale constraint,

$$V_\infty = \frac{\alpha(1-\rho)}{r} u((r+\lambda)Y v(\infty) \tag{14}$$

Dividing Eqs. (12) and (13) by Eq. (14), the equilibrium under short-sale constraint D is sustainable if, for all $W \in [0, Y]$

$$\Big[\frac{u((r+\lambda)Y - rX(W))}{u((r+\lambda)Y)}\Big] \left[\frac{v\big(ln\big(\frac{(r+\lambda)Y - rX(W)}{\lambda D}\big)\big)}{v(\infty)}\right] > 1 \tag{15}$$

where the amount borrowed, $X(W)$, is:

$$X(W) = \begin{cases} D & ;\, if\, W \leq Y - D \\ Y - D & ;\, if\, W \in (Y-D, Y] \end{cases}$$

for $W \in [0, Y]$

The first term in square brackets in Eq. (15) is always less than one (for any $r > 0$) and the second is always strictly greater than one. However, as the interest rate goes down, the first term approaches one, and the second remains bounded above one for any $W \in [0, Y]$. Their product approaches a value strictly greater than one for all $W \in [0, Y]$. The following proposition follows.

Proposition 11. *For any $D \in (0, y]$ there exists an $r > 0$ such that for any $0 < r \leq \bar{r}$, the feasible equilibrium under short-sale constraint D is sustainable.*

The Bulow-Rogoff argument does not hold in this economy. Politicians repay the debt even when the credit market is as complete as the asset market and the only punishment available to the foreign investors is the denial of future lending in the case of default. The reason lies in the politicians' inability to save enough. Even when the politicians would all like to save more, once in power they rationally choose not to and consume too much of their asset holdings. The county eventually has very little wealth and politicians decide to borrow again from foreign creditors. But, since we have assumed that if the country defaulted in the past it won't be able to borrow again, they have a strong incentive to repay. Politicians' perception of the benefit of default is reduced further when interest rates are low, since the return on savings is small.

The following proposition lays out the relationship between ability to pay and political risk.

Proposition 12. *Let $\bar{r}(D)$ be the highest interest rate at which the feasible equilibrium under short-sale constraint D is sustainable; then $\bar{r}D$ is decreasing in α.*

As the political risk increases (α decreases) savings are more distorted. This proposition tells us that as the political risk increases, politicians will repay debt more easily, as they can sustain debt contracts at higher interest rates. However, as the political risk fades away (i.e., as α converges to one), the following proposition holds.

Proposition 13. *(Bulow-Rogoff) For any short-sale constraint D,*

$$\lim_{\alpha \to 1} \bar{r}D = 0$$

As α increases, the incumbent is more likely to remain in power in the future. The savings distortions are reduced and the incumbent will find the default option more attractive. As α converges to one, a Bulow-Rogoff type result obtains: politicians will only repay the sovereign debt if the interest rate is zero. The debt is not sustainable as an equilibrium for any positive interest rate. This proposition makes clear that the reason why politicians repay sovereign debts lies in the inefficiencies in the savings that emerge when political uncertainty is high. Once political risk fades away politicians are able to save more efficiently and, no longer needing the credit markets, they will default for any positive interest rate.

The next proposition analyzes the other extreme, when political uncertainty is high.

Proposition 14. *For any $D \in (0, Y]$, there exists an $\bar{\alpha} \in (1-\rho, 1)$, such that for any $\alpha \in (1-\rho, \bar{\alpha}]$ the feasible equilibrium under short-sale constraint D is sustainable.*

When the political risk is high enough (α low enough), any stationary debt contract can be sustained.

I next show the dramatic results that occur when $\alpha + \rho - 1 < 0$.

6.2 Debt Sustainability, Case 2

Given a short-selling constraint D (see Eq. (10)), the following holds:

$$\lim_{\gamma \to \infty} V(W|D) = \frac{\alpha u(\lambda D)}{r}$$

Recall from before that, without debt,

$$\lim_{\gamma \to \infty} V(W) = 0$$

The following proposition then follows.

Proposition 15. *If $\alpha+\rho-1 < 0$ then, for any $(\alpha > 0, D > 0)$, the feasible equilibrium under short-sale constraint D is sustainable.*

The inefficiencies in savings created by the political risk are so large that the debt is sustainable regardless of the interest rate or the elasticity of substitution. In fact, as $\gamma \to \infty$, the spending rate converges to infinity. This is the dramatic outcome of the logic: if tomorrow "they" (whoever is in power) are going to eat a lot, I will eat much more today. What makes this possible is that, once the savings are accumulated, the total stock of assets belongs to the next party in power. The new incumbent will consume as much as they desire out of the total stock, making the current incumbent very reluctant to save. Debt puts a limit on this conduct because once tomorrow arrives the politicians will hit their borrowing constraint and this dramatic logic will no longer apply.

7 Autocracies versus Democracies

The previous section analyzed debt sustainability in a model with political turnover. One key aspect of that model was the stability of the political parties: the parties remain in the political game forever (i.e., the value function of being out of power is not zero). I showed that, due to the inefficiencies in savings inherent to the political structure, as political uncertainty increased, the politicians' ability to sustain sovereign lending also increased. I think of this political model as representing a modern democracy, with several long-lived parties.

Suppose now that political resurrection is not possible. Once a politician is out of government, they are out forever. I call this model autocracy. In an autocracy an incumbent rules continuously, but once a political shock happens and the incumbent is removed from power, they cannot return to the political game. In this situation, an incumbent's value function is:

$$V^A(W) = E\Big[\int_0^\infty e^{-(r+\gamma(1-\alpha))t} u(c_t)dt\Big] \tag{16}$$

where $\gamma(1-\alpha)$ is the probability that the incumbent is removed from power. The political instability makes the incumbent impatient (they have an effective discount rate higher than r) but does not make them time-inconsistent. The value function expressed by Eq. (16) is a standard exponential value function. In this case, the Bulow-Rogoff result holds: the incumbent will always default on any debt contract.

Therefore, the model predicts that:

- In a democracy, political turnover is positively correlated to debt sustainability; and
- In an autocracy, political turnover is not correlated to debt sustainability.

8 Conclusion

In this article, I proposed a theory of sovereign debt repayment based on political considerations. Bulow and Rogoff (1989) show that a country that has access to a sufficiently rich asset market cannot commit to repay its debts and, therefore, should be unable to borrow. I show that the presence of political uncertainty reduces a country's ability to save and, therefore, replicate the original debt contract after default.

In a model where different parties alternate in power, an incumbent with a low probability of remaining in power has a high short-term discount rate and is, therefore, unwilling to save. The incumbent realizes that whoever will be in power in the future will also be impatient, making the accumulation of assets unsustainable. Because of their inability to save, politicians demand debt ex-post and the desire to borrow again in the future enforces the repayment of currently outstanding debt.