

# Who can be trusted?: Sovereign debt and the impact of leadership change.

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## Abstract

The institutional context in which leaders serve shapes their ability to acquire sovereign debt and the consequences of leadership change. When leaders are beholden to a large coalition of supporters to retain power, as in a democracy, leader removal is easy. If creditors refuse loans to sovereigns who default then the citizens remove leaders who default. Beyond providing a means to restore creditworthiness, this mechanism ensures office seeking leaders do not default in the first place. With the default risk being minimal, such sovereigns can borrow at favorable terms and leadership change has minimal impact of the creditworthiness. In contrast, when leader removal is difficult, then sovereigns can default without jeopardizing their tenure in office. Without the institutional induced commitment to repay sovereign debt, creditworthiness depends upon economic conditions and characteristics of individual leaders. Nations with absolute leaders not only receive worse access to credit, but also their creditworthiness shifts with leadership change. We test these hypotheses using sovereign debt bond indices for developing and developed nations.

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The term sovereign debt originates from a time when a monarch would borrow funds on behalf of his or her nation. Given the anarchy of the international system, the monarch could always default. The terms on which leaders could borrow depended upon creditors' beliefs about the sovereign's willingness to repay. The development of democratic political institutions changed this pattern of borrowing in many countries. For instance, following the Glorious Revolution of 1688, English borrowing required the consent of parliament.<sup>1</sup> While the term sovereign debt persists, debts are associated with the nation rather than the sovereign directly.

Recently scholars have invested considerable effort into showing how domestic political arrangements shape a government's ability to credibly commit both in the domestic and international spheres (Przeworski and Limongi 1993; Elster 2000; North and Weingast 1989; Bates 1996; De Long and Shleifer 1993; Firmin-Sellers 1994; Levy and Spiller 1996; North 1981, 1990; Olson 1993, 2000; Shepsle 1991; Tsebelis 2002; Weingast 1995; 1997b; Fearon 1994; Smith 1998; Schultz 1998). In general this literature suggests democrats can commit themselves more easily than autocrats. Since the ability to obtain a favorable loan stems from the ability to commit to repay, it is not surprising that given their lower default risk, democrats can obtain larger and lower interest rate loans than can autocrats (Brewer and Rivioli 1990; Abdullah 1985; Citron and Nickelsburg 1987; Balkan 1992; Feder and Uy 1985).

While most scholars appear to agree that democrats can borrow at better terms than autocrats, there is considerable disagreement as to the details of why (see Stasavage

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<sup>1</sup> The historical development of borrowing in this period in England and France has been studied extensively, as has similar earlier development in the Netherlands (Root 1989; Schultz and Weingast 1998; Stasavage 2003; Velde and Weir 1992; Weingast and North 1989; Weingast 1997; Eichengreen 1991).

2003, chapter 1 for a summary). In this paper we propose a theory of sovereign borrowing based in sovereign specific punishments (McGillivray and Smith 2000, 2003; Guisinger and Smith 2002). In common with many reputational arguments (Eaton and Gersovitz 1981; Grossman and Huyck 1988; Atkeson 1991; Tomz 1999, 2000; Glick and Kharas 1986), in this theory creditors refuse additional credit to sovereigns who renege on their debts. Yet creditors do not have a permanent grudge against a defaulting nation, only against the defaulter herself. Beyond providing a mechanism for restoring creditworthiness and normalizing relations, when leaders are easily replaced sovereign specific punishments deter default in the first place. Citizens wishing to restore their nation's access to credit remove defaulting leaders. Leaders who want to retain their jobs dare not default!

These theoretical arguments focus on individual leaders and the consequences of leadership turnover on creditworthiness; questions, that to our knowledge, have not been previously considered. Using US dollar denominated bond indices (J. P. Morgan Securities Inc. 1999), we show that leadership turnover has no consequential effect in democratic states. In contrast, in autocratic states, where leader replacement is harder, leadership turnover has large effects on both the price of sovereign bonds and price volatility. In particular, leadership change in the most autocratic system reduces the bond indexes by an average of 10%. Leader change in autocratic states also massively increases price volatility by several orders of magnitude relative to democratic states.

We proceed as follows. First we discuss the general relationship between default and access to credit. Second, we introduce a simple formal model of loans and repayment. Third, we examine the impact of sovereign specific punishments within this

game and show how these strategies separate the behavior of autocrats and democrats. In particular, we show that the terms on which leader beholden to only a small coalition of supporters can obtain loans depends upon their idiosyncratic preferences for debt repayment and the economic ease of repayment. In contrast, when leaders are beholden to a large coalition of supporters and hence easily removed from power, then leaders can commit to repay loans under all but the most extreme of economic circumstances. Fourth, we use these theoretical developments to generate hypotheses regarding the impact of political institutions and leadership turnover on creditworthiness. We then test some of these predictions. In our fifth section we describe our political, economic and financial variables, paying particular attention to the construction and use of sovereign debt indices. Sixth, we present our findings. We conclude by discussing the importance of our results.

### **Credibility and Trustworthiness**

Sovereign lending is a risky business. In the domestic setting, creditors can typically seize the assets of debtors who fail to repay loans. In the international setting such recourses are rarely available to creditors. Unfortunately, while nations are willing to promise repayment when they need the money, when it comes time to raise taxes to make repayments leaders would prefer to forget their promises. This time inconsistency makes lending problematic.

If leaders could commit to repay sovereign debt then lenders would be willing to lend funds at favorable rates. Unfortunately, when leaders can not make such commitments, lenders need to be compensated for the risk of default. Nations seen as likely to default face higher interest rates, or as was historically often the case, must rely

on 'forced' loans. Many factors affect the probability of default (see Eaton and Taylor 1985 for an overview). Obviously nations with small debts, healthy tax revenues, and an adequate supply of foreign currency via exports can service debt easily. As debts mount relative to revenues and exports then servicing debt becomes increasingly hard. However, it is not simply a question of ability to pay, but also willingness to pay.

A domestic lending analogy is useful. Historically, debtors who could not pay their debt could be thrown in debtors prisons until their debts were paid. Given that these prisons were extremely unpleasant and debtors had few prospects of paying their debts once inside, it is probably safe to assume that those sent to debtors prisons could not pay their debts. It was not that they lacked willingness, they lacked means. In many ancient societies, such as the Roman Republic, citizens were sold into slavery to settle their debts. When the penalty for default is the indefinite loss of one's freedom, people make every possible effort to pay their debts and it is only those poor souls unable to make repayment that default.

In the US the cost of default for individuals is much reduced. For instance, people who declare personal bankruptcy can protect many of their assets, such as their house, from creditors. While bankruptcy is unpleasant, it does not typically involve prison or being sold into slavery. Not surprisingly, with the penalty for default reduced some people, who could service their debt, choose instead to default. The less the penalty for default, the more reluctant people are to make repayment. The same is true for nations. The smaller the penalties for refusing to pay debts the more likely nations are to default.

While the prospects of debtors' prison or slavery are not appealing, they make obtaining a loan easier since creditors realize the probability of default is small. The

ability to commit to repay means you can borrow more money at a lower interest rate. Schultz and Weingast (1998) show, for instance, that during the Seven Year war (also known as the French Indian war), since creditors believed the English risk of default was much lower than France's, England was able to beat the French militarily because they could obtain substantially more money at lower interest rate than France. The advantages of being able to commit to repay are clear. The key question is why are some nations able to commit while other can not?

In general the greatest threat creditors have is to refuse future loans. With the exception of those rare circumstances when creditors can mobilize their government to intervene militarily to force repayment (and these are often unsuccessful), the removal of all future credit is the harshest punishment creditors can impose. In many cases creditors can not even impose this level of punishment since the wily sovereign can play off one creditor versus another, promising to make payments to the party that advances further credit. In such circumstances the ability of creditors to coordinate plays an important role in disciplining sovereigns (Weingast 1997a,b). As a starting point for modeling sovereign debt, we will assume the harshest threat creditors possess is the complete removal of future credit.

We present a simple model of the loan-repayment problem. In each period sovereigns might need a loan. The terms of the loan they can receive depend upon creditors' assessment of the risk of default. Once a loan is made, sovereigns must decide whether or not to repay their debt. The ease of repayment depends upon economic conditions. It is easier to raise revenues during economic booms than economic busts. The model treats economic conditions under which repayment must be made as

stochastic. Further, we introduce heterogeneity into the population of sovereign leaders by varying the extent to which each wishes to repay loans. As we shall see, while this idiosyncratic desire to repay debt is of little consequence in democratic systems, it strongly accounts for prevailing interest rates in autocracies.

### **The Loan/Repayment Game.**

The game is infinitely repeated where the stage game is as follows<sup>2</sup>:

1) Nature decides with probability  $q$  whether the need for a loan arises. Access to a loan is worth  $V$ .

2) Should the need for a loan arise, there is a market of bankers/creditors who compete for the loan. We will not explicitly model this stage, however either the sovereign making a take it or leave offer (in which case she would offer the minimal price the bankers would accept) or Bertrand competition between bankers results in the competitive interest rate.

3) Nature decides the ease of repayment,  $c$ , where  $c$  is distributed with distribution  $F(c)$  (with associated density  $f(c)$ ). In what follows we focus our attention on the exponential distribution,  $F(c)=1-\exp(-c)$ .

4) The sovereign decides whether or not to repay.

5) Voters decide whether or not to retain the sovereign. The cost of removing the sovereign is  $k$ .

All players are risk neutral utility maximizers. Sovereign leaders receive a payoff of  $\Psi$  for each period in office and all payoffs are discounted with a common discount factor  $\delta$ . We normalize the banker's outside options, the risk free interest rate, to zero.

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<sup>2</sup> See Robinson (1998) and Schultz and Weingast (1998) for related models.

To introduce some heterogeneity into the model, we assume sovereigns differ in their desire to repay loans. Stasavage (2003), in his exploration of English borrowing following the Glorious revolution, shows that the Whig and Tory parties differed in their desire to repay loans. The difference is largely accounted for by the fact that those lending to the government typically associated with the Whigs. To capture these differences in willingness to pay between leaders, leaders receive a payoff of  $s$  if they repay a loan and zero if they do not. Leaders with high  $s$  values, such as late seventeenth century Whigs, regard paying loans as important. Leaders with low  $s$  value see little reason to repay loans beyond it enabling them to borrow again in the future.

While this model is highly stylized it captures the prevailing incentives. Both creditors and sovereigns are better off if loans are made and repaid, but once the loan is made the sovereign does not want to repay the debt. Reputation is a standard idea that encourages repayment (Bulow and Rogoff 1989; Dixit and Londregan 2000; Eaton and Gersovitz 1981; Grossman and Huyck 1988; Atkeson 1991; Cole and Kehoe 1994; Tomz 1999, 2000; Schultz and Weingast 1998; Glick and Kharas 1986). Since leaders want to be able to borrow again in the future (and at favorable rates), they repay debt that myopically they would prefer to default on. Providing the value of being able to borrow in the future is greater than the cost of servicing debt, leaders repay debts to preserve their reputation and access to credit. As debts mount and the cost of servicing debt escalates leaders becomes more tempted to repudiate their debt. To offset this increase in default risk, creditors require higher interest rates before they will lend more funds. Unfortunately, this rise in interest rates doubly endangers the lender/borrower relationship. First, as interest rates rise servicing debt becomes harder further increasing

the risk of default. Second, as interest rates rise, future borrowing becomes less attractive and hence retaining a good reputation becomes less important. There is a real danger that creditors' fears of default become self fulfilling expectations.

### **Sovereign Specific Punishments**

Traditional reputation arguments assume creditors punish nations who default by reducing access to future credit. We examine the consequences of shifting the target of these punishment strategies from the sovereign nation to the specific sovereign who defaulted. That is to say, should leader A default then creditors cut her off from future credit. Creditors are, however, prepared to lend to her successor, leader B. The imposition of such a lending strategy drives a wedge between the behavior of autocrats and democrats.

In order to examine why sovereign specific punishments are equilibrium behavior and the nature of behavior within the equilibrium we examine the problem through a series of questions. We start by calculating the interest rate at which a banker or creditor will lend to the sovereign. If the banker makes no loan then he keeps his money, worth 1. If, however, he makes a loan at interest rate  $r$ , then if the sovereign repays him his return is  $(1+r)$ , but if the sovereign defaults his payoff is 0. If  $\gamma$  represents the probability of default, then the banker only agrees to the loan if  $(1+r)(1-\gamma)+\gamma \cdot 0 \geq 1$ . Hence the competitive interest rate associated with the risk of default  $\gamma$  is  $r = \gamma/(1-\gamma)$ . As we would expect, as the risk of default rises creditors require higher returns.

Once a leader defaults then given sovereign specific punishments she can not secure future loans. Given that she can not obtain another loan she should default on any outstanding debt, and given that she will renege on any future repayments creditors

should not be tempted to loan to her. The threat of refusing future loans to defaulters is credible.

The consequences of going into default differ by regime type. When leader removal is extremely difficult then the defaulter retains office but can not secure additional loans. We will describe this setting as the realist scenario since the sovereign leader and the nation are effectively a single unitary actor.

In this realist setting, once default occurs the leader and nation miss the opportunity to earn  $V$  when the need for a loan occurs, which happened with probability  $q$ . In contrast if the leader avoids default then she can obtain future loans. We represent the value of being able to obtain future loans as  $Z_h$ . This payoff is often referred to as the continuation value, as it is expected value of the game starting without default. We will presently derive the value of  $Z_h$ , however for present purposes it is sufficient to assume it is valuable relative to playing the game following default,  $Z_d$ . The continuation value following default,  $Z_d$ , for a difficult to remove sovereign is  $\Psi + \delta\Psi + \delta^2\Psi + \dots = \Psi/(1-\delta)$ , the net present value of receiving the office holding benefit in every future period (remember no future loan can be secured once default occurs).

We can now address the central question of repayment. Suppose having taken a loan the sovereign (who was previously in good standing) defaults. Her payoff is  $V + \Psi + \delta Z_d$ , the value of receiving the loan ( $V$ ) and the value of office holding plus the discounted value of playing the game following default,  $\delta Z_d$ . Alternatively if the sovereign repays the loan then her payoff is  $V - (1+r)c + s + \Psi + \delta Z_h$ , where  $V$  is the value of having received a loan,  $(1+r)c$  is the cost of repaying the loan given the difficulty of repaying  $c$ ,  $s$  is the idiosyncratic desire of the leader to repay the loan,  $\Psi$  is the value of

holding office and  $\delta Z_h$  is the discount value of being able to secure loans in the future. Providing it is sufficiently easy to repay debt,  $c \leq c_H = (s + \delta Z_h - \delta Z_d)/(1+r)$ , then the sovereign repays her nations debt. If paying the debt becomes more difficult then she defaults.

The level of difficulty in paying loans at which the leader is indifferent between repayment and default,  $c_H = (s + \delta Z_h - \delta Z_d)/(1+r)$ , is critical in describing equilibrium behavior. Given  $c_H$  the probability of default is  $\gamma = \Pr(c > c_H) = 1 - F(c_H)$ , and the corresponding interest rate is  $r = \gamma/(1 - \gamma) = (1 - F(c_H))/F(c_H)$ . Given this critical level we can also calculate the sovereign's continuation value,  $Z_h$ . Specifically,

$$Z_h = \Psi + (1 - q)\delta Z_h + qV + qsF(C_H) + q\delta Z_h F(C_H) - q(1 + r) \int_0^{C_H} cf(c)dc + q\delta Z_d(1 - F(C_H))$$

. This expression is worthy of some description. The value of playing the game with an honest reputation has many components. First the sovereign receives the value of holding office  $\Psi$ . With probability  $(1-q)$  no need for a loan arises so the sovereign retains the ability to borrow in the future, the value of which is the discounted continuation value  $Z_h$ . With probability  $q$  the need for a loan arises which is worth  $V$ . Having taken this loan with probability  $F(c_H)$  the sovereign repays the debt. The expected cost of repaying the loan is given by the integral part of the expression about. In addition to these costs, the sovereign gains the payoff  $s$  and the ability to borrow again in the future ( $Z_h$ ) with probability  $F(c_H)$ . If the cost of repayment is high, specifically  $c > c_H$  which occurs with probability  $1 - F(c_H)$ , then the sovereign defaults. While this avoids the cost of repayment it means the future value of play is only worth  $Z_d$  rather than  $Z_h$ .

The definitions  $Z_h$  and  $Z_d$ , the competitive interest rate  $r = (1 - F(c_H))/F(c_H)$  and the equation  $c_H = (s + \delta Z_h - \delta Z_d)/(1+r)$  characterize the subgame perfect equilibrium in which bankers play sovereign specific punishments, the citizens do not replace their sovereign

even if she has defaulted and the sovereign repays debts if and only if she has not previously defaulted and  $c \leq c_H = (s + \delta Z_h - \delta Z_d) / (1 + r)$ .

Figure 2 shows the interest rate bankers charge sovereigns according to their idiosyncratic preferences for repayment,  $s$ . This example is generated assuming  $c$  is distributed exponentially,  $F(c) = 1 - \exp(-c)$ , the discount factor is  $\delta = 0.9$ , and the value of a loan is  $V = 2$ .

Figure 2: Prevailing interest rate given the sovereign's idiosyncratic desires to repay loan ( $s$ ) in the realist setting.

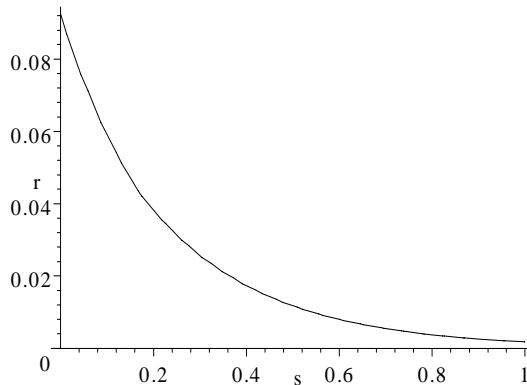


Figure 2 shows, that in the realist setting, the interest rate and the risk of default strongly depend upon the sovereign's idiosyncratic desires to repay debt. Leaders with an extremely strong desire to repay debt ( $s=1$ ) can obtain loans at .17% since they have risk of default of only .0017. Hence a leader who is strongly committed to repaying debt, and widely recognized as such, can obtain favorable terms. However, without this desire to repay loans an absolute sovereign ( $s=0$ ) must pay an interest rate of 9.2% since her risk of default is 0.084. Idiosyncratic factors and economic condition shape default risk and interest rates.

Default in the realist setting ends access to future credit. Under the sovereign specific punishments, creditors refuse future loans to defaulters. However, unlike traditional unitary actor approaches, sovereign specific sanctions offer the possibility of restoring creditworthiness via the replacement of the sovereign. Since creditors punish the sovereign and not the nation she represents, leader turnover offer the possibility of restoring access to credit. If, following default, the citizens replaced their leader then they could once more borrow funds. The advantage of replacing the leader is that they could once more obtain credit, but it costs  $k$  to replace a leader. The citizens' payoff from depositing their leader is  $-k + \delta Z_{Eh}$ , where  $Z_{Eh}$  is the citizens' continuation value from playing the game with a leader who has not defaulted.  $Z_{Eh}$  is similar to the leader's value for playing the game absent the office holding benefits and the idiosyncratic benefits of repayment,  $s$ . Specifically,  $Z_{Eh} = (1 - q)\delta Z_{Eh} + qV + q\delta Z_{Eh}F(C_H) - q(1 + r) \int_0^{C_H} cf(c)dc$ . If the citizens retain their leader then they avoid the cost  $k$  but their nation loses all access to future credit, a payoff of zero. When  $k$  is high, specifically,  $k \geq \delta Z_{Eh}$ , then citizens retain leaders who default and the nation loses access to credit. However, when leader replacement is easy citizens can restore access to credit by depositing their sovereign. It is to this domestic politics scenario that we now turn.

### **Domestic politics scenario**

When the cost of leader replacement is low then citizens can restore access to credit by removing a defaulting sovereign. Not only does this offer the prospects for restoring creditworthiness, but it also prevents default occurring in the first place since sovereigns are reluctant to default when it costs them their jobs. As we did in the realist

case, we will now examine a series of questions to characterize behavior under sovereign specific punishments given a low cost of leader removal.

Creditors require an interest rate sufficient to compensate them for any risk of sovereign default. As derived above,  $r = \gamma/(1 - \gamma)$ , where  $\gamma$  is the risk of default. We now consider the key question of whether to repay a loan or default. If the sovereign repays a loan then her payoff is  $V - (1 - r)c + s + \Psi + \delta Z_S$ , where  $V$  is the value of the loan,  $(1 - r)c$  is the cost of repaying the loan,  $s$  is the sovereign's idiosyncratic desire to repay,  $\Psi$  is the value of holding office and  $\delta Z_S$  is discounted continuation value of playing the game having never defaulted. We shall subsequently derive  $Z_S$ . If, alternatively, the sovereign defaults then the citizens remove her. Her payoff from default is  $V + \delta Z_E$ , where  $\delta Z_E$  is the discounted value the citizens receive from having a leader who has not defaulted. We are assuming here that the leader becomes a regular citizen once removed from power. We might alternatively assume she is removed from the game, which generates very similar results.

Given the relative benefits of repayment and default, the sovereign repays loans providing that  $c \leq c_s = (s + \Psi + \delta Z_S - \delta Z_E)/(1 + r)$ , and defaults otherwise. Given this critical difficulty of repayment  $c_s$ , we can now calculate continuation values and interest rate.  $Z_S$  is the continuation value for playing the game without prior default.

$Z_S = (1 - q)(\Psi + \delta Z_S) + qV - (1 + r)q \int_0^{c_s} cf(c)dc + F(c_s)q(\Psi + s + \delta Z_S) + q(1 - F(c_s))\delta Z_E$ . With probability  $(1 - q)$  no need for a loan will arise. In this circumstance the leader receives the value of office holding plus the discounted continuation value  $Z_S$ , since tomorrow she will be in an identical circumstance as today. With probability  $q$  the need for a loan arises. Once this contingency arises, the nation receives the value of the loan,  $V$ . With

probability  $F(c_s)$  the leader repays the loan, thus retaining office and benefiting from her idiosyncratic desire to repay,  $s$ . If she repays then she also receives the discounted continuation value of playing the game given no prior default. The integral part of the expression represents the expected value of repaying the loan. With probability  $q(1-F(c_s))$  the need for a loan arises but having taken the loan the cost of repayment is so high that the sovereign defaults. In this case the sovereign's payoff is the discounted continuation value of playing the game for citizens,  $Z_E$ , since she is removed from office and returns to private life for all subsequent periods. Given the value  $c_s$ , the above expression characterizes the value of playing the game for leaders. We now calculate the continuation value of the game for the average citizen: this the leader's expected payoff if she defaults.

The continuation value for the citizens,  $Z_E$ , is given by the following expression:

$Z_E = qV - (1+r)q \int_0^C cf(c)dc - qk(1 - F(C)) + \delta Z_E$ . With probability  $q$  the need for a loan arises. When the opportunity for the loan arises citizens receive the benefits of the loan,  $V$ . They also either pay the cost of repayment (the integral part of the expression) or they replace their leader at cost  $k$ . The former event occurs with probability  $F(c_s)$  and the latter occurs with probability  $(1 - F(c_s))$ .<sup>3</sup>

As a final step we characterize when the citizens would depose their leader rather than keep her if she defaults. If the citizens depose their leader then they pay cost  $k$  but obtain the discounted continuation value of being able to borrow in the future:  $-k + \delta Z_E$ . If

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<sup>3</sup> It is worth noting that for the purposes of calculation we have assumed the leader is succeeded by a leader with the same  $s$  value. However this is a benign assumption since in the domestic politics scenario leaders practically never default.

alternatively the citizen retain a defaulting leader for a single period before deposing her then their payoff is  $0 - \delta k + \delta^2 Z_E$ . Providing  $k \leq \delta Z_E$ , citizens depose leaders that default.<sup>4</sup>

The definitions of  $Z_S$ ,  $Z_E$  and  $c_s$  characterize a subgame perfect equilibrium when the cost of leader removal is low ( $k \leq \delta Z_E$ ). In particular a leader secures loans when the opportunity arises, and repays these loans if and only if she has never previously defaulted and  $c \leq c_s$ , otherwise the leader defaults. The citizens remove any leader that defaults or who has defaulted in the past. Otherwise they retain their leader.

Bankers/creditors lend to sovereigns at the competitive interest rate,  $r = (1 - F(c_s))/F(c_s)$ , providing the sovereign has never defaulted. Once a leader defaults, creditors refuse her future credit.

The properties of this subgame perfect equilibrium are best seen graphically. Figure 3 is the analogous graph to the realist case that was shown in Figure 2. Specifically it plots the difficulty of repayment ( $c_s$ ) required to bring about default given the discount factor  $\delta=0.9$ , the probability of needing a loan  $q=0.3$ , the value of a loan  $V=2$ , the cost of leader removal  $k=0$  and the value of office holding of  $\Psi=5$ . Unlike the realist case, where we plotted the associated interest rate, Figure 3 plots the  $c_s$  directly since the probability of default and hence the interest rates are effectively zero.

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<sup>4</sup> We obtain an identical answer if we consider indefinitely retaining the defaulting leader.

Figure 3: The difficulty of repayment ( $c_s$ ) required before default given the sovereign's idiosyncratic desire to repay loans ( $s$ ) in the domestic politics scenario.

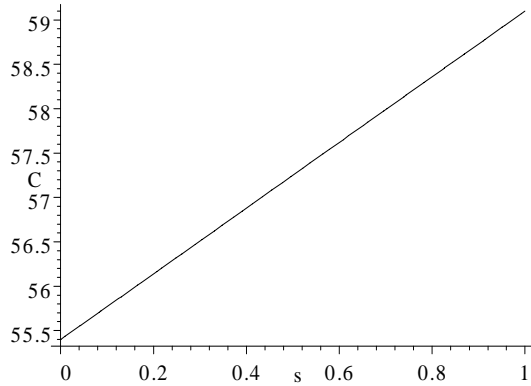


Figure 4: How the value of office holding,  $\Psi$ , influences the difficulty of repayment sufficient to induce default in the domestic politics scenario.

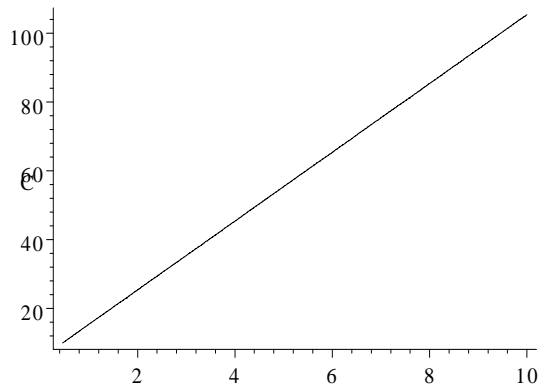


Figure 4 examines the more interesting comparative static of how the value of office holding  $\Psi$  influences how difficult repayment needs to be to induce default for the case where the leader has no idiosyncratic desire to repay ( $s=0$ ). By way of reference, under these conditions in the realist scenario the level of repayment difficult that induced default was  $c_H=2.471$ . As Figure 4 shows, even for relatively modest values for office holding the default risk is minimal in the domestic politics scenario.

Sovereigns repay loans even under very difficult circumstances in the domestic politics setting because it costs them their jobs if they do not do so. Once a sovereign defaults then bankers refuse new credit until the leader is deposed, at which point access to credit is resumed. Providing the cost of removing leaders is sufficiently low then defaulting on a loan becomes equivalent to losing office. If, as we believe, politicians are primarily driven by office holding goals then they avoid default in all but the most extreme circumstances. When leader removal is easy, as in democratic systems, sovereign specific punishments effectively eliminate the risk of sovereign default.

### **Domestic Political Institutions and the Ease of Leader Replacement.**

Sovereign specific punishments suggest default risk and leader behavior differ drastically as the cost of leader replacement changes. When the cost of leader replacement is high and hence leaders are relatively immune from the risk of deposition, then sovereigns can default with impunity. Although such default reduces their access to future credit it does not jeopardize their tenure in office. In contrast when leaders are easily removed citizens are keen to remove any leader who defaults in order to restore their nation's creditworthiness. Since defaulting costs leaders their jobs they are extremely reluctant to do so, which means the risk of default and hence the interest rate at which they can borrow is low.

While these predictions are all well and good, in order to operationalize the theory we need a metric for the ease of leader removal. Fortunately recent work by Bueno de Mesquita et al (1999, 2001, 2003; hence forth BdM2S2) focuses on exactly this problem. It might seem straightforward to argue that democratic leaders find it harder to survive in office than absolute rulers, however splitting the sample into democracies and non-

democracies provides little leverage on distinguishing between regimes within each of these broad classifications. Further it does not yield many of the subtle relationships between tenure in office and ease of subsequent survive that the BdM2S2 metric provides.

BdM2S2 classify all polities according to the size of the Selectorate (S) and the size of the Winning Coalition (W). Since our objective here is to use their metric to describe the ease of office holding we will provide a brief description of their argument and refer the interested reader to the works. The selectorate is the set of people within society that have a institutionalize say in who is leader. The most important role of the selectorate is that it is the set of people from which the leader picks her winning coalition, the set of supporters whose support she needs to retain power. The size of both the selectorate and the winning coalition can different radically. In a modern representative democracy the selectorate is effectively everyone and the winning coalition is a large fraction of this selectorate (50% in a directly elected system). In contrast monarchies and military junta's have small selectorates composed of aristocrats or upper brass. The winning coalition is some fraction of these. Autocratic systems typically have small coalitions, although they vary greatly in terms of selectorate size. BdM2S2 provide empirical measures of both concepts that we describe the data section.

Winning coalition size shapes the policy priorities of leaders. BdM2S2 propose that leaders can provide two types of polices: those that are designed to improve general welfare such as national defense, a fair and transparent legal system and public health, which they call public goods and policies that enrich only a limited number of supporters. Examples of these latter policies, private goods, include protectionism, bloated

procurement contracts, and corrupt public works. When the coalition size is small leaders only need to secure the support of a small number of supporters. Private goods enable the leader to greatly enrich the members of her coalition. In contrast when the coalition size is large each supporter's share of the private goods is small and leaders can more efficiently reward their supporters through public goods.

These differences in policy focus between large and small coalition systems shape the ease of leader survival. When coalition size is large then the majority of rewards come in the form of public goods. Since any subsequent leader will also provide public goods, supporters feel little loyalty to the incumbent because even if they are not in subsequent winning coalitions the value of private goods in large coalition systems is relatively small. In small coalition systems the situation is very different. Since leaders in small coalition systems favor private relative to public goods to reward their supporters, those in the coalition (who hence receive the private goods) have a much higher level of welfare than those outside the coalition. This creates a great risk for supporters who contemplate defection. All else equal leaders prefer to build a coalition around those people they like and people who like them, their natural supporters. When a leader comes to power she builds her coalition around those members of the selectorate with whom she has the greatest affinity. Supporters of a long term incumbent are fairly certain that they are a member of this set and so can be fairly certain of continuing to receive private goods for as long as the incumbent survives. They are less certain of receiving private goods if they defect to a challenger. Although their support might have been vital in bringing the challenger to power, once there the new leader wants to reorganize her coalition around her natural supporters. Since a potential defector cannot be certain of

being one of these core supporters, defection is very risky and supporters, once certain of their long term inclusion in the incumbent's coalition, are extremely loyal.

In large coalition systems political survival is always difficult since there is little loyalty towards the incumbent. In contrast, small coalition leaders find it much easier to survive in office. Further, the longer the tenure of a small coalition leader is, the easier it becomes for her to survive. The metric of winning coalition size provides a measure of the ease of leader replacement. When  $W$  is large leader replacement is always easy. In contrast, when  $W$  is small replacement is hard, becoming even harder the longer the leader has been in office.

## **Predictions**

We now derive hypotheses about the creditworthiness of nations and the impact of leadership turnover using results of the model and extensions of it.

Sovereign specific punishments predict the consequences of default vary with the ease of leader removal.

**H1) Domestic consequences of default:** *When the cost of leader removal is low then leaders who default are removed domestically.*

While this is clearly a prediction of the model it is extremely difficult to test directly since the fact that default costs them their jobs means large coalition leaders do not default in the first place.<sup>5</sup> The incentives of leaders who are sensitive to audience costs to avoid them creates selection effects that Schultz (2001) shows bias statistical tests to such an extent that completely the wrong inferences are drawn.

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<sup>5</sup> The costs democratic leaders pay for not honoring their commitments are often called audience costs (Fearon 1994; Leeds 1999; Schultz 1998, 1999, 2002; Smith 1996).

In the 1840's several US states, including Pennsylvania, Maryland, Mississippi, Indiana, Arkansas and Michigan, defaulted on loans. George Peabody, a banker who had organized the sale of many of these bonds, helped coordinate political campaigns against many of the defaulters. Through elections and bribery, Peabody produced legislatures that made good on their defaults and the creditworthiness of many of the states was thus restored (Chernow 1990, chapt. 1).

**H2) Restoration of credibility:** *When in default, leadership turnover restores creditworthiness.*

If creditors use sovereign specific punishments then leadership turnover improves the creditworthiness of a nation in default. The above example of US states in the 1840's certainly seems to support such a hypothesis. Unfortunately, we will not subject this prediction to rigorous testing since our data on bond indices do not contain instances of nations in default.

**H3) Institutional determinants of default and interest rates:** *When the cost of leader removal is low then the risk of default, and hence interest rates on sovereign debt, are low. In contrast, when the cost of leader replacement is high then the risk of default is higher and hence the risk premium on sovereign debt makes interest rates higher.*

Large coalition system nations default less and obtain larger loans at lower interest rates than small coalition nations. Figures 2, 3, and 4 graphically demonstrated how the risk of default is radically lowered under sovereign specific punishments when leader removal is easy.

**H4) Institutional determinants of interest rate volatility:** *When the cost of leader removal is low then the sovereign's idiosyncratic willingness to repay debt and economic conditions have little impact on default risk and interest rates. In contrast, leaders' idiosyncrasies and economic condition have a large influence on the prevailing default risk and interest rate when leader removal is difficult.*

Hypothesis 4 yields a key institutional difference between the borrowing patterns of nations. When leader removal is easy, as in large W systems, the threat of losing office through default ensures that all political leaders regardless of their personal convictions want to repay loans. Leaders in such systems do their up most to pay. Regardless of who is US president or British Prime Minister the institutionally induced constraint against default is so large that the risk of default is negligible. The same is not true in small coalition systems where leader removal is difficult. As Figure 2 showed, the risk of default varied greatly with the idiosyncrasies of the incumbent leader. Further, changes in financial conditions have a larger impact of terms of loans. Financial conditions have much less impact on loans to large coalition nations since their leaders repay except under truly exceptional conditions.

Not only should the interest rates democracies pay be low, they are consistently low. In contrast, in small winning coalition systems, not only must sovereigns pay higher interest rates but the rates they must pay vary drastically with perceptions of the leaders' idiosyncrasies and the nation's financial situation. As our subsequent tests of sovereign debt bond indices will show, there is vastly greater variance in bond indices for small coalition systems than large coalition systems.

**H5) Reputation for repayment:** *A past record of repayment under difficult conditions improves the credibility of a sovereign, and hence reduces the prevailing interest rate, when the cost of leader removal is high.*

By paying their debt, particularly when conditions are difficult, small coalition leaders can signal the strength of their desire to repay. Small coalition leaders can build a reputation for repaying debts. In the realist scenario we characterized the conditions under which sovereigns would repay debt given the prevailing interest rate ( $r$ ), the difficulty of repayment ( $c$ ) and their idiosyncratic desire to repay ( $s$ ). We saw that for any given interest rate and difficulty of repayment, those with a strong repayment desire (large  $s$ ) would be more likely to repay than those lacking such a desire (small  $s$ ). In the model we portrayed a leader's idiosyncrasies as fully known, yet in reality creditors are never completely sure who they are dealing with. However the past record of repayment enables creditors to weed out the least trustworthy sovereigns. As difficult circumstances present themselves some sovereigns choose not pay and default. Creditors do not lend to these leaders again. However, creditors become more trusting of leaders who do not default because by repaying rather than defaulting, such leaders demonstrate they are a trustworthy (large  $s$ ) type of sovereign. Such a process is often referred to as screening. As difficult circumstances arise, sovereigns are screened out according to their idiosyncratic desire for repayment.

Unfortunately due to data limitations we will not be able to trace the harshness of conditions under which leaders have previously made repayments. However, all else equal the longer a leader has made repayments without default the greater the number of

types that have been screened out and so the more creditworthy the sovereign becomes. Therefore, over time the interest rates that a small coalition sovereign can borrow at decline and the returns from holding their bonds increase.

Hypothesis 5 predicts that, absent default, as the tenure of a small coalition sovereign increases her creditworthiness improves. These reputation effects apply only to small coalition leaders, those hard to remove from office. A reputation for repayment is less important in determining interest rates for large coalition leaders since from the start these leaders are perceived as having only a minuscule default risk.

Before moving on, it is worth pausing to consider additional effects associated with tenure. BdM2S2 suggest that while it is always hard for large coalition leaders to survive in office, the ease of survival for small coalition leaders varies with tenure. Initially small coalition leaders are vulnerable to deposition (more so than even democrats according to BdM2S2's (2003) estimates). However, once such leaders become established it is extremely difficult to remove them. Tenure has little effect on the default risk of large coalition leaders. It is always easy to remove them and there is little screening since the ex ante default risk is so low. Tenure has competing effects for small coalition leaders. First, the longer their tenure the more screening that occurs and hence, absent default, the lower the default risk becomes. Second, while an established small coalition leader can default with impunity, she is initially vulnerable to removal suggesting higher initial credibility. Which effect dominates is an empirical question.

**H6) Leadership turnover:** *When the cost of leader removal is low then leadership turnover has little impact on default risk or interest rates (absent the unlikely event of*

*prior default). When leader removal is difficult, leadership turnover affects default risk. Except when the previous leader has defaulted, leader turnover in small coalition systems increases the risk of default.*

Hypothesis 6 forms the core of our empirical tests and the essential logic for explaining it lies in the reputation argument developed in hypothesis 5. Screening suggests that over time hard to remove leaders gain a reputation for repayment, so the default risk declines over time. However, since the reputation for repayment is based on the sovereign's idiosyncrasies, the reputation ends with the leader. In small coalition systems, leader turnover destroys a nation's creditworthiness. As such, following leadership turnover in small coalition systems, the interest rate on new loans increases and creditors are less willing to hold sovereign bonds. These effects are further exaggerated because financial actors are typically risk adverse, preferring to hold a bond with zero interest and 100% certainty of repayment rather than a bond with 100% interest and a default risk of 50%.

Leadership turnover has little effect in large W systems because the credibility with which leaders commit to repay loans comes from institutionally induced incentives and not their personal reputations for repayment. Since all democrats repay loans whatever their idiosyncrasies, leadership turnover in large coalition systems has no effect on creditors' willingness to hold bonds.

### **Empirical Tests: The data.**

Having derived hypotheses as to how the impact of leadership turnover depends upon the institutional context in which leaders serve we now test these predictions.

Empirical studies of creditworthiness take several approaches. Many studies attempt to estimate the probability of default or rescheduling of loans from economic fundamental (Frank and Cline 1971; Feder 1981; Kutty 1990; McFadden et al 1986; Savvides 1991). Rather than looking directly at default, other studies examine the determinants of perceived creditworthiness via credit rating (Lee 1993a, 1993b; Cantor and Packer 1996; Freder and Ross 1982). A third approach utilizes risk premiums charged to borrower on either bank loans or bonds to estimate market perceptions of default risk (Abdullah 1985; Citron and Nickelsburg 1987; Morgan 1994; Balkan 1992; Feder and Uy 1985; Brewer and Rivoli 1990).

We use the third approach and measure changes in creditworthiness and default risks using sovereign bond indices for 54 nations. For large part we use J.P. Morgan Emerging Market Bond Index Global (EMBI Global), although we supplement these with other sources such J. P. Morgan indices for developed market and Lehman Brother bond indices. All the bond data were collected from DATASTREAM. Since most political scientists are unfamiliar with these bond indices, we next provide a brief intuitive description of their construction and their use in measuring changes in default risk. J. P. Morgan (1999; see also Erb, Campbell and Viskanta 1999; Cumby and Pastine 2001) provides a full description of the indices' construction and associated methodology.

The EMBI calculate the average return on holding bonds issued by a sovereign government. Suppose for example that the government of nation A wishes to raise funds and issues bonds to do so. A bond is a commitment to repay specific sums at various times in the future. We use an extremely stylized example to explain the logic. Suppose the government states that it will pay \$5 returns for each year for thirty years. Investors

will then buy and trade these bonds. Suppose initially investors think that the bonds are worth \$100. That is the market price for bonds that pay \$150 over 30 years is \$100. The basic idea of bond indices is to calculate the value of holding the bond relative to its initial value. As the bonds mature they payout returns; in our hypothetical example \$5 per year. In terms of constructing the index it is assumed these payouts are reinvested. The value of holding the bonds also changes as the people's willingness to hold them changes. For instance suppose having bought the bonds at \$100 interest rates in nation A increase. Under this circumstance, investors want to sell their bonds and reinvest the money in the more profitable financial instrument. This causes the price of the bonds to fall. If alternatively interest rates fall then bonds become relatively more profitable and their price rises. The J.P. Morgan indices are composed using a basket of sovereign bond issues all of which are regularly traded on secondary markets.

In general the bond indices vary in response to three factors: interest rate risk, currency rate risk and sovereign default risk. The example above dealt briefly with the question of interest rate risk. As the rate of return on other financial instruments changes then the desirability (and hence price) of holding bonds shifts. Bonds can be denominated in a variety of currencies. If, for example, they are denominated in pesos and the peso falls in value relative to other currencies then investors obtain smaller returns in dollars. As with shifts in interest rates, shifts in currency exchange rates alter the desirability of holding bonds relative to other financial instruments. The EMBI indices look only at US dollar denominated bonds, therefore, currency risk is largely irrelevant, although a large devaluation increases a government's debt burden and hence increases the risk of default.

Thus far our example has assumed the government honors its commitment to pay \$5 every year for 30 years. However, the government might suspend repayment, or pay less than the full \$5. As the risk of such sovereign default increases then the price of the bond declines. If for instance the market suddenly believes the risk of default is 50% then relative to the initial \$100 value of holding bonds, the value shifts to \$50 and the bond index falls to from 100 to 50.<sup>6</sup>

The sovereign bond indices reflect the relative value of holding bonds. As the market perceives shifts in the returns on other instruments, or sovereign risk then the indices moves accordingly. As such bond indices provide us with a measure of how sovereign default risk changes. If markets perceive the risk of default as increasing then they no longer desire holding such bonds and the bond index falls. As the risk of sovereign default diminishes then the bond index rises. As such proportionate changes in the bond index reflect changes in interest rates and the risk of default. The actual value of the index per se is relatively uninformative except relative to the start of the index (December 31, 1993 =100 is a common standardization). We examine the indices at the monthly level of analysis by taking the daily index at the end of each month.

Our interest lies in examining changes in sovereign risk which are reflected in proportionate changes in the index. To capture this proportionate change we use a lagged dependent variable structure where our dependent variable is the  $\ln(\text{index})$ : the natural logarithm of the index at the end of the month. The variable  $\ln(\text{index}_{t-1})$  is the logged value of the index at the end of the preceding month. In this setup the coefficients on other variables can be interpreted as the proportionate change in the index from a unit change in the independent variable.

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<sup>6</sup> Actually the fall in the index is likely to be greater since financial actors tend to be risk averse.

Our general model is  $\ln(\text{index}) = \beta_1 + \beta_2 \ln(\text{index}_{t-1}) + \beta_3 X + \dots + \varepsilon_t$ , where  $\varepsilon_t$  is a stochastic error and  $E[\varepsilon_t^2] = \sigma^2$ . Our data have a panel structure of  $n$  nations, although the length of time varies drastically by country. The Table 2 reports OLS analyses. However alternatives methods such as random effects models, fixed effects models and GLS with first order autocorrelation corrections give practically identical results, as we document below. There has been much controversy as to which of these methodologies is the most appropriate (Green, Kim and Soon 2001; Oneal and Russett 2001; Beck and Katz 2001; King 2001). However, given that they all produce substantively similar results we do not explore these distinctions further. Hypotheses 4, 5 and 6 predict the variance of the change in the index,  $\sigma^2$ , depends upon institutional variables. Using MLE we also explicitly model variance,  $\sigma^2$ , as a function of independent variables.

BdM2S2 measure winning coalition size,  $W$ , as a composite index based on the variables *REGTYPE*, *XRCOMP*, *XROPEN*, and *PARCOMP* from the Arthur Banks (2001) data. These data are also commonly reported by Polity IV (Marshall, Jaggers and Gurr 2002). When *REGTYPE* is not missing data and is not equal to codes 2 or 3 so that the regime type was not a military or military/civilian regime,  $W$  receives one point. Military regimes are assumed to have particularly small coalitions and so are not credited with an increment in coalition size through the indicator of  $W$ . When *XRCOMP*, the competitiveness of executive recruitment, is larger than or equal to code 2 then another point is assigned to  $W$ . An *XRCOMP* code of 1 means that the chief executive was selected by heredity or in rigged, unopposed elections, suggesting dependence on few people. Code values of 2 and 3 refer to greater degrees of responsiveness to supporters, indicating a larger winning coalition. *XROPEN*, the openness of executive recruitment,

contributes an additional point to W if the executive is recruited in a more open setting than heredity (that is, if the variable's value is greater than 2). Executives who are recruited in an open political process are more likely to depend on a larger coalition than are those recruited through heredity or through the military. Finally, one more point can be contributed to the index of W if *PARCOMP*, competitiveness of participation, is coded as a 5, meaning that “there are relatively stable and enduring political groups which regularly compete for political influence at the national level” (Polity II, p. 18). This variable is used to indicate a larger coalition on the supposition that stable and enduring political groups would not persist unless they believed they had an opportunity to influence incumbent leaders; that is, they have a possibility of being part of a winning coalition. The indicator of W is then divided by 4 to create a five point scale for W taking the possible values 0, .25, .5, .75, and 1.

We measure the turnover of leaders using the BdM2S2 (2003) compilation of leaders. These data record the date each leader entered and left office.<sup>15</sup> Using these data we code whether any change in leadership took place in each country in each month. The ability to raise taxes and foreign currency, the debt burden, currency rates and economic growth have all been observed to influence sovereign bond prices (Eaton and Taylor 1985). Using economic data obtained from World Bank Development Indicators (2002) CD-ROM and the IMF's International Financial Statistics (2003) CD-ROM we included a number of these conditions. Table 1 describes the variables used.

## **Results**

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<sup>15</sup> These data are based primarily on Bueno de Mesquita and Siverson's (1995) article on the survival of leaders. These data were cleaned by Goemans (see Chiozza and Goemans, 2002a,b), and were in turn updated by BdM2S2 (2003).

The lagged dependent variable, the logarithm of the bond index in the previous month, strongly predicts the bond index. We now ask how leadership turnover moves bond indices from this base line. Model 1, shown in Table 2, represents a straightforward test of hypothesis 6. The statistically significant coefficient of  $-.080$  on the LeaderChange variable indicates that in a small winning coalition system ( $W=0$ ) if leadership change occurs in the month then the bond index falls by about 7.7% relative to what it would have done without leadership change. Consistent with the predictions of hypothesis 6, leadership change in small coalitions increases default risk and hence creditors' desire to hold bonds.

In large coalition systems the impact of leadership change is negligible. When the coalition is large ( $W=1$ ), as in democratic systems, then the impact of leadership change depends upon the cumulative effect of both the LeaderChange variable and its interaction with  $W$ . As can be seen, in models 1, 2 and 3, this cumulative effect of leader change is no larger than a statistically insignificant  $.002$ . Leader change in large coalition systems has no impact on sovereign bond prices.

Model 1 also contains the variable  $W$ , winning coalition size. The theory predicts large coalition systems have smaller sovereign debt risk compared with small coalition systems and so investors are more willing to hold such bonds. This willingness means the price of a bond from large coalition systems is higher than a comparable bond issued by a small coalition system. While the superiority of bonds issued by advanced democracies has been documented (Brewer and Rivoli 1990), our current use of bond indices does not allow us to examine this difference. Bond indices tell us only how the value of holding bonds has changed relative to the arbitrary starting point for the index. Since there is little

institutional change in the data, bonds issued by a democracy might always be more desirable than bonds issued by an autocracy but the indexing normalizes these differences away.

The results in model 1 were obtained using a mixture of both total returns and bond price indices. In particular we only have price indices for Switzerland, Sweden, Denmark and New Zealand. To ensure comparability Model 2 replicates Model 1 excluding these price indices. As can be readily seen, the results remain unchanged. Leadership turnover has no effect on bond prices in large coalition systems, but reduces the value of such bonds by about 8% in the smallest coalition systems.

Hypothesis 5 predicts the longer small coalition sovereigns are in office without defaulting, the greater their reputation for repayment becomes and hence the more desirable their bonds become. There is no predicted tenure effect for large coalition leaders because their institutionally induced incentive to repay dwarfs any personal idiosyncratic desire they have to make repayment. All democrats, regardless of their personal goals, repay loans except under truly exceptional circumstances. Model 3 tests this hypothesis. The Tenure variable is the logarithm of the sovereign's tenure in office. The coefficient on the Tenure variable is  $-.008$ , which while close to significant at the 5% level in a two tailed test, is in the opposite direction to that predicted. It is worth remembering that BdM2S2 predict that in small W systems tenure increases the difficulty of removing leaders. Hence in small coalition systems there are off setting effects. Although sovereigns might create a reputation for repayment, they simultaneously become harder to removing allowing them to default without jeopardizing office.

On aggregate tenure has little effect on bond prices. As predicted, in large coalition systems tenure has no effect on bonds. The inclusion of the tenure variables does not alter the impact of leadership change.

Table 1 reports OLS coefficients. These results are robust to method. If model 1 is re-estimated using a random effect model, fixed effects model, and GLS model with an AR(1) correction then the coefficients on the LeaderChange variable are -.080, -.079 and -.077 respectively. The corresponding coefficients on the W\*LeaderChange variable are .082, .079 and .077.<sup>7</sup> The coefficients are virtually identical regardless of methodology.

Although supportive of predictions, the small sample size means the results must be treated with care. Although the sample consists of 3850 nation-month observations, only 372 of these belong to small coalition systems (defined as  $W < .75$ ) and only 8 leadership changes occur within this set. As we shall now see this small number of leadership changes becomes extremely problematic when we attempt to control for economic conditions which reduces the sample of small coalition systems still further.

The final model reported in Table 4 includes economic control variables. Export/Debt is the ratio of monthly exports to debt (the ability to earn foreign currency to service debt). The variable Debt is central government debt as a percentage of GDP. Neither of these variables significantly influences bond indices, yet this is not surprising. As discussed above, bond indices are normalized and so they are not informative of absolute value per se. The size of modern government debts are sufficiently large that they do not vary greatly. While total debt and the ability to earn foreign currency to service it are undoubtedly important determinants of the desirability of holding bonds these factors do not change rapidly. However, the third economic variable, exchange rate

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<sup>7</sup> The correlation coefficient for the AR(1) process was .078.

change, can and does change rapidly. Indeed it was the inability of Argentina to maintain its peg with the US dollar that started its recent financial crisis.

The Exchange Rate Change variable is the greatest increase in the nation's exchange rate in either the current or previous month. The exchange rate is defined as the number of local currency units need to buy an SDR, effectively a basket of currencies used by the IMF. So some what paradoxically, an increase in the exchange rate corresponds to a devaluation of the currency. Devaluation can have particularly damaging consequences for a nation's creditworthiness. If, for instance, the currency halves in value (the exchange rate doubles) as it does for some nations in the sample, then the debtor nation's external debt effectively doubles in size. As model 4 shows this has a detrimental effect on a nation's sovereign debt bonds, measured by bond indices. The coefficient of  $-0.605$  means a doubling of the exchange rate reduces the bond index by about 60%.

Once controlling for economic effects, the magnitude and the statistical significance of the leader change variables declines. This initially appears to reject the proposed hypotheses, yet such an interpretation needs revising. The inclusion of these economic data reduces the sample size by 42%. The inclusion of other variables reduces the number of observation even further. Although bond indices exist for some developed nations from the 1980's onwards, there are few indices for non-democratic nations until the late 1990's. With such restricted time series the loss of even a few years' economic data, not currently available on IFS, drastically reduces the instances of leader turnover in the sample. Further since it is non-democratic nations that are worst at reporting data, it is data on these states that constituent most of the missing data. Indeed, in model 4, outside

of the two largest categories of  $W$  (that is  $W < .75$ ) there are only two instances of leader change: Lebanon and Indonesia, both 1998. Without variance in the key variables of interest, leadership change in small coalition systems, it is impossible to adequately test the hypotheses in the presence of economic control variables. The inclusion of other economic variables only makes the problem worse. Since the time series for most developing nations are so short even a few years of additional data should massively increase the degrees of freedom to play with. While this bodes well for future work, it necessitates proceeding without economic controls.

Domestic institutions determine the variance in sovereign bond indices. As hypothesis 4 predicts, when leaders are easy to remove then bond prices are relatively stable because the risk of default in such systems is negligible. In contrast, when leader removal is difficult, repayment depends upon the idiosyncrasies of the leader and the economic and financial conditions she faces. This creates much greater variation in the value of holding sovereign bonds in small coalition systems relative to large coalition systems. To explore this we explicitly model the variance of the error term,  $E[\varepsilon_t^2] = \sigma^2$ . Specifically we assume the stochastic error,  $\varepsilon_t$ , is normally distributed with mean zero and variance  $\sigma^2$ , and we model  $\sigma$  as a function of winning coalition size. We estimate the model using maximum likelihood estimation (King 1989). The results are shown in Table 3.

Models 5, and 6 all include `LeaderChange` and its interaction with  $W$  in the standard  $\beta$  coefficient part of the model. The effects of leadership change are the same as described above. Leadership change in a small coalition system reduces the value of sovereign bonds by about 10%, but leadership change has no effect on bond prices in

large coalition systems. Although the indexing of bond returns normalizes away differences in the level of returns across political institutions, coalition size drastically effects the variance of bond returns. In a small coalition system the standard deviation of the stochastic error term is 0.169. In contrast in a large coalition system  $\sigma = .169 - .134 = .035$ . These estimates suggest the variance in the bonds index of a small coalition system is 23 times larger than that of large coalition systems. These results suggest considerable variation in perceptions about default risk in small coalition systems.

Model 6 examines whether leadership turnover, in addition to lowering bond price in small coalition systems, also increases the volatility of prices. The statistically significant coefficient of .167 on the LeaderChange variable in the  $\sigma$  equation suggests leadership turnover in small coalitions systems creates an approximately four fold increase in price volatility ( $(.167 + .165)^2$  versus  $(.165)^2$ ). The negative coefficient of -.172 on the interaction variable, W\*LeaderChange, means in large coalition systems leadership turnover creates no additional volatility in bond prices. Not only does leadership turnover fail to push the price of sovereign bonds up or down, it also fails to increase the volatility in the bond market. In small coalition systems leadership change has a much marked effects. First it lowers the average bond price by about 10%.

Although the individual coefficients are not significant at the 5% level, a joint hypothesis test that both the LeaderChange and W\*LeaderChange variables are simultaneous zero is strongly rejected. Second, it increases the variance in the price of bonds. Compared to a leadership change in large coalition systems (for which  $\sigma^2 = .0009$ ), if leader change occurs in a small coalition system the variance in bond returns is 122 times greater ( $\sigma^2 = .110$ ).

The returns on bonds issued by large coalition nations are stable and insensitive to leadership change. When leaders are hard to remove, as in small coalition systems, then there is much greater volatility in bond returns and bond returns are highly sensitive to leadership turnover. Leadership change in the smallest coalition systems suppresses bond prices by an average of 10%, and increases volatility to over one hundred times more than would be observed in a corresponding large coalition system.

## **Conclusions**

In large coalition systems, where leader removal is easy, defaults are rare and sovereign bond prices are unaffected by leadership change. In contrast, in small coalition systems, where leader removal is difficult, the returns on sovereign debt are more volatile and sensitive to leadership change. Specifically, in the smallest coalition systems leadership change reduces the average value of holding sovereign bonds by about 7 to 10% and massively increases the volatility in these returns.

Although these results are compelling, they need to be treated with some caution. Few sovereign bond indices existed before the late 1990's for developing countries. This unfortunately means there are few instances of leadership change in small coalition systems in the sample. As we saw in the case of model 4, this unfortunately prevented the inclusion of many economic controls that we would otherwise wish to include. The situation is much better for large coalition systems which have longer time series, more complete economic data and more frequent leadership change. However, this is not as helpful as it might seem since the theory, which seems to be supported by the empirical data, states that in such systems leadership change is relatively unimportant. This calls for additional future research.

The theory proposed here asks what are the consequences of creditors holding individual sovereigns rather than the nations they lead responsible for default? The effects of sovereign specific punishments vary by regime type. When the cost of leader removal is low, as is the case in large coalition (democratic) systems, if leaders default then the citizens replace them to restore creditworthiness. Given that default equates to removal from office, leaders do not default except under the most extreme of circumstances. As a consequence, large coalition systems can borrow at favorable terms, and since the credibility of the commitment to repay loans is based in the institutionally induced incentives, and not characteristics of the individual leaders, leadership turnover has no effect of the terms under which democracies can borrow.

In small coalition systems, where leader removal is difficult, leaders can default without jeopardizing their tenure in office. As such the terms upon which sovereigns can borrow depend highly upon the economic and financial conditions they face and upon the market's perceptions of their individual characteristics with regard to repayment. Interest rates are higher and more volatile.

Many of the results, such as the prediction that democracies being able to borrow more at lower interest rates, parallel extant results on the institutional determinants of sovereign debt. Yet, by pushing the unit of analysis from domestic political institutions to individual leaders the theory generates additional hypotheses. For instance, we predict the impact of leadership change depends upon the institutional context in which a leader serves; a hypothesis which to our knowledge has never previously been examined. These new empirical tests are not only interesting in their own right, but they also help us to distinguish between competing theoretical arguments.

Table 1: Summary of Key Variables.

| Variable                  | Description   |
|---------------------------|---|
| Ln(index)                 | Logarithm of sovereign bond index, the dependent variable (Datastream).   |
| Ln(index <sub>t-1</sub> ) | Lagged dependent variable.  |
| W                         | Winning coalition size: takes values 0, .25, .5, .75, and 1 (BdM2S2 2003).  |
| LeaderChange              | Dummy variable code one if any leader change occurred during the month and coded zero otherwise (BdM2S2 2003).  |
| Tenure                    | Logarithm of tenure in office measured in years plus one (BdM2S2 2003).   |
| Exports/Debt              | Ability to pay: monthly exports divided by government debt (IFS).   |
| Debt                      | Sovereign debt as a proportion of GDP (WBDI).   |
| Exchange Rate Change      | Greatest change in the nation's exchange rate in either the current or previous month, where exchange rates are measures as currency units per SDR (IFS). |

Table 2: OLS Analysis of How Domestic Political Institutions Moderate the Impact of Leadership Turnover on Sovereign Debt Bond Indices.

|   | Model 1<br>ln(index)      | Model 2<br>Returns indices<br>only: ln(index) | Model 3<br>ln(index)     | Model 4<br>ln(index)    |
|---|---------------------------|---|--------------------------|-------------------------|
| ln(index <sub>t-1</sub> )                 | .988**<br>(.003)          | .987**<br>(.003)                              | .987**<br>(.003)         | .981**<br>(.003)        |
| W   | .001<br>(.004)            | .005<br>(.005)                                | -.011<br>(.010)          | -.034<br>(.014)         |
| LeaderChange                              | -.080**<br>(.025)         | -.079**<br>(.027)                             | -.079**<br>(.025)        | -.007<br>(.036)         |
| W*<br>LeaderChange                        | .082**<br>(.030)          | .079**<br>(.032)                              | .080**<br>(.030)         | .015<br>(.041)          |
| Tenure                                    |                           |   | -.008<br>(.004)          | -.013**<br>(.004)       |
| W*Tenure                                  |                           |   | .006<br>(.005)           | 0.12**<br>(.006)        |
| Exports/Debt                              |                           |   |                          | -.250<br>(.393)         |
| Debt                                      |                           |   |                          | -.000<br>(.000)         |
| Exchange Rate<br>Change                   |                           |   |                          | -.605**<br>(.018)       |
| Constant                                  | .063**<br>(.013)          | .066**<br>(.014)                              | .081**<br>(.015)         | .136**<br>(.016)        |
| F (test)<br>Anylead =0 and<br>W*Anylead=0 | F(23845)=5.43<br>Pr=0.004 | F(23359)=4.93<br>Pr=.007                      | F(23843)=5.29<br>Pr=.005 | F(22214)=.41<br>Pr=0.66 |
| No of obs                                 | 3850                      | 3364  | 3850                     | 2224                    |
| Adj R-squared                             | 0.973                     | 0.973   | .973                     | .984                    |

\* prob < .05, \*\* prob<.01; one tailed test. Standard errors in parentheses.

Table 3: How Domestic Institutions and Leadership Turnover Affect the Level and Variance of Sovereign Debt Bond Indices.

|  | Model 5<br>ln(index)      | Model 6<br>Ln(index)        |
|--|---------------------------|-----------------------------|
| <b>β equation</b>  |                           |                             |
| ln(index <sub>t-1</sub> )                                | .991**<br>(.002)          | .991**<br>(.002)            |
| W  | -.001<br>(.007)           | -.000<br>(.007)             |
| LeaderChange   | -.098*<br>(.043)          | -.103<br>(.068)             |
| W*LeaderChange   | .101*<br>(.045)           | .107<br>(.069)              |
| Tenure   |                           |                             |
| W*Tenure   |                           |                             |
| Constant   | .051**<br>(.011)          | .050**<br>(.011)            |
| <b>σ equation</b>  |                           |                             |
| W  | -.134**<br>(.005)         | -.130**<br>(.005)           |
| LeaderChange   |                           | .167**<br>(.049)            |
| W*LeaderChange   |                           | -.172**<br>(.050)           |
| Constant   | .169**<br>(.005)          | .165**<br>(.005)            |
| chi2 (test)<br>LeaderChange =0 and W*<br>LeaderChange =0 | chi2 (2)=5.19<br>Pr=0.075 | Chi2(4)= 14.42<br>Pr=0.0061 |
| No of Obs  | 3850                      | 3850                        |
| Log likelihood   | 6134.470                  | 6145.934                    |

\* prob < .05, \*\* prob<.01; one tailed test. Standard errors in parentheses.

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