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ABSTRACT

In this essay we review the empirical literature about sovereign debt and default. As we survey the work of economists, historians, and political scientists, we also emphasize parallel developments by theorists and recommend steps to improve the correspondence between theory and data.

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1. Introduction

Sovereign states have borrowed money for hundreds of years. *Sovereign debt* was one of the first financial assets ever traded, and it continues to comprise a significant share of global financial assets. In this essay we review the empirical literature about *external* sovereign debt, which arises when sovereigns borrow from foreign investors.

The significance of external sovereign debt is remarkable considering that sovereign debt is difficult to enforce. For centuries the legal doctrine of sovereign immunity limited suit against defaulting sovereigns, and even today few government assets are available for attachment in foreign jurisdictions. Moreover, although governments have political incentives to serve the interests of their own citizens, it is not obvious why they would also respect the wishes of foreign investors. Why, then, do governments ever honor their debts to foreign investors, and what gives private bondholders and banks the confidence to lend to foreign sovereigns?

The long history of external sovereign debt and associated problems of enforcement have attracted researchers in many fields. In this paper, we survey empirical work by economists, historians, and political scientists. As we review the empirical literature, we emphasize parallel developments in the theory of sovereign debt and recommend steps to improve the correspondence between theory and data.

2. A Model of External Sovereign Borrowing

We organize our review around a now-standard model of external sovereign debt and default.[1] In this model, adapted from Eaton and Gersovitz (1981), a sovereign country is represented by an agent that receives an exogenous random flow of a single consumption good $y(s)$ each period, where s is Markov and indexes the state of nature. To smooth its consumption the sovereign can borrow internationally by issuing one period zero coupon bonds. The bonds, with face value b, sell at a discount $q(b,s)$, a function of the level of borrowing and the state of nature.

The sovereign enters a period with bonds b and, after observing the new value of s, decides whether to repay (R) or default (D). Its recursive value function $V(b,s)$ satisfies

$$V(b,s) = \max\{V^R(b,s), V^D(s)\}.$$

[1] Aguiar and Amador 2013 and Wright 2012a review the literature, following early papers by Aguiar and Gopinath 2006, Arellano 2008, and Hamann 2004.

If the sovereign repays, it retains access to international capital markets and chooses new borrowing b' and consumption c to maximize its welfare, subject to a constraint that its consumption cannot exceed income plus the value of new borrowing, minus repayment of previous debts. Hence

$$V^R(b,s) = \max_{c,b'} u(c) + \beta E[V(b',s')|s],$$

subject to

$$c \leq y(s) + q(b',s)b' - b,$$

where u is a concave period-utility function, β is the sovereign's discount factor, and $E[.|s]$ is an expectation operator conditioned on today's state of nature.

If the sovereign defaults it suffers two costs: it is excluded from financial markets for a period of time, and it loses a fraction of output. The proportion of lost output, $\gamma(s)$, proxies for all other costs of default, such as domestic financial distress and disruptions to trade. At the end of each period, with probability p a country in default regains the ability to borrow and all previous debts are forgiven. Hence

$$V^D(s) = u\Big(y(s)\big(1-\gamma(s)\big)\Big) + \beta E[pV(0,s') + (1-p)V^D(s')|s].$$

Bond prices are determined by competition among risk neutral foreign creditors who discount the future at rate r, such that

$$q(b',s) = \frac{1-\pi(b',s)}{1+r},$$

where $\pi(b',s)$ denotes the probability the sovereign will default in the next period.

This model provides a useful framework for organizing our review of the empirical literature. In section 3 we focus on the volume and price of sovereign debt, which are captured in variables b and q. We discuss how researchers have measured the amount of debt; quantify sovereign debts in absolute terms and relative to other assets; and review research about the price of sovereign bonds.

We conclude section 3 by discussing three extensions to the standard model. First, the model assumes that all bonds last for only one period, but in reality countries undertake both short term and long term borrowing. We describe how researchers have measured the maturity of sovereign debt and consider the causes and consequences of various maturity structures. Second, the standard model expresses all transactions in terms of a single consumption good, but countries actually borrow and repay in various currencies. We discuss why countries often issue debt in foreign currencies and how this affects the likelihood of default. Finally, the standard model overlooks variation in the legal details of

debt contracts. We discuss trends in the design of debt contracts and consider the consequences of such provisions.

Section 4 focuses on the sovereign's decision to repay or default. The model describes two extreme options, R and D, which represent full compliance or complete abrogation of the debt contract. The actual behavior of sovereigns is more complex. Instead of renouncing their debts entirely, some sovereigns make partial or delayed payments, with or without the consent of creditors. Consequently, we review how empirical researchers have measured default and summarize patterns across countries and over time. The standard model also presumes that defaults end stochastically: in each period there is a probability p that the country emerges from default. Following this theme, we review the empirical literature about how long defaults last.

We conclude section 4 by examining the costs of default. In the standard model, defaulters lose access to international capital markets and pay an additional penalty, $\gamma(s)y(s)$. Researchers have studied history to infer how default affects a sovereign's ability to borrow, and whether default triggers additional costs such as trade sanctions or military intervention. We present the state of research on these important questions.

Finally, the standard model depicts the sovereign as a unitary actor who maximizes the aggregate consumption of the country as a whole. This simplification overlooks the role of domestic politics. In Section 5 we discuss recent empirical research about how voters, special interest groups, and domestic political institutions affect the decision to repay or default. The essay concludes by suggesting additional avenues for research.

3. Sovereign Debt

In this section we describe research on the quantity and price of external sovereign debt. We also discuss three features—currency composition, maturity structure, and contractual clauses—that are missing from the standard model.

Measuring the Stock of External Sovereign Debt

In the introduction, we defined external sovereign debt as obligations that arise when governments borrow from foreign investors. In practice, researchers may not know, from moment to moment, the identity and location of investors who own the debts of a particular sovereign. For this reason, most empirical researchers measure external debt as debt issued in a foreign legal jurisdiction or denominated in a foreign currency. We employ these measures when presenting descriptive statistics about the quantity of external debt, while

acknowledging that the measures may not map perfectly onto the distinction between foreign and domestic investors.

Data on the stock of sovereign debt are typically presented at *face value*. Defined as the undiscounted sum of future principal repayments (including, in the case of consols, principal that is repaid at infinity), face values have two problems. First, they only capture principal repayments. Thus, two debts with equal cash flows will have different face values if the debts involve different proportions of principal versus interest. Second, face values are typically computed without discounting future flows, and therefore treat similar-sized payments separated in time as equivalent.

To correct for differences in the division of principal versus interest, analysts should compute the face value of a common portfolio of debts that replicate the cash flows of the original debt. For instance, motivated by the standard model, they could treat each payment as if it were a maturing zero coupon bond and compute *zero coupon equivalent (ZCE) face values* (Dias, Richmond and Wright 2011). To correct for differences in timing, analysts could compute either the *present value* or the *market value* of the debt. Unfortunately, market values are not available for small borrowers and untraded debts, such as official loans, project credits, and many bank loans.

The ideal measure depends on the purpose for which the data will be used. When assessing the sovereign's debt burden, for example, we typically wish to know the amount of contracted payments. Market values would be misleading, because market values fall when traders expect the sovereign to default. Conversely, when measuring how much creditors expect to recover following a default, market values are more informative than contracted payments.

How Important Is Sovereign Debt as an Asset Class?

Sovereign debts have always been one of the largest classes of financial assets. To illustrate their importance, Table 1 presents public debt as a share of all financial assets from the 1850s to the present. Due to the limitations of available data, the table combines external and internal obligations.

The first set of columns gives the face value of all securities on the London Stock Exchange, the world's preeminent capital market for most of the 19th and early 20th Centuries. In 1853, British public debt accounted for 70% of listed securities, and foreign public debt totaled another 6%. Over the next 60 years the value of sovereign debt continued to rise, but corporate stock grew at an even faster pace. Consequently, on the eve of World War I, sovereign debt was only 35% of the London market.

The next set of columns covers securities listed in London, plus sovereign bonds—but not private securities—listed abroad. Here, the face value of public

debt was £10.9 billion (59% of the total) in 1933, and £11.9 billion (78% of the total) in 1950. Many public debts traded at substantial discounts, however, due to defaults during the Great Depression and World War II. Consequently, the market value of sovereign debt (column 1950b) was lower than its face value (column 1950a), not only in absolute terms but also as a share of total assets.

Table 1: Sovereign Debt as a Share of All Financial Assets

	Listed in London				London and Some Foreign			World			
	1853[a]	1873[a]	1893[a]	1913[a]	1933[a]	1950[a]	1950[b]	1950[c]	1978[c]	1990[d]	2010[d]
Total Assets	£1.2b	£2.3b	£4.9b	£11.2b	£18.5b	£15.2b	£14.3b	--	--	$54t	$212t
Public Debt	76%	59%	39%	35%	59%	78%	60%	22%	11%	17%	19%
Of which: UK	70%	38%	18%	14%	38%	66%	57%	--	--	--	--
Foreign & Colonial	6%	21%	21%	21%	21%	11%	3%	--	--	--	--

[a]Data from *Stock Exchange Official Intelligence* as reported in Michie (2001) Tables 3.2 and 5.1. All securities at face value. Data refer to securities listed on the London Stock Exchange, except for 1933 and 1950 which includes foreign and colonial public sector securities listed abroad.
[b]Data from *Stock Exchange Official Intelligence* as reported in Michie (2001) Table 8.1. All securities at market value. Data refer to securities listed on the London Stock Exchange, plus foreign and colonial public sector securities listed abroad.
[c]Data from Goldsmith (1985) Table 1 on share of government debt in financial assets, all measured at market values.
[d]Data from Roxburgh, Lund and Piotrowski (2011) Exhibit E1 on public debt securities at face value, relative to other debt at face value and equities at market value.

The final group of columns gives the market value of financial assets worldwide. Government debt made up almost 22% of the global total in 1950, but fell to 11% in 1978. The change reflects, among other things, the decline of international capital flows under the Bretton-Woods system and the inward-oriented development strategies adopted by many countries.

From its nadir in the 1970s, sovereign debt has grown in prominence and now accounts for about 19% of global financial assets. A number of factors help explain this resurgence. Beginning in the 1970s, governments dismantled controls that had impeded capital flows for much of the postwar period. At the same time, the surge in oil prices left petroleum exporters with a windfall that needed to be invested overseas (the so-called “recycling of petro-dollars”). In the next section, we quantify the indebtedness of sovereign countries.

How Indebted Are Sovereign Governments?

For the most recent period, we can isolate external debt (operationalized as debt issued in foreign jurisdictions) and quantify it in several ways. Figure 1 depicts the evolution of external sovereign indebtedness for an aggregate of 72 low and middle income countries (Dias, Richmond and Wright 2011, 2012). Each line plots a different measure of debt scaled by the Gross National Income (GNI) of the country. Although all measures peak in 1987 at the height of the debt crisis, the measures convey different pictures about the magnitude of external obligations. For example, ZCE face values peak at over 60% of GNI, whereas contractual face values peak at around 40%. The market values of sovereign

debt (estimated using both a constant 10% rate, and market yields) lie below the face values, with the discount declining toward the end of the sample.

If markets are imperfect, neither face values nor market values necessarily indicate the true burden of servicing a country's debt. Dias, Richmond and Wright (2012) propose a more informative measure, the "equivalent variation" of debt forgiveness, defined as the extra resources required to make a country as well off as if it had no debt. For a variety of market imperfections, this can be calculated by valuing the cash flows of a country's debts using the consumption capital asset pricing model. As shown in Figure 1, this internal country value always lies below the market valuation. This is consistent with economic theory: when capital markets are imperfect—for example, because of borrowing constraints or default risk—borrowing countries will value current resources more, and future resources less, on the margin than creditors.

Debts levels of the magnitude presented in Figure 1 are a challenge for the standard model of sovereign debt. When researchers run simulations using the standard model, they rarely generate face values greater than 10% of GNI (e.g. Arellano 2008). More elaborate models that allow for long-maturity debt or positive recovery rates in the event of default produce debt levels that more closely approximate the empirical record (e.g. Chatterjee and Eyigungor 2012, Benjamin and Wright 2008).

Measuring the Cost of Borrowing

Sovereign bonds have been traded on international capital markets for centuries. Consequently, we have long series on the prices of sovereign debt, which researchers have used to quantify the cost of borrowing. One common measure is the *current coupon yield*, defined as the ratio of the nominal interest rate to the market price of the bond. A second measure is the *holding period return*, which adds any amortization payments and capital gains to the coupon yield. A third measure is *yield to maturity*, defined as the rate of return investors would earn if they bought the bond at is market price and held it to maturity, and if the sovereign made all interest and principal payments on schedule.

In the standard model, the market price—and consequently the yield—reflect expectations about the probability of default. Consequently, researchers have examined why yields vary across countries and over time. Studies have shown that countries with a history of default get charged higher yields than countries with unblemished records.[2] Scholars have also investigated how economic and political institutions affect the cost of borrowing.

In an influential study, Bordo and Rockoff (1996) estimated the impact of the gold standard on borrowing costs. Using a sample of 10 sovereigns between 1870

[2] See, e.g., Flandreau and Zumer 2004, Tomz 2007, Cruces and Trebesch 2012, but c.f. Ozler 1993.

and 1914, they found that annual coupon yields were 30 to 40 basis points lower for countries that had adopted the gold standard, than for countries that had not. The authors argued that the gold standard was a "good housekeeping seal of approval," which reduced the cost of borrowing by signaling to foreign investors that the sovereign was fiscally responsible. Obstfeld and Taylor (2003) found similar patterns in a sample of 20 countries from 1870 to 1914. These conclusions are controversial, however. Follow-up studies have found no relationship between the gold standard and yields, after controlling for differences in monetary policies, fiscal policies, and common risk factors (Flandreau and Zumer 2004; Alquist and Chabot 2011).

Historians have also studied the effect of colonial status on bond yields. Ferguson and Schularick (2006) found that British colonies borrowed in London at substantially lower interest rates than noncolonies. The savings, which averaged between 100 and 175 basis points, existed because colonies carried a lower default risk than fully independent states. Accominotti, Flandreau, and Rezzik (2011) extended this line of research by showing that colonial status did not simply cause an intercept-shift in borrowing costs. Instead, colonialism reduced the marginal effect of standard economic variables, because investors thought that colonies would repay regardless of their macroeconomic fundamentals.

Although we have learned much from empirical research about borrowing costs, two caveats must be mentioned. First, the standard model assumes that sovereigns borrow by issuing bonds in competitive markets. In practice, many sovereigns borrow from commercial banks that do not publicize the cost of borrowing, and/or from governments and international organizations that extend credit on concessionary terms. Moreover, not all sovereign bonds are actively traded on liquid markets. Consequently, it can be hard to know the costs sovereigns would face if they borrowed entirely in competitive markets.

Second, the standard model assumes that all bonds have the same contractual features. In reality, bonds come in varying maturities, involve different currencies, and contain diverse provisions for renegotiation. Moreover, some sovereign bonds contain embedded options that make it hard to calculate yield to maturity. In the 19th century, for instance, bonds included clauses that allowed borrowers and lenders to accelerate the date on which the debt would be retired. With embedded options, coupon yields can be a misleading measure of the cost of borrowing.[3]

[3] Countries at risk of default typically issued bonds at a discount and with early repayment at par. Consequently, their bond prices should rise, and coupon yields should fall, mechanistically over time. If countries adopting the gold standard between 1870 and 1914 were poor credit risks, adoption will be spuriously correlated with declining yields. This may explain why Alquist and Chabot (2011)—who compute holding period returns that control for these trends—find no evidence of a "gold standard" effect.

In the next few sections we document the heterogeneity in bond contracts and their implications for debtor-creditor relations.

What is the Maturity of Sovereign Debt?

The standard model assumes that all debts mature in one period. In practice, countries borrow at a range of maturities, and the mix of maturities is important. Countries with large amounts of short term debt are vulnerable to "rollover crises," which occur when the government cannot issue new loans to repay maturing ones (Cole and Kehoe 1999, 2000, Chang and Velasco 2000). In the mid-1990s, Mexico, Indonesia, Korea, Thailand, Russia, and Brazil all experienced debt crises that were exacerbated by having debts with short maturities (Rodrik and Velasco 1999).

To summarize the maturity structure of sovereign debt, researchers often use *contractual maturity*, the date of the last principal repayment. Another common measure is *Macaulay duration*, defined as the elasticity of a debt's present value with respect to a constant discount rate (typically a market yield), and calculated as the discounted cash flow weighted average of the dates of future cash flows.

Both measures are suboptimal for many purposes. Contractual maturities are uninformative about the profile of cash flows over the life of a debt, and duration has the counterintuitive property that, due to discounting, deferring some payments to the distant future can actually shorten the debt's duration. Moreover, two countries with equivalent debt portfolios will have different durations, simply because of different discount rates. Finally, duration fluctuates with interest rates, even though debt contracts have not changed. An alternative measure that avoids these problems is the undiscounted cash flow weighted average of the dates of future cash flows, which we refer to as the *zero coupon equivalent weighted average life* of a debt portfolio.

Using unpublished data from Dias, Richmond and Wright (2011, 2012), we compute each of these measures for the year 2000 for a sample of 137 low and middle income countries. Across countries, contractual maturity varied from 10 to 40 years (see also Broner, Lorenzoni and Schmukler 2010). In contrast, duration—assuming a 5% discount rate—ranged from 3.4 to 14.2 years, with a mean of 7.1. These durations exceed the estimates from previous studies with smaller samples (Cruces, Buscaglia and Alonso 2002), and are longer than what economists typically use to calibrate models of debt (Hatchondo and Martinez 2009, Chatterjee and Eyigungor 2008). Finally, the ZCE weighted average life in the database was just over 9 years, with some countries as low as 3.9 and others as high as 19.[4]

[4] The ZCE weighted average lives of sovereign bonds have changed substantially over time, rising from 6 years during the 1980s, to 15 years during the Brady restructuring process, and trending back to 10 years by the end of the sample.

As noted above, short-maturity sovereign debt could contribute to sovereign debt crises. This concern is accentuated by the finding that maturities tend to shorten during debt crises. Arellano and Ramanarayanan (2012) studied four emerging market economies, and found that the duration (measured using a risk free rate) of new bond issues fell by about 1-2 years during crises. In an illustration of measurement problems, contractual maturities often lengthened during those same crises.

Why Do Countries Issue Debt in Foreign Currencies?

The standard model assumes that all debts are denominated in real consumption. In practice, countries borrow in a mix of currencies. At first glance, the reason for foreign currency issuance seems obvious: if debt were issued in domestic currency, the sovereign could implicitly default by unexpectedly increasing the inflation rate. Issuing in foreign currency forecloses this option, and presumably results in lower borrowing costs. However, when debts are denominated in foreign currencies, the sovereign is vulnerable to exchange rate risk.

How much borrowing is in foreign currencies? Eichengreen, Hausmann and Panizza (2005a) report that between 93% and 100% of all developing country debt is issued in foreign currencies, depending on the measure used. Moreover, outside the main financial centers and Europe, developed countries have between 70% and 90% of their obligations in foreign currencies.

Debts tend to be concentrated in a handful of currencies. Dias, Richmond and Wright (2011) constructed a sample of long term debts owed by 100 developing countries from 1979 to 2006. At any given time, countries had borrowed in about 75 different currencies. However, almost 70% of all debt in 2000 was denominated in U.S. dollars, and the five most important currencies (Dollar, Yen, Euro, Special Drawing Right, and Deutschmark) accounted for more than 90% of the total.

Some have hypothesized that investors demand repayment in foreign currencies from countries with histories of inflation, which would erode the real value of payments in the sovereign's own currency. However, researchers have found surprisingly little relationship between foreign currency debt issues and measures of inflation or currency depreciation (for example, Eichengreen and Hausmann 1999, or Eichengreen, Hausmann and Panizza 2005b). This led Eichengreen and Hausmann (1999) to refer to the preponderance of foreign-currency debt as "original sin," in reference to the Christian theological doctrine that all of humanity is in a state of sin as a result of the original "fall of man."

Others have conjectured that domestic-currency debt markets are rare due to the fixed costs of opening of such markets, and the need for a large market to produce sufficient levels of liquidity. Consistent with this idea, Bordo, Meissner and Redish (2003) argue that Canada, Australia, New Zealand and South Africa developed domestic-currency debt markets when major shocks—such as wars or the breakdown of the Bretton-Woods System—made it worthwhile to pay the necessary fixed costs. Furthermore, large countries are substantially more likely to issue debt in their own currency (Eichengreen, Hausmann and Panizza 2005b).

Sovereign Debt Contracts and Clauses

The risk to creditors also depends on where debts are issued and how debt contracts are written, a feature missing from the standard model. Das, Papaionnou, and Trebesch (2012) studied the sovereign bonds of 43 emerging market countries in 2009. The majority of bonds were governed by New York law (66% by value, 67% by number). Around a quarter were governed by London law (28% by value, 22% by number), and the remainder were governed by either German or Japanese law. Each of these jurisdictions has its own norms for handling defaults.

In recent decades, policymakers have designed contracts that would make it easier to restructure debts, if necessary (Taylor 2002, Eurogroup 2011). They have called for collective action clauses, which allow a supermajority of creditors to impose a settlement on a minority of holdout creditors; engagement clauses, which facilitate the formation of representative groups to negotiate with the sovereign; and aggregation clauses, to help creditors negotiate collectively even if they hold different debt securities.

To document the use of such clauses, Bradley and Gulati (2012) and Choi, Gulati and Posner (2012a,b) collected details on bonds issued between 1990 and 2011. They found that 34% required unanimity to change payment terms, but 66% contained collective action clauses that permitted changes if a supermajority (typically two-thirds, three-quarters, or 85%) of creditors consented. Moreover, the frequency of collective action clauses has risen over time. Prior to the Argentine default in 2001, roughly 95% of sovereign bonds (by number) issued in New York required unanimity to change payment terms (see also Richards and Gugiatti 2003). After the default, only 21% required unanimity.

Aggregation clauses, which allow the holders of diverse debt instruments to vote collectively to restructure all debts, have now been included in the bonds of four nations (Argentina, Dominican Republic, Greece, and Uruguay), with plans to introduce them in all Eurozone bonds starting in 2013 (Eurogroup 2011). Engagement clauses have also become more common, especially in bonds issued in London. Between 1992 and 2002 only 5% of bonds included such clauses, compared with 34% today.

Finally, researchers have studied *pari passu* clauses, which obligate sovereigns to treat creditors equally. Holdout creditors have successfully used *pari passu* clauses to obtain full repayment on bonds in a number of cases (Pitchford and Wright 2012). Moreover, debt contracts increasingly contain versions of the clause that are especially favorable to holdout creditors; these versions were absent in sovereign bonds prior to 1981, but now exist in 74% of bonds issued by the main emerging market borrowers, and in 21% of sovereign bonds generally (Choi, Gulati and Posner 2012a; Gulati and Scott 2011). This trend is surprising: if borrowers and lenders dislike the use of *pari passu* clauses by holdout creditors, we might expect the clauses to become less common (Wright 2011 provides one interpretation).

4. Sovereign Default

In this section we examine how often defaults occur, how long they last, and how creditors and debtors fare in the aftermath of default.

What Is Sovereign Default?

Defined narrowly, default occurs when the debtor violates the legal terms of the debt contract. For example, the debtor might fail to pay interest or principal within the specified grace period. Although useful, this narrow definition overlooks situations in which the sovereign threatens to default and creditors respond by "voluntarily" revising the contract.

In recognition of this problem, credit ratings agencies like Standard and Poor's (S&P) define a default as beginning either when the sovereign breaks the contract, or when the sovereign "tenders an exchange offer of new debt with less favorable terms than the original issue" (Beers and Chambers 2006). We prefer this broader definition.

To illustrate how definitions matter, consider the 2012 restructuring of Greek sovereign debt. At the time of writing, Greece's actions had not triggered a narrow default: the government had not missed any payments, nor violated any other contractual clauses. Nevertheless, Greece demanded new terms and creditors consented, causing ratings agencies to conclude that a default had occurred. The Argentine debt crisis provides another example. All three major ratings agencies—S&P, Moody's and Fitch—listed Argentina as defaulting in November 2001, when it announced its intention to suspend payments, even though the government did not break a contract until January 2002, when it failed to make a required payment.

Finally, researchers use different criteria when grouping decisions into a single default episode. If a country defaults within one year of restructuring its debts, we

treat the sequence as part of the same default episode. Our criteria imply that Mexico was in continuous default from 1982 to 1990, a judgment shared by S&P. However, other researchers reach different conclusions. For example, Borensztein and Panizza (2009) record four distinct Mexican defaults during the 1980s, Cruces and Trebesch (2012) list five, and Arteta and Hale (2008) count 23.

How Often Do Countries Default?

We now summarize the frequency of defaults on external debt over the past two centuries. Our data, which extend the work of Tomz and Wright (2007), cover 176 sovereign entities (counting countries and their historical counterparts as separate entities) from 1820 to the present.[5] The sovereigns were in existence for a total of 17,202 country-years. In 83% of those observations, sovereigns had external debt and were, therefore, candidates for default.

In building the database, we restricted attention to external debts that were issued or guaranteed by the national government. We also focused on debts to private creditors, although we also gathered data on the rescheduling of debts owed to official creditors under the auspices of the Paris Club. Moreover, we made no distinction between default and repudiation; between defaults on interest and defaults on principal; or between defaults that covered only part of a sovereign's debts, versus defaults that affected all debts.[6]

In our database, there were 248 external defaults by 107 distinct entities. The most frequent defaulters were Ecuador, Mexico, Uruguay, and Venezuela; each experienced at least 8 distinct spells of default, exemplifying a phenomenon Reinhart and Rogoff (2004) call "serial default." Ecuador and Honduras have each spent more than 120 years in default, beginning with their initial loans as members of the Central American Confederation in the 1820s, and Greece has been in default for more than 90 years of our sample. The largest default in history (by present value) was the 2012 Greek restructuring that covered more than €200b of privately held debt, followed by Argentina in 2001 and Russia in 1918.

Figure 2 documents the occurrence of sovereign default through history. The solid line (left-hand scale) plots the proportion of borrowing countries that were in default on their debts to foreign commercial creditors from the end of the Napoleonic Wars to the present. The gray columns (right-hand scale) depict the number of new defaults in each year. The dark gray captures defaults only on

[5] Alternative datasets of default events include: Purcell and Kaufman (1993), also used by Beim and Calomiris (2001); Suter (1990,1992), which forms the basis of the S&P dataset (Beers and Chambers 2006); Sturzenegger and Zettelmeyer (2007); Arteta and Hale (2008); Reinhart and Rogoff (2009); and Cruces and Trebesch (2012).

[6] We also do not include "debt crises" without a sovereign default (Pescatori and Sy 2007).

commercial creditors; the light gray represents restructurings only of bilateral debts of official creditors under the auspices of the Paris Club;[7] and the medium gray shows defaults on both commercial and official creditors.

The figure reveals four episodes in which at least 30% of the worlds' debtors (by number) have been in default, giving rise to the notion of a global default crisis. The first episode began in the 1820s, when a number of newly independent countries issued debt and immediately defaulted. The second episode, occurring in the 1870s, was associated with wars in Central and South America, followed by a fall in commodity prices. The third episode centers on the Great Depression, and the fourth is the global debt crisis of the 1980s. Figure 2 also shows defaults on official debts after World War II. To date, there have been 425 renegotiations of official debts under the Paris Club.

The frequency of default is sensitive to the sample being analyzed. In our database, the unconditional probability of a borrower defaulting on debts owed to commercial creditors is 1.7% per year. This is similar to the 2% default probability that is a target for many calibrated versions of the standard model. However, this estimate averages over all countries, including many developed countries that have never defaulted. It also averages over time periods in which there was little borrowing (for example, the Bretton-Woods system of restricted capital flows). If we restrict attention to countries that defaulted at least once and exclude the years 1945-1980, the probability of default jumps to 3%, while for 1980-2012 the probability more than doubles to 3.8%.

The frequency of default also depends on how one aggregates events. Our method of aggregation produces fewer defaults of longer duration. Other methods generate much higher default probabilities. For example, Arteta and Hale (2008) record 100 restructuring episodes with commercial creditors by 30 countries over a 25 year period, resulting in a 13% default probability per year.

The fact that this moment of the data is sensitive to reasonable changes in the definition of default suggests that an alternative moment—one more robust to changes in definition—should be used to calibrate models of default. One possibility is the fraction of time debtors spend in default, which is 18% across the entire sample.

How Long Do Defaults Last?

Like the probability of default, the duration of a default is sensitive to the definition researchers use. According to S&P, a default ends when "a settlement occurs and … no further near-term resolution of creditors' claims is likely" (Beers

[7] The Paris Club was founded in 1956 to represent official creditors in debt restructuring negotiations. We exclude defaults on other official debts such as the Inter-Allied War Debts.

and Chambers 2006). Defined in this way, the mean length of a default across the entire sample is 9.9 years, dropping to 7.8 years for the period since 1970. The mean is driven by a small number of long lasting defaults, such as the Russian repudiation of 1917. It may, therefore, be preferable to focus on the median, which is 6.5 years over the entire sample of 248 defaults.

There is substantial variation in the observed lengths of defaults, with a standard deviation of 10.5 years. The distribution is also right skewed, with a skewness coefficient of 2.1. These facts suggest that the distribution of default lengths is approximately exponential, a pattern we would expect if the probability of emerging from default were constant through time. The standard model contains this assumption, which is also predicted by the calibrated model of debt restructuring in Pitchford and Wright (2008).

How Large Are Creditor Losses in a Sovereign Default?

The standard model assumes that creditors lose their entire claim when a sovereign defaults. This is far from true. Defaults typically conclude with a settlement in which old defaulted debt is exchanged for new debts.

Measures of creditor losses ("haircuts") compare the value of the old securities to the settlement offer. *Nominal haircuts* (Alesina and Weder 2002, Yue 2010) value both old and new debts at face value, ignoring that defaulted debts trade at a discount to face value, and that debts issued during a settlement tend to mature over a longer time horizon. The *market haircut* instead compares the market value of the settlement to the face value of the defaulted debt. This measure is easy to compute and appropriate when pricing sovereign debt, but it overstates the value of defaulted debt and hence exaggerates creditors' losses. To correct the problem, one should value old and new debts using the same discount rates, as in Sturzenegger and Zettelmeyer (2008), who use "exit yields" derived from the prices of the settlement debts to value the defaulted debt, and thereby estimate the *SZ-haircut*.

Several estimates of market haircuts (Cline 1995, Benjamin and Wright 2008) use aggregate debt data from the World Bank's Debtor Reporting System to estimate creditor losses for as many as 90 defaults.[8] However, these data do not include losses due to maturity extensions. More recent estimates of creditor losses have involved security-level data. Sturzenegger and Zettelmeyer (2008), for example, estimate both market and SZ-haircuts for 22 restructurings, while Cruces and Trebesch (2012) provide estimates for 180 restructurings.

[8]Other haircut estimates for smaller samples were constructed using different data by Jorgensen and Sachs (1989), Rieffel (2003), Bedford et al. (2005), Finger and Mecagni (2007) and Díaz-Cassou et al. (2008).

Despite the differences in definitions, and despite wide divergence in the estimates for individual restructurings, all the measures give similar quantitative results. Benjamin and Wright (2008) estimate an average market haircut of 38%, while Cruces and Trebesch (2012) estimate a 40% market haircut and a 37% SZ-haircut. Both measures also show that defaults by the low income countries of sub-Saharan Africa resulted in larger haircuts.

How Does Sovereign Indebtedness Change After a Default?

The standard model assumes that default extinguishes past debts, such that the sovereign emerges from default without any obligations. This is not true in practice, and likely affects the quantitative performance of these models.

Benjamin and Wright (2008) show for their sample of 90 defaults that indebtedness, measured by the ratio of the face value of debt to GDP, does not fall and may even rise after a default. The median country ends the year of the settlement with a debt-to-GDP ratio 5 percentage points higher than when they entered default. The increases in indebtedness are largest for low income countries (Easterly 2002 and Wright 2011a).

Even if the face value of debt rises, the restructuring of repayments may bring relief to the borrower. Sturzenegger and Zettelmeyer (2008) and Zettelmeyer, Trebesch and Gulati (2012) propose a measure of debt relief that values a country's new debt stock at interest rates that would prevail during non-crisis times. As these rates tend to be lower than those immediately following a settlement, this measure produces values for debt relief that are smaller than creditor losses. In the recent Greek restructuring, a 65% haircut for creditors was associated with a 60% reduction in the value of debt to the sovereign, while in Uruguay in 2003, a 13% haircut was associated with a 5% *increase* in the value of the sovereigns debt. An alternative approach, based on the welfare cost of indebtedness (Dias, Richmond, and Wright 2012), could be a topic of future research.

Do debt restructurings improve a country's welfare? Depetris, Chavin and Kraay (2005) study 62 low-income countries between 1989 and 2003 and find no relationship between debt relief and partial indicators of country welfare such as GDP growth, investment rates, and public spending. Conversely, Arslanalp and Henry (2005) find large appreciations in the stock markets of middle income countries following debt relief under the Brady Plan. More research is needed to know how debt restructuring affects sovereign welfare.

How Does Default Affect Access to International Debt Markets?

Although the standard model of sovereign debt assumes that default is punished by disruption of capital market access, there is considerable controversy as to whether this is true in practice (Borensztein and Panizza 2009 and Panizza, Sturzenegger and Zettelmeyer 2009). In part, this reflects the nature of the problem: realized borrowing is affected by the country's demand for credit, and so different equilibrium outcomes need not reflect a reduced supply of credit. It also reflects different notions of what "normal" credit market access looks like, and hence different notions of what constitutes a disruption of access.

We begin by examining evidence on the quantity of borrowing. Data from the 19th Century are unambiguous.[9] In a study of 16 sovereign defaulters between 1820 and 1870, Tomz (2007) finds that only Greece was able borrow while in default. Moreover, the Greek case is the "exception that proves the rule": after having defaulted in 1826, Greece was able to borrow in 1833 only after securing loan guarantees from England, France, and Russia.

The picture for the early and mid 20th Century is muddled by disruptions to capital markets from two world wars, followed by restrictions on capital flows under Bretton-Woods. Following the end of World War II, few countries borrowed internationally regardless of their credit history, leading some researchers to suggest that defaulting countries were not punished (Jorgenson and Sachs 1989, Eichengreen 1989).

Since the 1970s the picture has become more complicated, due to official lending and bank decisions to roll over past-due debt to avoid capital charges. Gelos, Sahay and Sandleris (2011) partially correct for this by defining a country as having market access if the country borrows using either bonds or syndicated bank loans, *and* if the face value of the country's debts increases. They find that being in default is associated with less market access, with the average country taking 4.7 years to re-access markets following a default, declining to 2.9 years more recently (not including unresolved defaults like Argentina 2001).

The debt stock of a country may increase without new borrowing if interest arrears are capitalized, or if a country retires low face value debt by issuing high face value debt. To correct for this, Dias, Richmond and Wang (2012) define "normal" market access to be "net resource transfers" in excess of 1% of GDP. By this measure, half of defaulting countries do not regain market access within seven years of the end of the default. This echoes the finding of Levy Yeyati (2009), who finds that net resource transfers fall by between 0.1% and 1% of GDP following a default.

[9] Likewise for 16th Century Castilian borrowing (Drelichman and Voth, forthcoming).

Finally, the ability to borrow after default may depend on whether the sovereign had a reasonable excuse, and the magnitude of losses that creditors suffered. Dias, Richmond and Wang (2012) find faster market re-access following excusable defaults: half of all defaulting countries experiencing a natural disaster regained access within 3 years. Similarly, Cruces and Trebesch (2012) find that market access was slower following defaults that imposed haircuts in excess of 50%.

We next turn to evidence on the price of sovereign borrowing. In a study of 30 sovereign borrowers in 1872, Tomz (2007) finds that previous defaulters and new borrowers were charged in excess of 8%, whereas countries with a good credit records were charged around 5.5%. Significant yield differences remained after controlling for indebtedness and export earnings. For the modern period, Cruces and Trebesch (2012) concluded that the average defaulter paid 3-4% more to borrow than non-defaulters, with spreads above 5% for sovereigns that imposed large haircuts. Ozler (1992,1993) finds that defaults in the 1930s did not substantially increase the cost of borrowing in the 1970s, perhaps because the events were separated by several decades.

By what mechanism does default lead to higher spreads? If default reveals only that a country is a poor credit risk, higher yields should simply reflect the increased risk of lending. If high yields reflect punitive interest rates, however, then investors in these debts should earn excess returns. Lindert and Morton (1989) studied the *ex post* realized returns to holding sovereign debt from 1850 to 1983 and found no evidence of excess returns. Likewise, Klingen, Weder and Zettelmeyer (2004) found that returns on emerging market debt from 1970-2000 equaled those on US treasuries.

In summary, data from the past two centuries suggest that defaulters temporarily lose access to international capital markets, as implied by the standard model, and pay higher interest rates when they resume borrowing.

Other Costs of Default

Beyond losing access to capital, the standard model assumes that a country that defaults suffers a loss of output. This is intended as a proxy for costs in other areas of international relations. For instance, a country in default could become a target of military intervention. The idea of using arms to extract repayment may seem odd today, but many scholars believe this mode of enforcement prevailed until the early twentieth century. Finnemore (2003), for example, writes that militarized debt collection was “accepted practice” until the Second Hague Peace Conference in 1907. Mitchener and Weidenmier (2010) add that gunboat diplomacy was “effective and commonly used” to enforce debts before 1913.

Tomz (2007) maintains, however, that creditor governments generally did not use—or even threaten to use—force on behalf of bondholders. Even the 1902

intervention against Venezuela, often cited as the main example of a bondholder war, occurred because of tort claims, not debt default. Moreover, historical patterns of lending and repayment contradict the gunboat hypothesis. Investors lent to countries they had no chance of coercing, and debtors repaid militarily strong creditors no more often than weak ones. Notwithstanding these historical debates, all agree that today countries do not use military intervention to enforce debt contracts.

Default may also lead to a decline in international trade (Bulow and Rogoff 1989). Trade could suffer for at least three reasons. First, creditors could use tariff and nontariff barriers to reduce trade with the defaulter. Second, default could lead to the collapse of trade credit, thereby increasing the costs of trade (Kohlscheen and O'Connell 2007). Finally, creditors could seize the debtor's foreign assets, including tradable goods.

Researchers have begun compiling evidence about the effect of default on trade. When countries default on official Paris Club debt, they experience a decline in trade relative to levels one would expect from the standard "gravity" model (Rose 2005; Borensztein and Panizza 2010). It remains unclear why these changes in trade occur, however. If the decline were due to trade sanctions, trade with creditor countries would fall faster than trade with other countries. But Martinez and Sandleris (2011) found that default disproportionately depressed trade with non-creditors, and Agronovsky and Trebesch (2009) showed that exports to creditors actually rose after debt restructuring. Studies of earlier time periods cast additional doubt on the trade sanctions hypothesis (English 1996, Tomz 2007).

The evidence on declines in trade credit is equally ambiguous. Commercial credit shrinks in the aftermath of default, and exports of sectors that depend on external credit tend to suffer the most (Zymek 2012). However, the impact on commercial credit is brief and not sufficient to explain the total drop in trade (Borensztein and Panizza 2009).

Finally, there is little evidence of asset seizures following a default. For much of history, the doctrine of sovereign immunity prevented creditors from suing a defaulter in foreign courts (Wright 2012). Moreover, even if creditors could win a judgment they would find little to take, since most borrowing countries do not own extensive assets in foreign jurisdictions. Several recent court cases have illustrated the near impossibility of taking sovereign assets as compensation for default (Wright 2001, Doemeland et al 2008, Pitchford and Wright 2012, and Kolb 2011). In 2012, for example, an Argentine naval ship detained in Ghana on behalf of creditors was released after an appeal to the International Tribunal on the Law of the Sea.[10]

[10] See Romig S "Argentina Navy Ship Remains Impounded in Ghana" *Wall Street Journal* 11th October 2012, and Romig S "Ghana Ordered to Release Argentine Ship" *Wall Street Journal* 15th December 2012.

Cole and Kehoe (1998) suggested a different mechanism in which default leads to costs in other spheres of international relations. Default could signal that the government is unreliable, not just in debt, but in international affairs more generally. Foreigners might, therefore, be less willing to make direct investments or enter into trade agreements, environmental pacts, and military alliances with the offending state. The concept of reputational spillovers seems plausible, but few have tried to test it empirically (Fuentes and Saravia 2010; Rose and Spiegel 2009; Tomz and Wright 2010). This seems like an especially promising area for future research.

Do Countries Default in "Bad Times"?

The relationship between output and default is potentially informative about the incentives of a sovereign to default. On the one hand, models of sovereign debt with incomplete debt contracts—like the standard model of section 2—predict that defaults occur when output is low. On the other hand, models with fully state contingent securities imply that the temptation to default is strongest when output is high (Kletzer and Wright 2001, Wright 2001).

The widespread belief that sovereigns default only in bad times was challenged by Tomz and Wright (2007), who found a weakly negative relationship between default and output in a sample of 175 sovereign borrowers from 1820 to 2005. Defining low output as periods in which annual GDP data was below its Hodrick-Prescott trend, Tomz and Wright showed that sovereigns defaulted when output was below trend only 60% of the time, and that the average deviation of output from trend at the start of a default was only -1.6%. This result was robust for different time periods, samples of countries, and approaches to measuring trends in output. By contrast, calibrated default models predict that defaults almost always occur when output is below trend, with an average deviation from trend in excess of 8%.

This finding remains controversial. While Benjamin and Wright (2009) and Durdu, Nunes and Sapriza (2010) confirm these results using similar methods on different samples, De Paoli, Hoggarth, and Saporta (2006) and Reinhart and Rogoff (2011) find large output declines using different methods. Both of the latter studies emphasize that output costs are larger when default is accompanied by a banking or currency crisis, with defaults in isolation associated with small output declines.

Tomz and Wright (2007) suggest ways to reconcile their findings with the predictions of incomplete debt contract models. Perhaps bad times should be measured by changes in exports, government revenues, or world interest rates, rather than output. Another explanation is time aggregation: if sovereign default is associated with short, sharp declines in output, the relationship may be more clearly evident in quarterly data than in annual statistics (Mendoza and Yue

2011). Indeed, Levy Yeyati and Panizza (2011) find a strong negative relationship at quarterly frequency in a sample of 23 defaults.

5. Domestic Politics

Most theories of sovereign debt emphasize international enforcement mechanisms. Governments repay foreign debts, it is said, to avoid adverse international reactions such as exclusion from foreign credit or punishment in other spheres of foreign affairs. In recent years, though, scholars have begun examining how domestic politics affects the calculation to repay. This is a welcome development. When governments appropriate funds to service the foreign debt, they are making a political decision to prioritize foreign obligations over alternative goals that might be more popular with domestic constituents. In this section, we review recent work about the effect of domestic politics on sovereign debt.

Do Governments Favor Domestic Creditors over Foreign Ones?

Why would citizens ever want their government to repay foreigners, instead of defaulting on foreign debts and directing the savings toward domestic purposes? One possibility is that governments cannot repay their debts selectively (Broner, Martin and Ventura 2010; Broner and Ventura 2011; Guembel and Sussman 2009). If a government owes money to both foreigners and domestic citizens and cannot honor obligations to one group while defaulting on the other, the government might opt to pay creditors abroad, instead of declaring a comprehensive default that would also hurt creditors at home.

The argument seems most plausible in situations when debts take the form of bonds that are traded on secondary markets. If default ever loomed, foreign investors could sell their bonds to citizens of the country that was contemplating default. The transfer of ownership would increase the political costs of default, by putting bonds in the hands of people who could pressure the government to honor its debts. At the same time, the anonymity of secondary markets would make discrimination difficult. Not knowing who owns the debt, the government would find it hard to repay locals at the expense of foreigners.

Two facts seem consistent with this theory. First, many governments have large stocks of domestic as well as foreign debt. Reinhart and Rogoff (2011) assembled data on public debt for 64 countries beginning in 1914 and found that nearly two-thirds of public debt had been issued domestically. The stock of domestic debt has varied across countries and over time, however, in ways that should affect the incentive to repay. Future researchers should study the size and membership of the domestic creditor community, thereby offering new insight into the political consequences of default.

Second, governments often borrow by issuing bonds that can be traded domestically as well as internationally. Indeed, for most of recorded history, private investors financed foreign governments almost entirely through bonds that were traded on global capital markets. Although the situation changed in the late 1960s, when commercial banks began lending to foreign governments on a large scale, bond issues have outstripped bank loans in every year since the mid-1990s. Moreover, emerging markets have repaid bondholders at a higher rate than commercial banks (Tomz 2007).

However, other facts seem inconsistent with the hypothesis that governments repay foreign creditors to avoid hurting domestic ones. Most importantly, governments can—and often do—default selectively, by treating domestic creditors better than foreigners. Gelpern and Sester (2004, 794) examined recent defaults and concluded that, "in the world of sovereign debt, local and foreign investors buying the same paper rarely achieve what anyone would recognize as equal treatment." Some governments discriminate among holders of identical assets. Others transform their debt stocks in ways that permit discrimination. In 2000-2001, for example, Argentina induced domestic residents to shift into new instruments, which received better treatment than the bonds foreigners continued to hold.

Evidence from earlier periods supports the same conclusion. Waldenstrom (2010) studied bond markets during World War II, a time when capital controls segmented international markets. He found that yields on Danish bonds were lower in Denmark, where only Danish citizens could trade, than in Sweden, where foreign investors were active. The difference in yields is consistent with a model in which sovereigns can favor domestic investors over foreign ones.[11]

Although governments can discriminate across types of creditors, they do not always exercise the option. Erce and Diaz-Cassou (2011) analyzed ten recent defaulters and found that four discriminated against foreign creditors; three adopted a neutral approach; and three afforded preferential treatment to foreign creditors. The authors admit, however, that the cases in the latter category—Argentina, Russia, and Ukraine—are contentious. Indeed, some researchers code those same countries as discriminating in favor of domestic residents (on Argentina and Russia, see Gelpern and Sester 2004; on Ukraine, see Sturzenegger and Zettelmeyer 2007).

Future research should investigate why governments discriminate in some cases but not in others, and whether domestic creditors get better treatment on

[11] Governments also have the means to treat some foreigners more favorably than other foreigners. In the interwar period, Germany offered full service to British investors but only partial payment to Americans. Agents implemented this policy by stamping each bond to indicate "U.K. domicile" or "U.S.A. domicile." Likewise, Romania serviced British-owned bonds, while withholding payment from American investors (Tomz 2007).

average. We expect that conclusions will depend on the definition of default. S&P defines a domestic default as a situation in which the government explicitly violates the loan contract and excludes bursts of inflation that reduce the value of local currency debt. Applying the S&P definition, Kohlscheen (2010a) found that governments defaulted on external debts twice as often as domestic debts. Reinhart and Rogoff (2011) define domestic defaults to include government abrogation of debt contracts or inflation rates above 20%. With this broader definition, they found that defaults on external debt were no more common than defaults on domestic debt.

Which Domestic Groups Want to Repay Foreign Debts?

Repaying foreign debt creates domestic winners and losers (Frieden 1989, 1991). On the one hand, repayment often requires fiscal adjustment that falls more heavily on some citizens than on others. Governments in crises historically have met their foreign obligations by imposing austerity programs that hurt government employees, the unemployed, and the poor (Johnson and Salop 1980; Vreeland 2002). On the other hand, a government that honors its foreign debts can preserve its international reputation, benefiting domestic constituents who value future transactions with foreigners. These domestic preferences could affect the government's decision to repay or default.

As a first step toward testing these hypotheses, Tomz (2004) analyzed a unique public opinion survey that was administered in Argentina during the debt crisis of 2001-2002. On average, the desire to default was stronger among public sector employees than among private sector employees. Similarly, the poor or unemployed were more inclined to default than people with greater assets and more job security. On the other side of the ledger, citizens who assigned high value to future inflows of capital had a stronger preference for debt repayment. Finally, the correlation between economic self-interest and policy preferences held most strongly for sophisticates, who scored well on a test of economic knowledge that was embedded in the survey.

A second study, by Curtis, Jupille, and Leblang (2012), analyzed the 2011 referendum on debt repayment in Iceland. They found that citizens voted their pocketbook interests. People with extensive investment assets, and those who would suffer from higher borrowing costs, voted for repayment; the unemployed voted for default. However, the connection between personal economic interest and voting behavior did not depend on voter sophistication, perhaps because extensive media coverage had made everyone knowledgeable about the issue. Future research should take advantage of public opinion polls in developed and developing countries to understand the preferences of voters and domestic groups.

How Do Domestic Political Institutions Affect the Probability of Default?

Some authors argue that countries with checks and balances, or veto points, are more creditworthy than countries where political power is highly concentrated. In an influential paper, North and Weingast (1989) argued that the Glorious Revolution enhanced the creditworthiness of the British government by empowering the parliament as a counterweight to the crown. Cox (2011) offered a related historical account: British creditworthiness improved when the parliament "established a workable system to hold the king's advisors accountable—what we now call ministerial responsibility."

Additional research concurs that veto players increase creditworthiness. For example, coalition governments default less often than unified ones (Saiegh 2009), and countries with strong courts are seen as more creditworthy than countries without independent judiciaries (Biglaiser and Staats 2012).[12]

We offer three caveats, however. First, the effect of checks and balances should depend on the preferences of citizens and interest groups. If domestic groups agree on how to handle public debts, structural checks and balances should be irrelevant. If, on the other hand, groups have diverse attitudes about debt default, checks and balances could be consequential, as Stasavage (2003) demonstrated in a detailed analysis of British and French history. Stasavage (2011) subsequently examined the effect of representative assemblies in medieval and early modern Europe. He showed that assemblies enhanced creditworthiness in geographically small trade-dependent states, because those states had powerful mercantile interests that monitored the public credit.

Second, the effect of veto points should vary, depending on the policy to which a government would revert if one or more players exercised its veto. Does default require an affirmative act by government officials, or could it occur passively because leaders fail to appropriate the funds for debt repayment? If repayment requires affirmative action, the presence of veto players could lead to a war of attrition (Alesina and Drazen 1991) between competing groups, which could delay payments to foreign creditors. Thus, the presence of veto players could either increase or decrease the probability of default, depending on the reversion point. This seems like an important area for future research.

Third, although most researchers treat checks and balances as generic features of the political system, these constraints are likely to vary by issue. We need

[12] Research also shows that parliamentary regimes pay their debts more often than other types of democracies (Kohlscheen 2010b, Van Rijckeghem and Weder 2009). It is not clear how to interpret these findings, though. Many presidential regimes—in which bills typically require the consent of both the executive and the legislature—have more veto points than parliamentary ones.

more cross-country research about who enjoys veto power when it comes to sovereign debt, in particular.

In addition to studying the effects of checks and balances, researchers have asked whether countries that hold elections are more creditworthy, perhaps because voters would punish incumbents for defaulting on the foreign debt. Research about the effect of electoral democracy has generated contradictory conclusions, however. Schultz and Weingast (2003) offer historical examples of democracies that could borrow more money, on better terms, than autocracies. In a large-scale statistical test, though, Saiegh (2005) found that democracies were more likely to reschedule their external debts and paid interest rates at least as high as autocracies. Enderlein, Müller, and Trebesch (2011) add that democracies are significantly more "aggressive" toward foreign creditors, as measured by an index of the coerciveness of debt rescheduling. Archer, Biglaiser, and DeRouen (2007) claim that democracies do not enjoy higher credit ratings, but Beaulieu, Cox, and Saiegh (2012) find the opposite. More research is needed to reconcile these contradictory findings.

6. **Conclusions and Future Directions**

Empirical research on sovereign debt has advanced remarkably in recent years. Progress has occurred for three reasons. First, researchers have assembled new datasets that reveal previously unknown facts about sovereign debt. We now have an unprecedented amount of information about the stock, maturity, currency composition, and contractual features of sovereign debt for most countries in the world, over longs sweeps of history. We also know how often countries have defaulted, how long defaults have lasted, and how defaults have been resolved. These discoveries would not have been possible without heroic efforts to unearth data from archives, and to harmonize statistics from disparate sources.

Second, researchers have used the new data to assess theories of sovereign debt. The central puzzle in the literature is the problem of enforcement: what motivates sovereigns to repay, and why do investors ever lend to them? Theorists have posited that governments repay to avoid the loss of access to international capital markets, the disruption of foreign trade, or damage to the country's reputation in other spheres of international affairs. Armed with new data, researchers are beginning to quantify these costs. At the same time, researchers are gaining insight about how investors fare when defaults occur. Macroeconomists can and should use these facts to judge and recalibrate models of debt.

Third, new data are shedding light on the economic and political conditions that contribute to default. How do business cycles in the borrowing country or the global economy affect the probability of default? Given that the choice between

default and repayment is partly political, how do the preferences of voters and interest groups matter, and what role do political institutions play in determining whether sovereigns repay? We suspect these questions will become major foci in the literature, and will offer new opportunities for collaboration across the social sciences.

Throughout this essay we have not only highlighted the discoveries that empirical researchers have made, but also identified gaps between theory and data. To some extent, the gaps exist for practical reasons: key measures remain unavailable for some concepts, countries, and time periods. Addressing these problems will require a continual, collaborative commitment to data collection. Even without new data, it should be possible to improve the dialogue between theoretical and empirical research. We have offered guidance for choosing measures that speak most directly to theory. We have also cited recent empirical findings that should inform the next generation of theoretical work. It is only by combining theory and data that future research will advance our understanding of sovereign debt, a central issue for economics, politics, and international relations.

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Sidebar

Expropriation of Foreign Direct Investment

In addition to defaulting on their debts, sovereigns also expropriate foreign direct investment (FDI), either directly through nationalization or indirectly by limiting the property rights of foreign investors.

Some theories predict a close relationship between the occurrence of sovereign default and expropriation (collectively referred to as "sovereign theft"). For example, if sovereigns honor contracts in order to maintain a good reputation, and if one form of sovereign theft is informative about the likelihood of the other, sovereigns should default and expropriate together: the information revealed is the same but the benefits to seizing both are larger. A similar prediction arises if sovereign theft is deterred by retaliatory threats of denying access to international debt and equity markets.

Surprisingly, Tomz and Wright (2010) found no short-run relationship between default and the expropriation of US FDI; sovereigns rarely expropriated and defaulted at the same time. They did, however, uncover a strong long-run relationship: most countries consistently avoided both types of theft, or they committed both types at varying points during the 20th century. Eden, Kraay, and Qian (2012) documented similar patterns in a study of non-US FDI. They also found no evidence that lending declines after expropriation, nor that FDI declines after defaults (but contrast Fuentes and Saravia 2010).

Definitions

Debt Relief: A reduction of, or extension to the timing of, payments on a debt.

Default: Narrowly, a violation of the terms of a debt contract such as a failure to pay within the specified grace period. Broadly, also includes voluntary restructurings of debt that reduce the value of that debt to creditors.

Doctrine of Sovereign Immunity: A legal doctrine proscribing suit against a sovereign state, and attachment of a sovereign state's property, without the sovereign's consent.

External Debt: Debt owed to foreign investors. In the data, this is often approximated by debt denominated in foreign currency, or debt issued in a foreign legal jurisdiction.

Face Value of Debt: The undiscounted sum of future principal repayments of a debt.

Haircut: The loss, in percentage terms, experienced by a creditor as a result of a default. It is equal to one minus the recovery rate on the debt.

Sovereign State: A political organization with supreme independent authority over a geographic area. Foreign sovereign immunity is extended to entities that have been recognized as sovereign states by the sovereign state of the relevant legal jurisdiction.

Sovereign Debt: Debt owed or guaranteed by the government of a sovereign state.

Figure 1: The Evolution of Sovereign Indebtedness

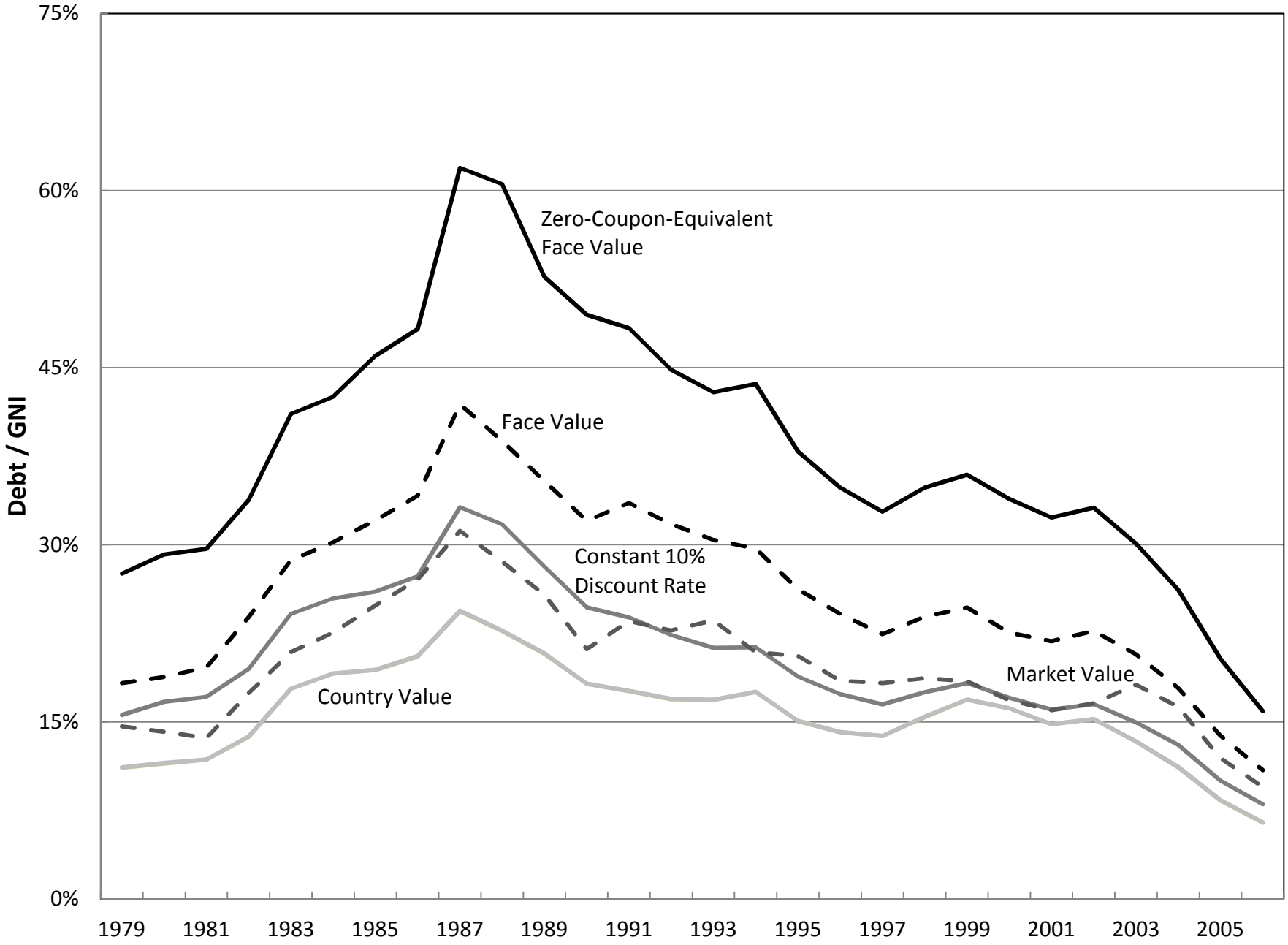

Figure 2: The Frequency of Sovereign Default