Executive constraint and sovereign debt: Quasi-experimental evidence from Argentina during the Baring crisis

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Abstract

The literature on whether executive constraint improves the credibility of sovereign debt takes the political regime as the unit of analysis, typically computing an average yield or price for each regime, then relating that average to regime characteristics. In this paper, we take the individual bond issue as the unit of analysis, examining quasi-experimental evidence from two Argentine sovereign debts issued in the 1880s. The loans were sought by the same government and offered nearly identical terms to borrowers, except that one was funded and the other was unfunded. The loans sold at virtually the same price until the Baring crisis of 16 November 1890 erupted. Thereafter, their price histories diverged markedly. We analyze the market's evolving valuation of the two loans before and after the Baring crisis using a difference-in-differences estimator and weekly price data. Our study shows that exposure to executive discretion strongly influences market assessments of value.

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Introduction

North and Weingast's (1989) seminal work sparked a debate over whether institutional constraints on political executives help make sovereign debt more credible. Unconstrained executives can unilaterally reschedule debts to address fiscal crises. In contrast, constrained executives require the cooperation of parliament—via passage of a statute—in order to reschedule debts. Thus, as long as parliament is independent of the executive and has different preferences (Stasavage 2003), debt-holders' rights should be more secure when the executive is constrained.

While the original debate focused on the case of 17th- and 18th-century Britain, subsequent empirical studies have explored how executive constraint affected debt credibility in the 19th and 20th centuries. These studies (reviewed below) reach diverse conclusions but all take the constitutional regime as the unit of analysis. They test whether investors view debt from a regime with an unconstrained executive as less credible than debt from a regime with a constrained executive.

Recently, Cox (2016, chs. 3-5) has proposed that the unit of analysis should ideally be individual sovereign debt issues. Even when a regime possesses an independent legislature, some debts are unfunded, leaving the executive wide discretion over how to repay them. Funded debts, in contrast, leave the executive little discretion. Thus, how executive constraint affects debt credibility can be more confidently assessed at the micro-level (the individual loan) than at the aggregate level (the political regime). Micro comparisons can hold constant country fixed effects, regime fixed effects, and even government fixed effects, whereas the typical cross-sectional design used in the empirical literature cannot.

At least since the work of Stasavage (2003), many scholars have viewed the partisan support base of a government as an important determinant of how pro-creditor it will be and hence how credible its debt issues will be. Micro comparisons of different debt issues offered by the same government can hold this important factor constant.

In this paper, we examine quasi-experimental evidence from two Argentine sovereign debts issued in 1884 and 1886-87. The two loans offered nearly identical terms to borrowers; and were issued by the same administration. However, the first loan was unfunded (secured only on the general revenues of the republic) whereas the second was funded (secured by a first lien on the customs revenues). The two loans sold at virtually the same price until the Baring crisis of 16 November 1890 erupted. Thereafter, their price histories diverged markedly. We analyze the market's evolving valuation of the two loans before and after the Baring crisis using a difference-in-differences estimator and weekly price data. More cleanly than previous papers based on cross-sectional data, our study shows that executive discretion strongly influences market assessments of value.

Related literature

Our study relates to several strands in the previous literature. Most directly, we contribute to the debate over whether executive constraints improve the credibility of sovereign debt. Previous contributions to this debate have mostly relied on two kinds of research design. First, several studies compare debt in a single country before and after constitutional reforms. Examples include case studies of early modern England (North and Weingast 1989; Stasavage 2003), nineteenth-century Argentina (Saiegh 2013), and nineteenth-century Brazil (Summerhill 2008).

Second, several studies examine time series cross-sectional data on credit ratings received by 20th century countries (Archer, Biglaiser, and DeRouen 2007; Breen and McMenamin 2013; DiGiuseppe and Shea 2015; Ballard-Rosa, Mosley, and Wellhausen 2016). Here, an important complication in interpreting statistical results is that regimes with unconstrained executives (autocracies) were much less likely to be rated than regimes with constrained executives (mostly democracies) (Beaulieu, Cox and Saiegh 2012).

Methodologically, our study is closest to a third strand of studies that examine historical panel data and employ a difference-in-differences approach (Dincecco 2011; Dasgupta and Ziblatt 2016).[1] Dincecco (2011) examines 11 European countries during the early modern period. He demonstrates that, when a country adopted annual budgets (thereby constraining the executive), it typically experienced an improvement in its yield spread against the British consol. Dasgupta and Ziblatt (2016) examine 22 European and Latin American countries over the 19th century. They show that suffrage expansions worsened debt credibility (measured by yield spreads) in countries with unconstrained executives but not in countries with constrained executives.

These studies, however, compute an *average* yield for each country using a sample of debt issues. Therefore, they do not control for contractual terms—such as interest rate, seniority and maturity—which may have varied across individual loans within a given regime (and may have varied on average across the loans issued under each regime). In contrast, our study compares two specific loans with comparable contractual terms. As we shall show, this micro focus produces a much cleaner

[1] See also Stasavage (2007 and 2011).

satisfaction of the common trend assumption. Our study also relies on a shock, the timing of which was arguably as-if random, whereas previous studies have relied on endogenous events to trigger the difference-in-differences analysis.

Our study also relates to literature exploring how much contractual terms affect sovereign debt pricing in the contemporary era. Recently, sovereign loans have differed in terms of their courts of jurisdiction; listing places; covenants; amendments (CACs); and currencies of denomination (cf. Gelpern and Gulati 2016). Statistical analyses based on cross-national evidence, however, are somewhat inconclusive as to the effects of these contractual terms. The reason is probably the well-known problem of unobserved heterogeneity that plagues this sort of data. Our study focuses on a single contractual difference—whether a loan is funded or not—while controlling for other possible contractual differences by matching.

Study Context: Argentine sovereign debt and the Baring crisis

Saiegh (2013) examined the link between institutional constraints and the risk premia of Argentine bonds between 1822 and 1913. Before adoption of constitutional constraints on the executive in 1860, the average interest rate paid by the Argentine government was roughly 9.7%. In the period 1860-1913, in contrast, the mean cost of borrowing declined to 6.3%.

While Argentina's executive was generally more constrained after 1860, important variation potentially remained in how exposed individual debt issues were to executive discretion. In particular, loans differed in terms of *funding*—whether some specific tax revenues were dedicated to repayment or not—and *sufficiency*—the fraction of face value that the earmarked funds could be expected to repay. Variations in these contractual features could in principle greatly affect the value of a debt. Indeed,

whether creditors viewed "constitutional commitment" post-1860 as good news or not would be jointly shaped by funding and sufficiency. While holders of senior and well-funded debts naturally crave better commitment, holders of junior or underfunded debt can only be hurt by increasing the number of veto players in the legislative process (Cox 2016, p. 50). Thus, it is important to control for contract terms when assessing whether executive constraints improve debt credibility—something that no previous studies explicitly do.

Table 1: Characteristics of two loans

Year of issue	Amount of loan	Lead brokerage firm	Interest rate	Discount rate	Maturity	Funding
1884	£1,714,200	Baring's	5%	84.5%	35 years	Unfunded
1886	£4,000,000	Baring's	5%	80.0%	35 years	Secured on customs revenue
1887	£4,290,100	Baring's	5%	85.5%	35 years	Secured on customs revenue

Our approach is to focus on two Argentine sovereign loans from the mid-1880s which shared many characteristics but differed significantly in one aspect: one was funded and one was unfunded. Table 1 provides some details, from which it can be seen that the loans—both issued under statutory law and sold by the same lead brokerage firm (Baring Brothers)—offered the same interest rate, similar price discounts, and similar maturities.

It should also be noted that both bonds were issued under the administration of President Julio Argentino Roca (1880-1886) and spearheaded in Congress by his political ally, then-Senator Carlos Pellegrini. Known for his devotion to the credit rating of Argentina in international money markets, when Pellegrini assumed the presidency in 1890, he promptly secured legislative support for his economic program, which

included the statutory approval of the debt restructuring agreement following the Baring crisis. Both Roca and Pellegrini enjoyed considerable influence over the hegemonic Partido Autonomista Nacional (PAN), a coalition that controlled Argentine politics in the last two decades of the nineteenth century (Botana 1977; Alonso 2000). Thus, the partisan complexion of the governing coalition—a factor often cited as affecting debt credibility—was the same at issuance of the two bonds we investigate and did not change during the period we study (1886-1900).

The main differences between the two bonds were that the 1884 loan was smaller in amount and unfunded, whereas the 1886-87 loan was almost five times larger, issued in two rounds, and secured by a first lien on the customs revenue. Our identification strategy is to examine how the market treated these two loans before and after the Baring crisis. The logic of our study is similar to the classic investigation of cholera undertaken by John Snow. In the 1850s, one area of London was served by a water company that drew clean water from far down the Thames, while another (intertwined) area was served by a company drawing sewage-infected water near the city. When a cholera epidemic hit Soho in 1854, Snow showed that customers of the company drawing nearby water had a much higher incidence of infection, relative to their otherwise similar compatriots.

In our study, we examine two different classes of investor, those holding the unfunded 1884 bonds and those holding the funded 1886-87 bonds. The executive had considerable discretion in repaying the unfunded debt, because there were many competing demands placed on the general revenues of the republic and the executive was authorized, indeed obliged, to make hard choices between them. In contrast, the 1886-87 loan's authorizing statute gave it a first lien on the customs revenues; and the

executive had no authority to unilaterally ignore this statutory priority. The statute further restricted executive discretion by mandating the direct collection of the pledged duties by the national bank acting as the bondholders' agent. The national bank itself had a statutory authorization which, among other things, meant the president could not legally order it to hand over the money it collected.[2] Indeed, the funds were to be held in trust for the creditors and remitted to the Bank of Paris at the end of each month. Thus, the 1884 bonds were significantly more exposed to executive discretion than the 1886-87 bonds.

The shock that turned the bonds' different exposures to executive discretion from a theoretical to a practical concern was the Baring crisis. On November 16, 1890, the general public learned that Baring Brothers &. Co was in serious trouble. Barings had made its problems known to the Bank of England a week earlier (November 8-9, 1890). This gave the Governor of the Bank of England, William Lidderdale, enough time to arrange a bailout, which was announced soon after the firm's difficulties became public, thereby calming the London markets and averting a general panic.

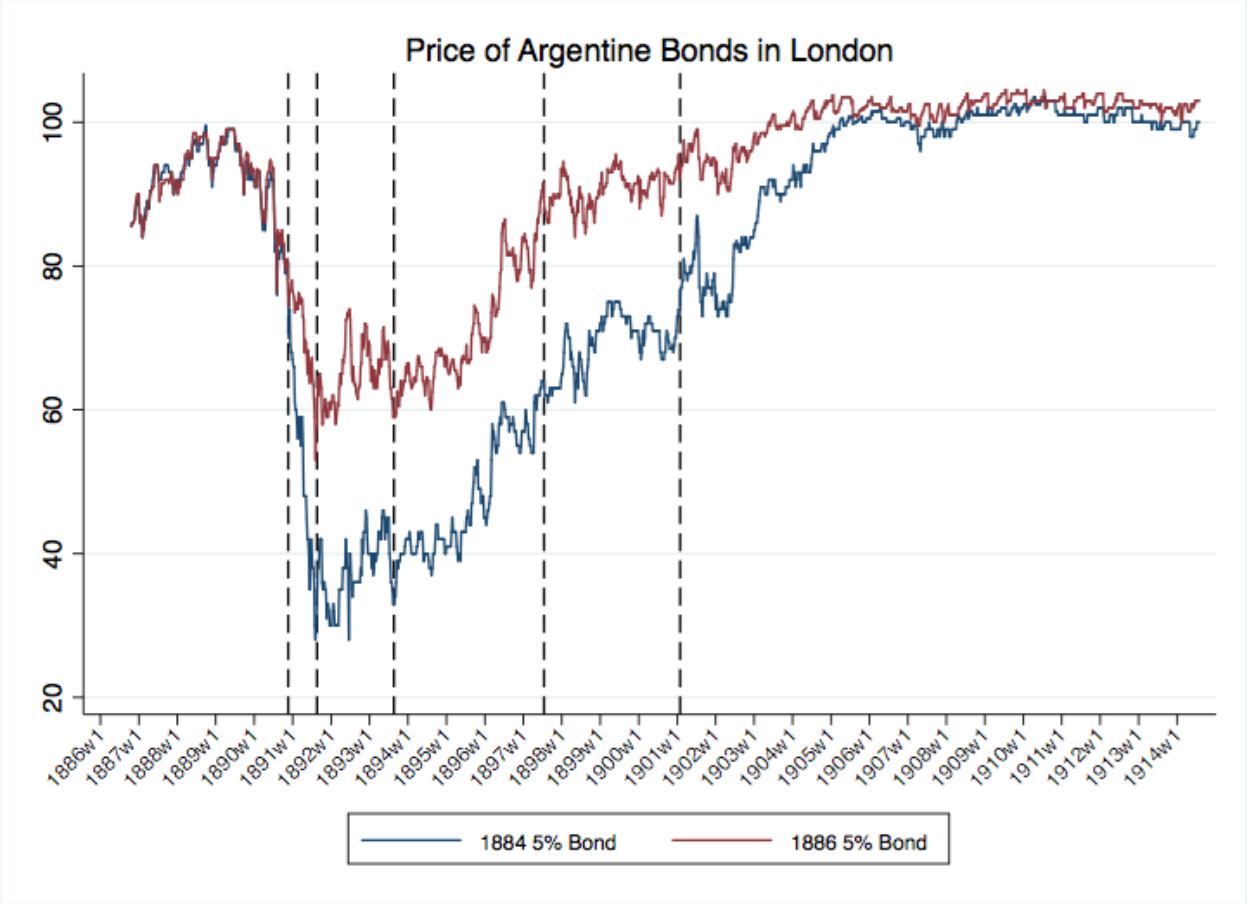
While the house of Baring was saved, it came at a great cost. On 25 November 1890 the old partnership was liquidated and a new firm, called Baring Bros. (Ltd.), was registered as a joint-stock company. Winding up the partnership's affairs was difficult, however, because the firm had locked up a huge amount of capital in Argentine securities. To secure adequate liquidity, the firm had to be able to sell its enormous holdings. However, news of Baring's troubles provoked a catastrophic drop in the

[2] Vizcarra (2009) analyzes a similar but even more extreme commitment device in Peru. Revenues from the country's guano deposits were statutorily earmarked to service its debt and a British firm was given the right to collect the guano, sell it, and withhold sufficient sales revenues for debt servicing (effectively as the bond-holders' agent), before remitting any balance of funds to the government.

market for Argentine debt. If Argentina defaulted, all hope of meeting Baring's liabilities would have to be abandoned.

Our study is based on weekly price data quoted in the London stock exchange for the 1884 and 1886-87 bonds.[3] The raw data, covering the period from 1886 to 1914, are displayed in Figure 1.

Figure 1



The first dashed vertical line in Figure 1 marks the public announcement of the Baring crisis (the week starting on November 16, 1890). The second and third lines indicate the government's first and second rescheduling efforts (the "Funding Loan" and

[3] The data come from Mitchener and Weidenmier (2008), as well as the archives of *The Economist* and *The London Times*.

the “Arreglo Romero”, both of which we describe in the appendix). The fourth line indicates the resumption of regular payments. Finally, the last dashed vertical line marks the full regularization of the debt.

It is clear from the graph that, prior to the Baring crisis, the prices of the two bonds were in complete lockstep. A price gap first emerged after the Baring crisis became public on November 16, 1890. On November 22, the Argentine financial agent in London, Dr. Victorino de la Plaza announced that his government would send the entire service of the foreign debt for the October-January period. He could not conceal, however, the Argentine government’s inability to meet its obligations beyond January 1891. Once the first rescheduling agreement went into effect on 23 January 1891, the two bonds traded at different prices revealing their intrinsic values (Fama 1965).

The discount on the 1884 bonds reflected the effects of information based both on this event (according to the agreement, their coupon payments were no longer to be made in cash, but rather with Funding Loan bonds) as well as events which as of then the market expected to take place in the future (i.e. increased risk due to executive discretion). Likewise, when the second arrangement was reached on 3 July 1893, the two bonds continued to trade at different prices. Once again, the spread reflected an instantaneous adjustment to the terms of the new arrangement (according to which the 1886-87 bonds earned 4% interest per year while the 1884 bonds’ interest rate was reduced to 3% per year), but also the market participants’ assessments of the intrinsic risk differential entailed by both bonds. The weight of the latter concern becomes more evident after the full regularization of the debt in 1901. After that date, both bonds had the same interest rate (5%) again. Their prices, however, bonds did not quickly

converge. Instead, it took about five years for approximately full convergence. The continuing price gap thus reflected investor's evaluations of the political risks associated with these bonds.

Research Design

To analyze these price and return data more formally, we use a difference-in-differences (DD) design.[4] We examine the period between October 23, 1886 , when the 1884 5% Bonds started trading in the London Exchange, and December 29, 1900, when the full regularization of the debt was achieved. Therefore, our sample includes 741 weekly price observations.

Let y_{jt} denote the price of bond j in week t. Let Exposed_j be an indicator for whether the bond was exposed to executive discretion (due to being unfunded) or not. Let $\text{Baring}_t = 0$ for weeks t prior to the Baring crisis, = 1 for weeks after. Then the basic model we estimate is

$$y_{jt} = \alpha_j + \theta_t + \gamma_1 \text{Exposed}_j + \gamma_2 \text{Baring}_t + \gamma_3 \text{Exposed}_j \times \text{Baring}_t + \varepsilon_{jt} \quad (1)$$

Here, α_j is a debt-specific fixed effect; θ_t is a week-specific fixed effect; and ε_{jt} is an error term. The coefficient γ_1 represents how exposure affected bond prices prior to the crisis; γ_2 reflects how the mean change in the funded bond price after the crisis; and γ_3 shows how exposure affected bond prices post-crisis. In this regression, we include all data 1886-1901, stopping the analysis just before full regularization of the debt.

The conditions under which $\hat{\gamma}_3$ can be interpreted as the causal effect of earmarking funds on market assessments of value are as follows. First, DD designs rely

[4] Angrist and Pischke (2009, ch. 7) provide an overview. Specific examples of studies similar in design to ours include Card and Kreuger (1994) and Abadie and Gardeazabal (2003).

on a common trend assumption—that the treated (1886-87) and control (1884) bonds were on a similar price trajectory pre-crisis and would likely have continued to be so had the crisis not hit. This assumption seems fully supported by Figure 1. Indeed, there are few DD studies in which the common trend assumption is so clearly satisfied.

Second, we have to assume that the only significant contractual difference between the 1884 and 1886-87 bonds was that the first was unfunded whereas the latter was funded. Table 1 makes this plausible but the 1886-87 loan was larger and one might worry that its size induced the government to treat it more favorably. It is not clear why a government would generally favor bond-holders based purely on the size of the original issue. But, even if the Argentine government did have such a preference, the English houses sitting on the government's restructuring committee held more than 50% of the 1884 bonds when they were launched but none of the 1886-87 debt (Flores 2010). Thus, committee members' incentives would have been to soften the blow to the unfunded bonds as much as possible. Given how much influence the English houses had, the government most likely tried to minimize the price gap.[5]

In addition to directly examining the contract terms, we can also examine the pre-crisis prices. As Figure 1 shows, prior to the crisis there was virtually no price gap. This suggests that the market did not view the other differences in the contract terms of the two issues as significant. The difference in exposure to executive discretion, while real, did not matter because the government had enough general funds to pay the 1884 bond-holders and also meet its other obligations. Once the liquidity crisis hit, however,

[5] Another difference between the 1884 and 1886-87 bonds stemming from their different sizes is that, because both had a 1% sinking fund, the outstanding debt for the former was smaller. This would not matter for the period between the crisis and full resumption (1901), however, because the sinking fund payments were suspended. And, if anything, the smaller outstanding debt should help push the price of the 1884 bonds upwards.

the government had to make hard choices and had the discretion to administer a larger haircut to the unfunded debt-holders.

Third, the estimates from DD designs like ours, where an event of some sort differentiates two previously similar groups, are more credible when the triggering event is exogenous and as-if random in timing. We believe these conditions are met in our study.

As to exogeneity, the Baring crisis is usually viewed as stemming from Baring's decisions to hold so much Argentine debt and from certain enactments, such as the Guaranteed Banks Act (passed November 1887), which reduced liquidity (della Paolera and Taylor 2001). Both of these decisions were made well before November 1890.

As to timing, from early 1889 foreign investors became reluctant to absorb additional Argentine government debt. Indeed, many of them were selling Argentine bonds in the London market. By 1890 the country was burdened by an immense circulation of inconvertible and depreciated paper currency, and a large public indebtedness. On March 4, 1890, the Buenos Aires Standard reported:

> "Some of the heaviest capitalists are overburdened with stocks, not to mention some new banks and companies that made their business out of contango and backwardation differences on these stocks -- a rotten business, that now leaves them with millions in unsalable stocks, daily falling more and more in value …."

Nonetheless, as late as April 1890, the *Economist* still remarked that Argentina's natural wealth and fertility would save the government from default (cf. Peters 1934: 45).

Despite the optimism of some foreign observers, popular sentiment against the government was running high. In late July, a political upheaval (known as the "revolución del parque") broke out in Buenos Aires. President Celman was turned out of

office and replaced by Vice-President Carlos Pellegrini on August 6, 1890. The change in government further weakened confidence in the stability of Argentine finances.

In this climate, rumors regarding the solvency of various financial houses with interests in Argentina soared. The climax was reached on November 15, 1890. *The New York Times* reported:

> "For a, long time the Stock Exchange district has been flooded with tales of dire distress in high financial quarters. Not one house, but many, rumor has declared to be in difficulties threatening disaster. For a long time these suggestions were confined to hint and insinuation and innuendo, but feeble makeshifts of this sort have lately been thrown aside to make way for open declarations impugning the financial integrity of men and firms that have been preeminently influential in the financial world…"

Moreover, the *Times* reported, even Baring Brothers & Co—"the greatest banking house of all the world"—was in peril.

A day later, the company publicly confirmed its difficulties. Analyzing the crisis two weeks after Baring's announcement, *The Economist's Investor's Monthly Manual* (IMM) stated that Baring Brothers' collapse had not been "seriously contemplated, or, in fact, hardly considered possible… little was known of the difficulties in which Barings were involved until arrangements had been completed for assisting the firm" (IMM, Vol. 20, No. 11: pp. 563-564).

Within Barings, T.C. Baring had been predicting disaster in Argentina for several years (Ziegler 1988). However, as the *New York Times* and IMM both noted, no one in the general investment community really believed that Baring Brothers could be in danger. Even Baron Revelstoke (Edward "Ned" Baring), the senior partner of firm, deluded himself that all would be well.

This brief account suggests that, while many investors saw mounting risks beginning in 1889, few anticipated that Barings would fall and the exact timing of the crisis was not easily predictable. Anyone who had anticipated the timing of the crisis could have made immense amounts of money by shorting the bonds but there is no evidence of a pre-crisis surge in shorting, just a gradual decline in both bond prices. No evidence of any pre-crisis difference in the liquidity of the two bond issues (as measured by bid-ask spreads) neither exists.

Results

The results from estimating equation (1) are displayed in Table 2. They provide a statistical analysis of the price gap uncovered in Figure 1. As can be seen in Model 1, both bonds were trading at an average of about 92% of par in the pre-crisis period. After the Baring crisis hit, the 1886-87 bonds suffered about a 15.5 percentage point decline in price, while the 1884 bonds suffered a drop that was nearly 23 percentage points larger (or 15.5 + 23 = 38.5 in total).

Since the year fixed effects can fit the data without the post-crisis indicator, while the bond fixed effects can account for their different exposure to executive discretion, Model 2 reruns the analysis dropping the indicators. As expected, neither the fit nor the estimate for the interaction change.

Table 2: Bond prices before and after the Baring crisis

VARIABLES	(1) price	(2) price
Baring	-15.51***	
	(0.912)	
exposed	-0.281	
	(1.089)	
Baring x exposed	-22.96***	-22.96***
	(1.290)	(1.290)
Constant	92.29***	
	(0.770)	
Observations	1,482	1,482
R-squared	0.661	0.661
Mean control t(0)		92.29
Mean treated t(0)		92.01
Diff t(0)		-0.281
Mean control t(1)		76.78
Mean treated t(1)		53.54
Diff t(1)		-23.24

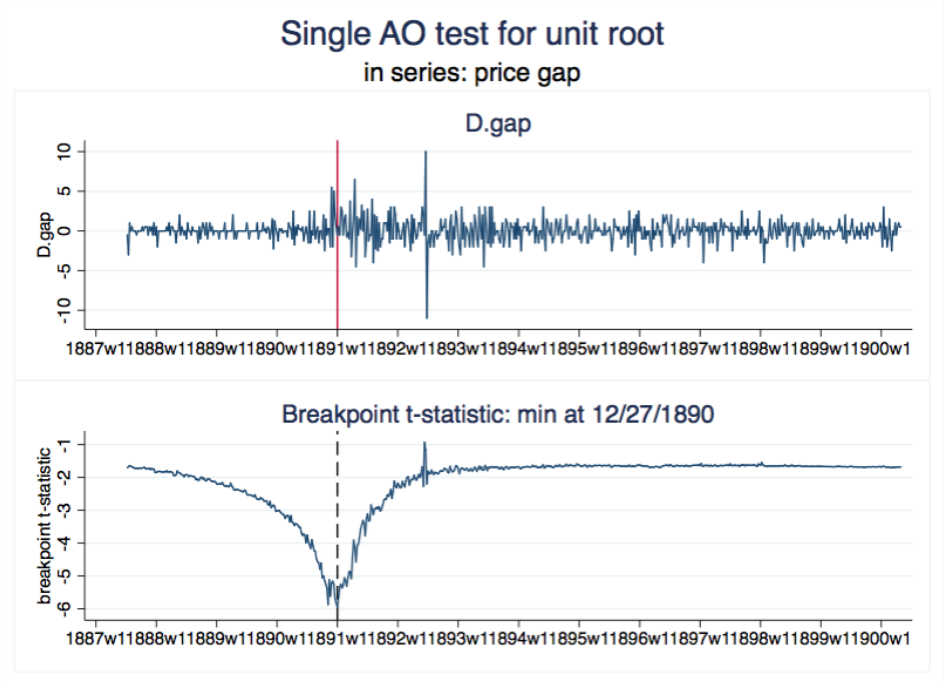
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Figure 2, we plot the weekly price gap between the bonds—defined as the price of the funded debt minus the price of the unfunded debt. The price gap illustrates the Baring×Exposed interaction. As can be seen, the price gap hovers near zero before the crisis, rapidly expands in the first post-crisis year, then fluctuates around a new equilibrium gap of around 25 points until 1898. In 1898, there is a small reduction in the price gap, to about 20 points, which persists until the end of the series.

Figure 2: The price gap over time

Treating the price gap as a single time series, we can estimate when the structural break occurs (see Figure 3). The Perron-Volesang test endogenously selects 12/27/1890 as the break point (t = -4.24 compared to a 5% critical value of 3.56). The date does not correspond to the outbreak of the Barings crisis, but rather reflects the fact that the next interest payment due on both bonds was on January 1, 1891 (and, given the weekly nature of our data, the break is the closest to that date). The estimated change in the price gap from this analysis is 22.95, which is almost exactly the same result that we obtained from the DD analysis. These results further bolster our claim that the Baring crisis was indeed an unanticipated shock and that it converted the 1884 bond-holders from potentially to actually exposed to executive discretion.

Figure 3: Evolution of the price gap



Executive discretion

In what ways did the executive "exercise discretion" over the unfunded debt? As noted in passing above, the 1884 bond-holders suffered two important changes in the terms of their repayment. First, after the initial restructuring, they were paid in bonds rather than cash. This change, imposed only on the unfunded debt-holders, was negotiated by the Argentine financial agent in London and the chairman of the Barings committee, Baron Rothschild. On 23 January 1891, the agreement was ratified by the Argentine Congress (Law 2770). Second, as part of the second restructuring, interest payments on the 1884 bonds were reduced from 5% to 3% per year, while interest payments on the 1886-87 bonds were reduced from 5% to 4%. This change, also negotiated by Lord Rothschild and the Argentine financial agent in London, required legislative approval and received it in December 1893 (Law 3051).

Although both restructuring agreements received statutory approval, the president's ability to administer haircuts to the 1884 bond-holders by decree should have affected the negotiations between Rothschild and the Argentine agent. Had the first restructuring negotiations failed, Rothschild should have anticipated that the outcome would be unfavorable for the English houses holding 1884 bonds, since the Argentines had already admitted they lacked the funds needed to make full coupon payments past January. This bad outcome in the event of disagreement should, by standard bargaining theory, have induced Rothschild to accept a stiffer haircut for the 1884 bonds—as in fact happened. Meanwhile, as the first negotiations were underway, market participants should have anticipated that the unfunded debt would likely be given a larger haircut—deal or no deal. This helps explain why the unfunded debt's price plunged more sharply than the funded debt's price, before the first restructuring agreement was announced.

Why did the funded debt price decline?

Argentine issues were popular on the London capital market in the 1880s, based on the country's favorable fundamentals and the low yield on British Consols. The political clout of Argentine agricultural exporters kept taxes low. In addition, a consumption boom fueled rising imports. To finance the growing import surplus, the government resorted to a combination of further foreign borrowing and inflation, all while trying to maintain the gold standard in order to maintain the salability of Argentine securities abroad. The government's strategy, while it might have papered over a small shock, was not sustainable when the economy suffered more prolonged setbacks (Felix 1987).

The funded debt-holders, however, had a first lien on the customs revenue. So, when the crisis hit, why did the price of their bonds decline? Logically, these bond-holders faced two risks. First, they faced an "insufficiency risk": the customs revenues might fall so low that they could not cover all of the debt. At this point, the uncovered portion of the debt would have the legal status of unfunded debt and would be exposed to executive discretion. In practice, however, the customs revenue always sufficed to pay the 1886-87 debts, with roughly 40% left over for other purposes even in bad years. So, the risk of insufficiency appears to have been small.

Second, funded debt-holders faced a "statutory risk": if the regime become so insolvent that Congress was willing to repeal and replace the original statutes, then the funded bond-holders might be treated similarly to the unfunded bond-holders. During this period, the Argentine Congress was not simply a rubber stamp (Alonso 2000). Congress' independence should have mitigated the statutory risk somewhat. In practice, however, the 1886-87 bond-holders did have the terms of their repayment altered by statute under the second restructuring (Law 3051), as noted above. This shows the regime had reached the point at which statutory haircuts were politically feasible by 1893. Market anticipation of this risk can then explain the drop in the funded debt's price in the first post-crisis year.[6] The gradual price recovery after the second restructuring in 1993 (visible in Figure 1) corresponds to a slow economic recovery in Argentina and in international demand for Argentine products.

[6] Note that the regime's willingness to pass new statutes could also have *helped* bond-holders, if new taxes were raised, for example. So, the price drop represents the market's assessment of the expected net impact of statutory revisions on the bond-holders' interests.

Conclusion

In this paper, we have conducted what we believe is the first micro-level examination of how statutory constraints on executive discretion affect the price of sovereign debt. Our analysis focuses on how two Argentine debt issues—similar in all relevant respects except that one was unfunded while the other was funded—reacted to the Baring crisis of 1890. Using a difference-in-differences approach, we are able to provide credible causal evidence that the bonds with greater exposure to executive discretion suffered a much larger price decline in the wake of the crisis.

How much do our results support the general claim that constitutional commitment boosts the credibility of sovereign debt (per North and Weingast 1989)? To answer this question, note first that sovereign debt can be credible for reasons other than statutory funding. Even an absolutist ruler can issue credible debt, if repeat-game reputational incentives are strong in a particular historical context. Thus, how much statutorily earmarking funds to repay a debt affects the debt's price depends on what other credibility-enhancing factors are in place. If such other factors are strong, then there will be little price difference between funded and unfunded debt. As soon as the other factors weaken, however, the superior security offered by statutory funding becomes important.

This general point is illustrated in the case under study here. Argentina could issue credible *unfunded* debt in the 1880s because the market thought that the regime's concern for its reputation would suffice to ensure repayment, given the country's good economic fundamentals. Once the regime became seriously illiquid, however, the market's estimate of how much reputational concerns would protect bond-holders plunged, and the price followed. All told, perhaps the best way to restate North and

Weingast's original theoretical claim would be that statutory regulation of the terms of bond-holders' repayment substantially increases the credibility of sovereign debt issued by regimes that face such difficult economic conditions that reputational mechanisms alone cannot ensure repayment. The same two bonds provide another illustration of this point during World War I. While their prices had converged again by 1906 (see Figure 1), the onset of the Great War delivered another negative shock to Argentina's finances, whereupon a significant price gap again opened (to the detriment of the unfunded debt-holders).

As an empirical matter, one should be able to study the effects of contractual terms—funding, seniority, litigation clauses, and so forth—using a design similar to ours in other countries. The basic ingredients needed are two debts issued nearly simultaneously by the same country shortly before a crisis of some sort. The design is sharper when the paired debts differ in only one or a few contractual terms, whose effects can then be studied via the government's and market's responses to the crisis. The Baring crisis itself may support other useful studies, since it was a regional shock, not confined to Argentina (Mitchener and Weidenmier 2008). Thus, for example, if one could find a pair of debt instruments issued by another Latin American country before the crisis that differed in only a few contractual terms, one could extend the study offered here.

Appendix

Data Sources

Investors in the late nineteenth century had access to highly detailed information on financial instruments issued by borrowing countries. The prices of bonds from emerging market countries were reported on a weekly basis by *The Economist*. This information was also made available every day in Britain's main newspapers, such as the *London Times*. Our data were drawn from these two sources.

For the 1884 5% bond, we rely on weekly data complied by Mitchener and Weidenmier (2008) from *The Economist* for the period between January 17, 1885 and June 27, 1914. In the case of the 1886 5% bond, the data provided by Mitchener and Weidenmier (2008) covers the period between October 23, 1886 and October 5, 1889 as well as the period between August 29, 1891 and June 27, 1914. To complete the historical series, we collected weekly prices using the *London Times* as our source for the period between October 12, 1891 and August 22, 1891.

We obtained the Mitchener and Weidenmier (2008) from the authors. In the case of the *London Times*, the data was collected from the newspaper digital archive: http://find.galegroup.com/ttda/

Rescheduling Agreements

We now describe the first and second restructuring efforts in more detail.

After the collapse of Baring Brothers, Argentine president Carlos Pellegrini announced that he would put his country's reputation in European financial circles above the solvency of his own government. On November 27, 1890 a committee headed by Baron Nathan Rothschild and appointed under the auspices of the Bank of England met to examine and report on the condition of Argentina's national debt. The committee proposed that interest payments on Argentina's external debt due after January 1891 and before January 1894 were to be exchanged for bonds of a 6 percent Funding Loan. In turn, Argentina pledged its import duties as a collateral for the service of the bond. Figure A1 displays the terms of the Funding Loan as they were announced to contemporaries.

Figure A1: The 1891 Funding Loan

1891.—Six per Cent. Funding Loan. Amount authorised £14,880,000. Specially secured upon the Customs Receipts, subject to the charges of the 1886-7 Loan. Service to be remitted monthly to London by the National Bank. The Coupons are receivable for Customs Duties during the year of their currency. Proceeds to be applied exclusively to the service (during 1891-2-3) of all External Loans or Obligations contracted by the Nation or (under conditions of the Law of 23rd January 1891) about to be contracted. It was laid down that, during the years that the External Loan Service was made by these Bonds, no fresh Loans or Guarantees could be contracted, and that the surplus of the revenue should be applied to the annual withdrawal from circulation of $15,000,000 currency, and to a Reserve Fund for the amortisation of this Loan. Amount issued £7,630,680. Redeemable in 1921. Included in the Romero Arrangement.

Source: Annual report of the Council of the Corporation of Foreign Bondholders (1896)

On January 24, 1891, the Argentine Congress approved a law detailing the terms of the agreement. The funding loan accomplished its immediate purpose by temporarily relieving the Argentine government of the main burden upon its revenues. The agreement, however, was abandoned before the end of period provided.

On June 19, 1893, an arrangement on the debt known as the "Arreglo Romero" (after Argentine Minister of Finance, Juan José Romero) was concluded in London. It stipulated that the Argentine government would remit annually to the Bank of England a lump sum of 1,565,000 pounds for distribution to creditors over the next five years. Full payment of interest would resume in 1898 through the original issuing houses.

The arrangement imposed a "haircut" on the bondholders according to their debt seniority. So, for example, holders of the Five per Cent 1886-7 Loan (which had a first lien on Customs revenue) were treated differently than those who possessed 1884 5% bonds. A detail of these "haircuts" can be seen on Figure A2.

Figure A2: Haircuts under the Arreglo Romero

LOANS AFFECTED BY THE ROMERO ARRANGEMENT.

PART I.

No. of Loan.	Denomination.	Outstanding Amount	Names of Houses charged with the service of the Loans.
		£	
1	5 % Loan, 1886-7	7,582,000	La Banque de Paris et des Pays Bas and Baring Brothers & Co., Limited, and J. S. Morgan & Co.
2	5 % Waterworks Loan, 1892	6,324,400	Baring Brothers & Co., Limited.
3	6 % Funding Loan, 1891 ..	*6,593,000	J. S. Morgan & Co.
4	6 % Railway Loan, 1881 ..	375,440	La Banque de Paris et des Pays Bas and Baring Brothers & Co., Limited.
5	6 % Buenos Ayres, 1824 ..	166,257	Baring Brothers & Co., Limited.
6	5 % Loan, 1884	1,471,500	La Banque de Paris et des Pays Bas and Baring Brothers & Co., Ltd.
7	5 % North Central Railway Extension	3,768,100	Baring Brothers & Co., Limited.
8	5 % Treasury Conversion, 1887..	585,150	Do. do.
9	5 % North Central Railway (2nd Issue)	2,863,680	J. S. Morgan & Co.
10	5 % Banco Nacional, 1887 (German Loan)	1,887,301	Disconto Gesellschaft, Berlin.
11	5 % Buenos Ayres Port ..	1,384,700	The London & River Plate Bank, Ltd.
12	4½ % Internal 1888, quoted in London..	3,674,087	The Deutsche Bank and Baring Brothers & Co., Limited.
13	4½ % Sterling External Conversion Loan	5,030,080	Disconto Gesellschaft and Baring Brothers & Co., Limited.
14	3½ % Ext. Conversion Loan	2,447,280	Stern Brothers.
		44,152,975	

* Issue since increased to £7,630,680.

PART II.

The Amount of the Remittance.	How to be Distributed.
From 12th July, 1893, to 12th July, 1898. £1,565,000 per annum.	1. 4 per cent. per annum on the Loan No. 1. 2. 4 ,, per annum on the Loan No. 2. 3. 5 ,, per annum on the Loan No. 3. 4. On all the other Loans enumerated in Schedule 60 per cent. of the interest which was payable thereon at the time the payment in Funding Bonds was commenced.
From 12th July, 1898, to 12th July, 1899.	1. 5 per cent. (being full interest for that year) to the Holders of Bonds of Loan No. 1. 2. The payments to the various Holders of Bonds of Loans Nos. 2 to 14 inclusive as in the previous five years. 3. A sum sufficient to recoup to the Holders of Bonds of Loan No. 1 the amount (viz. 1 per cent. per annum) deducted from their interest during the preceding five years. 4. The balance remaining unappropriated to the Holders of Bonds No. 3 towards arrears of interest.
From 12th July, 1899, to 12th January, 1901.	The full interest due on every class of Bond composing the National External Debt.
From 12th January, 1901, during the currency of the Loans.	The full interest on every class of Bond composing the National External Debt and the Sinking Fund in every case as provided by the conditions of Issue.

Source: Annual report of the Council of the Corporation of Foreign Bondholders (1896)

The arrangement was later modified by the decision of the Argentine Government to anticipate by one year the dates upon which, according to the original compromise, full interest payments on the various Loans were to be resumed. On January 12th, 1901, contributions to the Sinking Fund of every issue were resumed. That date can be taken as the moment were full regularization of the debt was achieved.

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