How Are Sovereign Debtors Punished? Evidence from the Gold Standard Era

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Using an augmented gravity model of trade and a new database of nearly 9,000 bilateral trade pairs, this paper examines how sovereigns were punished for defaulting on external debt during the classical gold standard period. We do not find that, in general, trade between creditor and debtor countries fell in response to a default – evidence that would be consistent with the presence of trade sanctions. During the period 1870-1914, a statistically significant decline in trade, as a result of default, was observed only when gunboat diplomacy was used by creditor countries. Indeed, the use of "supersanctions" during the gold standard era – instances where external military pressure or political control was imposed on defaulting nations – proved to be an effective means for punishing debtors and reducing *ex ante* default probabilities. Conditional on default, the probability that a country would be "supersanctioned" was greater than 30 percent.

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I. Introduction

Why do sovereign debt defaulters ever repay? Unlike debt issued to public corporations, sovereign debt offers little legal recourse for creditors when a nation defaults. And yet, despite numerous and repeated instances of default, creditors regularly negotiate debt settlements after sovereigns default on their financial obligations. Argentina's 2001-2002 default on $88 billion of privately held debt is only the most recent instance of sovereign debt default and subsequent renegotiation that has taken place regularly over the past two centuries (Reinhart and Rogoff, 2004). (Indeed, Argentina was a prominent defaulter in the 1890s as well.) Despite legal uncertainties and this long history of default, borrowers seem quite willing to continue lending anew to sovereigns. Given the widespread incidence of default, what is less obvious is why sovereign debtors pay at all.

Although it is not unheard of, outright repudiation or complete default of sovereign debt is rare. Hence, economists have proffered two broad explanations as to why borrowers repay: reputation and sanctions. In a widely cited paper, Eaton and Gersowitz (1981) model sovereign debt default and show that sovereign debtors repay because there are reputational costs if they renege.[1] A country with a poor reputation might, as a result of default, be frozen out of international capital markets.[2] On the other hand, Bulow and Rogoff (1989, 1989b) argue that reputation alone is insufficient for explaining debt repayment; they instead model repayment by defaulters as driven by sanctions or the threat of them. The precise nature of sanctions was not specified in their model, although they suggest that an obvious way to punish borrowers would be through restrictions on trade credit or an embargo.[3]

To shed light on the issue of why sovereigns repay, this paper offers new empirical evidence on the experience of sovereign defaulters during the classical gold standard era. In particular, this paper tests whether there is evidence that sanctions were used to punish

[1] English (1996) and Ozler (1993) provide some historical and empirical evidence on the importance of reputation in debt repayment.
[2] Although described as a reputational effect, the outcome (no access to foreign capital) could also be viewed as a "reputational sanction." These are not necessarily mutually exclusive arguments; however, the theoretical literature on sanctions and repayment has largely developed in contradistinction to one another.
[3] For a literature survey on sovereign debt, see Eaton and Fernandez (1993) and Obstfeld and Rogoff (1996).

defaulters. Although we do not rule out that reputation may have also played a role in the decision to repay or come to terms with creditors, we focus on sanctions for several reasons. First, we want to examine whether there is any empirical evidence that supports models showing sovereigns repay because of sanctions. Second, recent empirical work by Rose (2002) and Martinez and Sandleris (2004) has focused on testing for the presence of trade sanctions in recent default, so we are interested in understanding whether these operated during the gold standard era.[4] Reliable data on trade make it possible to test empirically for trade sanctions during the gold standard era. Fourth, the historical record (references: Borchard, 1951, Suter and Stamm, 1992) suggests that a broader range of sanctions, not just trade sanctions, may have been employed during the 1870-1914; to our knowledge, sanctions of a military or political nature have never been empirically tested, in part because they were believed by economists and historians to be rare and isolated episodes (Lindert and Morton, 1989; Lipson, 1989; Mauro and Yafeh, 2003; Suter and Stamm, 1992, Tomz, 2004).[5] Finally, commentators examining more recent defaults have concluded that the only effective sanctions that can be applied to defaulters are those by governments, and not by banks or individual creditors (Kaletsky, 1985). This suggests that understanding how political and military sanctions have been applied in the past may be instructive, even though the range of such governmental sanctions is perhaps narrower today.

Although "supersanctions" – instances where external military pressure or political control was imposed on defaulting nations – were not imposed on every country that defaulted and seemed to have been reserved for cases where the defaulting nation had strategic or military importance, the evidence presented in this paper suggests that supersanctions proved to be an effective means for punishing debtors. Sovereign defaulters ran the risk of gunboats blockading their ports or creditor nations seizing fiscal control of their country if they defaulted; conditional on default, the probability that a country would be "supersanctioned" was greater than 30 percent. During the period 1870-1914, a statistically significant decline in trade as a result of default was observed only when gunboat diplomacy was used by creditor countries. Consistent with the view that supersanctions were an effective means of altering behavior of defaulting

[4] Weidenmier (forthcoming) provides historical and empirical evidence that although trade sanctions can explain why the Confederate government serviced the cotton bonds for the entire Civil War (despite the onset of domestic hyperinflation and a Northern army at the gates of Richmond), trade sanctions can only support a small amount of debt.

nations, bond traders lowered their assessment of default risk in countries that were supersanctioned. We find that *ex ante* default probabilities (for a principal default) fell by more than 50 percent after supersanctions were imposed in a country.

Section II of the paper describes the nature of sovereign defaults during the gold standard era, and based on both the theoretical literature on sovereign default and the historical record, provides a range of actions that creditors could take in response. Following the lead of empirical work examining whether there is evidence that trade sanctions are imposed on defaulters, the next two sections examine the effects of default on trade. Section III presents a simple augmented gravity model of bilateral trade and describes the data used to test the model. Section IV presents the empirical results of default and trade and extends it to consider whether episodes of gunboat diplomacy affected trade during the gold standard era. Section V broadens our investigation of supersanctions by examining the impact that they had on *ex ante* default probabilities. Section VI offers some concluding comments and avenues for future research.

II. Sovereign Debt Default during the Gold Standard Era

The classical gold standard period is often described as the era of high bond finance since firms primarily financed their investment projects through debt. The issuance of sovereign debt to European countries as well as newly independent countries in other parts of the world, in particular Central and South America, was another prominent feature of this period. Creditor nations were primarily located in Western Europe, and were led by Britain; French, German and the Dutch capital played a secondary role. The lion's share of sovereign debt was issued on the London Exchange, both in terms of issues and size of issues (Clemens and Williamson, 2004). Sovereign debt default was nevertheless commonplace during the classical gold standard period (Table 1). As a result, British bondholders formed a creditor association in 1868 called the Corporation of Foreign Bondholders (CFB) to protect their interests and seek settlements when sovereign borrowers defaulted. Figure 1 provides an estimate of the total amount of sovereign debt in default during this period based on data collected from CFB *Annual Reports*.

Some recent research, notably by Mauro and Yafeh (2003) and Wright (2003), has examined how the CFB punished countries with poor capital market reputations. They point out

[5] For a discussion of the economic effects of sanctions since World War I, see Davis and Engerman (2003).

that the Corporation published valuable economic data on sovereign debt burdens and tax revenues to discourage investment in countries that did not repay their debts. The CFB also set up creditor committees to facilitate debt settlements between lenders and defaulters and even worked with creditor associations in Paris and Berlin to prevent debt defaulters from borrowing in international capital markets. Occasionally, the CFB would ask the British government to intervene and pressure a sovereign to repay or settle its debts.

Although the CFB may have used a variety of methods to punish defaulters, Flandreau and Zumer (2004) provide new evidence that reputation alone was an insufficient condition for repayment during the classical gold standard. They find that interest rate spreads (interest rate of country *i* that defaulted minus the interest rate on the 'risk-free' UK Consol) increased by 500 basis points following a default. One year after a debt settlement was reached, markets assessed a penalty of 90 basis points, which fell to 45 basis points 10 years after a default. Flandreau and Zumer (2004, p. 49) conclude that, "while there is indeed a penalty for defaulting, this penalty turns out to be, over the medium run of a smaller order of magnitude than the savings associated with the amount of debt that has been repudiated. In other words, there was a clear incentive for governments not to repudiate their debt, but this incentive was too small to act as a systematic deterrent."[6]

Flandreau and Zumer's findings suggest that, in addition to reputation, creditors may have used other types of sanctions to punish defaulting sovereigns and to discourage future default. One possibility, suggested by Bulow and Rogoff (1989, 1989b), is that creditors punish defaulters by imposing restrictions on trade through tariffs or quotas or denying countries access to trade credit. According to Rose (2002), the later has not been used with any regularity as a disciplining device, so he examines whether they operated through a trade channel using evidence from sovereign defaults over the last forty years. He finds that bilateral trade between a creditor and defaulting country significantly declines subsequent to default; moreover, the reduction in trade seems to persist for at least 15 years after the default.

Although the effect is economically significant, Rose does not identify the precise reason why trade shrinks. For example, it could be to punish defaulters and deter future episodes or it could be for some other reason altogether. Martinez and Sandleris (2004) have interpreted Rose's

[6] Lindert and Morton (1989) also find little evidence that defaulters were charged higher interest rates in international capital markets.

results as evidence in favor of a trade sanctions interpretation. They subjected Rose's initial empirical exercise to further testing by examining whether trade in general, and not just with creditor nations, falls in response to default. Once trade with all partners is controlled for, they find no statistically significant decline in trade associated with creditor countries.[7] Martinez and Sandleris argue that this is evidence that trade sanctions are not used to punish defaulters.[8]

Testing for the presence of trade sanctions during the gold standard era (or alternatively, for some general effect of default on trade) seems like an obvious starting point given the current debate in the literature as to whether these effects exist. Moreover, since 1870-1913 predates the existence of official creditor programs, we do not have to worry about disentangling changes in trade flows that may result from the involvement of multilateral institutions. However, the historical record suggests that, during the gold standard era, the range of sanctions was broader. Besides the possibility of restrictions on trade via conventional channels (trade credit or tariffs and quotas), there were more invasive responses that also affected trade, which we will also consider in our empirical analysis.

Table 2 provides a list of supersanctions during the classical gold standard period. The use of gunboats when Venezuela defaulted in 1902-3 and the threatened use of them in conjunction with the Roosevelt Corollary in Central America were episodes that clearly could have impacted trade. Costa Rica settled its long outstanding defaulted debts in 1909 because they feared the United States would intervene and takeover the country customs houses. Moving beyond episodes of gunboat diplomacy that may have affected trade, there were other types of supersanctions that countries imposed on defaulters. When Egypt, Greece, Morocco, Santo Domingo, Tunis, and Turkey defaulted, customs collection or fiscal administration was carried out by administrative bodies consisting of representatives from creditor countries. For these episodes, the average length of outside fiscal control by foreign powers was 10.6 years.

Despite the long duration of these and the obvious costs to defaulting countries, we are unaware of any empirical evidence that tests whether there was a significant relationship between foreign intervention and default.[9] As we noted above, some historians and economists

[7] To be fair, Rose (2002) also examines the general trade effect by looking at whether trade diversion occurred – that is, if trade dried up with the creditor country, perhaps more trade took place with non-creditors as a result.
[8] Their evidence could also be interpreted as consistent with trade sanctions, because if trade shrinks for any reason, sovereigns might be more likely to repay.
[9] Kaletsky (1985, p.40) asserts that the "nineteenth century's gunboats" were effective "in bringing defaulters to their knees," but does not formally test this hypothesis.

have tended to downplay the behavioral effects of this lost sovereignty on creditor-borrower relations because supersanctions were relatively infrequent events. Even though most governments felt an obligation to protect the property and safety of its citizens, they were mostly reluctant to intervene directly on behalf of creditors because this not only invited moral hazard on the part of creditors, but it often proved politically and economically costly. Britain, in particular, was concerned that such interventions violated sovereign immunity and undermined the confidence in newly formed nations. The British Foreign Office had maintained this non-interventionist position at least since the defaults of the early 1820s, but as Platt (1968) and Lipson (1985) point out, exceptions to this policy were often made for strategic interests.

To provide an initial perspective on how episodes of direct intervention may have affected borrower behavior, we examine the statistical independence of supersanctions and default, and then calculate the probability that a country would be supersanctioned if it defaulted. To do so, we classified interventions that took place between 1870-1913 into two types: (1) interventions preceded by a debt default; and (2) major wars and international conflicts (intra- and extra-state interventions). Sovereign defaults were identified from the Annual Reports of the CFB and Borchard (1951), and the Correlates of War (COW) database was used to compile a list of all major wars between leading creditors –UK, France, Germany, and the United States-- and major sovereign countries and colonies during the period. We augmented interventions from COW with Hogan's (1906) list of Pacific blockades and minor interventions during the late nineteenth century.[10]

Table 3 presents a two-by-two contingency table of yearly debt defaults and interventions for 78 countries and colonies during the classical gold standard period. For each country or colony, we tabulate the number of years it existed during the gold standard period, and then assign these values to the various cells of the contingency table. So, a country existed from 1870-1913 would have 44 years that are assigned in Table 3, and these would be divided up among the four categories shown in the table: (1) default and intervention, (2) default but no intervention, (3) no default and intervention, and (4) no default and no intervention. We applied this algorithm to the 78 countries and colonies in our sample and calculated the total number of years for each category.

[10] A Pacific blockade is a nineteenth century term used to describe a naval blockade or minor intervention. For a brief discussion of Pacific blockades, see Davis and Engerman (2003).

Using the data in Table 3, we tested the null hypothesis that interventions and debt defaults were independent during the classical gold standard era, and found that the null hypothesis of independence could be rejected at less than the 1 percent level of significance using a standard Chi-square test (under the assumption of normality) or Fisher's nonparametric exact test.[11] Second, we examined the importance of supersanctions *in light of default*. Table 3 shows that the probability of any type of intervention was 6.2 percent. However, a different picture emerges if we consider the conditional probability: the likelihood of being supersanctioned if a country defaulted. There was a greater than 30 percent chance that a country would lose fiscal sovereignty or see gunboats in its harbors if it defaulted. For every year a country spent in default, there was nearly a one-third probability that a country would be subject to gunboat diplomacy or the establishment of an international financial council that administered various aspects of the debtor's finances. We now turn to quantifying the importance of trade sanctions and testing whether trade fell in response to default during the classical gold standard period.

III. Modeling Bilateral Trade during the Gold Standard

A. Estimation Strategy

To examine how default affected bilateral trade in the gold standard era, we construct a gravity model of international trade a la Rose (2002). The gravity model is a very simple empirical relationship meant to capture the main effects of trade: mass and distance. As in a standard gravity equation, mass (measured here by the size of countries) is proportional to trade whereas distance varies inversely. We augment it with an additional set of covariates to capture other influences on bilateral trade. The basic estimation equation takes the following form:

[11] One might argue that we should drop extra-state wars, which were generally conflicts between a hegemon and some part of its empire. This would only strengthen our results because most of the wars during the gold standard were extra state.

$$(1)\ \ln(BITRADE_{ijt}) = \beta_0 + \beta_1 \ln(RR_i RR_j)_t + \beta_2 \ln(Pop_i Pop_j)_t + \beta_3 \ln D_{ij} + \beta_4 Lang_{ij} + \beta_5 \ln(Urb_i Urb_j)/Pop_i Pop_j)_t + \beta_6 Bord_{ij} + \beta_7 Gold_{ij} + \beta_8 Lndlck_{ij} + \beta_9 \ln(Area_i Area_j) + \beta_{10} CU_{ij} + \theta CREDITOR_{ijt} + \Sigma_K \theta_k CREDITOR_{ijt-k} + \Sigma \gamma DEFAULT_{tij} + \Sigma_M \gamma_m DEFAULT_{ijt-m} + \varepsilon_{ijt},$$

where i and j denote countries, t denotes time, and other variables are defined as:

- $BITRADE_{ijt}$ denotes the average bilateral trade between i and j at time t;
- RR is railroad track miles;
- Pop is population;
- D is distance between i and j;
- Lang is binary variable which is unity if i and j have a common language;
- Urb is the total population located in cities greater than 50,000;
- Bord is a binary variable which is unity if i and j share a border;
- Gold is a binary variable which is unity if i and j both are on the gold standard;
- Lndlck is the number of landlocked countries in the country-pair dyad (0,1, or 2);
- Area is the land mass of the country in square miles;
- CU is a binary value if both countries are part of either the Latin or Scandinavian currency unions;
- CREDITOR is a binary variable which is unity if i or j is in default at time t and one of the countries is Britain;
- DEFAULT is a binary variable which is unity if either i or j is in default at time t;
- K and M are lags of unknown length;
- β are a set of nuisance parameters;
- and ε is a well-behaved error term capturing other influences on bilateral trade.

The key coefficients of interest are the θs, which show the effect of default on bilateral trade between the creditor and defaulter, and the γs, which show the general effects of default on trade. Including both CREDITOR and DEFAULT in equation 1 enables one to disentangle the direct effect of a default on creditor-borrower trade from the effects on trade between the defaulted sovereign nation and all trading partners. We estimate equation (1) with both fixed-effects and random-effects panel techniques. The fixed effects or within estimator is equivalent to adding a complete set of country pair-specific intercepts to the estimating equation. While fixed effects ensures that the estimation of θ and γ are consistent, they may not be efficient. The random effects estimator can yield more efficient estimates, but it does not apply in as wide a range of

circumstances as the fixed effects estimator. We also employ specifications using a full set of year dummies.

B. Data

To understand the relationship between trade and default, we use a new data set that we assembled based on annual bilateral trade data collected from volumes of the *Annual Abstract of British Statistics* for the period 1870 to 1913. The data set includes approximately 286 country pairs. Although by no means complete, the sample is fairly wide ranging and captures much of the world's trade during the gold standard era; however, there are notable omissions from the data, including very few observations for two defaulters in our sample, Turkey and Greece. We are in the process of expanding our data set based on a consistent set of sources that will deepen (more years) and broaden (more partners) the coverage of in our current sample. The trade data, which were converted into current pounds using annual exchange rates, are deflated using the U.K. PPI and are expressed in £2000. Although we would like to have included GDP to measure "mass," reliable annual estimates for a wide range of non-OECD countries prior to 1914 (including the sovereign defaulters) are scarce. We therefore used several other proxies to capture mass: area in square miles, population, and total railroad miles. Following Acemoglu, Johnson, and Robinson (2001), we use measures of urbanization (the total number of people living in cities greater than 50,000) to proxy for the level of development. These data are from Banks (1976). Data on (log) distance in miles are from Rose (2002). Data on when countries went onto the gold standard and joined the Latin and Scandinavian Monetary Unions are from Bae and Bailey (2003), Ferguson and Schularick (2004), Meissner (2000), and Officer (2004). Default dates for sovereign debtors were collected from various issues of the Corporation of Foreign Bondholders *Annual Report*.

IV. Measuring the Effects of Sanctions on Trade

A. Empirical Estimate of the Effects of Default on Trade

Table 4 displays pooled regressions using ordinary least squares and clustered standard errors. Column 1 shows a bivariate regression of bilateral trade on default, and as predicted by the trade sanctions literature, the sign is negative. Column 2 places the default variables alongside a very simple gravity model and adds three lags of the default dummy. Adding (log) distance and (log) area produces results that are consistent with gravity model predictions: distance reduces bilateral trade and mass increases it. When we consider the sum of the coefficients on default and its lags, trade declines in response to default. The sum of the current and lagged default coefficients remains negative when urbanization and either the log product of population (column 3) or the log product of railroad miles (column 4) are added. The overall negative effect of default on trade does not change when year dummies are added (column 5) or when additional lags of the default variable are included, although only the lag in period t-2 is statistically significant at the 5 percent level.

Specifications in Table 5 improve upon the initial specification by including other influences affecting trade, as described in equation 1. They also exploit the panel nature of the data by estimating random and fixed effects gravity models – the latter controlling for omitted bilateral-specific effects. The gravity model does a decent job of predicting trade flows. The R-squared in the random effects model (when distance can be included) is approximately 0.5, suggesting that our model predicts a significant amount of variation in the bilateral trade flows. Moreover, the coefficients on the βs are largely as predicted (in sign) and are for the most part statistically significant. Countries that are more developed (as proxied by urbanization) have greater trade, and trade between countries with more mass as measured by the log product of population is greater (although the empirical results suggest that larger countries, as measured by area, trade less in three of the four specifications). There is also some evidence that countries with more railroad miles trade less, although the coefficient on railroad miles is only statistically significant in one specification (Column 3). The unexpected sign of the coefficients on area and railroad miles suggests that there may be some multicollinearity in the model. We also find that those countries that border each other or are both on the gold standard also have larger trade flows.[12] On the other hand, those that are landlocked or are further in distance from each other

[12] Lopez-Cordova and Meissner (2003) find that joining the gold standard increased trade by nearly 30 percent during the period 1870-1913. Bordo and Rockoff (1996) find that countries on the gold standard were charged lower interest rates in international capital markets.

have lower bilateral trade. For the most part, these results are consistent with Rose (2002), Martinez and Sandleris (2004), and other models measuring bilateral trade.

Our empirical estimates differ from research using data from the second half of the 20th Century in that we discern no decline in trade as a result of default.[13] In fact, in all four specifications shown in Table 5 (with or without year dummies), default enters with a positive but statistically insignificant coefficient in the current period; moreover, the sum of the effect (including lags) is insignificantly different from zero.[14] The result suggests that trade sanctions may not be operating during the gold standard period. (As Appendix Tables 1 and 2 show, these findings are robust to using the only other comprehensive database on bilateral trade (Barbieri, 1996).)

To test this result further, Table 6 includes an additional indicator variable to capture bilateral trade between the creditor and the defaulting country when the sovereign borrower is in default. We used Britain as the creditor country. Including this variable allows us to distinguish between an overall change in trade as a consequence of default and an effect that is particular to the creditor-debtor relationship. The expected sign on the creditor-debtor indicator variable would be negative if trade sanctions are present. However, as the results in all four columns show, the effect is statistically insignificant. We tried alternative specifications using a broader set of creditor countries (Germany, France, Holland, and Britain), but the result on the creditor-defaulter indicator variable was still statistically insignificant. The positive sign on default also seems to persist even in the presence of the creditor variable.[15] Overall, the results from Tables 4-6 cast doubt on the idea that trade declined in trade in response to default during the gold standard era – at least when it is analyzed in a framework that is analogous to that used to examine more recent episodes of default (see Rose 2002, and Martinez and Sandleris 2004). Although it does not rule out the possibility that trade was curtailed in response to default, it suggests that, during the gold standard, the channel may have operated differently then from today – an issue to which we now turn.

[13] This result did not change when we varied the lag length of the default variable.
[14] We also experimented with changing the number of lags in the fixed and random effects models. Even when we change the lag lengths, we do not find a statistically significant decline in trade after default.
[15] We also considered specifications controlling for left-hand censoring of the bilateral trade variable. A random effects tobit model did not change the results presented here.

B. "Super Sanctions" and Gunboat Diplomacy

There were several episodes of default during the classical gold standard era, which were met with more drastic responses than standard trade sanctions. In contrast to the post-World War II environment, creditors during this period were sometimes able to convince governments to intervene on their behalf and force payment through gunboat diplomacy or direct fiscal control of the defaulter; this was often possible because the government's own political or strategic objectives were aligned with creditors' private motives. One might expect that if a debtor country's finances are taken over by a creditor country or if it is forced to make payments because gunboats are sitting in its harbors that the bilateral trade effects might differ from more "traditional" trade sanctions. We consider five of the most important episodes of supersanctions: the blockading and bombardment of Venezuela in 1902; the imposition of the Roosevelt Corollary in Central America in 1904; and the establishment of control over Egyptian finances by Britain in 1883, over Turkish finances by European powers in 1881, and over Greek finances in 1898.[16] In each of these cases, nations had defaulted on their debt and were unwilling or incapable of making payment, and in each case, creditor governments responded by taking away sovereignty or using gunboats to enforce debt claims.

Episodes of gunboat diplomacy are perhaps the cleanest type of supersanctions for testing in a gravity model framework because the expected sign on the trade coefficient is unambiguous. Two of our five cases fit this category. One case of gunboat diplomacy occurred in 1902, when European countries used a naval blockade and gunboats to force Venezuela to come to terms on its defaulted debt. Venezuela had experienced a revolution in 1898 that lasted more than two years, during which time substantial foreign property was destroyed and the government ceased payments on its debt. President Castro of Venezuela refused to reply to foreign claimants, and in response Britain, Germany, and Italy blockaded the ports of La Guiara and Puerto Cabello and seized customhouses. Germany then unilaterally bombarded the fort at San Carlos. Castro acquiesced in February 1903, and agreed to arbitration and a gradual liquidation of Venezuelan debt. Under the eventual terms agreed to at the Hague conference in 1904, the European countries that blockaded Venezuela were given right to a preferential payment of 30% of claims

[16] We hope to extend this section of the paper to also include the cases of international financial control in Morocco and Tunis.

since they had footed the bill and provided the force that resulted in benefits to all creditors; claims of countries that did not participate in the military occupation, including the U.S., were subordinated.

A second case of gunboat diplomacy came a few years later, and covered a broader geographical area in the same region. Signaling a dramatic shift in its relations with its neighbors, and at least partly in response to the Venezuelan episode, the Roosevelt administration outlined a new interventionist policy in 1904, which came to be known as the Roosevelt Corollary to the Monroe Doctrine.[17] The United States would police the nations of Central America, northern South America, and the Caribbean, and protect the interests of European investors by using its regional power to ensure that sovereign debts of these Latin American nations would be honored. By proposing a larger role for the U.S. in the region, Theodore Roosevelt aimed simultaneously to assert U.S. dominance in the region (which included the construction of the Panama Canal) and to check any military expansion of Europeans. The corollary to the Monroe Doctrine was first articulated by the Roosevelt administration in a speech delivered by Secretary Root on May 20, 1904. As Root explained, the U.S. would henceforth play the role of enforcing creditors' claims in Central America, the Caribbean, and the northern reaches of South America:

"If a nation shows to act with decency with regard to industrial and political matters, if it keeps order and pays its obligations, then it need fear no interference from the United States. Brutal wrong-doing, or an impotence which results in a general loosening of the ties of civilized society, may finally require intervention by some civilized nation, and in the Western hemisphere the United States cannot ignore the duty." (quoted in Rippy, 1934, p.195.)

We coded an additional indicator variable that takes on values of one in years when the debtor country was being impacted by gunboats or gunboat diplomacy. In contrast to the results shown in previous tables, we find a negative and statistically significant effect on trade for these two cases of gunboat diplomacy (Table 7). Given the presence of gunboats in its harbor at the end of 1902, it is not terribly surprising that bilateral trade was disrupted and fell in response to the military actions of Italy, Germany, and Great Britain. Table 7 shows that trade for Venezuela fell approximately 45 percent in both the fixed and random effects models as a result of the

[17] See Mitchener and Weidenmier (2004) for more details on this episode and an examination of the effects of this policy on sovereign debt prices.

international blockade. Moreover, as described above, the actions had the intended effect (at least in the eyes of the private individuals who held Venezuelan debt) in that it forced Venezuela to agree to negotiate a debt settlement.

We also find that the implementation of the Roosevelt Corollary (RC) had a negative and statistically significant effect on trade. The fixed effects model estimates that bilateral trade between countries in Central America and the United States fell by 44 percent while the random effects models estimates the drop in bilateral trade to be nearly 38 percent. The negative sign associated with the Roosevelt Corollary suggests that U.S. foreign policy may have diverted bilateral trade in the region considering that overall trade in the area increased during this period. Indeed, when we recode the RC dummy variable to include all bilateral trading partners for the Central American Republics, the dummy variable in Table 8 becomes positive and insignificant. The finding is consistent with the results of Mitchener and Weidenmier (2004), which shows that even though trade in Central America increased after the announcement of the Roosevelt Corollary. The main effect of the U.S. policy was to increase the willingness of countries in the region to settle or repay long-defaulted debts. Costa Rica, for example, settled with its bondholders in 1911 after being in default for a decade. The country even floated a new issue of 6 percent bonds on the Paris Bourse in 1912. The United States backed the debt issue by pledging to intervene in the event of a default. Guatemala also came to terms with bondholders in 1912 after the threat of gunboat diplomacy by the United States.

The second type of supersanction occurred when foreign financial control was exercised over the defaulter. These episodes are more difficult to test in a gravity model framework because the hypothesized sign on the supersanction dummy variable is ambiguous. Creditor countries exercising fiscal control over a debtor could change the procedures or methods for collecting customs duties or other sources of revenues and/or bring in armies or officials to restore order and ensure that trade continues, thus *increasing* trade. Or creditor countries imposing fiscal control could choose to punish defaulters and make an example of them by allowing trade to suffer. There were three prominent examples where financial control by outside powers was exercised after a default. The first occurrence was in Egypt. Its external debt increased four fold in less than twenty years under the leadership of Khedive Ismail Pasha. From 1863 until the mid 1870s, the ruler used external debt to build bridges, a road system, canals, and Cairo. However, the Khedive became overextended and eventually sold new debt on the London

market to cover old debts. After several failed attempts to curb government expenditures, a Commission of Inquiry in 1878 by the Egyptian Assembly recommended a series of reforms, including restrictions on the power of the Khedive. Egyptian nationalists deposed Pasha in 1879 and a peasant ruler came to power two years later. Order broke down in the country and Britain intervened following the murder of some European citizens. Britain took control of the country in the early 1880s and limited the power of the Egyptian Assembly, a policymaking body that had no authority over spending decisions but had to be consulted over new taxes. Britain helped negotiate a debt settlement for Egypt in 1883 and ruled the country for the remainder of the gold standard period.

A second case, around the same time, occurred in 1881 in Turkey (Ottoman Empire). After a protracted period of default, the misuse of the receipts from foreign loans, and constant financial disorder, European powers moved to take over the administration and collection of Turkish finances. The Decree of Mouharrem spelled out the debt adjustment reached with foreign creditors in Turkey. It was issued as a municipal law, but was effectively a bilateral agreement with its foreign creditors whereby their agents would assume the collection of revenues. The Ottoman Debt Council was composed of representatives of bondholders from creditor countries (with official governmental support of the creditor nations), and was charged with the administration, collection, and encashment of the revenues that were ceded to it for the payment of debt (Borchard, 1951).

A third case of foreign control (also by a group of European powers) occurred in Greece in 1898 after default on its war indemnity resulting from the Greco-Turkish War of 1897. As terms of the peace treaty, European powers were given authority to take on the administration of revenues on behalf of existing creditors and to effectuate payment of the war indemnity. Germany had been the major player in arranging the protection of foreign bondholders' interests, and it was given authority by the other European countries to come to terms with Greece about the operation and control over Greek finances as well as the terms of debt settlement. These were laid out in a Greek municipal law of March 10, 1898, but according to Borchard (1951), it was a sovereign act in appearance only.

Although data limitations are considerable in all three of these cases (that is, we lack years when the countries were not in default), we are able to offer at least a preliminary test of whether trade fell in response to foreign financial control in Turkey and Greece (We do not have

sufficient trade data before Egypt's 1876 default to test the Egyptian case, so it is excluded.) As Table 9 shows, supersanctions had a negative and significant effect on trade in Greece, but a positive and insignificant effect in Turkey. [18] These findings may reflect several factors. First, creditor powers tried to promote trade to pay off external debt, but the increased efficiency of customs collection led to more smuggling. Second, Greece also fought several wars in the early twentieth century, which may have reduced its trade.

Although the empirical results suggest that the effect of foreign control on trade was at best mixed, international financial control nevertheless constrained the behavior of defaulting governments and ruling elites in Turkey, Egypt, and Greece in important ways. By establishing economic control over these countries, creditors effectively placed defaulting governments under "house arrest": they lost the ability to make fiscal decisions without foreigners having a say. A committee of foreign bondholders, backed by the military power of the leading creditor nations (UK, France, and Germany), administered customs collection and controlled the finances of the three countries. Each committee made sure that the defaulters adhered to their debt settlements which pledged tax revenues from import and export duties to repay renegotiated debts.

The British administration in Egypt set up an efficient tax collection system and restored fiscal discipline. Roads, railroads, and drainage canals were constructed using funds from tax revenues and new debt issues placed on international capital markets. In the case of Greece, the establishment of an international financial commission also brought much needed fiscal reform to the country and actually enhanced its borrowing power. Greece used international capital markets to finance several wars in the years prior to 1914 that increased its boundaries by 68 percent. Foreman-Peck (1995) notes that Greece spent 193.7 million drachmas on its military between 1905 and 1911, and an additional 411 million drachmas on wars in the Balkans. Turkey, on the other hand, negotiated deals with France and Germany for the building of railroads in Mesopotamia and Iraq in exchange for concessions. Great Britain and Russia closely monitored railroad building in the Ottoman Empire because the two powers feared that a large railroad network in the Middle East might infringe on their territorial ambitions in the region. Although

[18] We also tested to see if the establishment of international financial control had a positive or negative effect on trade, as discussed in the opening paragraph in this section. Our tests were inconclusive, suggesting that the establishment of international financial control had an insignificant effect on trade. The result may reflect two offsetting factors: (1) creditors powers tried to promote trade to pay off external debt (2) increased efficiency of customs collection led to more smuggling. For a discussion of smuggling in Turkey during the late nineteenth century, see Borchard (1951).

the channeling of funds into the construction of new railroads and infrastructure brought some benefits to Egypt, Greece, and Turkey, these supersanctions were very costly to the governments of these countries because they lost control of the purse strings and were placed under "house arrest" for 32, 15, and 31 years, respectively.[19]

V. Supersanctions and Re-evaluation of Default Risk

The historical evidence suggests that supersanctions may have improved the credit reputations of defaulters. We examine this question by comparing the *ex ante* default probabilities of supersanctioned countries using all available IPO sovereign debt prices before and after the imposition of a supersanction. We collected IPO or issue prices for all supersanctioned countries in Table 2 (Costa Rica, Egypt, Greece, Liberia, Nicaragua, Tunis. and Turkey) from the *Investor's Monthly Manual* and *London Stock Exchange Yearbook* except for Guatemala, Santo Domingo, and Venezuela. Although these countries renegotiated their debts with creditors, they did not issue new debt prior to World War I.

In our equation for *ex ante* default probability, we assume that investors are risk neutral and that the return from holding the debt of a sovereign must be greater than or equal to the return on "risk-free" British Consols – the preeminent debt issue of the gold standard period. We estimate *ex ante* default probabilities for two different types of default: (1) total default (default on the principal) and (2) mild default (where the sovereign only reneges on the interest). A model of the expected rate of return for a bond issued by country *i* is a weighted average of the contractual return and the default return. The model can be written as:

$$(2) \qquad R_1(1-p) + R_2(p) \geq R_{UK},$$

where R_1 is the *ex ante* internal rate of return at the time of issue, R_2 is the rate of return if country *i* defaults on its debt, R_{UK} is the return on risk-free UK Consols, and p is the probability of default. The model assumes that the rate of return on the bonds of country *i* is greater than the return on risk-free UK Consols, $R_1 > R_{UK}$. For a total default, equation (2) becomes

[19] For a brief discussion of tax revenue pledges by a defaulter as a type of sanction see Obstfeld and Rogoff (1996).

(3) $R_1(1\text{-}p) - 100(p) \geq R_{UK}$.

The –100 reflects the complete loss of principal in the event of default. In the case of a mild default, we assume that country *i* defaults on its interest payments, but not the principal. Equation (3) becomes

(4) $R_1(1\text{-}p) + 0(p) \geq R_{UK}$.

To compute an *ex ante* measure of default probability, we only considered debt with a maturity greater than 10 years because our proxy of the risk-free rate, British Consols, were long-term perpetuity bonds. In addition, all of the bonds in our sample are denominated in sterling except for Nicaragua which issued new debt on the Paris Bourse in 1909. Since our sample is dominated by sterling bonds, this (practically) eliminates currency risk in equation (2), a common problem in measuring default risk in modern financial markets. We then calculated *ex ante* default probabilities using equations (3) and (4). The average *ex ante* default probability for each country appears in Table 10.

Table 10 shows that 7 out of the 8 countries in our sample had a large drop in their *ex ante* default probability using either of the two measures. *Ex ante* default probabilities rose only in one case, when Nicaragua issued new debt in 1909 following a bloody war with several other Central American republics. Table 11 reports the percentage reduction (increase) in the *ex ante* default probability for each of the 8 countries in our sample. Overall, we find that *ex ante* default probabilities dropped nearly 30 percent for a mild default and more than 50 percent for a complete default. The decline in the *ex ante* default probability is greatest for Egypt, Greece, and Turkey, countries that individually issued more than 15 million pounds of new debt and were supersanctioned for more than 15 years. On the other hand, countries with the smallest reduction in *ex ante* default probabilities, Liberia and Colombia, were supersanctioned for much shorter periods of time and issued very little new debt. Liberia, for example, issued a 100,000 pound sterling issue in 1907 while Colombia floated less than 1 million pounds on the London exchange in 1911. The empirical evidence suggests that financial markets believed that creditors were more likely to enforce supersanctions in countries that issued large amounts of new debt.

We then test the null hypothesis that the *ex ante* default probabilities were equal in the pre-supersanction and supersanction regimes. We can easily reject the null hypothesis that the difference in default probabilities are equal at the one-percent level for both measures of default probability. (Although one could point out that the spread between emerging market debt and British Consols may have changed over time, it seems highly unlikely that the spread changed an order of magnitude to nullify the effect of supersanctions on *ex ante* default probabilities.) The response of the bond markets is particularly interesting since one might expect countries that had previously defaulted to have had much higher *ex ante* default probabilities when they issued new debt in international capital markets; the fact that default probabilities fall for this particular sample suggests that supersanctions had powerful effects on the way bond market participants assessed risk. In summary, the evidence from the IPO markets suggest that supersanctions significantly improved lending prospects for emerging market debtors during the gold standard period.

VI. Conclusions

How were sovereign debt defaulters punished during the classical gold standard period? This paper offers new insight into this question. We extend the analysis of sovereign debt repayment to analyze the importance of some other types of sanctions during the gold standard period: (1) direct trade sanctions and (2) supersanctions. Contrary to recent studies of the modern period, we do not find empirical evidence that creditors punished defaulters through direct trade sanctions by increasing tariffs or restricting trade credit. Only in the case of blockades and/or gunboat diplomacy do we see a significant decline in trade. We also present evidence that supersanctions were employed approximately one-third of the time following a debt default. For supersanctioned countries that issued new debt in international capital markets, we find that their *ex ante* default probability decreased by more than 50 percent. The large drop in *ex ante* default probability helps to explain why some earlier studies found little evidence that defaulters were punished during the gold standard: they failed to separate out countries placed under foreign control. Although our analysis shows that gunboat diplomacy increased the willingness and ability of supersanctioned countries to repay their debts, it does not show whether supersanctions influenced the behavior of non-sanctioned countries. We leave this as an item for future research.

Overall, our analysis of the gold standard period suggests that supersanctions were an important and under-appreciated mechanism used by creditors to promote debt repayment during the classical gold standard period.

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Table 1. Sovereign Debt Default During the Gold Standard Era

Country	Default	Resumption	Default	Resumption	Default	Resumption	Default	Resumption
Argentina	1890	1894						
Austria	1868	1870						
Bolivia	1878	1880						
Brazil	1898	1902						
Columbia	1879	1906						
Costa Rica	1874	1886	1895	1898	1901	1912		
Santo Domingo	1872	1889	1892	1894	1897	1898	1899	1907
Ecuador	1868	1890	1894	1900	1903	1913		
Salvador	1898	1900						
Egypt	1876	1881						
Greece	1826	1880	1894	1898				
Guatemala	1875	1889	1894	1896	1898	1913		
Honduras	1873	1927						
Liberia	1874	1900						
Mexico	1867	1887	1914					
Nicaragua	1827	1875	1894	1896	1912	1918		
Paraguay	1874	1886	1892	1897				
Peru	1876	1890						
Portugal	1892	1903						
Spain	1873	1876						
Turkey	1876	1882						
Uruguay	1876	1879						
Venezuela	1865	1882	1898	1906				

Source: Corporation of Foreign Bondholders, *Annual Report* (various issues).

Table 2
Supersanctions during the Classical Gold Standard Period, 1870-1913*

Country	Type of Supersanction	Duration of Supersanction
Costa Rica	U.S. threatens to takeover customs houses	1909
Egypt	U.K. administers finances For the Khedive	1881-1913
Greece	International Financial body administers finances of the defaulting republic	1898-1913
Guatemala	U.K. threatens Guatemala with gunboats; Guatemala agrees to settle long outstanding defaulted debts with its creditors	1913
Liberia	U.S. administers customs houses and imposes debt restrictions	1912-1913
Morocco	International body appointed to oversee customs houses; France establishes protectorate over country after Sultan is unable to pay debts	1906-1913
Nicaragua	Agrees to Dawson Pact with U.S. in 1910 that calls for the republic to set aside revenue to pay debts; U.S. also helps negotiate new debt issue	1910-1912
Santo Domingo	U.S. administers customs Houses	1905-1913
Tunis	International financial body administers customs houses following debt default	1869-1881 (followed by the establishment of a French protectorate)
Turkey	International financial body administers customs houses following debt default	1882-1913
Venezuela	International Blockade in response to debt default	1902-1903

Sources: Angell (1933), Borchard (1951), and Suter and Stamm (1992).

*Serbia was also sanctioned by an international financial commission for defaulting in 1895. Despite the establishment of an international commission, Serbia maintained control of its domestic finances. For this reason, we leave Serbia's default sanction off the list (Suter and Stamm, 1992).

Table 3
2 x 2 Contingency Table of Sovereign Debt Default, Major Interventions, and Wars during the Classical Gold Standard, 1870-1913*

	Intervention	**No Intervention**	**Total**
Default	116	253	369
No Default	75	2615	2690
Total	191	2868	3059

P-value (test of the null hypothesis of independence between default and intervention): 0.0

*Countries included in the sample: Argentina, Austria, Belgium, Bolivia, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Denmark, Ecuador, Eritrea, France, Greece, Guatemala, Honduras, Hungary, Italy, Japan, Liberia, Mexico, Montenegro, Netherlands, Nicaragua, Natal, Norway, Orange Free State, Panama, Paraguay, Persia, Portugal, Rumania, Russia, Salvador, Santo Domingo, Serbia, Siam, Spain, Sweden, Thailand, Transvaal, Turkey, United States, Uruguay, Venezuela,

British Colonies included in the sample: Antigua, Australia, British Guyana, Canada, Cape Colony, Ceylon, Egypt, Fiji, Gold Coast/Ghana, Hong Kong, India, Jamaica, Mauritius, Natal, New Zealand, Nigeria, Orange, Sierra Leone, Straits Settlement, Transvaal, and Trinidad

Other(includes major French, Italian, and German colonies): Algeria, Congo, Cuba, French Indochina, German East Africa, Italian Somaliland, Morocco, Philippines, and Tunis.

Sources: *Investor's Monthly Manual*, *London Stock Exchange Year-Book*, State Department Country Reports, and country websites.

Table 4. The Effects of Default on Trade, 1870-1913 (Pooled OLS Regressions)
(Dependent Variable: Log of the Average Value of Annual Bilateral Trade)

Independent Variable	Column 1	Column 2	Column 3	Column 4	Column 5
Default	-1.179 ***	-0.746 ***	0.004	-0.028	0.054
(standard error)	0.073	0.124	0.090	0.110	0.100
Lagged Default (-1)		-0.071	-0.102 **	-0.117 **	-0.140 **
		0.060	0.051	0.056	0.057
Lagged Default (-2)		-0.045	0.002	0.002	0.021
		0.035	0.033	0.032	0.035
Lagged Default (-3)		-0.565 ***	-0.151 ***	-0.222 ***	-.080
		0.100	0.068	0.078	0.071
Log Distance		-0.533 ***	-0.551 ***	-0.541 ***	-0.510 ***
		0.104	0.074	0.081	0.072
Log Area		0.257 ***	0.088 **	0.074	0.056
		0.041	0.037	0.056	0.041
Log Population			0.570 ***		0.509 ***
			0.046		0.069
Log Urbanization			0.932 ***	0.504 ***	0.936 ***
			0.067	0.110	0.095
Log Railroad Miles				0.465 ***	0.091
				0.063	0.068
Year Dummies	NO	NO	NO	NO	YES
Adjusted R-Squared	0.03	0.14	0.61	0.53	0.63
Number of Observations	8552	8549	7613	7605	7605

Notes: A constant term (not reported) was also included. Standard errors are clustered and shown below the coefficient. Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 5. A Gravity Model of Trade With Default, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects		Fixed Effects		Random Effects	
Default	0.026		0.025		0.047		0.047	
(standard error)	0.035		0.035		0.036		0.036	
Lagged Default (-1)	-0.035		-0.035		-0.035		-0.038	
	0.046		0.046		0.046		0.046	
Lagged Default (-2)	0.008		0.008		0.028		0.026	
	0.047		0.047		0.047		0.048	
Lagged Default (-3)	-0.031		-0.031		-0.027		-0.028	
	0.036		0.036		0.036		0.037	
Log Distance			-0.273	***			-0.324	***
			0.078				0.074	
Log Area	-0.304	***	-0.066	**	-0.200	*	-0.019	
	0.100		0.031		0.103		0.031	
Log Population	0.936	***	0.775	***	0.697	***	0.687	***
	0.048		0.037		0.057		0.039	
Log Urbanization	0.424	**	0.484	***	0.263	***	0.408	***
	0.030		0.024		0.033		0.030	
Log Railroad Miles	- 0.014		0.007		-0.039	**	-0.003	
	0.018		0.017		0.020		0.019	
Common Language			0.507	***			0.336	*
			0.198				0.188	
Common Border			0.839	***			0.755	***
			0.225				0.212	
Number Landlocked			-0.064				-0.206	
			0.175				0.167	
Gold Standard	0.054	***	0.054	***	0.049	***	0.042	**
	0.018		0.018		0.018		0.018	
Currency Union	-0.241		0.096		0.186		-0.008	
	0.168		0.146		0.168		0.144	
Year Dummies	NO		NO		YES		YES	
Adjusted R-Squared	0.447		0.58		0.40		0.50	
Number of Observations	7605		7605		7605		7605	

Notes: A constant term (not reported) was also included. Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 6. A Gravity Model of Trade With Default & Creditors, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects		Fixed Effects		Random Effects	
Default	0.023		0.022		0.045		0.044	
(standard error)	0.036		0.036		0.036		0.037	
Lagged Default (-1)	-0.030		-0.029		-0.029		-0.032	
	0.047		0.047		0.047		0.047	
Lagged Default (-2)	0.007		0.007		0.026		0.025	
	0.048		0.048		0.048		0.049	
Lagged Default (-3)	-0.033		-0.034		-0.029		-0.031	
	0.037		0.037		0.037		0.037	
Default w/Creditor	0.068		0.070		0.061		0.065	
	0.158		0.158		0.157		0.158	
Lagged Default w/Creditor (-1)	-0.108		-0.107		- 0.112		-0.109	
	0.192		0.193		0.190		0.192	
Lagged Default w/Creditor (-2)	0.022		0.021		0.032		0.029	
	0.192		0.193		0.190		0.192	
Lagged Default w/Creditor (-3)	0.043		0.057		0.046		0.061	
	0.153		0.153		0.152		0.153	
Log Distance			-0.273	***			-0.325	***
			0.078				0.074	
Log Area	-0.303	***	-0.066	**	-0.199	*	-0.019	
	0.100		0.031		0.103		0.031	
Log Population	0.936	***	0.776	***	0.697	***	0.687	***
	0.048		0.037		0.057		0.039	
Log Urbanization	0.424	***	0.484	***	0.263	**	0.408	***
	0.026		0.024		0.033		0.030	
Gold Standard	0.054	***	0.054	***	0.049	***	0.042	**
	0.018		0.018		0.018		0.018	
Currency Union	-0.241		-0.096		-0.186		-0.008	
	0.168		0.146		0.168		0.144	
Year Dummies	NO		NO		YES		YES	
Adjusted R-Squared	0.44		0.58		0.40		0.56	
Number of Observations	7605		7605		7605		7605	

Notes: A constant term as well as common language, common border, number of landlocked countries, and the log product of railroad miles were also included (not shown). Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 7. A Gravity Model of Trade With Supersanctions, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects	
Default	0.051		0.052	
(standard error)	0.041		0.042	
Lagged Default (-1)	-0.026		-0.031	
	0.054		0.032	
Lagged Default (-2)	0.034		0.032	
	0.056		0.057	
Lagged Default (-3)	-0.034		-0.034	
	0.043		0.044	
Default w/Creditor	-0.033		-0.036	
(standard error)	0.074		0.074	
Lagged Default w/Creditor (-1)	-0.025		-0.020	
	0.096		0.097	
Lagged Default w/Creditor (-2)	-0.012		-0.013	
	0.097		0.099	
Lagged Default w/Creditor (-3)	0.014		0.012	
	0.075		0.076	
Log Distance			-0.324	***
			0.073	
Log Area	-0.212	**	-0.018	
	0.102		0.030	
Roosevelt Corollary	-0.437	***	-0.379	***
(trade with US only)	0.097		0.097	
Venezuelan Incident	-0.449	**	-0.438	**
	0.201		0.195	
Year Dummies	YES		YES	
Adjusted R-Squared	0.41		0.57	
Number of Observations	7613		7613	

Notes: A constant term as well as common language, common border, number of landlocked countries, the log product of urbanization, the log product of population, the log product of railroad miles, gold standard, and currency union variables were also included (not shown). Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 8. A Gravity Model of Trade With Supersanctions, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects	
Default	0.057		0.057	
(standard error)	0.041		0.042	
Lagged Default (-1)	-0.025		-0.030	
	0.054		0.055	
Lagged Default (-2)	0.031		0.030	
	0.056		0.057	
Lagged Default (-3)	-0.034		-0.034	
	0.043		0.044	
Default w/Creditor	-0.037		- 0.040	
(standard error)	0.074		0.074	
Lagged Default w/Creditor (-1)	-0.027		-0.021	
	0.097		0.098	
Lagged Default w/Creditor (-2)	-0.010		0.012	
	0.098		0.099	
Lagged Default w/Creditor (-3)	0.014		0.012	
	0.076		0.076	
Log Distance			-0.329	***
			0.074	
Log Area	-0.172	*	-0.014	
	0.102		0.031	
Roosevelt Corollary	0.024		0.030	
(all trade)	0.030		0.029	
Venezuelan Incident	-0.457	**	-0.452	**
	0.203		0.196	
Year Dummies	YES		YES	
Adjusted R-Squared	0.42		0.57	
Number of Observations	7613		7613	

Notes: A constant term as well as common language, common border, number of landlocked countries, the log product of urbanization, the log product of population, the log product of railroad miles, gold standard, and currency union variables were also included (not shown). Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 9. A Gravity Model of Trade With Supersanctions, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects	
Default	0.036		0.034	
(standard error)	0.036		0.037	
Lagged Default (-1)	-0.030		-0.033	
	0.047		0.047	
Lagged Default (-2)	0.028		0.027	
	0.048		0.049	
Lagged Default (-3)	-0.023		-0.024	
	0.037		0.037	
Default w/Creditor	0.067		0.070	
(standard error)	0.157		0.158	
Lagged Default w/Creditor (-1)	-0.120		-0.121	
	0.190		0.192	
Lagged Default w/Creditor (-2)	0.030		0.027	
	0.190		0.192	
Lagged Default w/Creditor (-3)	0.050		0.067	
	0.152		0.153	
Log Distance			-0.324	***
			0.073	
Log Area	-0.237	**	-0.020	
	0.103		0.031	
Roosevelt Corollary	-0.443	***	-0.385	***
(US trade only)	0.097		0.096	
Venezuelan Incident	-0.459	**	-0.448	***
	0.200		0.194	
Ottoman Revenue	0.003		0.004	
Collection	0.116		0.116	
Greek Revenue Collection	-0.140	*	-0.188	**
	0.077		0.077	
Year Dummies	YES		YES	
Adjusted R-Squared	0.39		0.57	
Number of Observations	7605		7605	

Notes: A constant term as well as common language, common border, number of landlocked countries, the log product of urbanization, the log product of population, the log product of railroad miles, gold standard, and currency union variables were also included (not shown). Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 10
Ex Ante Default Probabilities Before and After Supersanctions
(Percent)

Country	Average Default Probability (before Supersanctions) (interest only)	Average Default Probability (After Supersanction) (interest only)	Average Default Probability (before Supersanctions) (principal)	Average Default Probability (After Supersanctions) (principal)
Colombia	63.3	5.1	47.7	2.9
Costa Rica	61.4	4.8	41.4	2.1
Cuba**	56.1	4.0	35.6	1.6
Egypt	58.4	4.4	17.3	.6
Greece	51.7	3.1	25	1.1
Liberia	60.8	4.6	50	2.8
Nicaragua	47.4	2.9	54	3.3
Turkey	60.3	4.9	37.4	1.7
Average	57.4	4.2	38.6	2.0

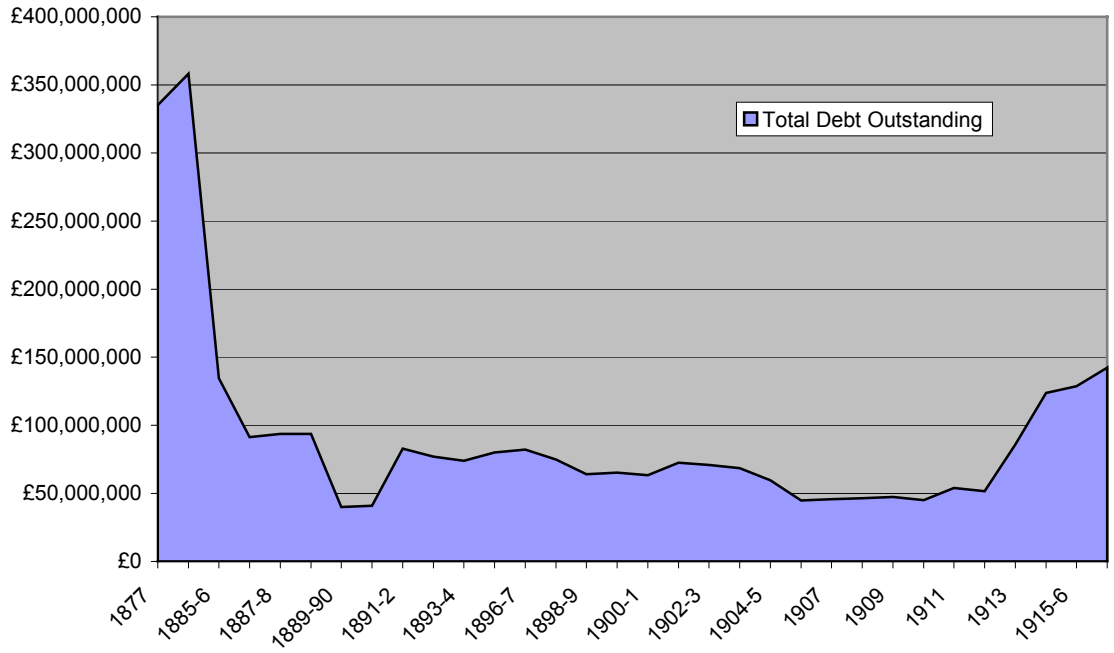
Table 11
Ex Ante Default Probabilities Before and After Supersanctions
(Percent)

Country	Percent Change in Default Probability (interest only)	Percent Change in Default Probability (principal)
Colombia	-24.6	-43.1
Costa Rica	-32.5	-55.8
Cuba**	-36.4	-59.5
Egypt	-70.5	-86.4
Greece	-51.2	-63.9
Liberia	-17.8	-39.1
Nicaragua	13.8	12.1
Turkey	-37.9	-66
Average	-32.3	-50.5

Test of differences in means: p-value = 0.01 for both an interest only and principal default.

**Cuba was not sanctioned by the United States because of a debt default. However, the Platt Amendment (1903), which called for the removal of U.S. troops from the country following the Spanish-American War, placed restrictions on the amount of debt the island nation could borrow in international capital markets. The United States was concerned that a Cuban default would lead to foreign intervention. Removing Cuba from the sample does not change the results.

Figure 1. Total Defaulted Debt Outstanding: 1877 - 1917



Source: Corporation of Foreign Bondholders, *Annual Reports* (various issues).

Statistical Appendix (Barbieri Sample)

Table 1. The Effects of Trade on Default, 1870-1913 (Pooled OLS Regressions)

(Dependent Variable: Log of the Average Value of Annual Bilateral Trade)

Independent Variable	Column 1	Column 2	Column 3	Column 4	Column 5
Default	-0.828 ***	-0.327 **	0.290	0.282 ***	0.292
(standard error)	0.083	0.114	0.097	0.109	0.096
Lagged Default (-1)		-0.348 ***	-0.270 ***	-0.278 ***	-0.198 ***
		0.098	0.067	0.071	0.060
Lagged Default (-2)		0.195 **	0.138 *	0.202 **	0.106
		0.097	0.081	0.083	0.075
Lagged Default (-3)		-0.611 ***	-0.092	-0.049	0.022
		0.123	0.103	0.118	0.108
Log Distance		-0.522 ***	-0.426 ***	-0.377 ***	-0.323 ***
		0.100	0.083	0.084	0.075
Log Area		0.223 ***	0.028	0.006	-0.070
		0.041	0.042	0.046	0.041
Log Population			0.498 ***		0.306 ***
			0.058		0.064
Log Urbanization			0.640 ***	0.313 ***	0.515 ***
			0.090	0.102	0.098
Log Railroad Miles				0.421 ***	0.312 ***
				0.049	0.047
Year Dummies	NO	NO	NO	NO	YES
Adjusted R-Squared	0.01	0.132	0.43	0.42	0.51
Number of Observations	7194	6219	5847	5847	5847

Notes: A constant term (not reported) was also included. Standard errors are clustered and shown below coefficient. Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.

Table 2. A Gravity Model of Trade With Default, 1870-1913
(Dependent Variable: Log of the Average Value of Bilateral Trade)

Independent Variable	Fixed Effects		Random Effects		Fixed Effects		Random Effects	
Default	0.127	**	0.136	**	0.139	**	0.159	***
(standard error)	0.054		0.055		0.054		0.056	
Lagged Default (-1)	-0.116	*	-0.118	**	-0.094		-0.103	
	0.069		0.069		0.069		0.071	
Lagged Default (-2)	0.069		0.075		0.050		0.060	
	0.069		0.070		0.069		0.071	
Lagged Default (-3)	-0.064		-0.056		-0.045		-0.030	
	0.052		0.053		0.053		0.054	
Log Distance			0.009				-0.052	
			0.096				0.079	
Log Area	-1.125	***	-0.266	***	-1.019	***	-0.206	
	0.111		0.041		0.020		0.037	
Log Population	1.150	***	0.813	***	1.044	***	0.705	***
	0.058		0.044		0.081		0.044	
Log Urbanization	0.024		0.072	***	0.032	***	0.093	***
	0.020		0.019		0.021		0.020	
Log Railroad Miles	-0.040	**	0.032	**	-0.023		0.084	***
	0.018		0.017		0.020		0.019	
Common Language			0.238				0.134	
			0.269				0.228	
Common Border			1.099	***			1.000	***
			0.231				0.235	
Number Landlocked			-0.518	**			-0.483	**
			0.249				0.203	
Gold Standard	0.114	***	0.135	***	0.115	***	0.137	***
	0.027		0.027		0.027		0.027	
Currency Union	0.291		0.466		0.345		0.548	*
	0.607		0.335		0.607		0.289	
Year Dummies	NO		NO		YES		YES	
Adjusted R-Squared	0.04		0.37		0.05		0.41	
Number of Observations	5847		5847		5847		5847	

Notes: A constant term (not reported) was also included. Stars indicate significance at 1(***), 5(**), and 10(*) percent levels, respectively.