

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

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## I. Introduction

Why do sovereign debt defaulters 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 been taking place regularly over the past two centuries. (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, most episodes of default do not end up with outright repudiation. Hence, economists have proffered two broad explanations as to why borrowers repay: reputation and sanctions. In a widely cited paper, Eaton and Gersowitz (1981) construct a model and show that sovereign debtors repay because there are reputational costs if they renege.<sup>1</sup> A country with a poor reputation might, as a result of default, be frozen out of international capital markets.<sup>2</sup> 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.<sup>3</sup>

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<sup>1</sup> English (1996) and Ozler (1993) provide some historical and empirical evidence on the importance of reputation in debt repayment.

<sup>2</sup> 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.

<sup>3</sup> For a literature survey on sovereign debt, see Eaton and Fernandez (1993) and Obstfeld and Rogoff (1996).

To shed light on theoretical models showing sovereigns repay because of sanctions, Rose (2002) 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 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.<sup>4</sup> Martinez and Sandleris argue that this is evidence that trade sanctions are not used to punish defaulters.<sup>5</sup>

This paper offers new empirical evidence on whether sovereign nations are punished when they default by examining the classical gold standard era. We broaden the scope of the earlier empirical studies by Rose (2002) and Martinez and Sandleris (2004) by using a gravity model of trade to examine sovereign debt default between 1870 and 1913. We test whether trade fell after default, and do so in an environment that is less fraught with empirical minefields. For example, since the classical gold standard period was largely an era of free trade, it is easier to rule out one possible factor that may interfere with measuring trade effects: tariffs or other trade restrictions imposed on non-borrowing countries. 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. Furthermore, the comparatively smaller number of financial institutions implies that the collective action problem was much smaller during the gold standard era, making it easier for disgruntled creditors to impose costly sanctions on defaulters. The House of Barings, the world's largest provider of short-term trade bills at the time, could easily impose sanctions on bad public or private borrowers by refusing to accept its bills of exchange for discount. Since London was the world's

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<sup>4</sup> 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.

<sup>5</sup> 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.

center for international trade and finance, Barings and firms discounted bankers' acceptances and bills of exchange for the entire world, not just bills for the British Empire (Foreman-Peck, 1995). In addition, we are able to consider a broader range of sanctions because the international community permitted harsher responses to default including the violation of a country's sovereignty during the gold standard period. Therefore, our analysis examines the effects of restrictions on trade credit as well as what we call "super sanctions" – responses to default where creditors used gunboat diplomacy to induce repayment. Although historians and economists have noted their importance, our research offers a pioneering attempt at quantifying whether they had real effects on trade.

In contrast to the research on more recent episodes of sovereign default, our preliminary empirical results suggest that trade sanctions were not effective during the classical gold standard era. Although our gravity model accurately captures bilateral trade flows from 1870-1914, trade did not decline after default and in some specifications actually rose. However, in two of the four cases, we find some evidence that super sanctions or gunboat diplomacy reduced trade. Section 2 of the paper describes our data, the episodes of sovereign debt default, and the empirical model we will use to examine this period. Section 3 presents the empirical results, and section 4 speculates on our findings and describes avenues for future research.

## **II. Trade and Sovereign Default during the Gold Standard Era**

### *A. Sovereign Debt and Sanctions*

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, particularly Britain, but France, Germany and the Netherlands 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. 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 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.

Rose (2002) states that one response to such defaults may have been to restrict trade with the defaulter in order to punish them and prevent future defaults. He suggests that explicit trade restrictions (tariffs or quotas) can be levied on the defaulting country's exports or that trade credit can evaporate in response to a default. According to Rose, the former has not been used with any regularity as a disciplining device, so most empirical research has focused on the latter. But during the first era of globalization, the range of sanctions was broader. It also included more invasive responses, such as the use of gunboats when Venezuela defaulted in 1902-3, the threat of lost sovereignty (in Central America after the announcement of the Roosevelt Corollary) or lost sovereignty – when Greece, Egypt, Turkey, and Santo Domingo defaulted and customs collections was taken over by foreign creditors). One hypothesis is that if trade declined in response to default, “super sanctions” or episodes of gunboat diplomacy may have had an even stronger influence on trade flows. By design, they involved the direct extraction of income or wealth for bondholders, and since the main source of public wealth in debtor countries was often customs revenues. It may be that super sanctions actually increased trade; on the other hand, creditors could have also punished defaulters through trade since they were forced to undertake a costly intervention in response to default.

### *B. 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:

$$(1) \ln(\text{BITRADE}_{ijt}) = \beta_0 + \beta_1 \ln(\text{RR}_i \text{RR}_j)_t + \beta_2 \ln(\text{Pop}_i \text{Pop}_j)_t + \beta_3 \ln D_{ij} + \beta_4 \text{Lang}_{ij} + \\ \beta_5 \ln(\text{Urb}_i \text{Urb}_j) / \text{Pop}_i \text{Pop}_j)_t + \beta_6 \text{Bord}_{ij} + \beta_7 \text{Gold}_{ij} + \beta_8 \text{Lndlck}_{ij} + \beta_9 \ln(\text{Area}_i \text{Area}_j) + \\ \beta_{10} \text{CU}_{ij} + \theta \text{CREDITOR}_{ijt} + \sum_K \theta_k \text{CREDITOR}_{ijt-k} + \sum \gamma \text{DEFAULT}_{tj} + \\ \sum_M \gamma_m \text{DEFAULT}_{ijt-m} + \varepsilon_{ijt},$$

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

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

The key coefficients of interest are the  $\theta$ s, which show the effect of default on bilateral trade between the creditor and defaulter, and the  $\gamma$ s, which show the general effects of default on trade. Including both  $\text{CREDITOR}$  and  $\text{DEFAULT}$  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 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  $\theta$  and  $\gamma$  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.

### *C. Data*

As a preliminary pass at understanding the relationship between trade and default, we use annual bilateral trade data collected from various 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 collecting a much larger 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*.

## **III. Measuring the Effects of Sanctions on Trade**

### *A. Empirical Estimate of the Effects of Default on Trade*

Table 2 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, 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 our 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.

Table 3 improves upon the initial specification by including other influences affecting trade, as described in equation 1, and exploits 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 around 0.54, suggesting that our model predicts a significant amount of variation in the bilateral trade flows. Moreover, the coefficients on the  $\beta$ s 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 is greater, although the empirical results suggest that larger countries trade less. Those countries that border each other or are both on the gold standard also have larger trade flows. On the other hand, those that are landlocked or are further in distance from each other have lower bilateral trade (although distance is statistically insignificant once we include other factors). These standard results are consistent with Rose (2002) and Martinez and Sandleris (2004).

Our empirical estimates differ from research using data from the second half of the 20<sup>th</sup> century in that we discern no decline in trade as a result of default. In fact, in all four specifications shown in table 3 (with or without year dummies), default enters with a positive and statistically significant coefficient in the current period; moreover, the sum of the effect (including lags) is positive. This result suggests that trade sanctions may not be operating during the gold standard period.

To test this result further, table 4 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.<sup>6</sup>

The results from tables 3 and 4 cast doubt on the presence of trade sanctions during the gold standard. Although the results should be viewed as preliminary, they suggest that the mechanisms that deterred default during the gold standard may have been different from those operating today.

There are a couple of potential explanations for these results. Even though the collective action problem during the classical gold standard period was less severe, it might have been the case that it was too difficult for firms to collude and impose trade credit sanctions on a defaulter because the potential profits from cheating on a sanction were too great. This is a distinct possibility given that most of the firms that issued trade credit (with the notable exception of Barings) did not issue sovereign debt. Another possibility is that creditors primarily punished sovereigns through reputation, by cutting off their access to international capital markets. Indeed, several studies including Borchard (1951) and Kelley (1999) have pointed out that creditor associations such as the Council of Foreign Bondholders successfully prevented defaulting sovereigns from listing new debt on the London Stock Exchange as well as the major continental bourses (Amsterdam, Berlin and Paris).

### *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 trade sanctions. In contrast to the post-World War II environment, creditors during this period were sometimes able to convince governments (often for political reasons) to intervene on their behalf and force payment through gunboat diplomacy. One might expect that if a debtor country’s finances are taken over by a creditor country or if it

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<sup>6</sup> 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.



is forced to make payments because gunboats are sitting in its harbors that trade in the presence of gunboats might differ from the effects of traditional trade sanctions. For example, since creditor countries can 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, “super sanctions” might actually *increase* trade. On the other hand, creditors may choose to punish defaulters and make an example of them by allowing trade to suffer. To examine whether this response was present, we consider four different episodes of gunboat diplomacy: the imposition of the Roosevelt Corollary in Central America in 1904; the blockading and bombardment of Venezuela in 1902; and the establishment of control over Turkish finances by European powers in 1881 and Greek finances in 1898.<sup>7</sup>

In each of these cases, nations had defaulted on their debt and were unwilling or incapable of making payment. In 1902, 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 2 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 Guaiara 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 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.

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.<sup>8</sup> 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

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<sup>7</sup> We hope to expand this list to include the occupation of Egypt in a future draft, but our current sample does not include trade figures for it.

<sup>8</sup> See Mitchener and Weidenmier (2004) for more details on this episode and an examination of the effects of this policy on sovereign debt prices.

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.)

In 1881, 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 similar move was made by European powers 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.

To measure the effects of super sanctions, we coded an additional indicator variable that takes on values of one in years when the debtor country was under the sphere of influence of

foreign power(s). This translated to adding four dummy variables to equation one for each episode for which we have data. Contrary to the results shown in earlier tables, we find a negative and statistically significant effect on trade in two of the cases of gunboat diplomacy. The reduction in trade appears most robust in the case of the blockade of Venezuela in 1902. Given the presence of gunboats in its harbor, it is not terribly surprising that trade was disrupted and fell in response to the military actions of Italy, Germany, and Great Britain. The decline in trade may have been especially large for Venezuela, compared to the other instances of gunboat diplomacy, because Italy, Germany, and Great Britain had fewer strategic interests in the region. There was less incentive for an individual power to negotiate a side deal with Venezuela in exchange for greater political influence in the region. Platt (1968) describes British strategic goals in Latin America as “apolitical” and notes that the Foreign Office was very reluctant to become involved in the internal politics and problems of Latin American countries.<sup>9</sup> He notes that Great Britain intervened in Venezuela because the rights of British citizens had been violated in the country. The British government had already decided to intervene in Venezuela before bondholders pressured the Foreign Office for action.

We also find that the implementation of the Roosevelt Corollary (RC) had a negative and statistically significant effect on trade. 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 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.

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<sup>9</sup> Lipson (1985, p. 45) provides a similar view. He argues that Great Britain recognized that it was “cheaper to bear the immediate costs of occasional bond defaults than to risk sabotaging local governments by frequent interventions.”

The empirical results also suggest that the major powers did not punish Greece and Turkey with trade sanctions in response to its sovereign defaults. We only find a negative and statistically significant effect on trade in the random effects model for Greece following default and the establishment of international financial control. The absence of a strong trade effect is quite possible considering that the British government had guaranteed debt issues for both countries in the nineteenth century: a guarantee for Greece in 1833 to finance a war of independence and for Turkey in 1854 and 1855 to raise funds for the Crimean War when Great Britain and France allied with the Sultan against Russia. Her Majesty's government may have felt compelled to uphold its credibility by making sure that British backed bonds were repaid. Debt repayment would be more easily accomplished without direct trade sanctions that would reduce the revenues from import and export duties.

Political factors may also have played a role in explaining why trade did not shrink in Greece and Turkey following default. The establishment of an international financial commission brought much needed fiscal reform to Greece and actually enhanced the country's 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 closely watched the dealings and prevented the construction of a railroad from Baghdad to the Persian Gulf that would infringe on its Empire and trade with India. Russia objected to the construction of new railway lines that threatened its borders with Eastern Turkey. Overall, the historical record shows that political and strategic considerations were much more important in the Balkans than punishing Greece and Turkey with trade sanctions for defaulting on its debts. Nevertheless, the empirical results do not imply that England and the other major powers did not punish Greece and Turkey via the trade channel. On the contrary, by establishing international financial control over the two countries, the defaulters pledged tax revenues including import and export duties to repay its renegotiated debts, denying the Greek and Turkish governments funds to spend on consumption, military, and other purposes.<sup>10</sup>

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<sup>10</sup> For a brief discussion of tax revenue pledges by a defaulter as a type of sanction see Obstfeld and Rogoff (1996).

#### **IV. Future Directions**

This paper provides a preliminary examination of the role that default had on trade during the gold standard era. Future research will aim to provide a more complete picture of the issues that are raised here. The insignificant and sometimes positive effect we find on trade when default occurs is contrary to findings using more recent data, and if robust, suggests that trade sanctions were not operating during the gold standard era in the same fashion as they have more recently. Since it appears that trade with creditors or in general did not fall as a result of default, our preliminary results suggest that reputation models rather than those based on sanctions may provide a better fit of the data for the 1870-1914 period. To test this hypothesis, we plan see if sovereign default leads to a negative and statistically significant drop in the growth rate of railroad miles, an internal improvement often financed by sovereign debt during the classical gold standard. However, we leave this task for a future version of this paper.

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**Table 1. Sovereign Debt Default During the Gold Standard Era**

<u>Country</u>	<u>Default</u>	<u>Resumption</u>	<u>Default</u>	<u>Resumption</u>	<u>Default</u>	<u>Resumption</u>	<u>Default</u>	<u>Resumption</u>
Argentina	1890	1894						
Austria	1868	1870						
Bolivia	1878	1880						
Brazil	1898	1902						
Columbia	1879	1897						
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. The Effects of Trade on Default, 1870-1913 (Pooled OLS Regressions)**

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

<b><u>Independent Variable</u></b>	<b><u>Column 1</u></b>	<b><u>Column 2</u></b>	<b><u>Column 3</u></b>	<b><u>Column 4</u></b>	<b><u>Column 5</u></b>
Default	-1.176 ***	-0.686 **	0.007	-0.117	0.008
(standard error)	0.073	0.115	0.092	0.097	0.091
Lagged Default (-1)		-0.076	-0.140 ***	-0.094 **	-0.153 ***
		0.057	0.051	0.045	0.051
Lagged Default (-2)		0.043	0.082 *	0.081 *	0.095 ***
		0.049	0.045	0.043	0.045
Lagged Default (-3)		-0.737 ***	-0.173 ***	-0.229 ***	-.086
		0.111	0.079	0.091	0.081
Log Distance		-0.518 ***	-0.485 ***	-0.473 ***	-0.428 ***
		0.104	0.078	0.079	0.076
Log Area		0.264 ***	0.032	0.012	-0.040
		0.040	0.037	0.049	0.041
Log Population			0.576 ***		0.376 ***
			0.046		0.074
Log Urbanization			0.481 ***	0.271 ***	0.369 ***
			0.048	0.054	0.054
Log Railroad Miles				0.511 ***	0.279 ***
				0.059	0.079
Year Dummies	NO	NO	NO	NO	YES
Adjusted R-Squared	0.03	0.160	0.57	0.57	0.59
Number of Observations	8362	7424	7192	7192	7192

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

<u>Independent Variable</u>	<u>Fixed Effects</u>	<u>Random Effects</u>	<u>Fixed Effects</u>	<u>Random Effects</u>
Default	0.070 *	0.065	0.087 **	0.079 **
(standard error)	0.039	0.040	0.039	0.039
Lagged Default (-1)	-0.109 **	-0.105 **	-0.101 **	-0.101 **
	0.050	0.050	0.049	0.050
Lagged Default (-2)	0.057	0.057	0.068	0.070
	0.048	0.049	0.049	0.049
Lagged Default (-3)	-0.029	-0.022	-0.017	-0.017
	0.037	0.037	0.036	0.037
Log Distance		-0.129		-0.295 ***
		0.081		0.075
Log Area	-0.705 ***	-0.181 ***	-0.352 **	-0.010
	0.109	0.032	0.112 *	0.032
Log Population	1.129 ***	0.830 ***	0.676 **	0.642 ***
	0.049	0.038	0.060 *	0.039
Log Urbanization	0.065 **	0.084 ***	0.035 ***	0.056 ***
	0.010	0.010	0.010	0.010
Log Railroad Miles	0.061 **	0.141 **	-0.040 *	0.036 *
	0.018	0.016	0.021	0.019
Common Language		0.742 ***		0.221
		0.202		0.189
Common Border		0.749 ***		0.461 ***
		0.231		0.212
Number Landlocked		-0.205 ***		-0.421 ***
		0.193		0.177
Gold Standard	0.251 ***	0.091 ***	0.068 **	0.074 ***
	0.064	0.018	0.018 *	0.018
Currency Union	0.561	0.366	0.193	0.655 ***
	1.448	0.250	0.458	0.234
Year Dummies	NO	NO	YES	YES
Adjusted R-Squared	0.27	0.54	0.25	0.50
Number of Observations	7192	7192	7192	7192

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

**Table 4. A Gravity Model of Trade With Default & Creditors, 1870-1913**

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

<u>Independent Variable</u>	<u>Fixed Effects</u>	<u>Random Effects</u>	<u>Fixed Effects</u>	<u>Random Effects</u>
Default	0.071 *	0.064	0.088 **	0.079 **
(standard error)	0.040	0.040	0.040	0.040
Lagged Default (-1)	-0.108 **	-0.104 **	-0.099 **	-0.099 *
	0.051	0.052	0.050	0.051
Lagged Default (-2)	0.056	0.056	0.066	0.068
	0.050	0.050	0.049	0.050
Lagged Default (-3)	-0.031	-0.025	-0.020	-0.021
	0.038	0.038	0.037	0.038
Default w/Creditor	0.002	0.018	-0.004	0.023
	0.195	0.197	0.191	0.194
Lagged Default w/Creditor (-1)	-0.018	-0.023	0.127	-0.037
	0.238	0.240	0.233	0.238
Lagged Default w/Creditor (-2)	0.028	0.025	0.033	-0.031
	0.222	0.224	0.217	0.222
Lagged Default w/Creditor (-3)	0.054	0.073	0.066	0.093
	0.172	0.173	0.168	0.171
Log Distance		-0.130		-0.296 **
		0.080		0.074
Log Area	-0.705 ***	-0.180 ***	-0.352 ***	-0.010 ***
	0.109	0.032	0.288	0.031
Log Population	1.129 ***	0.828 ***	0.677 ***	0.641 ***
	0.049	0.038	0.060	0.039
Log Urbanization	0.065 ***	0.085 ***	0.035 **	0.057 ***
	0.010	0.010	0.010	0.010
Gold Standard	0.074 ***	0.091 ***	0.068 ***	0.075 ***
	0.018	0.018	0.018	0.018
Currency Union	0.135	0.368	0.194	0.658 ***
	0.466	0.249	0.458	0.232
Year Dummies	NO	NO	YES	YES
Adjusted R-Squared	0.27	0.54	0.25	0.50
Number of Observations	7192	7192	7192	7192

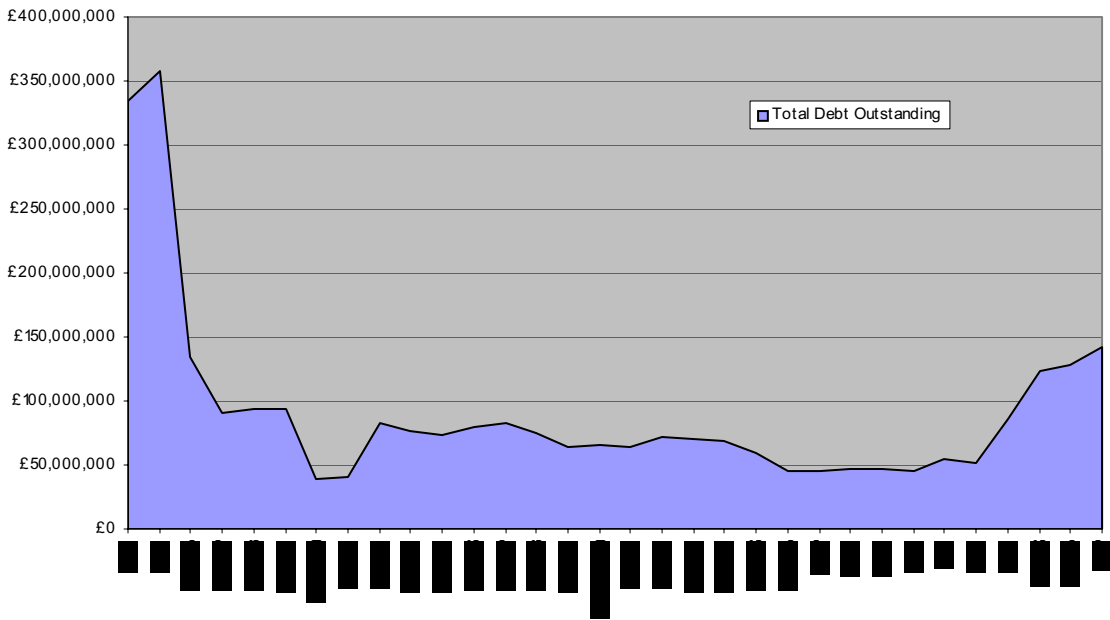
Notes: A constant term as well as common language, common border, number of landlocked countries, and the log product of railroad miles were also included (not shown). Stars indicate significance at 1(\*\*\*), 5(\*\*), and 10(\*) percent levels, respectively.

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

<u>Independent Variable</u>	<u>Fixed Effects</u>		<u>Random Effects</u>	
Default	0.080	*	0.070	**
(standard error)	0.040		0.041	
Lagged Default (-1)	-0.097		-0.097	*
	0.051		0.052	
Lagged Default (-2)	0.068		0.070	
	0.049		0.050	
Lagged Default (-3)	-0.019		-0.019	
	0.037		0.038	
Default w/Creditor	0.006		0.035	
(standard error)	0.191		0.194	
Lagged Default w/Creditor (-1)	-0.033		-0.048	
	0.233		0.238	
Lagged Default w/Creditor (-2)	0.032		0.030	
	0.217		0.221	
Lagged Default w/Creditor (-3)	0.069		0.100	
	0.168		0.171	
Log Distance			-0.294	***
			0.074	
Log Area	-0.411	***	-0.012	***
	0.289		0.031	
Roosevelt Corollary	-0.347	***	-0.315	***
	0.072		0.073	
Venezuelan Incident	-0.461	**	-0.442	***
	0.199		0.194	
Ottoman Revenue Collection	0.041		0.007	
	0.116		0.117	
Greek Revenue Collection	-0.041		-0.072	**
	0.075		0.076	
Year Dummies	YES		YES	
Adjusted R-Squared	0.25		0.50	
Number of Observations	7192		7192	

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.

Figure 1 Total 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)

<u>Independent Variable</u>	<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>
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)

<u>Independent Variable</u>	<u>Fixed Effects</u>		<u>Random Effects</u>		<u>Fixed Effects</u>		<u>Random Effects</u>
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.

**Table 3. A Gravity Model of Trade With Default & Creditors, 1870-1913**

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

<u>Independent Variable</u>	<u>Fixed Effects</u>	<u>Random Effects</u>	<u>Fixed Effects</u>	<u>Random Effects</u>
Default	0.118 *	0.122 *	0.132 **	0.150 **
(standard error)	0.060	0.061	0.061	0.063
Lagged Default (-1)	-0.112	-0.117 **	-0.085 **	-0.099 *
	0.076	0.077	0.076	0.078
Lagged Default (-2)	0.063	0.070	0.041	0.051
	0.076	0.077	0.076	0.079
Lagged Default (-3)	-0.075	-0.073	-0.052	-0.046
	0.058	0.059	0.058	0.060
Default w/Creditor	0.033	0.045	-0.027	0.029
	0.134	0.136	0.134	0.138
Lagged Default w/Creditor (-1)	-0.026	-0.015	-0.052	-0.035
	0.179	0.181	0.179	0.183
Lagged Default w/Creditor (-2)	0.026	0.022	0.048	-0.041
	0.179	0.182	0.179	0.184
Lagged Default w/Creditor (-3)	0.042	0.073	0.026	0.072
	0.133	0.135	0.133	0.137
Log Distance		0.003		-0.059
		0.095		0.077
Log Area	-1.121 ***	-0.261 ***	-1.018 ***	-0.202 ***
	0.111	0.041	0.123	0.036
Log Population	1.149 ***	0.808 ***	1.044 ***	0.698 ***
	0.058	0.044	0.081	0.043
Log Urbanization	0.024	0.073 ***	0.033	0.096 ***
	0.020	0.019	0.021	0.020
Gold Standard	0.114 ***	0.135 ***	0.115 ***	0.138 ***
	0.027	0.027	0.027	0.027
Currency Union	0.291	0.470	0.345	0.550 ***
	0.607	0.333	0.607	0.283
Year Dummies	NO	NO	YES	YES
Adjusted R-Squared	0.05	0.37	0.05	0.41
Number of Observations	5847	5847	5847	5847

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 4. A Gravity Model of Trade With "Super Sanctions," 1870-1913**  
 (Dependent Variable: Log of the Average Value of Bilateral Trade)

<u>Independent Variable</u>	<u>Fixed</u> <u>Effects</u>		<u>Random</u> <u>Effects</u>	
Default	0.113	*	0.133	**
(standard error)	0.061		0.063	
Lagged Default (-1)	-0.083		-0.096	
	0.076		0.078	
Lagged Default (-2)	0.047		0.054	
	0.076		0.079	
Lagged Default (-3)	-0.048		-0.041	
	0.059		0.060	
Default w/Creditor	0.030		0.029	
	0.134		0.138	
Lagged Default w/Creditor (-1)	-0.057		-0.043	
	0.179		0.183	
Lagged Default w/Creditor (-2)	0.041		0.038	
	0.179		0.184	
Lagged Default w/Creditor (-3)	0.043		0.089	
	0.133		0.137	
Log Distance			-0.056	***
			0.077	
Log Area	-1.041	***	-0.201	***
	0.122		0.036	
Roosevelt Corollary	-0.393	***	-0.215	***
	0.155		0.154	
Venezuelan Incident	-0.574	**	-0.612	***
	0.208		0.204	
Ottoman Revenue Collection	-0.073		0.051	
	0.100		0.102	
Greek Revenue Collection	-0.089		-0.179	*
	0.097		0.100	
Year Dummies	YES		YES	
Adjusted R-Squared	0.05		0.42	
Number of Observations	5847		5847	

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.