

Contagion by Shared Financial Intermediary in the pre-1914 London Sovereign Debt Market: Two Quasi-Natural Experiments[†]

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Abstract

We document a type of financial contagion in which the driving force is shared financial intermediation. In the London sovereign debt market before 1914, financial intermediation played a major informational role for investors. We use a hand-collected dataset of weekly bond prices and borrower-underwriter relationships to explore two events of financial distress—the Brazilian Funding Loan of 1898 and the Greek Funding Loan of 1893—as quasi-natural experiments of contagion by a shared underwriter. After the crises, bond prices of countries that shared the same merchant bank dropped by a significant amount relative to the rest of the market.

KEY WORDS: Contagion, Sovereign Debt, Quasi-Natural Experiments, Relational Finance.

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I. Introduction

Recent literature on international financial contagion recognizes the existence of channels of shock propagation, in which a crisis in one country affects the asset values issued by other countries despite the absence of fundamental economic links or common external shocks. One channel is informational, which is often called an information spillover, or the “wake up call” hypothesis [Van Rijckeghem and Weder (2000)]. Another channel is mechanical: in response to a crisis in one country, investors realign their portfolios when facing margin calls, which affects the asset values of other countries. We present evidence that a shared financial intermediary is a mechanism through which contagion takes place.

The empirical setting is the London market for peripheral (countries outside Europe and without a developed internal financial market) sovereign debt bonds in the pre-1914 period. We use two events of financial distress, the Brazilian funding loan of 1898 and the Greek funding loan of 1893, as quasi-natural experiments. We show that countries with strong ties to the same financial intermediary—but no meaningful fundamental economic links with a distressed debtor—suffer a reduction in their bond prices above and beyond the rest of the market.

The pre-1914 bond market shares some characteristics with present day markets. The prevalence of indirect lending through bond issues and the absence of an international legal system to enforce debt contracts are two common characteristics. Nevertheless, two distinctive characteristics of the pre-1914 debt market make it an ideal empirical setting for studying contagion through shared financial intermediation [see, e.g., Mauro and Yafeh (2003) on differences between the pre-WWI and today’s markets].

The first characteristic is the existence of long-term relationships between countries and intermediaries. From 1870 through 1914, many countries used the same bank as the lead underwriter of their debt. Underwriters played an active role in monitoring and advising their debtors, providing macroeconomic advice, debt management counseling, market-making of bonds, and direct lending services such as short-term credit advances [see Flandreau and Flores (2007)].

As Flores and Flandreau (2007) show, long-term relationships reflect the enormous informational asymmetry between bondholders and countries in the pre-1914 period, especially outside Western Europe. The information available to the typical British investor about the political and economic situation in, say, Peru was quite scarce by today’s standards.

Information gathering and monitoring were much costlier. In contrast, present-day investors in Amsterdam can easily verify how the Chilean current account behaved over the last five years. In the pre-1914 London bond market, most borrowers had no trustworthy standard for publishing their fiscal and commercial information.

The second characteristic is the public visibility of relationships, which were common knowledge to market players. Furthermore, a hard financial performance measure is available: the bond price at the London secondary market. Thus, we observe both the strength of the relationship and some objective measure of financial performance. In a typical empirical setting, when relationships are important (small firms, for example), little hard information on the borrower's terms of credit are available.

We consider the events of a financial crisis that satisfy the following set of conditions as potential quasi-natural experiments for testing the hypothesis of a contagion by a shared intermediary. First, the country in distress must have a strong financial relationship with a merchant bank, which is the most important type of financial intermediary operating in the London peripheral market. Second, the distress is triggered by internal reasons or commodity shocks, and not by a generalized financial crisis originated in the developed centers. Third, it is possible to find a group of countries that have a strong relationship with the same intermediary as the country in distress. Fourth, the countries that share the merchant bank with the country in distress cannot have meaningful economic linkages to the distressed country, and cannot be directly affected by the commodity shock that might have caused (or intensified) the financial crisis in the distressed country. Countries that share the merchant bank with the country in distress are the treatment group, and the other countries are the control group. Satisfying these conditions guarantees that the treatment is random. Thus, causality (i.e., contagion) can be inferred by comparing bond prices of the control and treatment groups around the period of financial distress.

To find events of financial distress that satisfy the conditions is only a necessary condition for inferring contagion. Establishing causation demands the documentation of the importance of relationships in the nineteenth century debt market. Flandreau and Flores (2007) show the importance of underwriter-country relationships in London sovereign debt market during the 1820s, a period preceding ours. They establish two facts. Significant segmentation exists in the market for underwriting, i.e., "good" countries matched with "good" underwriters. Good "borrowers" tend to issue their debt with the same merchant bank. Thus, brand has value in underwriting, and suggests that the identity of the underwriter

and its relationships mattered. We also document the existence of stable relationships between countries and merchant banks for a much longer period 1820-1914.

Contagion by shared financial intermediary is not a nineteenth century anomaly. Recent events have undermined the reputation of credit rating agencies as informational brokers. AAA rated mortgage-backed securities have proven less than safe, and have caused suspicion in other instruments rated by credit agencies. The problem is aggravated by the difficulty in pricing these instruments because of their complexity and their sudden drop in liquidity. The analogy with our application is the following. Peripheral countries are complex and, as a consequence, are difficult to price. Also, their bonds are "rated" by merchant banks at issuance. Distress in one country leads to suspicion on that class of assets in general, and on papers underwritten by the same merchant bank. In this sense, our results can shed light on contagion driven by uncertainty about the quality of monitoring or rating.

The paper relates to several pieces of literature. First, we contribute to the literature on contagion. Recent work suggests that economic fundamentals cannot fully account for contagion [Kumar and Persaud (2002)] so several alternative explanations emerged. For example, common creditor spillovers happen when depositors call the creditor who has exposure to the country under distress. In that case, contagion arises when creditors sell their positions in other country's assets to fulfill their commitment to depositors [Calvo (1998) and Kaminsky and Reinhart (2000)]. Information spillovers arise when investors update their beliefs about the quality of the underwriting (or the credit rating) in the event of financial distress [Van Rijckeghem and Weder (2000)].

Measuring contagion is difficult. Empirical work usually measures contagion as an increase in co-movement between asset prices. Forbes and Rigobon (2002) show that interpreting co-movement as contagion resembles inferring causation from correlation. By appropriately choosing events of distress, we recover the causal impact of distress in one country on another country's asset prices, which bypasses methodological concerns advanced by Forbes and Rigobon.

Our paper also relates to the relational lending literature. Theory and empirical evidence suggest that the borrower-lender (or financial intermediary) relationship is an important method for producing loans. In Rajan (1992) and Petersen and Rajan (1994), repeated borrower-lender interaction alleviates informational problems as lenders acquire soft information on the borrower's project. In Boot and Thakor (1994), Bolton and Scharfstein (1980), and Carrasco and De Mello (2009) relationships mitigate hidden action

problems¹. We document the “reverse of the fortune” of relational finance. If relationships are important, then investors update their beliefs about the relational lender’s ability to screen or monitor when one of its borrowers (or its underwriting clients) defaults².

The paper contains four sections including this introduction. Section II describes the London market for sovereign debt. Section III outlines the empirical strategy, with emphasis on the episodes of financial distress that constitute our quasi-natural experiments. Description of data, results and identification strategy are also on Section III. Section IV concludes.

II. The Peripheral London Market for Sovereign Debt

From the 1820s through World War I, London was the most important market for sovereign debt. In 1913, the British investment in foreign government bonds was £1.1 billion, which represented a third of total overseas investment [Feis (1964)]. This proportion was even higher in the late nineteenth century. The London sovereign debt market was divided into three segments, based on the level of financial development of its participants: the colonies and British dominions, financially developed borrowers, and the peripheral market. Segments had different *modus operandi* in regard to debt underwriting and, to borrowers in different risk classes. Except for colonies and dominions, which were formally treated differently, this market segmentation was informal. Nevertheless, when discussing financial events and bond quotations, both The (London) Times and the Investors’ Monthly Manual (IMM) classified countries according to these segments. We focus on the peripheral segment, where relationships between countries and London intermediaries were an important phenomenon³.

The peripheral segment includes countries from almost all of Latin America, some Eastern European, Asian and African, and the Western European countries of Portugal, Spain, and Italy. Contrary to the colonial market, this segment was not regulated. In contrast to financially developed borrowers, its participants had neither developed domestic capital

¹ Empirical evidence supporting these proposition abounds (see Berger and Udell [1995], Hoshi, Kashyap and Scharfstein [1991], Aoki and Dinç [2000] among others).

² Works on corporate Initial Public Offerings (IPOs) show the importance of underwriter credibility in explaining the success of IPOs. Brau and Fawcett [2006] report that, when choosing the underwriter, CFOs care more about the intermediary’s reputation and expertise than other aspects such as market-making and pricing. See also Krigman, Shaw and Womack [2000] and Carter, Dark and Singh [1998].

³ An earlier working paper version had a full discussion on the differences among the three segments. See Abreu, De Mello and Sodr  [2007]. Flandreau and Flores [2007] provide a full account of segmentation in the market.

markets nor trustworthy disclosure of statistics. Most peripheral countries were far away from London, further increasing the cost of accessing country-specific information.

After 1860, the underwriting of peripheral countries' debt was done mostly by two types of intermediaries: merchant banks and joint-stock banks.⁴ Merchant banks were large private investment institutions with high reputation, which practically monopolized the market for foreign debt underwriting until the 1860s. Between 1815 and 1904, the two largest British merchant banks—N. M. Rothschild and Sons Limited (hereafter Rothschilds) and Barings Brothers & Co. (hereafter Barings)—participated in no less than 205 foreign government bonds issues, totaling approximately £ 2 billion [Davis and Galman (2003)]. Most of these issues occurred after 1870.

Merchant banks performed several tasks. Some were bureaucratic, such as handling subscriptions and making coupon payments. More substantial tasks included to act as trustees for the bondholders and to issue a prospectus for them. A typical prospectus had information about the terms of the loan (currency of denomination, coupon, payment dates), about the destination of the proceedings of the loan (if any), and about the country in general. Figure 1 has the prospectus of the Brazilian funding loan that followed the financial crisis of 1898.

Several peripheral countries established long lasting relations with a financial intermediary or with an international syndicate of banks. Relationships were observed by the general public. By January 1890, 10 out of 26 peripheral countries (with more than one bond listed) had 50% or more of their outstanding debt issued by the same intermediary. Table 1 displays, for January 1890, the proportion of the central government's outstanding debt issued by each country's main underwriter. Excluding borrowers that were in default, or whose bonds were issued as a result of debt settlements, only Russia had less than 50% of their outstanding debt with the same intermediary. Later on in the 1890s, Russia would have more than 50% of her debt issued by Rothschilds.

The average investor faced significant uncertainty about peripheral borrowers' financial soundness. The history of this market is a tale of defaults and debt renegotiations. From the early 1820s through World War I, Mexico, Argentina, Greece, Portugal, Spain, Turkey, Egypt, Santo Domingo, Honduras, Paraguay, Colombia, Uruguay, Liberia, and Venezuela were part of the long list of defaulters. Renegotiation was long and complex.

⁴ In the early stages of the market, commercial companies with business abroad issued debt of foreign countries, especially those from outside Europe (see Marichal [1988] and Flandreau and Flores [2007]).

Flandreau and Flores [2007] and Abreu, De Mello, and Sodre [2007] give a full account of the mishaps of the London debt market.

Given the absence of international monitoring agencies, and the difficulties in gathering country specific-information, moral hazard was a pervasive problem. A large number of prospectuses indicated an intended employment of the resources, but examples of diversion abound [Wynne (1951)]. For example, the revenues from a 4% Greek Monopoly loan were earmarked to pay debt obligations. Nevertheless, roughly one third of the loan's revenues were spent on the construction of three ironclads, whose contractors were connected to the Comptoir d'Escompte, the French underwriter of the loan [Levandis (1944)]. It was impossible for an investor in London to obtain this kind of information.⁵

Furthermore, as a general rule, the British Government took no action on behalf of bondholders. Sovereign debt contracts were subject to limited enforceability. The position of the British legal system toward defaulters and the problem of limited enforceability was a frustration among bondholder associations. For example, the 1873 Annual Report of the Council of Foreign Bondholders stated on page 68, “[The practice] of the English Courts, both of Equity and Common Law, has been uniformly in favour of the privileged exemption of Sovereign States in all matters of private contract. There is no recognized international tribunal to which such differences can be referred, (...)” [see Abreu, De Mello, and Sodre (2007)]. Besides the legal enforceability problem, the British government did not regularly use its military power to force settlements (see Tomz (2006) for empirical evidence on the reluctance of the British government in using force to settle debt litigation).

As expected, the British investor priced the risk of peripheral debtors accordingly. Among issues of bonds outstanding in January 1890, the price offered to the public for the purchase of a £100 security ranged from £52 (5% Turkish Defense Loan) to £100 (Orange Free State 6% Loan of 1884). The average initial price was £84.6. Thus, yields were quite high. Nonetheless, relationships could influence the evaluation of the assets. Flores and Flandreau [2007] present ample evidence that high-quality relational merchant banks, such as Rothschilds and C. J. Hambro and Sons (hereafter Hambro), obtained country-specific information. They were also efficient in monitoring their clients. Relational bankers superior

⁵ It was also common that prospectuses contained pledges that revenues were to be used to debt repayment. In many cases, pledges went unfulfilled. For example, the Turkish loans of 1858 and 1862 pledged customs duties and taxes on tobacco and salt, among other sources of public revenue. The prospect mentioned an external commission to monitor the use of the revenues. Not only the same revenues were pledged in subsequent loans, but the monitoring commission had no effective power [Wynne (1951)].

technology stemmed both by the intermediary access to the government accounts, and by personal connections with government representatives and local firms.

The merchant bank was normally responsible for coupon payments and debt amortization operations [Borchard (1951)]. Thus, it had a direct source of hard information on the debtor's financial standing. Any delay or difficulties met by the borrower in fulfilling these advances was known by the bank in advance. The relationship between Brazil and Rothschilds illustrates the importance of government accounts as a direct channel of hard information. The following passage, from the report of the committee to inquire into the organization of N. M. Rothschild and Sons Limited Accounts in 18 November 1908, is illustrative:

“[The Brazilian Account] shows the amount standing to the credit of the Brazilian government, and the amounts debited for dividends and for sinking funds charges. The account is balanced at the end of each month and a copy is sent to the government. It contains also a record of the installments received on account of each loan...”[quoted from the report by Flores(2007)].

Beyond obtaining hard information directly from the country's account, the intermediary sometimes had direct control of the government's main sources of revenue. For example, as a result of negotiations of the 1887 Greek Monopoly loan, the British merchant bank Hambro, the Greek relational underwriter in London, became responsible for collecting and remitting pledged revenues directly to creditors [Levandis (1944)].

Intermediaries also acquired private information as new loan agreements were negotiated. The terms of loans depended (at least in part) on the financial standing of the debtor country. Thus, the borrower released some information, and the intermediary made efforts to verify them. Sequential loan contracts both reduced the cost of acquiring information about the countries and increased the intermediary's payoff from acquiring this information [see, e.g., Flandreau (1998) and Flandreau and Flores (2007)].

Bank managers' personal networking provided soft information on countries' political, commercial, and financial standings. Connections varied from personal relationships with government officials to the establishment of a local office headed by money doctors. Consider the Brazil-Rothschilds relationship. From the start, the Rothschilds built a wide network of agents to supply the bank with intelligence on Brazilian affairs. Until the 1850s, Samuel, Phillips & Co. was the main commercial agent of Rothschilds in the country. The correspondence displays the latest information on the Brazilian border conflicts

with Argentina during the 1820s (Rothschilds Archives, RAL XI/28/215). The information gathering process also involved a considerable exchange of letters between Nathan M. Rothschild and the Brazilian ministers in London.

Relationships also increased the intermediary's leverage in imposing conditionality. Bondholder's associations used retaliatory actions⁶. Relational intermediaries went further and imposed conditionality on a regular basis, even during the normal operation of the relationships [Flandreau (2000)]. However, an underwriters' relational ability to influence debtors was partial. Even exclusive underwriters, who faced little competition, were unable to impose their will in several occasions. Consider the case of Brazil in the 1890s, when the financial situation worsened steadily. Despite several attempts, Rothschilds was unsuccessful in convincing the Brazilian president to lease the Estrada de Ferro Central do Brasil as a means to raise funds [Abreu (2002)].

Quite importantly, the market recognized the existence of relationships as disciplining devices. Bondholders often complained not to the country's representatives in London, but to the issuing houses [see, e.g., Flandreau and Flores (2007)]. Relationships were particularly important when the intermediary was reputable, as Flandreau and Flores (2007) document. In our episodes of distress the underwriters were considered high-quality.⁷

III. Episodes of Distress, Data, and Results.

III.A Episodes of Distress

The identification strategy rests on selecting the appropriate events of financial distress. The Brazilian funding loan of 1898 and the Greek funding loan of 1893 are the two episodes that fulfill the following necessary conditions for identification: 1) the distressed country has a strong relationship with an underwriter; 2) the presence of other countries with strong ties with the same underwriter, which form the treatment group; 3) the countries in the

⁶ The most common, albeit usually unsuccessful, action was trying to prevent new issues by defaulters.⁷ The fact that the Rothschilds was a reputable house is widely accepted. The Hambros were also on the high-quality segment of the market, to use FF terminology. See Y. Cassis, "London Banks and International Finance, 1890-1914," in Y. Cassis and E. Bussière eds., *London and Paris as International Financial Centres in the Twentieth Century*, Oxford, pp. 110.

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treatment group are geographically and economically heterogeneous; and 4) the crisis in the original country is driven by internal reasons.

It is self-evident that conditions one and two need to be satisfied. Conditions three and four are crucial for a causality, i.e., for interpreting a drop in the price of bonds in the treatment group relative to the market as evidence of contagion. Geographical diversification reduces the chance of capturing some common unobserved shock. If the origin is abroad, then the bond prices of treatment or control countries are contaminated, preventing causal interpretation.

If countries sharing the same merchant bank produce similar commodities, or have strong trade linkages, then one expects a higher co-movement among their bond prices, above and beyond their co-movement with the rest of the market, especially in the face of crisis (increased variance is often confounded with contagion [Forbes and Rigobon (2002)]). A commodity price shock that affects the external solvency of the treatment countries produces the results regardless of the shared underwriter. One of the most famous defaults of the nineteenth century, the Argentine bankruptcy of 1890, fails condition four because the only peripheral country that had a strong relationship with Barings was Uruguay, which produced the same staples with and had strong commercial links to Argentina.

III.A.1 The Brazilian Episode

Since 1858, Rothschilds had been the official bankers of the Brazilian government in London. By 1898, they had issued 100% of the outstanding debt underwritten in London. Rothschilds was responsible for the advertising of Brazilian securities in the market, as well as informing the English press about Brazilian economic and political conditions. Their relationship with Brazil was widely known to investors.

The Brazilian crisis had three main causes: political turmoil, loose monetary policy, and a shock in the price of coffee, the main Brazilian exporting commodity [Abreu (2002)]. During the transition from the Empire to the Republic (1889-1898), Brazil experienced major political instability. Successive exchange devaluations, totaling some 300% of the milr eis-sterling rate, resulted in a massive fiscal imbalance. Spreads on central government loans, below 2% in the late 1880s, peaked at 4% in 1898. The sharp drop in coffee prices after 1895 was the final blow to the Brazilian ability to sustain its external payments. In March 1898, after the Brazilian budget was published in the English press, bond prices dropped roughly

15%. Prices kept falling until July 1898, when Brazil announced a funding loan scheme: instead of paying interest on its foreign debt, it would issue new bonds in the following three years. The amortization payments covered by the funding scheme were suspended for the following years. The funding loan scheme was designed with the guidance of Rothschilds.

III.A.2 The Greek Episode

Similar to the Brazilian episode, the mix of a commodity shock and internal political turmoil caused the Greek financial debacle. Greece's history as a debtor begins in the 1820s. After several decades of default and renegotiations, Greece reappeared in the European markets in 1879 by floating a loan in Paris, followed by a series of debt issues. The underwriting of all Greek debt was performed by an international syndicate of banks whose leader was the merchant bank Hambro, the British member of this syndicate. In 1893, service of the Greek foreign debt represented 33% of her budgetary revenues [Levandis (1944)]. The external balance relied heavily on the currant crop, whose international price had been falling since the early 1890s. In late 1892, as bankruptcy was impending, Greek authorities engaged in negotiations with Hambro to raise a new loan. Hambro hesitated and negotiations resulted in an agreement that a British official, Major Law, should be commissioned to review the Greek financial standings [Levandis (1944)]. The visit of the British expert was public knowledge, and his reports were eagerly awaited and were commented on by the financial press. The report, released on April 14, 1893, triggered a drop in Greek bond prices, which were further depressed by the dismissal of the Minister of Finance. Weeks later, Greece announced a funding loan scheme.

III.B Data, Summary Statistics and Preliminary Evidence

We use two sources of data: the Investor Monthly Manual (IMM), published by the London Stock Exchange from 1869 to 1926, and The [London] Times, the daily newspaper published since the late 18th century. The IMM has a list of sovereign bonds quoted in the London Stock Exchange as well as information such as monthly prices (opening, highest, lowest, and closing), the outstanding amount of the loan, and dates of coupon payments. The Times published (previous day) bond prices only if negotiation took place.

The sample comprises all of the bonds from a peripheral country or provinces

whose prices were published in The [London] Times in the section Stocks and Shares, coupons payable in London. For data gathering feasibility reasons, the weekly bond price is the (previous) day price that first appears in a certain week⁸. When a bond shows no prices for the whole week, the observation is treated as missing. For the Brazilian episode, we have a sample of 90 bonds from 33 countries and provinces. For the Greek episode, the sample comprises 84 bonds from 34 countries and provinces. Table 2, panels A and B, shows the size of the sample and some summary statistics on the amount of outstanding debt in our sample of debtors. Panel C has the geographical distribution of the sample. In both events, the sample primarily comprises bonds issued by Latin America and Eastern European countries, but overall it is quite spread out across countries and provinces.

The “raw” bond price contains the coupon payment. Using dates of payment, we correct weekly prices for dividend payment. At the date of dividend payment, the coupon paid is “added back” to the price of the bond by using the interest rate contracted and the period of payment (semester or quarter). Accounting for bond payments is important because dividend payments produce sharp fluctuations in prices, which have little to do with risk assessment. Information about coupon payments is from the prospectuses published in The Times or in the Annual Reports of the Council of Foreign Bondholders.

The decision about the beginning of the crisis period—the moment when the market learned about the distress—is based on both the movement of prices and historical evidence. Figures 2 and 3 present the evolution of bond prices of the distressed country in both crises, and the definition of the tranquil and crisis periods (the before and after). In both cases, the first sharp drop in prices marks the beginning of crisis period. Historical evidence also supports these choices. In the Brazilian case, it is the week the national budget first appeared in the British press. In the Greek case, it is the resignation of the finance minister.

Figures 2 and 3 also show the length of the tranquil and the crisis periods. The tranquil period ends with the distress. Identification is cleanest when the tranquil period is shortest. However, we cannot know whether the markets anticipated the distress. Thus, we stretch the tranquil period to ten weeks to guarantee that, for at least a relevant part of the pre-treatment period, the markets are unaware of the distress.

Determining the end of the crisis period is more difficult. We have no precise historical record of the news flow during this period. Thus, the length of the crisis period is determined empirically. The crisis ends when the bond prices of the country in distress stop

⁸ The search involves finding the section *Stocks and Shares, coupons payable in London* of *The Times* and reading through a table. Without the recording criteria the search would have been impractical.

falling drastically. Using this criterion in the Brazilian and the Greek cases, the tranquil and the crisis period lasted 14 and 4 weeks, respectively. We do perform robustness checks on these periods (see Table 8).

For both episodes of financial distress, the strategy consists of comparing the dynamics of the price of the bonds between two groups: countries that have a relationship with the same merchant bank as the country in distress (treatment), and countries that do not (control). The country under distress is excluded. Following the empirical literature on relational lending, we measure the strength of the relationship by the proportion of the country's outstanding debt issued by the underwriter [Berger and Udell (1995) and Petersen and Rajan (1994)].

Table 3 shows the bond issues of the countries with at least one outstanding debt bond issued by Rothschilds, as of February 1898. Among these countries, we classify Chile, Hungary, and Russia as "Rothschild countries". The line is drawn between Russia and Turkey. Not only does Turkey have a lower proportion of Rothschild underwritten debt (27.15% against Russia's 62.37%), but its debt was co-issued with the Imperial Ottoman Bank, with equal status. Historical records show that since 1881 the Imperial revenues had been monitored by an external bondholder's commission [Feis (1964)] and Wynne (1951)]. Thus, Rothschilds had a relatively small monitoring role. The remaining cases are less controversial. We exclude Egypt because, besides having a small proportion of her debt issued by Rothschilds, it was under foreign intervention during the Brazilian crisis period. Transvaal has only one bond issue. Spain has only a negligible proportion of her debt issued by Rothschilds.

Table 4 displays all the countries that in 1893 have at least one bond issued by Hambro. In contrast to the Brazilian crisis, all three Hambro countries have concentrated operations. Hambro underwrote not only 100% of the Norwegian and Swedish outstanding debt but also all their previous issues back in the 1870s [Wynne (1951)]. Although the three Italian bonds negotiated in London only date back to the 1860s, historical records allow us to classify Italy as a Hambro country [Abreu, De Mello and Sodr  (2007)].

In the Brazilian episode, the treatment group is composed by Russia, Chile, and Hungary. Analogously, in the Greek crisis, the treatment group is composed by Italy, Sweden, and Norway. In both cases the rest of the market is the control group. For the Brazilian episode (and to a lesser extent the Greek), the treatment group is quite heterogeneous, which is a desired feature of the treatment group because economically similar countries can be subject to common unobserved shocks.

A digression is warranted on the inclusion of Chile and Italy in the treatment groups of the Brazilian and Greek episodes, respectively. Although Italy and Greece are close geographically and have similar climates, there were no special commercial or financial linkages between them. Their bilateral trade was very small (the Italian share of Greek imports or exports was under 5%). The major exports of Greece were currants and tobacco (50-60%). Italian exports were less concentrated (about 50% were of silk products, olive oil, and wines). Similarities between Greece and Italy are only geographical. Economically, no relevant financial or trade linkages existed.

Chile had a financial crisis in 1898, which is a potential threat to our estimation strategy. The financial situation in Chile starts to deteriorate in early July, when a bank run forces the government to declare a moratorium on July 11th [Subercaseaux (1922)]. Since our window of analysis ends in May, the event of financial distress in Chile does not invalidate its inclusion as a member of the treatment group. Brazil and Chile are close geographically, but they had no bilateral trade to speak of. Chile's major export was saltpeter (50-60% of the total). Brazil's main export was coffee (60% of the total) and Chile was not an exporter of any other Brazilian exports such as rubber, sugar, and tobacco.

After defining the treatment and control groups and the length of the tranquil and crisis periods, we have 173 and 113 week-country pairs in the Brazilian and Greek episodes, respectively. The reduced number of observations for the Greek episode is due to more missing observations in the tranquil period (140 versus 79).

Table 5 presents the summary statistics on prices for both crises, before and after the market learned about the distress. Starting with the Brazilian episode at the crisis period, bond prices of Rothschilds countries were 7.38% lower than in the tranquil period. The rest of the market dropped only 3.85%. Qualitatively, the same pattern arises in the Greek episode. Bond prices dropped by 1.73% and 1.41% for Hambro and non-Hambro countries, respectively.⁹ Raw data are very noisy and standard errors are quite large.

III.C Empirical Strategy and Main Results

Typically, contagion is documented by computing co-movement between two securities before and after some episode of financial distress. Flandreau and Flores (2007) and Mauro and Yafeh (2003) follow this strategy. Forbes and Rigobon (2002) distinguish

⁹ The working paper version has kernel density estimates of the distribution of bond prices in treatment and control groups before and after the distress. "Difference-in-differences" of densities are in line with the difference-in-differences in means. See (Abreu, De Mello and Sodr  [2007]).

contagion from co-movement, which is analogous to the difference between causation and correlation. They show that correlation techniques produce inconsistent estimates for contagion because of heteroskedasticity, omitted variable bias and reverse causation. Heteroskedasticity hinders causal interpretation because distress increases the volatility of security prices by increasing the correlation between assets prices mechanically. Identifying the origin of the distress is also tricky. Is it country A that contaminated B, or the other way around (reverse causality)? Or is it country C that contaminated both (omitted variable)? We bypass these problems by selecting episodes of distress that are quasi-natural experiments for testing contagion by a shared financial intermediary. Thus, it is unnecessary to search for instruments to correct for reverse causation and omitted variable. The identification strategy is as follows. In both episodes, bonds are partitioned into two mutually exclusive sets: bonds issued by countries that had a strong relationship with the underwriter of the country under distress (the Treatment Group, T), and bonds issued by countries that did not (Control group, C). The sample is also partitioned into two periods, before (B) and after (A) the crisis in the distressed country. Let i be a country. We define the following two dummy variables:

$$EPISODE_t = \begin{cases} 1, & \text{if } t \in A \\ 0, & \text{otherwise} \end{cases} \quad \text{and} \quad MERCHANT_{ij} = \begin{cases} 1, & \text{if } i \in T \\ 0, & \text{otherwise} \end{cases} \quad (1)$$

We assume that for countries $i \in T$

$$\log(\tilde{p}_{jt}) = \beta_i + \beta_1 EPISODE_t + \varepsilon_{jt} \quad (2)$$

$$\text{and } \log(\tilde{p}_{jt}) = \beta_i + \varepsilon_{jt} \text{ for } i \in C \quad (3)$$

\tilde{p}_{jt} is the bond ‘‘corrected’’ price. We test whether β_1 is negative. Interpretation of β_1 as contagion by a shared underwriter is warranted under the following unconfoundedness assumption [Rosenbaum and Rubin (1983)]:

$$E[\varepsilon_{jt} \mid EPISODE_t, MERCHANT_i, Controls] = E[\varepsilon_{jt} \mid Controls] = 0 \quad (4)$$

In our setting, unconfoundedness means that, after controlling for bond and week fixed-effects, unobserved shocks to bond prices (ε_{jt}) are mean independent of crisis periods ($EPISODE$) and of sharing the underwriter ($MERCHANT$). Unconfoundedness is violated if countries with the same underwriter also have trade linkages, for example. We select episodes that are a quasi-natural experiment, justifying equation (4). In this case, β_1 is consistently estimated by the following model:

$$\log(\tilde{p}_{it}) = \beta_0 + \beta_1 MERCHANT_j \times EPISODE_t + C_j + T_t + v_{ijt}, \quad (5)$$

where C_j is a set of individual bond effects and T_t is a set of week dummies. We estimate

equation (5) for both the mean and the median. An observation is a pair of bond-week but the variation is at the country level. For this reason, we cluster observations at the country level to account for in-country correlation of bond price when estimating standard errors.

The dummies C_j control for all time-invariant country characteristics that make the relational underwriter particularly valuable, such as intrinsic risk, enough scale on debt, etc. The week dummies control for all shocks specific to each week but common to bonds (and countries). These include a generalized increase in risk aversion in the peripheral market, or an increase in the attractiveness of British bonds. Including week dummies and taking into account time-invariant bond effects makes it more credible that condition (4) is satisfied.

Table 6 presents fixed-effects estimation results for both episodes. The coefficients on the interaction $MERCHANT \times EPISODE$ capture the effect of the contagion by a shared underwriter. Bond prices in the treatment group fell, above and beyond the market, by 4.5% and 3% in the Brazilian and Greek episodes, respectively. In all columns standard errors are robust to (between and within) panel heteroskedasticity are reported. Results are robust to the inclusion of week dummies and to exclusion of defaulted bonds.

The estimated contagion seems small when compared to the results in Flandreau and Flores (2007). They estimate an increase in about 200 basis points in bond prices. The difference may be due to different sample periods: Flandreau and Flores concentrate on the 1820s, a period of much more volatility in the debt market. Another possibility is our method. We use only the drop in bond prices of the treatment group above and beyond the rest of the market (difference-in-differences). Doing so makes our identification strategy cleaner, but at a cost: we dispense with a potentially useful variation. If we did one difference, which is comparable to correlation, results would be twice as large. In their case, using more variation is not costly because they document segmentation. In our case, cleanliness of identification is more important because we are after contagion. Thus, we prefer the smaller, more conservative estimate.

Results for the mean may be sensitive to outliers, especially because the treatment contains only three countries in both crisis episodes. We estimate the model for the conditional median and quartiles, which is more robust to outliers. Table 7 has the results. For both episodes, the estimated impact on the three quartiles is negative. Except for the third quartile for the Brazilian episode, the impact is statistically significant and has a similar magnitude as the effect on the mean of the bond price distribution.

Because we make hard empirical choices, in Table 8 we present an extensive robust analysis. First, we change the length of the tranquil and crisis periods, reducing or

augmenting them by one or two weeks. Results are similar. We use the raw price (as opposed to the bond price corrected for coupons payments). Results are, if anything, stronger. We exclude bonds that, although not officially defaulted, were trading with prices lower than £40. Again, results are similar.

In addition, we perform several exercises with slightly different treatment groups. Although Italy and Greece had little economic links, we exclude Italy from the Greek episode treatment group. Since Norway and Sweden are very similar, we also exclude them, one at a time, from the treatment group. In both cases, results are similar. In the Brazilian episode, we start by excluding Russia because it was the borderline case in terms of classifying as a Rothschilds country. Results are similar. Finally, we exclude Chile. Although no relevant links between Brazil and Chile existed, their geographical proximity raises concerns. Contagion still arises. It is smaller but still of a significant impact. Precision is lost, which is not surprising because excluding Chile reduces the number of observations in the treatment group by half. The fact that the coefficient is still negative indicates that the phenomenon indeed does not depend on the inclusion of Chile.

IV. Conclusion

We document a type of contagion whose transmission mechanism is a shared underwriter. This phenomenon is documented for two different episodes of financial distress in the late nineteenth century. Both episodes share a common feature of desirable characteristics that allow us to identify contagion. They are isolated and have an internally-produced impending debt restructuring event in a country with an established relationship with a merchant bank, and there are other countries with strong ties with the same underwriter. This contagion is informational in essence, and arises as the flip-side of the relational lending coin: the very reason why relational finance (in this case, underwriting) helps alleviate informational and incentive problems also produces contagion.

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Fig. 1 Prospectus of the 1898 Brazilian Funding Loan

United States of Brazil Funding Scheme

The Government of the United States of Brazil, having decided to fund for three years, namely, from the 1st of July, 1898, to the 30th of June, 1901, both inclusive, the Interest on the External Debt, the Interest on the 4½ per cent. Internal Gold Loan of 1879 and also certain amounts payable annually for Railway Guarantees, His Excellency the Minister of Finance, acting in conformity with Laws No. 401 of the 11th September, 1846, No. 427 of the 9th December, 1896, No. 428 of the 10th December, 1896, and No. 489 of the 15th December, 1897, has authorized Messrs. N. M. Rothschild & Sons to issue an amount not exceeding £10,000,000 nominal Capital, 5 per cent. Funding Bonds specially secured by the Customs Revenues, as hereinafter mentioned.

The following LOANS will be included in the funding scheme: The 4 ½ per cent. Loan of 1888. [It follows a list of other four loans]. The Internal 4 ½ per cent. Gold Loan of 1879, and also the amounts GUARANTEED to the following Railways: The Alagoas Railway Company (Linha Principal). [It follows a list of 18 other foreign railways].

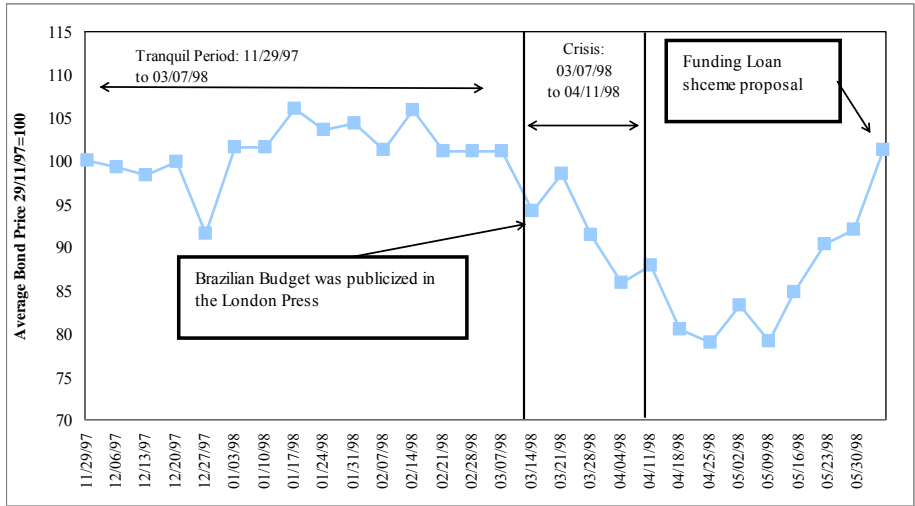
The Sinking Funds and Redemption of the Loans, will be suspended for thirteen years from the 1st of July, 1898. The said 5 per cent Funding Bonds will be the specially secured by the Rio de Janeiro Customs Revenues, on which they will be a first charge after provision has been made for the amount required for interest and repayment of the £2,000,000 five per cent. Treasury Bills issued in January, 1898, which are repayable at the rate of £500,000 every six months, the first amount being due on the 1st of July, 1898. The Bonds will also be secured by the Customs Revenues of the other parts of the Union, should the Rio de Janeiro Customs at any time prove insufficient. According to the Official Returns the Customs Revenues of the Federal Capital amounted, for the year of 1897, to 92,000 Contos of Reis, equivalent, at the Exchange of 7d., to £2,683,333 and at the Exchange of 8d., to £3,066,066. The total Customs Revenues of the Union, including the above, amounted to 244,000 Contos of Reis, equivalent, at the Exchange of 7d., to £7,116,666 and the Exchange of 8d. to £8,133,333.

On and after the 1st of January, 1899, and *pari passu* with the issue of Funding Bonds the Government will deposit in Rio de Janeiro, in Trust with the London and River Plate Bank, Limited, the London and Brazilian Bank. Limited, and the Brazilianische Bank fur Deutschland, the equivalent of the said Bonds in current paper money at the exchange of 18d., and the paper money equivalent to the Bonds issued from the 1st of July to the 31st of December, 1898, will be deposited in the same manner during a period of three years, commencing the 1st of January, 1899. The paper money deposited will either be withdrawn from circulation and destroyed, or, if and when the Exchange is favourable, will be applied in the purchase of Bills on London in favour of Messrs. N. M. Rothschild & Sons, to be placed to the credit of a Fund towards the future payment in Gold of the Interest on the Loans and the Railway Guarantees.

The 5 per cent Funding Bonds will be free from all Brazilian Taxes. The Bonds will be to bearer in sums of £20, £100, £500 and £1,000 each, with Coupons for Interest at the rate of 5 per cent. per annum payable quarterly on the 1st of January, the 1st of April, the 1st of July, and the 1st of October in London, in pounds sterling; and in Paris, Amsterdam, Brussels and Hamburg at the exchange of the day in London. The bonds will be redeemed by an Accumulative Sinking Fund of one-half per cent, per annum, to be applied half-yearly by purchase of Bonds, when the price is under par, and when at or above par by drawings. The Redemption of the Bonds by means of the Sinking Fund, will commence at the end of ten years from the 30th of June, 1901, but the Government reserves the right to pay off the Loan at par at any time. This Funding Scheme was formulated with the approval of Dr. Campos Salles, President-Elect of the Republic, who during his recent visit to London was in constant communication with his Government on the subject: and before his departure His Excellency expressed his satisfaction with the scheme and added his assurance that during his term of office, he would do all in his power to place the finances of Brazil on a sound basis, and to restore the credit of his country.

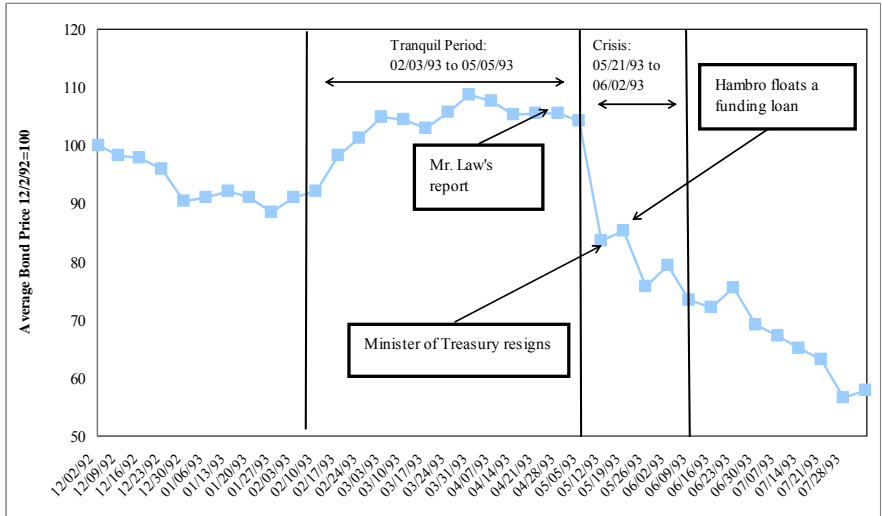
[Details follow on conditions to be observed by holders of the funding of their Coupons as they become due up to the 30th of June, 1901, inclusive.] [London] New Court, E.C., 15th of June, 1898.

Fig. 2 Variation in the Average Brazilian Bond Prices



Source: The [London] Times. Average bond price is computed by the arithmetic mean of the prices the 6 Brazilian Bonds negotiated in London. The mean was normalized to 100 in 10/1/1897

Fig. 3: Variation in the Average Greek Bond Prices



Source: The [London] Times. Average bond price is computed by the arithmetic mean of the prices the 5 Greek Bonds negotiated in London. The mean was normalized to 100 in 12/2/1892

Table 1 – Proportion of outstanding debt issued by the main underwriter as of January 1890.

Country	Number of bonds negotiated in London	Bonds issued by the main underwriter	Amount of outstanding debt (in pounds) in January 1890 issued by the main underwriter (percentage of the total outstanding debt)
Argentina	6	2	9,648,800 (62%)
Brazil	8	8	32,072,994 (100%)
Chile	4	2	8,163,200 (87%)
China	4	4	3,612,100 (100%)
Greece	5	4	15,319,180 (95%)
Hungary	3	3	64,816,700 (100%)
Italy	4	1*	157,176,484 (97%)
Norway	3	3	6,362,100 (100%)
Portugal	1*	1*	46,573,560 (100%)
Russia	17	5	35,932,739 (39%)
Sweden	3	3	8,831,780 (100%)

Sources: Investors Monthly Manual (IMM), January 1890 and The [London] Times (several issues). *Number of bonds negotiated* in London refers to loans listed by the IMM. The underwriter(s) was(were) determined, for each loan, by inspecting the prospectuses of the issues published on The [London] Times. The main underwriter refers to the underwriter which took part in issuing the majority of a country's debt. We attributed a loan to the main underwriter in the cases in which it was not the only one responsible for that issue (multiple underwriters). Data on outstanding debt is also from IMM, January 1890, (pp. 8-12). We excluded countries that were in default in 1890 or whose outstanding bonds were floated (or had its original clauses modified) as the result of debt renegotiations agreements with bondholders (Colombia, Costa Rica, Egypt, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, San Domingo, Spain, Turkey, and Uruguay) and debtors that had only one loan listed by the IMM (Hawaii, Japan, and Venezuela). Only federal loans were considered. * represents a series of perpetuities emissions, all with the same interest rate, which are listed as one bond by the IMM.

Table 2 – Sample Description

Panel A: Brazilian Episode			
Bonds whose price were published in <i>The Times</i> in February 1898			
	#Borrowers	Bonds	%
Total	33	90	
<i>Countries</i>	27	75	83.33%
<i>Provinces</i>	6	15	17.78%
<i>Defaulted</i>	6	16	6.67%
<i>Hungary, Russia, and Chile</i>	3	15	16.67%
<i>Other Governments</i>	30	75	83.33%
Outstanding Debt			
	Total	Median	%
Total	£681,705,648	£2,386,100	
<i>Countries</i>	£665,747,148	£2,972,180	97.66%
<i>Provinces</i>	£15,958,500	£1,131,400	2.34%
<i>Hungary, Russia, and Chile</i>	£193,236,178	£4,000,000	28.35%
<i>Other Governments</i>	£488,469,470	£2,359,800	71.65%
Panel B: Greek Episode			
Bonds whose price were published in <i>The Times</i> in February 1893			
	# Borrowers	Bonds	%
Total	34	84	
<i>Countries</i>	27	70	83.33%
<i>Provinces</i>	7	14	16.67%
<i>Defaulted</i>	9	14	16.67%
<i>Italy, Sweden, and Norway</i>	3	9	10.71%
<i>Other Governments</i>	31	75	89.29%
Outstanding Debt			
	Total	Median	%
Total	£423,648,860	£2,006,000	
<i>Countries</i>	£410,479,860	£2,581,750	96.89%
<i>Provinces</i>	£13,169,000	£829,300	3.11%
<i>Sweden, Norway, and Italy</i>	£12,488,620	£1,697,120	2.95%
<i>Other Governments</i>	£411,160,240	£2,282,450	97.05%

Source: *The [London] Times*, Stocks and Shares, coupons payable at London. Investors Monthly Manual for outstanding debt

Panel C: Geographical Distribution of the Sample

	Episodes of Distress			Episodes of Distress	
	Greek No. of Bonds	Brazilian No. of Bonds		Greek No. of Bonds	Brazilian No. of Bonds
South America			Europe		
Argentina (central)	9	11	Bulgaria	1	2
<i>Buenos Aires</i>			Denmark	-	1
<i>Cordoba</i>	1	3	Greece	-	6
<i>Entre Rios</i>	3	3	Hungary	1	1
<i>Santa Fe</i>	5	6	Italia	3	2
Argentina (central and provincial)	20	25	Norway	3	3
Brazil (central)	4	-	Portugal	1	1
<i>São Paulo</i>	1	-	Russia	6	7
Brazil (central and provincial)	5	-	Spain	2	2
Chile	5	8	Sweden	3	2
Colombia	1	1	Turkey	9	6
Ecuador	1	1	Total	29	33
Paraguay	1	1			
Uruguay	1	2	Asia		
Venezuela	1	1	China	4	5
Total	35	39	Japan	1	1
			Total	5	6
North and Central America			Africa		
Costa Rica	2	2	Egypt	5	5
Guatemala	2	1	Transvaal	1	1
Honduras	2	1	Total	6	6
Mexico (central)	2	3			
<i>San Luis Potosi</i>			Oceania		
<i>Tucuman</i>	1	1	Hawaii	1	-
Mexico (central and provincial)	4	4	Total	1	0
Nicaragua	1	-			
San Domingo	-	1			
Total	11	14			

Table 3 – Peripheral Countries with debt issued by Rothschild in 1898

Loans	Underwriter	Amount of Outstanding Debt in February 1898 (in British pounds)	Proportion Issued By N. M. Rothschild & Sons
Chile			
4.5% 1885	City Bank	745,800.00	
4.5% 1886	Rothschilds	5,604,900.00	
4.5% 1887	Rothschilds	1,089,400.00	
4.5% 1889	Rothschilds	1,484,392.00	
5% 1892	Rothschilds	1,770,400.00	87.08%
4.5% 1893	Rothschilds	582,200.00	
4.5% 1895	Rothschilds	1,988,600.00	
5% 1896	Rothschilds	4,000,000.00	
Hungary			
4% Gold Rentes	Rothschilds	63,400,000.00	97.13%
3% State Loan	Lloyds Bank	1,871,000.00	
Russia			
1822	Rothschilds	4,445,735.00	
1859 3%	Thompson	2,375,300.00	
Nicolas Railway	Baring	21,256,440.00	
3% Transcaucasian Railway	Baring	27,312,241.00	
Cons. Series I	Rothschilds	48,459,310.00	62.37%
Cons. Series II	Rothschilds	12,485,935.00	
Cons. Series III	Rothschilds	8,221,460.00	
3.5% Bonds	Rothschilds	15,766,112.00	
4% Dvinsk and Vitebsk*	-	2,983,040.00	
Turkey			
4% 1891	Rothschilds/Imperial Ottoman Bank	6,157,920.00	
3.5% 1894	Rothschilds/Imperial Ottoman Bank	8,130,280.00	
4% Priority 1890	Imperial Ottoman Bank	7,303,240.00	
Converted Series A	Council of Administration of the Ottoman Public Debt	799,400.00	
Converted Series B	Council of Administration of the Ottoman Public Debt	7,930,300.00	27.15%
Converted Series C	Council of Administration of the Ottoman Public Debt	29,117,171.00	
Converted Series D	Council of Administration of the Ottoman Public Debt	42,384,465.00	
5% Customs loan	Barclay	5,160,320.00	
Egypt			
Unified 4%	Anglo-Egyptian Banking Company	55,971,960.00	
Pref. Red 5%	Bank of England	26,568,420.00	
3% Inscribed	Bank of England	2,825,160.00	3.71%
4.25% State Domain	Rothschilds	3,546,300.00	
4% Daira Sanich	Stern	6,631,600.00	
Spain			
1882 External	Financial Agency	77,587,612.00	
Quicksilver 1870	Rothschilds	413,000.00	0.53%
Transvaal			
5% 1892	Rothschilds	2,500,000.00	100.00%

Source: Amount of Loan Unredeemable: Investor's Monthly Manual (Feb. 1898). Underwriter: Bond prospectuses published by The Times.

Table 4 - Peripheral Countries with debt issued by Hambro in 1893

Loans	Underwriter	Amount of Outstanding debt February 1893 (British pounds)	Proportion Issued By C.J. Hambro
Norway			
4% 1880	C.J. Hambro	1,055,120.00	
3.5% 1886	C.J. Hambro	1,697,120.00	100.00%
3% 1888	C.J. Hambro	3,525,760.00	
Sweden			
4% 1878	C.J. Hambro	887,840.00	
4% 1880	C.J. Hambro	5,988,000.00	100.00%
3% Bonds	C.J. Hambro	1,470,000.00	
Italy			
Sardinian 5% 1851	C.J. Hambro	740,340.00	
Irrigation 6%	C.J. Hambro	2,120,200.00	100.00%
5% Marremmana Railway	C.J. Hambro	1,782,000.00	

Source: Amount of Loan Unredeemable, Investor's Monthly Manual (Feb. 1898). Underwriter: Bond prospectuses published at *The Times*.

Table 5 – Summary Statistics

		Brazilian Episode			Greek Episode		
		<i>Tranquil</i>	<i>Crisis</i>	Δ	<i>Tranquil</i>	<i>Crisis</i>	Δ
Relational Countries	Obs	129	33		87	34	
	Mean	95.25	88.22	-7.38%	99.36	97.67	-1.73%
	Std Dev	16.69	16.39		7.34	6.96	
Rest of the Market	Obs	799	210		783	230	
	Mean	68.08	65.55	-3.85%	68.30	67.35	-1.41%
	Std Dev	32.05	32.04		30.49	29.89	

Source: *The [London] Times*, Stocks and Shares

Table 6 – Regression Results: Dependent Variable: Log (Bond Price)

	Brazilian Episode			Greek Episode		
	Fixed Effects			Fixed Effects		
MerchantxEpisode	-0.044 [0.023]*	-0.046 [0.022]**	-0.042 [0.024]*	-0.034 [0.015]**	-0.036 [0.015]**	-0.027 [0.016]*
Episode	-0.005 [0.011]	-	-	0.02 [0.014]**	-	-
Week Dummies?	No	Yes	Yes	No	Yes	Yes
Excludes defaulted bonds?	No	No	Yes	No	No	Yes
Number of observations	1170	1170	1001	1120	1120	955
R-squared	0.02	0.16	0.16	0.07	0.15	0.17

All regressions include a constant. Standard errors are clustered at the country level and are robust to between panel heteroskedasticity. *** = significant at 1%. ** = significant at 5%. * = significant at 10%.

Table 7 – Linear quartile regressions

	Brazilian Episode			Greek Episode		
	3rd quartile	Median	1st quartile	3rd quartile	Median	1st quartile
Merchant*Episode	-0.003 [0.012]	-0.035 [0.017]**	-0.043 [0.019]**	-0.021 [0.005]***	-0.012 [0.004]***	-0.015 [0.003]***
Episode	-0.008 [0.002]****	-0.012 [0.002]****	-0.01 [0.002]***	0.015 [0.003]***	0.007 [0.002]***	0.006 [0.001]***
Number of observations	1109	1109	1109	1120	1120	1120
Bond Dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.94	0.94	0.94	0.92	0.94	0.95

Bootstrapped errors in brackets (500 replications). *** = significant at 1%. ** = significant at 5%.

Table 8 – Robustness Checks

Episode	Brazilian		Greek	
	Merchant* Episode	Standard Deviation	Merchant* Episode	Standard Deviation
Beginning of the tranquil period	$t+1$	-0.046 [0.023]*	-0.039 [0.17]**	
	$t-2$	-0.039 [0.022]*	-0.039 [0.018]**	
Beginning of the crisis	$t-1$	-0.047 [0.023]*	-0.036 [0.015]**	
	$t+1$	-0.053 [0.025]**	-0.039 [0.017]**	
Crisis Ending	$t-1$	-0.051 [0.023]**	-0.035 [0.017]*	
	$t+1$	-0.048 [0.025]**	-0.036 [0.016]**	
Raw Price		-0.049 [0.023]**	-0.037 [0.017]**	
Only bond prices greater than 40: Brazil ^a and Greece ^b		-0.050 [0.024]**	-0.020 [0.011]*	

Fixed Effects estimates including week dummies. All regressions include a constant. Standard errors are clustered at the country level. *** = significant at 1%. ^a 781 obs. (52 bonds). ^b 754 obs. (53 bonds).

Greek Episode		
	Merchant* Episode	Standard Deviation
Greek Neighborhood ^a	-0.017	[0.006]**
Excludes Italy	-0.017	[0.008]*
Excludes Sweden	-0.021	[0.005]***
Excludes Norway	-0.013	[0.006]*
Brazilian Episode		
Excludes Russia ^(e)	-0.055	[0.020]***
Excludes Chile ^(f)	-0.024	[0.028]

Fixed Effects estimates including week dummies and excluding defaulted bonds. All regressions include a constant. Robust standard errors in brackets. *** = significant at 1%. Raw prices denotes the not corrected for coupon payments ^(a) Includes Bulgaria, China, Egypt, Hungary, Italia, Norway, Portugal, Russia, Spain, Sweden, and Turkey, 516 obs (37 bonds). ^(b) 482 obs. (34 bonds) ^(c) 482 obs. (34 bonds) ^(d) 471 obs. (34 bonds) ^(e) 961 obs. (68 bonds). ^(f) 529 obs. (38 bonds).