TEXTO PARA DISCUSSÃO

No. 552

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Informational spillovers in the pre-1914 London Sovereign Debt Market[†]

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Abstract

We document a novel type of international financial contagion whose driving force is shared financial intermediation. In the London peripheral sovereign debt market during pre-1914 period financial intermediation played a major informational role to investors, most likely because of the absence of international monitoring agencies and the substantial agency costs. Using two events of financial distress – the Brazilian Funding Loan of 1898 and the Greek Funding Loan of 1893 – as *quasi-natural* experiments, we document that, following the crises, the bond prices of countries with no meaningful economic links to the distressed countries, but shared the same financial intermediary, suffered a reduction relative to the rest of the market. This result is true for the mean, median and the whole distribution of bond prices, and robust to an extensive sensitivity analysis. We interpret this as evidence that the identity of the financial intermediary was informative, i.e, investors extracted information about the soundness of a debtor based on the performance of her financial intermediary. This spillover, informational in essence, arises as the flip-side of the relational lending coin: contagion arises for the same reason why relational finance (in this case, underwriting) helps alleviate informational and incentive problems,

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I. Introduction

Recent literature on international financial contagion has recognized the existence of informational channels of shock propagation in which crisis in one country affects the asset values issued by other countries, even in the absence of fundamental economic links, common external shocks, or mechanistic portfolio realignment issues. These channels has been called *informational spillovers*, or *the "wake up call" hypothesis* (Van Rijckeghem and Weder [2000], pp 3). Aside from explanations based on self-fulfilling crises, the literature was has not provided, neither theoretically nor empirically, any specific economic rationale capable of producing informational spillovers. In this paper, we document two examples in which the transmission mechanism of informational contagion is a *shared financial intermediary*.

The London market for peripheral sovereign debt bonds in the pre-1914 period is the empirical setting. By studying two events of financial distress, the Brazilian funding loan of 1898 and the Greek funding loan of 1893, we show that countries with no meaningful economic links with distressed debtor but with a strong relationship with the same *financial intermediary* suffered a reduction in their bond prices in the secondary market above and beyond the rest of the market. These results suggest that the identity of the financial intermediary contained relevant information about borrowers. By observing the performance of other countries whose debt was vouched by same underwriter, investors learned about something about the soundness of a borrower, thus generating a form of *informational* contagion. A crisis in a relational debtor "waked up" investors to update their priors on the other asset values underwrote by the intermediary.

The pre-1914 bond market shares some common characteristics with present day markets. The prevalence of indirect lending through bond issues as the main source of external funding for debtors, and the absence of an international legal system to enforce sovereign debt contracts are two such characteristics. Nevertheless, the many differences make the pre-1914 a particularly interesting setting for studying informational spillover in financial markets, especially when contagion is driven by shared financial intermediation (see Mauro, Yafeh [2003] to a lengthy comparison between the actual and the pre-WWI markets).

One crucial difference is the very existence of such long-term relationships between borrowers and financial intermediaries, and their *modus operandi*. Between 1870 and 1914, several countries did all their debts issues with the same bank or with a syndicate of financial intermediaries led by the same bank. More importantly, these

leading banks played an active role in monitoring and advising their relational debtors, providing macroeconomic advice, debt management counseling, market-making of bonds, and direct lending services such as short-term credit advances (Flandreau, [2003]).

The existence of these long-term relationships may reflect the fact that, compared to present day markets, there was considerably more informational asymmetry between bondholders and countries in the pre-1914 period, especially outside Western Europe. For example, the information readily available to the average British investor about the political and economic situation in Peru or Transvaal was not likely to be precise by today's standards. Information gathering and monitoring were much costlier. While nowadays an investor in Amsterdam can easily verify how the Chilean current account balance behaved over the last five years, many of the countries and provinces that issued in the pre-1914 London bond market had not established an organized, systematic, and trustworthy standard for publishing their fiscal and commercial balances.

Investigation on the institutions and the workings of London pre-1914 debt market indicate that the City's sovereign market had two important features. First, by establishing long-term relationships, financial intermediaries reduced their marginal cost of gathering specific-country information, and improved their ability to monitor clients, thus acquiring a competitive advantage in underwriting the countries' initial public offers of bonds. Second, the relationship was observable, therefore conveying information to bondholders. Given these two features make the pre-1914 a good empirical setting for testing the hypothesis of *informational contagion by shared underwriter*, a spillover driven by the fact that, when pricing assets issued by a country, investors took into account the credibility of the financial intermediary that had an observed long established relationship with that debtor.

The Brazilian and Greek crises were chosen because they were the only events of financial distress that satisfied the following set of conditions. First, both countries had a strong financial relationship with a merchant bank, the most important type financial intermediary operating in the London peripheral market. In both episodes the distress was caused mainly by internal reasons and/or commodity shocks, and not by a generalized financial crisis originated in the developed centers. Moreover, in both episodes there existed a group of countries (other than the country in distress) that had, at the time of the distress, a strong relationship with the *same* intermediary as the country in distress. Finally, countries that had a strong relationship with the same merchant bank cannot have meaningful economic linkages to the distressed country, *and* could not have been directly

affected by the commodity shock that might have caused, or intensified, the financial distress in the original country. With all these conditions satisfied, the event of financial distress in one country is a *quasi-natural* experiment for testing the hypothesis of informational contagion: countries that had a strong relationship with the same merchant bank are "treatment" units, and other countries are the "control" group. The hypothesis of *informational contagion by shared underwriter* is tested by comparing, around the period of financial distress, the dynamics of bond prices between these two groups of countries..

The paper is organized as follows. Section II discusses the related literature. Section III contains a detailed description of the London market for peripheral sovereign debt, focusing on the level of risk that its participants faced. Section IV describes the workings of financial relationships, with emphasis on the advantages of the relational underwriters in solving adverse selection and moral hazard problems faced by lenders. Section V explains the empirical strategy. We show that two episodes of financial distress, the Brazil in 1898 and Greece in 1893, are *quasi-natural* experiments, and therefore provide an unique empirical opportunity to test for presence of informational contagion,. Section VI presents the data and the summary statistics. Section VII shows our main results. Section VIII discuss the findings, including alternative explanations, and concludes.

II. Relating two literatures: contagion and relational lending

During the 1990s, a consensus emerged that trade linkages are unable to totally account for the numerous events of contagion (Kumar and Persaud [2002]). Several works tried to fill the gap by studying the role of mechanical portfolio realignment and financial linkages in fomenting recent contagion episodes. Mechanical portfolio realignment spillovers arise between countries with no fundamental links when investors respond to a crisis by changing their investment strategies, following some optimum decision rule, as mean-variance framework, Value-at-Risk (Schinasi and Smith [2000]), or adjusting the portfolio's exposure to risk factors (Kodres and Pritsker [2002]). Realignment can also be triggered by liquidity constraints or capital adequacy requirements (Valdés [1996]). Another set of papers, more closely related to but still quite distinct from ours, pursue the explanation of contagion among countries with shared common creditors. Common creditor spillovers happen when depositors call the creditor with exposure in the country under distress. To fulfill her commitments, the creditor sells her positions in another

country's assets and contagion arises (Calvo [1998], Kaminsky and Reinhart [2000], Van Rijckeghem and Weder [2000]).

Finally, spillover effects caused by herding behavior do provide an economic rationale for non-fundamental spillovers effects. However, informational contagion through shared underwriter produces sharper empirical implications because one can identify which countries should suffer contagion. For instance, Calvo and Mendoza [2000] explore the idea that the utility gains from processing country-specific information are small when there is a large set of investment options, leading investors to mimic arbitrary market portfolios. Thus, *ex- post* contagion, i.e., which countries are affected by some financial turmoil, depend upon the *ex-ante* arbitrary portfolios and market positions. Goldstein and Pauzner [2004] present a model in which the complementary nature of the investment (the number of individuals holding the assets affects their return), along with wealth effects on risk aversion, generate herding behavior. Again, the contagion results depend on portfolio decisions made *ex- ante* by investors.

Differently from these studies, the spillover considered here is driven by investors,following a specific economic reasoning, such as reinterpreting information, updating beliefs and recalculating the expected returns of a whole class of assets, *regardless* of whether countries involved share any economic linkages. Moreover, the economic reasoning implies the identification of which debtors were subject to non-fundamental spillover.

Our work relates also with the literature on relationship lending. When a borrower gets in trouble, this has an adverse reputational effect on her relational financial intermediary. This reputational effect arises precisely because there is a well-establish borrower-lender relationship. Relations, which help alleviating adverse selection and hidden action problems, also produce contagion.

The idea that relationships reduce the costs of gathering and processing debtor specific information is presented in the relationship lending literature. 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 [2006] relationships work as disciplining devices to mitigate hidden action problems. Empirical evidence supporting these proposition abounds (see Berger and Udell [1995], Hoshi, Kashyap and Scharfstein [1991], Aoki and Dinç [2000] among others). Although the relationship considered here is not direct lending, the results of the relationship lending

literature apply in indirect lending setting as well, since the payoff of a financial intermediate engaged in a relationship is connected to the *ex-post* behavior of the debtor. For instance, if the debtor fails and falls in disgrace, the intermediary suffers a payoff loss from not being able to promote future bond issues of the defaulter. Or it may have its reputation tainted, resulting in profitability decrease of other sovereign debt initial public offerings.

In the light of this reasoning, recent work on corporate Initial Public Offerings (IPOs) underlines the importance of credibility of both issuer and underwriter in explaining the success of IPOs. CFOs surveyed by Brau and Fawcett [2006] report that, when choosing the underwriter, they care more about the intermediary's reputation and expertise than other aspects such as market-making, pricing and valuation promises and fee structures. In the same fashion, Krigman, Shaw and Womack [2000], find that the firms' decision to switch underwriter is more based on underwriter's prestige than on the poor performance of previous IPOs. Carter and Manaster [1990] argue that, by choosing more prestigious underwriters, firms reduce the benefits of investors to gather firm-specific information, therefore reducing the number of informed investors and the IPO's underprice level (see Carter, Dark and Singh [1998] for empirical evidence on this topic).

This paper contributes to the literature in two ways. First, it identifies and tests for an undocumented channel of non-fundamental spillovers. Second, it adds on an empirical literature on how the financial markets institutional structure, in my case, the existence of relationships, can explain shock propagation among different economies.

III. The peripheral London market for sovereign debt

Operating since the 1820s, the London market for sovereign debt was, until the World War I, the most important in terms of volume of resources invested and variety of borrowers, even though it faced from the early 1870s increasing competition from other European continental bourses (such as Paris and Berlin), and, towards the end of the 19th century, from the New York Stock Exchange. Feis [1964, pp. 27] estimates that in December 1913, British investment on government bonds amounted £ 1.1 billion, representing approximately one third of total overseas British investment. This proportion was higher in the late XIX century.

The London sovereign debt market can be divided in three segments, according to the regulation of the market and to the level of financial development of its participants: colonies and British dominions, financially developed borrowers, and the peripheral market. These segments had different *modus operandi* regarding debt underwriting and, more importantly, borrowers in different segments had different risk statuses. We focus on the peripheral segment, where relationships between countries and London intermediaries played a major role in transmitting information to market participants, most likely because in the peripheral segment, moral hazard and information asymmetry issues were particularly acute, enhancing the relevance of the monitoring role of intermediaries. Finally, focusing in that group permits us to maintain an some level of homogeneity among the debtors in our sample.

Even though this market segmentation was except for the case of colonies and dominions, informal, the financial press of the period adopted it, strengthening the idea that financial assets of these groups were perceived by investors as having different status. Quite tellingly, both The [*London*] Times and the *Investors' Monthly Manual* (IMM), when discussing the financial events and bond quotations, classified countries according to this categorization.[1]

The bonds of British dominions and other colonies were under a very specific regulation. Through the Colonial Stock Act of 1877 and its revision in 1900, the British government maintained a tough control upon the colonial debt issues, imposing safeguards to borrowers as the prohibition of the borrower to create legislation contrary to the British investors and total compliance with any British court decision in legal cases pursued by bondholders (Feis [1964], Flandreau [2005]). For example, Indian Government loans were controlled directly by the British Parliament. Regarding financial matters, colonial and British dominions were officially separated in two categories: colonies and responsible (but not autonomous) dominions. Until the 1880, almost all loan issues of these two categories were handled by the Office of Crown Agents or the Bank of England. The latter took care of several New Zealand, Western Australia, and South Australasia issues. After that date, the Office of Crown Agents became administratively independent of the British government and self responsible governments could no more issue loans through it, although colonies continued largely to use its services (Sunderland, [1999]). Participation of regular financial intermediaries was allowed for colonies

[1] The IMM was the main publication of the London Stock Exchange.

classified as having responsible government, but in most of cases, those dominions used domestic banks with London connections (Davis and Galman, [2001, pp. 177]). Moreover, the revision of the Colonial Stock Act in 1990 made possible to trustees, supervisors of investment funds with high transparency standards, to deal with domain stocks (Stewart, [1938]). In general, colonial and dominions bonds were considered a less risky investment as debtors were subject to British surveillance.

The second category, the financially developed countries, contained sovereigns as France, Belgium, Germany, Netherlands, Switzerland, United States, among others. Starting in the 1880s, after having developed mature internal financial markets and as the volume of international business in their currencies increased, these debtors were able to issue most (and in some cases all) of their debt internally, and use the London market only as secondary[2]. Therefore, for this category, long lasting relationships with London financial intermediaries did not exist. Furthermore, because countries in this segment were economically developed, less prone to political turmoil, and located, except the United States, in Continental Europe[3], the purchase of their bonds were viewed as a sounder investment, and the level of information available on their financial standings were higher. These countries were, for instance, subject of continuous press coverage.

The peripheral market encompassed the rest of the governments that used the London market for funding their ventures or budgetary needs. It included almost all Latin America, some Eastern European states, Asian and African countries, as well as less reputable Western European borrowers as Portugal, Spain, and Italy. Contrary to the colonial market, this segment was not regulated in any meaningful way and, differently from the category of financially developed debtors, most of its participants did not have a high degree of economic development, political stability, and trustworthy official means of information disclosure of fiscal and commercial statistics. Moreover, most participants of the peripheral market were far away from London, increasing the cost of accessing country-specific information.

[2] Some peripheral countries (Brazil, Argentina, and Russia) had, at some point before the World War I, bonds issued at home which were negotiated in London, but these cases were few and the amount of the debt represented by these bonds were small compared to the total debt issued in European Continental centers by these sovereigns.

[3] Although they sound developed, Norway and Sweden had neither a fully developed financial system capable of absorbing all debt issues nor an international currency allowing their internal debt to be negotiated in the main continental bourses. Russia, despite of its great military power, was in the same situation.

In the majority of cases, after 1860[4], two kinds of financial intermediaries were used by the peripheral countries to float their issues in London: merchant banks and joint-stock banks. Merchant banks were the term used to describe large private investment institutions with high reputation, which practically monopolized the market of foreign debt underwriting until the 1860s. In fact, the core business of merchant banks was foreign bonds and railways issues. As an illustration the prevalence of merchant banks, between 1815 and 1904 the two main British merchant banks, the N. M. Rothschild and Sons Limited (hereinafter Rothschilds) and the Barings Brothers & Co. (hereinafter Barings), participated in the issue of no less than 205 government bonds, totaling approximately £ 2 billion (Davis and Galman, [2001, pp. 167-68]). Most of these issues occurred after 1870. Towards the end of the century, merchant banks faced increasing competition from joint-stock banks, which were mainly British-owned overseas intermediaries specifically created to finance trade between Britain and some specific country or region. For example, the Hong Kong and Shanghai Banking Corporation handled almost all Chinese issues between 1880 and 1914. In the same way, the Imperial Ottoman Bank (formed by British and French capital) took over the flotation of Turkish debt, mainly after the establishment of the international financial control in Turkey during the 1880s (Wynne [1951]).

As underwriters, merchant banks were responsible for tasks, some rather bureaucratic as handling subscriptions, making coupon payments. Other tasks were more substantial, such as acting as trustees for the bondholders and issuing a prospectus. A typical prospectus included detailed information about the terms of the loan (the currency of denomination, the coupon, payment dates), information about the specific destination of the proceedings of the loan (if any), and about the country in general. In appendix 1, we show (parts of) the prospect of the six per cent £1,000,000 loan issued by the Republic of Salvador (nowadays El Salvador) in 1908. This prospect is very illustrative, bringing detailed balance of payment information about the country, information about the market of its main export crop (coffee), and about its relations with neighbors. Interestingly it states explicitly the presence of a representative of the trustees, and relations with the government of Salvador.

[4] In the early stages of the market, between 1820 and 1860, many commercial companies with business abroad were in charge of issuing debt of foreign sovereigns, especially those from outside Europe (see Marichal [1988] for some Latin American examples).

In the peripheral market, several major countries established long lasting relations with a financial intermediary or with an international syndicate of banks (normally when the country issued debt concurrently in more than one European bourse). These relationships were observed to the public as the debtors repeatedly selected the same intermediary as agents for sovereign initial public offers. By January 1890, 10 out 26 peripheral countries with more than one bond listed had 50% or more of their outstanding debt had been issued by the same intermediary. These relational debtors had more than 50% of total peripheral debt negotiated in London.[5] Table I displays, for January 1890, the proportion of central government's outstanding debt issued by each countries' main underwriter. Excluding debtors that were on default or whose bonds were issued (or had their clauses changed) as a result of debt settlements, only Russia had less then 50% of their outstanding debt floated by the same intermediary. Later on in the 1890s , however, Russia would have way more than 50% of her debt dealt in Lombard Street issued by one single merchant bank, the Rothschilds.[6]

Table I – Proportion of outstanding debt issued by the main underwriter

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%)
Rússia	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). N*umber of bonds negotiated* in London refers to loans listed by the IMM. The underwriter(s) was(were)

[5] Bonds were listed at the *Investors Monthly Manual*. The *Investor Monthly Manual* includes a list of foreign loans (and their outstanding amount) of all peripheral countries considered in this study, although, for a few countries, some minor loans (as some provincial and municipal loans) were not displayed. Therefore, the London bonds' total outstanding debt, for these countries, is underestimated by a small amount.

[6] In January 1891, the proportion of outstanding Russian debt floated through the Rothschilds reached 67%, totaling £ 91 million (Investors Monthly Manual, January 1891).

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.

When investing their money in the peripheral market, the average investor faced significant uncertainty about borrowers' financial soundness. In fact, the history of the peripheral market is, for most of its debtors, a tale of defaults and debt renegotiations. From the early 1820s to the eve of the First World War, major debtors such as Mexico, Argentina, Greece, Portugal, Spain, Turkey, Egypt as well as small players such as Santo Domingo, Honduras, Paraguay, Colombia, Uruguay, Liberia, and Venezuela were part, for long periods of time, of the vast list of defaulters. This made the informational importance of underwriting all the more important.

Moreover, the process of debt renegotiation was often complex and in many cases took decades to be concluded. The case of Mexico is illustrative. Following its independence, Mexico, in 1824 and 1825, floated in London two loans totaling £ 6.4 million. By 1827, the country, depleted by civil war, defaulted on its external obligations. Then, a series of short lived arrangements with bondholders took place, each of them involving bond conversions followed by new debt repudiations, and a definitive settlement was reached only in 1886, 59 years after the first default.[7] Table II shows, for a sample of peripheral defaulters the length of time between default and the final settlement. The longer it takes for a settlement, the higher the indirect costs for the bondholders, usually represented by expenses incurred with lawyers, missions to survey the financial standing of the defaulters, communication among bondholders to ensure coordination, design of new contracts, among others.

[7] Portugal is another example. After the 1837 default, 19 years were necessary for the consolidation of a settlement which was honored by the government. The settlement was followed by a series of loans (issued in London, Berlin and Paris) summing up to £ 78.8 million. Another default took place in January 1892 and the new rounds of renegotiation lasted ten years

Table II - Periods of Debt Renegotiations

Country	Periods of Debt renegotiation
Argentina‡	1893-1898
Brazil±	1898
Colombia‡	1826-1873
	1879-1896
	1900-1905
Costa Rica‡	1874-1885
	1895-1897
	1901-1911
Ecuador‡	1826-1854
	1868-1914*
Egypt†	1876-1882
Guatemala‡	1828-1855
	1876-1888
	1894-1913
Greece†	1824-1878
	1893-1898
Honduras‡	1827-1867
	1872-1897
	1900-1914*
Mexico†	1827-1886
	1875-1890
Liberia‡	1874-1898
Nicaragua‡	1827-1874
	1894-1895
	1911-1912
Paraguay‡	1874-1885
	1892-1895
Peru†	1825-1849
Portugal†	1837-1856
	1892-1902
Salvador‡	1828-1859
	1898-1899
San Domingo†	1872-1888
Spain‡	1823-1851
	1871-1876
	1898-1902
Turkey†	1874-1881
Uruguay‡	1876-1883
	1892
Venezuela‡	1826-1841
	1847-1880
	1898-1902

Source: †Wynne[1951], ‡Anual Reports of the Council of Foreign Bondholders (1914), and ±Abreu[2002]. Periods of Debt Renegotiation starts when the country interrupted full contractual service and ends when a debt settlement was reached and sustained in the following three years. *Agreement was not reached when the WWI began.

Given the absence of international monitoring agencies and the difficulties in gathering country specific-information[8], moral hazard was a pervasive problem. A large number of prospectuses indicated an intended employment of the resources, but examples of diversion abound (see Wynne [1951] for a comprehensive exposition of some of these cases). The 4% Greek Monopoly loan is but one example. Although the prospectus stated that the proceedings would be applied to meet maturing debt obligations,, around one third of the loan's revenues were spent in the construction of three ironclads (Levandis [1944, pp. 68]). The contractors of this construction were connected to the *Comptoir d'Escompte*, the French underwriter of the loan. In the same fashion, the Greek government applied only one third of the "Piraneus-Larissa Railway loan of 1890" proceedings to the construction of the mentioned railway. It was all but impossible for an investor in London learn all this information.

It was also common that prospectuses of sovereign's public offers of peripheral loans bonds contained pledges of specific governmental revenues to be used to debt payment. In many cases, these guaranties were not fulfilled. For example, the Turkish loans of 1858 and 1862 pledged some customs duties and taxes on tobacco and salt, among other sources of public revenue. According to loans' prospectuses, there should be an external commission to monitor the use of the revenues. Not only the same revenues were pledged in subsequent loans, but the promised monitoring commission had no effective power to supervise the collection of the pledged revenues. In fact, the supervision of these revenues was carried out by the Imperial Ottoman Bank, the Turkish relational intermediary in London.

Notwithstanding the turbulence of 1870-1914 period, when a series peripheral countries defaulted *de facto* actions of the British Government to recover bondholders' losses were scarce. First, as occurs nowadays, sovereign debt contracts were subject to limited enforceability. The posture of the British legal system towards defaulters and the problem of limited enforceability was a frustration among bondholders associations, as it is expressed by 1873 Annual Report of the Council of Foreign Bondholders (pp. 68),

[8] For example, the first fiscal Turkish budget was released in 1862, eight years after the first Turkish international loan. Nonetheless, until the establishment of external control in 1881, Wynne [1951, pp. 416] points out they were remarkably untrustworthy: "Public accounts, in the proper sense of the term, scarcely existed and estimates of revenue and expenditure were hopeless unreliable"

"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, (...), even assuming that these difficulties were overcome, and a possibility existed of obtaining a formal judicial decision upon the matters in dispute, there would remain the further, and practically insuperable difficulty, of executing the process of the Court.".

Besides the legal enforceability problem, the British government was not regularly prone to use its military power to bring debt claims to a settlement. Tomz [2006], studying a large dataset on wars, threats of conflicts, and defaults after the 1850s, and matching these data with Foreign Office diplomatic correspondence, indicates that the British military power was rarely used primarily to protect bondholders' interests. Even in the most famous case of military debt collection, Venezuela at the beginning of the 20th century, pressure by bondholders was not the primary concern.[9]

The cases in which the British government did participated or support, alone or along with the other European powers (France, Germany, Italy and Russia) in the establishment of international control over the public finance of defaulters were again motivated by geopolitical concerns, not bondholders' interests (Feis, [1964, pp 83-84]). This was the case of the Middle East and Balkans regions. In the late part of the XIX century, external control was imposed on Egypt, Turkey, Greece, Serbia, and Bulgaria.

The Greek financial crisis in the 1890s is also representative of the unwillingness of the British Government to interfere openly to protect bondholders unless there existed geopolitical concerns. After default took place in 1893, during the next 4 years, the renegotiation of Greek debt was left to British private associations. British Government

[9] In 1901, when a new Venezuelan government suspended debt payments, British and German navies initiated a blockade and engaged in war against the defaulter. In a few months, Venezuela was defeated and forced to reach a new agreement with the bondholders. A closer look into the diplomatic correspondence and the timing of events shows that the British display of power was motivated mainly by the fact the Venezuelan military units had, in several occasions under the new government, seized British property and invaded colonial territories. Moreover, the current civil war led to pillage of British property in the country. In fact, in the last British ultimatum before the beginning of the hostilities, bondholder's claims ranked last (see Tomz [2006] and Marichal [1988] to a comprehensive description of this event).

only took a strong position regarding the Greek default after Greece engaged in a disastrous war with Turkey over Crete. The fast capitulation of the Greek army led the debtor to urge for the mediation of the Powers and depletion of Greek bargaining power. Eventually, as a result of the six powers' (England, Russia, France, Germany, Italy, Austria-Hungary) mediation, Greece surrendered most of the control over its finances and partial control over its monetary policy. Although protection of bondholder's interest was an issue in the British intervention, it was not the driving force. In fact, the harsh position taken by Germany, with threatened military action to assure a fast debt renegotiation, willingness that was perceived by the British government as prone to bring instability to the region, was the key concern of the British Foreign Office. Such a view was shared by the Russian Foreign Minister. The British Ambassador in St. Petersburg stated that *"the action of Germany, in subordinating a question of such international importance to the interests of her bondholders subjects was, in [Russian Foreign Minister's] opinion, greatly to be regretted"*(Correspondence on the Affairs of the Southeastern Europe (C.A.S –E.E.) Pt. 178 No. 20 Foreign Office cited on Wynne [1951], pp. 315).

In Latin America, the rule was never direct intervention (Feis [1964], pp. 108). Even diplomatic pressure was not often employed as an instrument to settle debt claims in the region. Tomz [2006], using a sample of Foreign Office correspondence with bondholders in the period 1823-53, shows that the British government refused to get involved in 88% of the bondholder's requests to interfere in their favor in debt-related complaints against Latin American states.

Even the settlement of the Argentine failure in 1890, which led to the bankruptcy of the Barings Brothers, a major British *Merchant* bank, and jeopardized the stability of the British financial sector, was left to bondholders' private associations[10]. A final settlement for the Argentine debt was reached only in 1898.

Without any guarantee of protection by the British Government in cases of default or diversion in the promised use of resources, bondholders resorted to the establishment of their own private associations. The most important one was the Council of Foreign Bondholders, initiated in 1868. Its main goal was to ensure coordination among bondholders aiming to increase their bargain power in processes of debt renegotiations.

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[10] In 1 November, the head of the Baring Brothers, the main underwriter of Argentina, announced to the Bank of England that he, given the Argentina moratorium and the fact that the bank's vault was full of Argentine papers, could not guarantee the payments to investors. A short lived bank run followed. The Bank

One of the goals of the Corporation was the diffusion of information on debtors to investors. Under the Council's initiative, a enormous library on foreign governments' affairs were constituted, general informative meetings were held, press communications were released, and representatives were sent to debtors to investigate *in loco* their financial conditions (Mauro and Yafeh [2003]). Nevertheless, these actions aiming to raise the level of information of bondholders were implemented mostly during the process of debt renegotiations, i.e, after a country felt in disgrace.

These examples show persuasively that bond issued at the peripheral market had no implicit guarantee by her Majesty Government, and the securities carried the countries´ sovereign risk. This is very important for our purposes because, were bonds backed, albeit informally by the British government, underwriter would not be important "information brokers", and there would be no reason for informational contagion to occur.

As expected, the British investor priced the risk of peripheral debtors accordingly. For issues of bonds outstanding in January 1890, whose initial price is listed in the *Investors Monthly Manual* of that month (79 emissions), the price offered to the public to the purchase of a 100-pounds security ranged from 52 (5% Turkish Defense Loan) to 100 (Orange Free State 6% Loan of 1884) The average initial price was 84.6 (median 86.5), implying that bondholders normally demanded high promised high yields. Nonetheless, as suggested by the economic literature, the observable relationship could influence the evaluation of the assets either as these relations constituted monitoring devices or since the relationship could signal to investors the higher level of soundness of the debtor. The next section outlines the operation of the relationships, showing how the existence of them allowed the relational intermediaries to obtain, at a reduced cost, country-specific information and be more efficient in monitoring their clients.

IV. The workings of the merchant bank – country relationships

By engaging in relationships, the financial intermediary reduced the marginal cost of gathering country-specific information on peripheral debtors, and enhanced its ability to monitor and advise them. These scale economies were both derived directly, by the intermediary access to the government accounts, and indirectly, by personal connections

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of England and the Rothschilds led a bailout, and a new Baring Brothers was formed as a joint-stock bank (Wirth [1893]).

with governments representatives, and local firms with which the intermediary also did business.

Because it was normally responsible for coupon payments and debt amortization operations (Borchard [1951, pp. 21]), either by drawing bonds for redemption at par or by buying bonds in the market, the underwriter had a direct source of hard information on the debtor financial standing. The country was obliged to provide the underwriter with the resources necessary to perform debt payments in advance. Therefore, any delay or difficulties met by the borrower in fulfilling these advances were known by the bank in advance. In cases of when a government faced difficult times, it could try to resort to short term advances the market was not aware of, but the intermediary knew about.[11] A relational intermediary, by dealing with the majority of a country's loans, had a comprehensive picture of the short-term financial conditions of the debtor. The relationship between Brazil and Rothschilds exemplifies the importance of government accounts as a direct channel of hard information. This passage, from the report of the committee to enquire into the organization of the 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 by Flores[2007]).*

In some cases, beyond obtaining hard information directly from the country's account, the intermediary had direct control of the government's main sources of revenue. The Imperial Ottoman Bank assumed control over the 1858 and 1862 pledged revenues years before international intervention (Wynne [1951]). In the same fashion, negotiations of the 1887 Greek "Monopoly" loan resulted in the establishment of a firm in charge of collecting and remitting pledged revenues directly to the agents of the loan (a syndicate formed by French banks and the British *Merchant* bank C. J. Hambro and Sons, the Greek relational underwriter in London). The new company, called *Société de Regie de Monopoles de Grèce*, was headed by bank's representatives (Levandis [1944, pp. 69]).

Intermediaries also acquired privileged information as new loans agreements were negotiated. The amount raised, the initial price, the risk-sharing scheme (i.e., whether the intermediary would hold the bonds in the event of undersubscription), and the guarantees to be pledged (if any) were the result of general market conditions, the financial situation of debtor and competition among banks to get the contract. When debtor's situation or the general market conditions were worse, the intermediary's ability to impose safeguard clauses and financial advice improved. Therefore, it was crucial to loan contract's design that the government released at least 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.

Soft information on the government's long-run situation, including political, commercial, and financial perspectives, was obtained mainly by the bank managers' personal networking. These connections varied from close relations with government officials and commercial firms that had business in the country, The latter were potentially interested in how the proceedings of the loan have been applied.

Bulgaria was an example of the construction of such connections. Following becoming independent from the Ottoman Empire in 1878, Bulgaria debuted as a debtor issuing a series of bonds in 1889, 1892, and 1896. In 1902, 1904, and 1907 in Paris (and other European bourses) through a syndicate led by *Banque de Paris et des Pays-Bas* (Paribas), a French investment bank. The negotiations leading to this series of bonds issues included the appointment of a "money doctor" in Bulgaria. Although formally a "bondholders' representative", the "money doctor" was appointed by the Paribas. After his nomination was accepted by the French Government, he was sent to Bulgaria with powers to control taxes revenues and veto powers on monetary and fiscal policies. As Avramov [2003] reports *"the bulk of his [the delegate] correspondence was not with the bondholders, but with the Paribas headquarters. His personal promotion and numerous regalia were directly dependent on Paribas"*. This example illustrates how the underwriter gained access to privileged information through a hands-on process , which included building a network of personal contacts by placing a representative inside the issuer's government. The disclosure of such information to final investors was at the intermediary's discretion. Portugal is another good example. In 1898, a Portuguese

[11] In fact most times the underwriter provided these advances

official revealed to *Crédit Lyonnais* how his government managed to cook its financial statements (Flandreau, [1988]).

Since the beginning of his relationship with Brazil, back in the 1820s, the Rothschilds built a wide network of agents to supply the bank with intelligence on Brazilian commercial and financial markets. Until the 1850s, Samuel, Phillips & Co. was the main commercial agent of the Rothschilds in the country. For example, the correspondence displays the latest information on the Brazilian border conflicts with Argentina during the 1820s (Rothschilds Archives, RAL XI/28/215). Another critical piece of information that the Rothschilds obtained through Samuel, Phillips & Co. to Rothschilds was data on Brazilian commodity exports. The information gathering process also involved a considerable exchange of letters between the head of the bank, Nathan M. Rothschilds and the Brazilian ministers in London.

Finally, the relations between Brazil and the Rothschilds also involved private benefits. Baron do Penedo, Brazilian minister in London from 1855 to 1889 received personal investments advice and some 200,000 pounds in gifts from N. M. Rothschild and Sons Limited (Shaw [2005]).[12]

Just as information gathered through relationships was a strategic asset to the bank, the decision to disclose it was also a strategic variable to the intermediary. For example, if a relational country was under financial distress, but the intermediary, using its privileged information, believed that the distress was temporary and bankruptcy could be averted (for example, if the intermediary believed the distress was caused by a temporary external shock), the optimal behavior of the intermediate could involve not revealing in full the current situation of the debtor bondholders, who, in case of they had this information, could be more pessimist than the bank and did not will to provide additional financial support necessary for the debtor sustain its obligations during the turmoil.

In the two episodes of financial distress studied here, Greece in 1893 and Brazil in 1898, differ in terms of the behavior of the relational underwriter regarding information disclosure to the public. In the Brazilian case, when the funding loan agreement was made public, it was accompanied by the publication of two short letters between the Brazilian president, Campos Salles, and Nathan Rothschild. In these letters, the new

[12] The Baron de Penedo was the main negotiator of the 1858 contract under which the Rothschilds became the exclusive underwriters of Brazilian debt. See Shaw [2005]. The Brazil-Rothschilds deal is described in further detail below.

Brazilian government promised to adopt the economic measures specified in the funding loan agreement, which were targeted at reducing the amount of fiat money in circulation. In contrast, when Hambro was negotiating during the negotiation the 1893 funding loan with Greece, a British official was sent with orders to elaborate a report on the financial standings of the country. The trip of this envoy was common knowledge to the market, and the contents of his findings were released before the funding loan was announced. In fact, in the Brazilian case, the funding loan scheme was carried out as planned, suggesting that the country suffered a liquidity problem. Shortly after that, the Greek funding loan arrangement was aborted and a complete default followed, suggesting that Greece faced insolvency. Solvency versus liquidity may account for the different attitudes taken by the two relational intermediaries in these episodes.

The intermediary's leverage in imposing conditionality increased with the knowledge the she had about the debtor's affairs, especially when the country was in distress. Bondholder's associations used retaliatory actions (attempts to prevent new issues by the defaulter's in the London Stock Exchange were the most common, albeit usually unsuccessful, actions). On the other hand, relational intermediaries, in their role of advising the debtor on the current London market's conditions and maintaining short terms lines of credit, could try to impose conditionalities on a regular basis, during the normal operation of the relationships (Flandreau [2003, pp. 33]). However, relational underwriters' ability to influence debtors was partial, and varied with the degree of competition among banks, as suggested by the relationship lending literature (Petersen and Rajan [1995]).[13]

Even exclusive underwriters, who faced little competition, were unable to impose their will in several occasions. A particularly illustrative example is Brazil in the 1890s, when the financial situation worsened steadily. Despite several attempts, the Rothschilds were unsuccessful in convincing the Brazilian president to lease the *Estrada de Ferro Central do Brasil* as a mean to raise funds (Abreu [1994]).

Rather important for our purposes, the market recognized the existence of relations as monitoring devices. In some occasions, bondholder's complaints were addressed not to

[13] For example, Argentina had access to European financial markets at surprisingly good terms even after 1885, when it was noticeable that her macroeconomic fundamentals were deteriorating. Flores [2007] argues that Argentina's position was strenghened by the fact that the Baring Brothers, Argentina's main underwriter in London, faced significant competition from French and German houses. Between 1881 and 1889, Barings issued £ 42 million of Argentinean debt in London, of which 20 million were floated in 1888.

sovereign's representatives in London, but to the issuing houses. This was the case of the Italian loan of 1881:

> *"In July, 1881, a prospectus of the Italian Government 5 per cent loan for £14,600,000 was issued by Messrs. Baring Brothers and Co., in conjunction with Messrs. C. J. Hambro and Sons.*
> *Letters were at once addressed to them, bringing to their notice the fact that the amount of income tax the Italian Government intended to place upon the Coupons of the Bonds of this new Loan held by external holders, had not been stated, and referring to the treatment of the Coupons of the Sardinian (1851) 5 per cent loan which had been subjected to an income tax of 13'20 per cent, although the bonds had expressly declared them exempt from taxation. The reply received from the Agents for the issue of the Loan conveyed a communication from the Ministry of the Treasury that there was no question of imposing any further tax than the income tax of 13'20 per cent, at present chargeable (Annual Report of the Corporation of Foreign Bondholders, 1881, pp.51)".*

The Council of Foreign Bondholders, through a private letter to Nathan Rothschild, discussed with the bank its opinions on the terms of the funding loan arranged with the Brazilian government in 1898.

Furthermore, evidence from the financial press at the time support the hypothesis that investors took into account the existence of relationships when making investment decisions. The following passage, from the *Investors Monthly Manual*, appeared right after the announcement of the Brazilian funding loan:

> *"At one time investors were justified in the robust faith they reposed in the princes of Finance, who invited their subscriptions to foreign loans; but that faith was rudely shaken by the breakdown in Argentine and the collapse of the Barings and Murrieta, and it is not likely to be restored by the Brazilian experience, with which Messrs. Rothschild are more particularly concerned. […] Surely the time has arrived when the investing classes should think for themselves, and not to follow blindly*

whoever chooses to lead them, whether Rothschilds or Barings, Parmatos or Hooleys" (Investors Monthly Manual, June 1898, pp. 6)

The workings of the underwriter-country relationships, and how the market perceived them, motivate our conjecture that a financial crisis in a relational debtor revealed important information about the financial intermediary, which could be under-investing in gathering information, failing to provide borrowers with appropriate incentives, giving bad policy advice, or plainly behaving opportunistically, i.e., underwriting debt of countries that she knew to be unsound. During the crisis, as investors update their priors, other borrowers with strong ties to the same bank as the distressed country suffer an increase in their risk premium, thus generating informational spillover. The next section describes the empirical strategy we follow to test the *informational* contagion hypothesis.

V. Empirical Strategy

Identification rests on appropriately selecting the 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: (i) the distressed country had a strong relationship with an underwriter; (ii) the presence of other countries with strong ties with the same underwriter, which form the treatment group; (iii) countries in the treatment group have to be geographically and economically heterogeneous; (iv) crisis in the original country driven (at least mainly) by internal reasons, that is, the crisis must be somewhat idiosyncratic to the country.

It is self-evident that conditions (i) and (ii) need to be satisfied: it does not make sense to look for informational contagion when a crisis is originated in country that is not a relational debtor, or when there are no countries to be suffer from contaminated through shared underwriter.

Conditions (iii) and (iv) are crucial for a clean interpretation of a drop in the price of bonds in the treatment group as evidence of informational contagion. First and foremost, it is not clear that a crisis originated somewhere else than the country contains any relevant information about her underwriter. Furthermore, if the origin in abroad, then chances are that bond prices of potential treatment or control countries would already be contaminated, preventing interpretation of the results,

If countries sharing the same merchant bank also produced similar crops, or had strong trade ties among them, then one would expect a higher co-movement among their bond prices, above and beyond their co-movement with the rest of the market, especially following a crisis.[14] For example, a commodity price shock that affects the external solvency of "treated countries" can produce the results regardless of shared underwriter. The most famous default of 19th century, the Argentine bankruptcy of 1890, fails condition (iv) because the only peripheral country that, at the time of the crash, had a strong relationship with the Barings was Uruguay, preventing us from separating *informational* from geographical contagion.[15] Besides that, the Argentine default, as mentioned in section II, led its main underwriter to bankruptcy, and caused a financial crisis in London, and disturbing the whole peripheral market.

Since 1858, the *merchant* bank Rothschilds was the official bankers of the Brazilian government in London. In 1898, 100% of the outstanding debt underwritten in London had been issued by this bank, which was responsible for almost all advertising of Brazilian securities in the market, as well as providing the English press with information about Brazilian economic and political conditions. The tight relationship between Brazil and the Rothschilds was widely known to investors.

The Brazilian crisis had three main causes: political turmoil, loose monetary policy, and a commodity shock in the price of coffee, the main Brazilian exporting commodity. The drop in the price of coffee had a significant impact on the Brazilian budget since the taxes on coffee exports were the primary source of revenue to the Government.

During the transition from the Empire to the Republic (1889-1898), Brazil experienced major political instability. Successive exchange devaluations, totaling some 300% of the *milréis*-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 as contracted. In March 1898, right after the Brazilian budget was published in the English press, Brazilian bond prices dropped roughly 15%. We assume

[14] Increased variance disguises itself as contagion, as demonstrated by Forbes and Rigobon [2002]. More on this is section IV.

[15] Argentina and Uruguay, besides having cattle as they main export product, shared significant trade links. Triner [2001] presents a case study of contagion on Brazil originated from Argentina failure in 1890. Differently from our paper, this work rationalizes the co-movement of Brazilian and Argentine bond yields after the crisis from the fact that investors might have observed strong similarities across both economies (in a geographical approach). In contrastt, we selected crisis in which geographical issues were minimized.

that this sharp price movement determines the moment in which the market learned about the crisis. 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 3 years. The amortization payments covered by the funding scheme (almost all the central government debt) were suspended for the following 13 years. The funding loan scheme was designed with the guidance of the London Rothschilds, which also were in charge of presenting the scheme to British investors.

Similarly, a mix of commodity shock with internal political turmoil explains the Greek episode. The Greece's history as a debtor begins in the 1820s. After several decades of default and tortuous debt renegotiations, Greece reappeared in the European markets in 1879, floating a 60,000,000 Franc loan in Paris, followed by a series of debt emissions placed, over the subsequent years, in London, Paris and other continental bourses. The underwriting of all Greek debt was performed by a syndicate of banks. The English partner in this syndicate was the merchant bank C.J. Hambro & Sons (hereinafter Hambro). In 1893, service of the Greek foreign debt represented 33% if 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, a Greek bankruptcy was impeding. In order to avoid that, the Finance Minister, Chamilaoes Tripocoupis, engaged in negotiations with the Hambro house to raise a new loan in London. Levandis [1944] reports some hesitations by Hambro. The negotiations resulted in the agreement that an English Official, Major Law, should be commissioned to review the Greek financial standings. It was followed by a French advisor. The visit of the British expert was public knowledge, and his reports eagerly awaited and commented by the financial press. Law's report disclosure in April 14, 1893 triggered a drop in Greek bond prices, which were further depressed by the dismissal of the Minister of Finance. A few weeks after those events, Greece announced a funding loan scheme.

As mentioned above, an important similarity between the Brazilian and the Greek crises was the presence of a group of countries that related to the same *merchant* bank as the distressed debtor, but geographically and economically heterogeneous, with no relevant trade linkages among them. We decide whether a country had a strong relationship with a merchant bank using two pieces of information; one quantitative, the concentration of underwriting operations observed by the market, and on qualitative, based with historical records.

For both the Brazilian and the Greek episodes of financial distress, the strategy

consists of comparing the dynamics of the price of the bonds between two sets of countries: one composed of countries that had a relationship with the same merchant bank as the country in distress (treatment), and one that did not have (control). The country under distress is always excluded. We compare both the whole distribution of prices, and several sample moments of the distribution, before and after the distress for the two groups. The next section describes how the sample was constructed, and how the groups defined.

VI Data and Summary Statistics

We use two primary sources of data: the Investor Monthly Manual (hereinafter 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 contains a list of sovereign bonds quoted in the London Stock Exchange as well as information on the bonds, including information about monthly prices (opening, highest, lowest, and closing), the amount of the loan unredeemable, and dates of coupon payments. The Times published (previous day) bond prices only if bonds that were negotiated at those days. The sample is defined as all bonds whose prices were published at the section *Stocks and Shares*, *coupons payable in London.* This criterion excludes, as discussed in section II, colonies and other British dominions and the financially developed borrowers. We use weekly data on bond prices which was gathered using the first price that appears in a certain week. It does occur in our sample that a bond shows no prices for the whole week, in which case the observation is treated as missing.

Tables III and IV presents the size and some summary statistics on amount of outstanding debt in our sample of debtors for both crises. Table V shows the geographical distribution of the sample. In both events, the sample consists mostly of bonds issued by Latin America and Eastern Europe countries.

Table III – Sample, Brazilian Episode

Bonds whose price were published in The Times, February 1898

	No. of borrowers	Bonds	%
Total	33	90	
Countries	*27*	75	83.33%
Provinces	*6*	16	17.78%
Defaulted	*6*	16	*6.67%*
Hungary, Russia, and Chile	3	15	16.67%
Other Governments	30	75	83.33%

	Outstanding Debt				
	Total	%	Median	Min	Max
Total	£681,705,648		£2,386,100	£145,500	£77,587,612
Countries	£665,747,148	97.66%	£2,972,180	£145,500	£3,660,100
Provinces	£15,958,500	2.34%	£1,131,400	£239,400	£77,587,612
Hungary, Russia, and Chile	**£193,236,178**	**28.35%**	**£4,000,000**	**£528,200**	**£63,400,000**
Other Governments	£488,469,470	71.65%	£2,359,800	£145,500	£77,587,612

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

Table IV – Sample, Greek Episode

Bonds whose price were published in The Times in February 1893

	No. of borrowers	Bonds	%
Total	34	84	
Countries	*27*	70	83.33%
Provinces	*7*	14	16.67%
Defaulted	9	14	26.47%
Italy, Sweden, and Norway	3	9	10.71%
Other Governments	31	75	89.29%

	Outstanding Debt			
	Total	%	Median	Min
Total	£423,648,860		£2,006,000	£122,400
Countries	£410,479,860	96.89%	£2,581,750	£122,400
Provinces	£13,169,000	3.11%	£829,300	£152,600
Sweden, Norway, and Italy	**£12,488,620**	**2.95%**	**£1,697,120**	**£740,340**
Other Governments	£411,160,240	97.05%	£2,282,450	£122,400

Source: The Times, Stocks and Shares, coupons payable at London. IMM for outstanding debt

Table V – Size and Geographical Distribution of the Sample

	Episodes of Distress			Episodes of Distress	
	Greek	Brazilian		Greek	Brazilian
South América	**No. of Bonds**	**No. of Bonds**	**Europe**	**No. of Bonds**	**No. Of Bonds**
Argentina (central)	9	11	Bulgaria	1	2
Buenos Aires	*2*	2	Demark	-	1
Cordoba	*1*	3	Greece	-	6
Entre Rios	*3*	3	Hungary	1	1
Santa Fe	*5*	6	Italia	3	2
Argentina (central and provincial)	20	25	Norway	3	3
Brazil (central)	4	-	Portugal	1	1
São Paulo	1	-	Russia	6	7
Brazil (central and provincial)	5	-	Spain	2	2
Chile	5	8	Sweden	3	2
Colômbia	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					
Costa Rica	2	2	**Africa**		
Guatemala	2	1	Egypt	5	5
Honduras	2	1	Transvaal	1	1
Mexico (central)	2	3	**Total**	**6**	**6**
San Luis Potosi	*1*	1			
Tucuman	*1*	1	**Oceania**		
Mexico (central and provincial)	*4*	4	Hawaii	1	-
Nicarágua	*1*	-	**Total**	**1**	**0**
San Domingo	-	1			
Total	**11**	**14**			

With the weekly bond price information from The Times, along with dates of coupon payment from the IMM, weekly prices are corrected for dividend payment, so that weekly comparisons are free of dividend payment. More precisely, the "raw" bond price has embodied the payment of the coupon. So, at the date of dividend payment, the coupon paid is "added back" to the price of the bond, using the interest rate contracted and the period of payment (semester or quarter) at the original prospectus. If there is a payment on date t = 0, the price is corrected by subtracting the "weekly coupon payment". Suppose a i%-coupon, semester-payment bond with face value price 100 has a "raw" price p_t. For the 25 weeks following the payment week (called $t = 0$), the "corrected" price $\tilde{p}_t$ of the bond is:

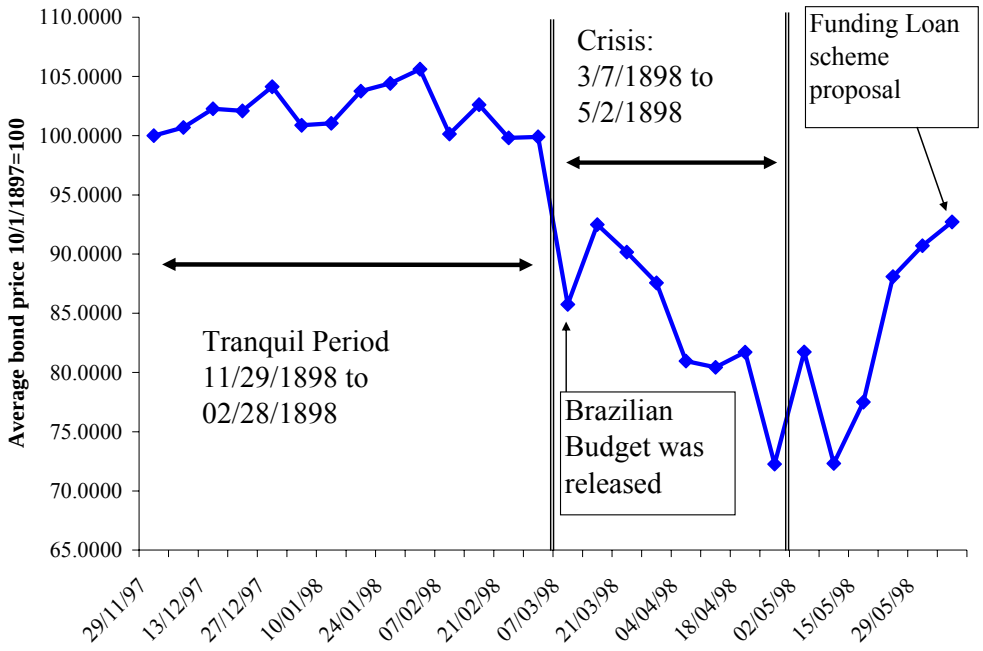
$$\widetilde{p}_i = p_t - 100 \times ((1+i)^{52} - 1) \quad (1)$$

The "corrected" price, although resembling the yield, has on important advantage: it assumes a zero probability of default only for the remaining weeks to next coupon, and not for the whole flow of income of the bond. Accounting for bond payments is particularly important given the high frequency of the data (weekly), the relatively short period of the sample (14 weeks), and the fact that dividends were typically paid every six or four months. In this case, dividend payments produce sharp (and undesired) fluctuations in prices, which have little to do with risk assessment. Information about coupon payments were extracted from the prospectuses published on The Times or on the Annuals Reports of the Council of Foreign Bondholders (for bonds issued as a result of debt renegotiations).

In each crisis, data were collected for 10 weeks before the market learned about the distress and 4 weeks after. These periods are not arbitrary. Two criteria were used. First, to avoid picking confounding effects, we choose the shortest before the distress conditional on having confidence that we at least half of the observations from periods in which the market had no hint about the distress. Second, the end of the sample after the distress was the week in which the bond prices of the (original) distressed country stopped falling, signaling the end of the crisis. In both the Brazilian and the Greek cases, these periods were roughly 10 and 4 week. The decision about the period in which the market learned about the distress was based on the movement of bond prices. Figures I and II present the evolution of bond prices of the distressed country in both crises, and the definition of the tranquil and turbulent periods. In both cases, there is a first sharp drop in prices.16 Additionally, there is qualitative historical evidence to support the choices. In the Brazilian case, it is the week selected in which the Brazilian governmental budget first appeared in the English press. In the Greek case, the sharp drop in bond prices occurred when the financial minister resigned.

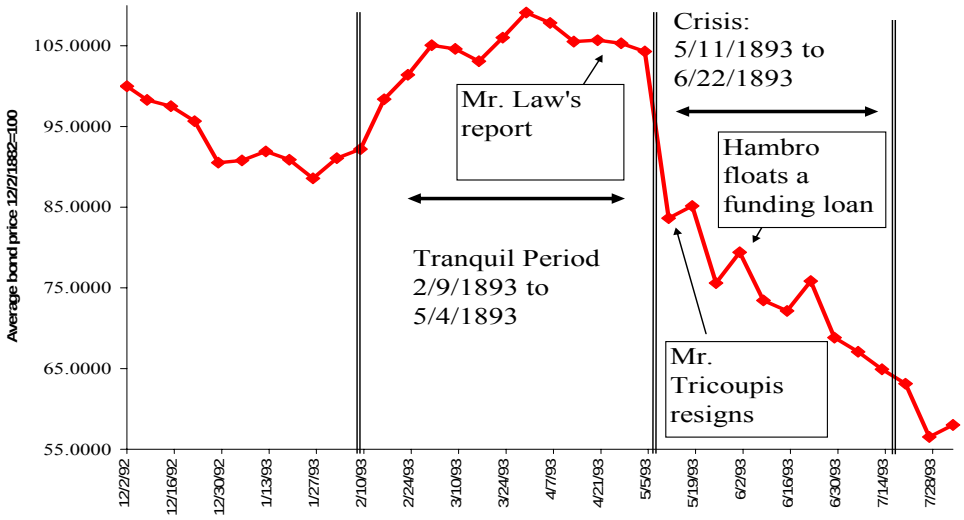
[16] Robustness checks were performed using slightly different periods.

Figure I: Variation in the Average Brazilian Bond Prices



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

Figure II: Variation in the Average Greek Bond Prices



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

The next step is to establish, in each case, the group of countries with strong ties to

the same merchant bank as the distressed ones. Differently from the empirical literature on relationship lending (Aoki and Dinç [2000], Berger and Udell [1995], Petersen and Rajan [1994], De Mello [2006]), the measure of relational strength has to be observed by market. Thus, we measure strength of relationship with a certain underwriter by the proportion of the country's outstanding debt issued by the underwriter. In addition to this quantitative measure, we use historical records to corroborate the choices, or to guide robustness checks for the borderline cases.17

Tables VI shows the bond issues and the characteristics of the countries that, in February 1898, had at least one bond issued by Rothschilds, and the proportion of outstanding debt issued by this merchant bank. Among countries that did have operations with the Rothschilds, Chile, Hungary and Russia are considered Rothschild countries. Two cases are borderline: The line is drawn between Russia and Turkey. Not only Turkey had a significantly lower proportion of Rothschild underwritten debt, but the 27.15% it has was split between the Rothschild and the Imperial Ottoman Bank. Furthermore, historical records as Feis [1962] and Wynne [1954] show, as discussed in section II, that Turkish main revenues had been monitored, since 1881, by an external bondholder's commission. Reports of the commission were available to the public through the Annual Reports of the Council of Foreign Bondholders. Therefore, the monitoring role of Rothschild was likely to be small on this country18.

As having a small proportion of overall debt issued by the Rothschilds, Egypt was also under external intervention, therefore, we do not consider this debtor as belonging to the treatment group. Another dubious case was Transvaal. In this a 100% of the debt was issued by the Rothschild but there was only one bond issue of low amount, so by construction it would be concentrated.19 The other country that had Rothschild operations, Spain, had a very small proportion of the overall debt issued by this bank.

[17] One example is Italy in the Geek case. The quantitative measure suggests that Italy is a Hambro country in the Greek episode. There is, however, conflicting historical record .In the regressions, we take this into account by estimating the models with and without Italy. See section IV.

[18] There are historical reasons to be cautious with Russia as well. Despite the large proportion of Rothschild issued debt, the country and the Bristish merchant bank relationship was in dire straits over the Czar government's treatment of her Jewish subject during the (broader) period of the Brazilian crisis. For this reason, robustness checks were performed by excluding Russia,

[19] Additionally, Transvaal could well be considered a British colony at the period.

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

Loans	Underwriter	Amount of Outstanding Debt in February 1898 (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	**87.08%**
5% 1892	*Rothschilds*	1,770,400.00	
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	**0.53%**
Quicksilver 1870	*Rothschilds*	413,000.00	
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 IV does the same for the Greek crisis, i.e., it displays all countries which in 1893 had at least one bond issued by Hambro. In this case, contrary to the Brazilian one, all

countries that had Hambro operations had them concentrated, and all three countries had three issues.

Not only Norway and Sweden had 100% of their debt outstanding by Hambro, but all previous issues, back to the 1870s, were also handled by this bank. Although the three Italian bonds negotiated in London dated back to the 1860s, historical records allow me to classify this country as a Hambro one. In 1888, after the rivalry between Italy and France almost led to war, a press campaign against Italian securities took place in Paris. Geopolitical concerns motivated the German government to foster the formation of a syndicate of banks to sustain Italian credit. Hambro were the London partner of this syndicate. This syndicate was granted exclusivity in the next Italian bond emissions in Europe (Feis [1964, pp. 238]). In 1880 and 1881 Italian contracted two huge loans in Germany and other continental bourses. Although London was not selected as a primary market for these emissions, Hambro was in charge of distributing bonds of these loans to British investors

Table VII - 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 Raiway	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*.

In the Brazilian episode, the sample of bonds is divided into two groups: those issued by Russia, Chile and Hungary, and the rest of the market. Analogously, in the Greek crisis, the division is between the bonds issued by Italy, Sweden and Norway and the other bonds.

As shown in Table VIII, which contains the geographical distribution of the issues

in the sample, the control groups in both episodes were quite heterogeneous. This is an important feature of the data since geographically homogenous countries would be subject to similar unobserved shocks that could compete with the shock of financial distress on the treatment group. Table VIII shows the summary statistics on prices for both crises, before and after the market learned about the distress. Bond prices of Rothschild countries, for the Brazilian episode, fell by some 5 points (4.69%) over the period. In the Brazilian case, the average price for the rest of the marked fell by 2%. For the Greek case, the same pattern arises, but less dramatic: 2.18% fall for Hambro countries, and 1.80% fall for non-Hambro countries. Standard errors for the raw data are, however, quite high, and the amount of variation in data is significantly higher in the Brazilian.

Table VIII – Summary Statistics

		Brazilian Episode			**Greek Episode**		
		Before Crisis	*During Crisis*	Δ (%)	Before Crisis	During Crisis	Δ (%)
Relational Countries	#Obs	165	61	-4.69%	79	34	-2.14%
	Mean	95.07	90.61		98.56	96.45	
	Standard Deviation	15.18	18.24		7.19	6.98	
Rest of the Market	#Obs	799	309	-1.74%	723	343	-1.80%
	Mean	67.22	66.05		67.55	66.33	
	Standard Deviation	32.01	31.66		30.25	29.54	

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

Besides the mean, we also compute unconditional differences in estimated density of bond prices for the control and treatment groups before and after the episodes of financial distress, for the Brazilian 1898 and the Greek 1893 episodes (figures III and IV). For the Rothschild countries the estimated density of prices clearly shifts to the left after the episode. For the Greek case, although the same seems true, the shift is much less obvious. Both visual suggestions are confirmed in table IX.

For the Brazilian episode, while the null hypothesis that bond prices from Rothschild countries were drawn from the same distribution before and after the episode is safely rejected, for non-Rothschild countries it is not (p- value = 29.49%). For non-Hambro countries, the before and after distributions are all but indistinguishable. For

Hambro countries, one can reject the equality of the two distributions at the 3.06% level.

Figure III - Brazilian Episode: Treatment and Control Estimated Densities Before and After the Crisis

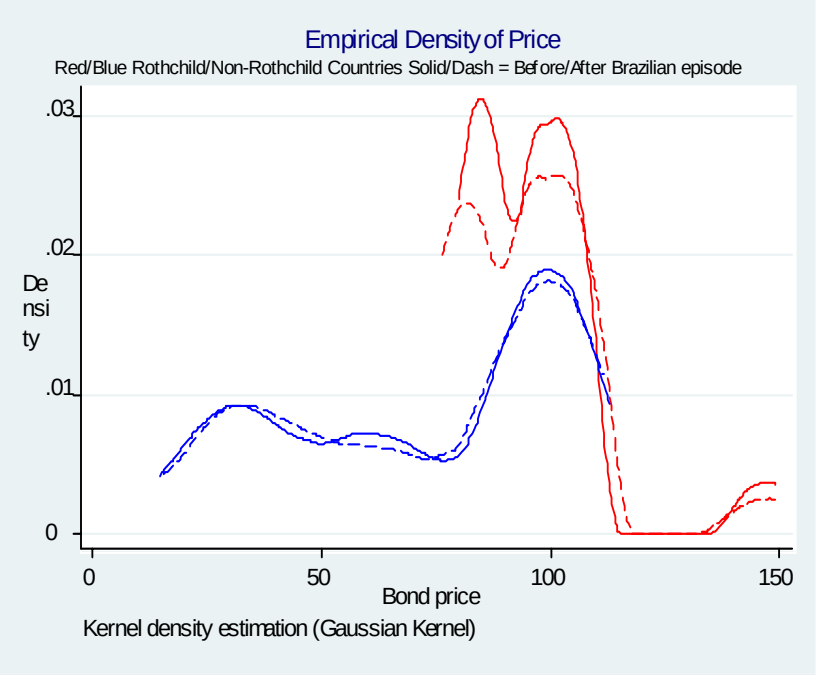


Figure IV - Greek Episode: Treatment and Control Estimated Densities Before and After the Crisis

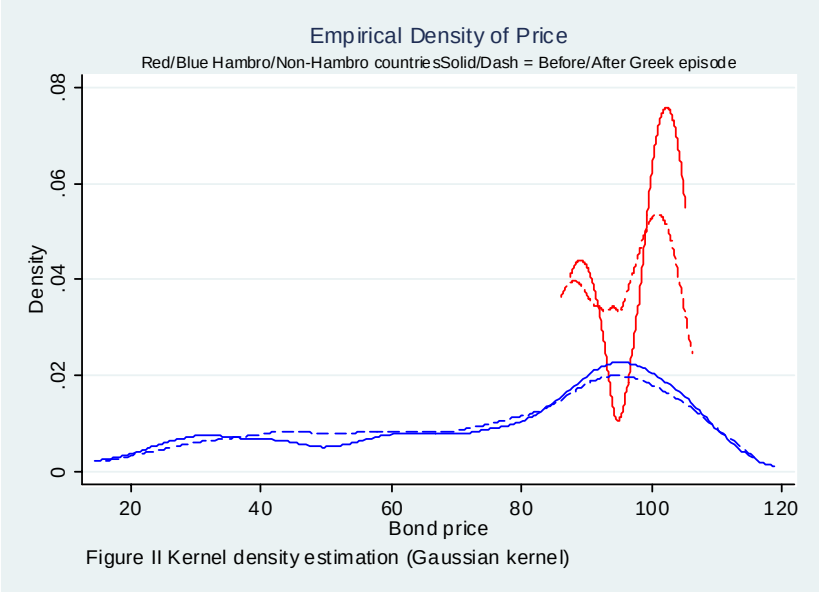


Table IX - Non-parametric tests of equality of distributions

Brazil		Greece	
Rothschild	0.00%	Hambro	3.06%
Non-Rothschild	29.49%	Non-Hambro	55.96%

p-values of the Mann-Whitney test for equality of distributions. Test: H0: $F(price|after\ crisis) = F(price|before\ crisis)$ *vs* H1: $F(price|after\ crisis) \neq F(price|before\ crisis)$.

As figure III and IV indicate, for both episodes, the control groups display bond prices that are pretty much lower than the prices observed in the treatment group. This reflects the fact that the control groups contain countries in default and other debtors which could potentially have embodied a greater risk than bonds in the treatment groups. In order to transform the treatment groups as similar as possible to the control ones, I repeat the unconditional distributions estimates and the hypothesis tests excluding from the control group countries whit low bond prices. In the Brazilian episode, I excluded bonds that, for at least one week in the sample, were quoted bellow 60. In the Greek episode the line for exclusion is the same. This procedure reduces the sample to 52 bonds in the Brazilian episode and 53 bonds in the Greek episode. Figures V and VI, and table X display the results obtained and show that the main unconditional findings are not modified by the exclusion of lower-prices bonds.

Figure V - Brazilian Episode: Treatment and Control Estimated Densities Before and After the Crisis (reduced control group)

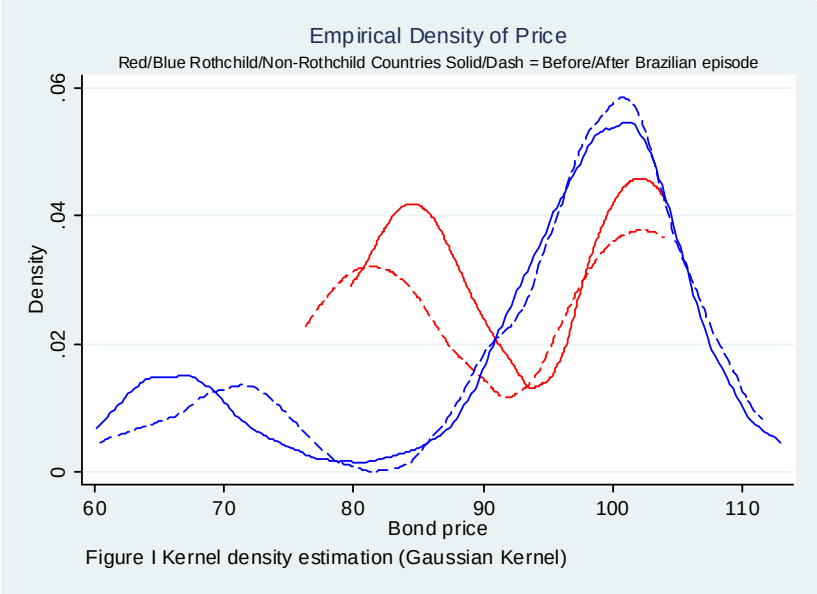


Figure I Kernel density estimation (Gaussian Kernel)

Error!

Figure VI - Greek Episode: Treatment and Control Estimated Densities Before and After the Crisis (reduced control group)

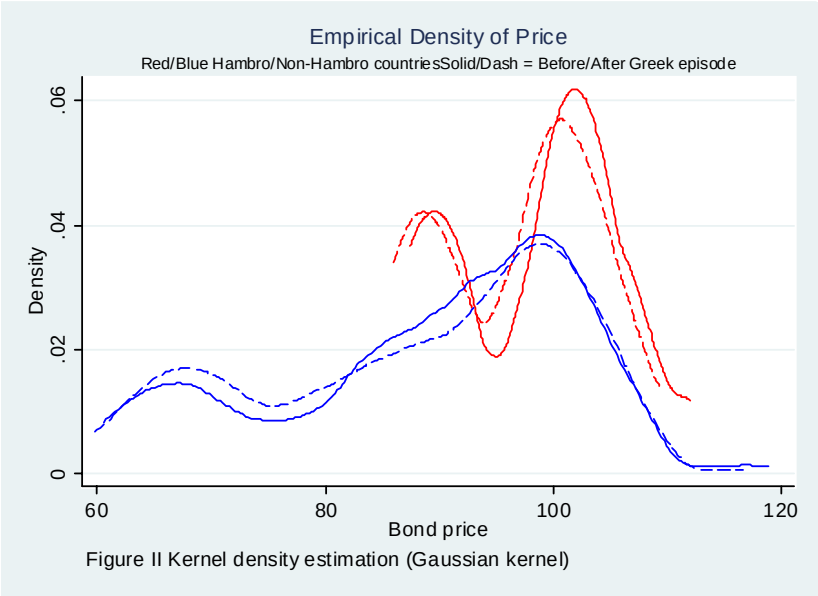


Table X - Non-parametric tests of equality of distributions (reduced control group)

Brazil		Greece	
Rothschild	0.00%	Hambro	3.06%
Non-Rothschild	34.81%	Non-Hambro	92.09%

p-values of the Mann-Whitney test for equality of distributions. Test: H0: $F(price|after\ crisis) = F(price|before\ crisis)$ *vs* H1: $F(price|after\ crisis) \neq F(price|before\ crisis)$.

IV. Empirical Model and Main Results

The unit of observation is a bond (indexed by *j*) price at week *t*. For both episodes, the bonds of peripheral countries are partitioned into two into two mutually exclusive sets: those issued by countries, those issued by countries that shared a strong relationship with the same underwriter as the country under distress (group *U*), and those issued by countries that did not (*NU*). The sample is also partitioned into two grand periods, bond prices from before (*B*) and after (*A*) the crisis in the distressed country, where *B* and *A* are

defined as explained in section III. If T is the whole sample period,

Let i index a country. Define the following two dummy variables:

$$EPISODE_t = \begin{cases} 1, \text{if } t \in A \\ 0, \text{otherwise} \end{cases}$$

$$MERCHANT_{ij} = \begin{cases} 1, \text{if } i \in U \\ 0, \text{otherwise} \end{cases}$$

We impose a simple structure of relation between prices of bonds from pairs of countries. In particular, we assume, for countries $i \in U$

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

and for $i \in NU$

$$\log(\tilde{p}_{jt}) = \beta_i + \varepsilon_{jt} \tag{3}$$

where $\tilde{p}_{jt}$ is the bond price "corrected" by formula (1). The parameter of interest is β_1. The hypothesis test is:

$$H_0 : \beta_1 \geq 0 \text{ versus } H_1 : \beta_1 < 0$$

that is, a crisis in one country has an adverse effect on countries that share the same underwriter.

The observables determinants of bond prices (ε and v) are allowed to have different data generating processes but we make the following unconfoundedness assumption:

$$E\left[\varepsilon_{jt} \mid EPISODE_t, MERCHANT_i, Controls\right] = E\left[\varepsilon_{jt} \mid Controls\right] = 0 \tag{4}$$

Unconfoundedness means that, after controlling for covariates (bond and week fixed-effects in our case), unobserved determinants of bond prices (ε_{jt}) are mean independent of crisis periods (EPISODE) *and* sharing the same underwriter (MERCHANT). (4) would be violated if, for instance, there were important trade linkages among countries that shared the same underwriter: in this case $E\left[\varepsilon_{jt} \mid EPISODE_t = 1, MERCHANT_i = 1, controls\right] < 0$. For this reason, we demanded that episodes satisfied the rather demanding list of conditions (see section II).

If the $\beta_1 < 0$, equations (2) and (3) have the following two implications about the joint distribution of bond prices:

Implication 1: The co-movement between bond prices of a pair of

countries $(i,j) \in U$ should increase *relative* to bond prices of a pair of countries $(i,j) \in NU$

Implication 2: The prices of bond prices from countries $i \in U$ should suffer a depreciation *relative* to bond prices in countries $i \in NU$.

Implication 1 is the classical measure in the literature: contagion is measured as an increase in covariance. Forbes and Rigobon [2002], however, show that an increase in volatility produces a spurious an increase in covariance even without any contagion. In our notation that would mean:

$$Var\left(\varepsilon_{jt} \mid EPISODE_t = 1\right) > Var\left(\varepsilon_{jt} \mid EPISODE_t = 0\right)$$

Contrary to the common application in the contagion literature, increased covariance due to increased volatility is not problematic in our case. Since we compare countries in U and NU, covariance results would be biased only if:

$$\begin{aligned} &Var\left(\varepsilon_{jt} \mid EPISODE_t = 1, i \in U\right) - Var\left(\varepsilon_{jt} \mid EPISODE_t = 0, i \in U\right) > \\ &Var\left(\varepsilon_{jt} \mid EPISODE_t = 1, i \in NU\right) - Var\left(\varepsilon_{jt} \mid EPISODE_t = 0, i \in NU\right) \end{aligned} \quad (5)$$

Table VIII, while suggesting a clear picture of the mean, presents a more ambiguous one for the variance. Indeed, in the Brazilian episode, volatility of bond prices increased after crisis (standard deviation went from 15.18 to 18.24). In the Greek episode, however, variances stayed constant in both groups (Hambro and non-Hambro countries). Because of the Brazilian episode, however, we cannot dismiss (5), and thus we view results on the covariances between pairs of bond prices only as corroborative.

Since episodes of financial distress were chosen to have internal, idiosyncratic, reasons, the only first-order feature shared by the triggering countries and the countries in the treatment group is the *merchant* bank. The shock to countries with a common underwriter is, therefore, as close as one get to a natural experiment (see Besley and Case [1994]), and the unconfoundness assumption (4) is justified, especially because we control for all time-*invariant* heterogeneity among bonds. Therefore, implication (2) can be consistently tested by estimating the following regression:

$$\log\left(\widetilde{p}_{it}\right) = \beta_0 + \beta_1 MERCHANT_j \times EPISODE_t + \sum_{j=1}^{J} C_j + \sum_{t=1}^{T} T_t + \upsilon_{ijt} \quad (6)$$

where C_j is a dummy specific for bond j (J is the number of bonds in the sample). In most specifications we also include a set of week specific dummies W_t. β_1, a difference-in-

differences coefficient, is the parameter, and an estimated negative value for β_1 is interpreted as evidence of information contagion. (6) is estimated for both the mean (OLS) and the median (quantile regression).

The set of bond specific dummies C_j controls for all time-invariant unobserved determinants of bond prices. Most importantly, these include country fixed effects that could correlate with having a relational underwriter, such as intrinsic risk, enough scale on debt, etc. 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 (which most likely occurred during the crisis episodes), and any increase in the attractiveness of British bonds.

Including week dummies and, more importantly, bond dummies among controls makes it more credible that assumption (4) is satisfied. Still, unobserved time-*varying* components could still produce the result, and (4) would be violated. Nevertheless, the characteristics of the treatment and control groups in both episodes, and historical evidence, suggest that this is not the case.

In the Brazilian episode, there are three Rothschild countries: Hungary, Russia, and, rather distinct from the previous two, Chile. This is an important feature because countries could be contaminated because similarities other than the shared underwriter. For instance, were the Rothschild group was composed by only Latin American countries, geographical similarity would rationalize the results. In the Greek episode the other Hambro countries were more similar: Norway, Sweden and Italy. There is, however, no recorded concurrent independent historical event that rationalizes a fall in Scandinavian bond prices (see Feis [1922], Wynne [1951] and IMMs of 1893).

Furthermore, there is no immediate link, such as geography, between Greece and Norway/Sweden that could compete to rationalize the contagion. Finally, it is important to notice that the two episodes are distant in time, some 5 years. Since the control groups in both events are quite similar, if episodes were close in time, an unobserved shock to even a subset of countries in the control group could rationalize the results. Table XII presents a set OLS regressions results for both episodes.

Table XII– Regression Results, dependent Variable: Log (Bond Price)

	Brazilian Episode			*Greek Episode*		
	Fixed Effects			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
Merchant×Episode	**-0.043**	**-0.044**	**-0.041**	**-0.030**	**-0.031**	**-0.023**
	[0.006]* **	**[0.007]*** **	**[0.006]*** **	**[0.004]*** **	**[0.005]*** **	**[0.004]*** **
Week Dummies?	**No**	**Yes**	**Yes**	**No**	**Yes**	**Yes**
Defaulted bonds?	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**No**
# observations	1304	1304	1304	1179	1179	1006
R^2	0.012	0.001	0.035	0.005	0.001	0.001

All regressions include a constant. Robust standard errors in brackets. *** = significant at 1%. ** = significant at 5%. *= significant at 10%.

The coefficients on the interaction *Merchant×Episode* capture the effect of the contagion by shared underwriter. Bond prices among countries that shared the same underwriter as the country in distress fell, *above and beyond* the market, by some 4% and 3% in the Brazilian and Greek episodes, respectively. In all columns standard errors robust to (between and within) panel heteroskedasticity are reported. Robustness to between panel heteroskedasticity is particularly important in light of the potential increase in variance in for countries $i \in U$ in the Brazilian case. Columns (2), (3), (5) and (6) show that results are insensitive to the inclusion of week dummies are included and to exclusion of defaulted bonds. Table XIII has the same estimates for the median and other quantiles of the distribution of the log of bond prices.

Table XIII - Quantile regressions, dependent variable: Log(Bond Price)

	Brazilian Episode			*Greek Episode*		
	25% percentile	Median	75% percentile	25% percentile	Median	75% percentile
Merchant×Episode	**-0.033**	**-0.028**	**-0.004**	**-0.005**	**-0.014**	**-0.018**
	[0.010]* **	**[0.014]** **	**[0.005]**	**[0.004]**	**[0.004]*** **	**[0.004]*** **
# of observations	1116	1116	1116	1006	1006	1006
Pseudo R^2	0.956	0.944	0.927	0.945	0.945	0.926

Bootstrapped errors in brackets (500 replications). *** = significant at 1%. **= significant at 5%. *=significant at 10%. Week and bond dummies included in all estimated models.

The main coefficient of is again the interaction term, which captures how the quantiles of the distribution of bond changed differently in the treatment and non-treatment countries, as a response to the episodes of financial distress in Brazil and Greece. The effect on all three quantiles is negative, as expected. The median log of bond price in the treatment group decreased for both episodes.

Several robustness checks are conducted. Table XIII reports only the coefficient

Merchant×Episode for the linear conditional mean. The sample is restricted in several ways, mainly geographically. For instance, in the Brazilian case, all Latin American countries, including Chile, were excluded. Also, we let the beginning of the crisis as well as the beginning and ending of the tranquil and crisis period to vary. Finally, bonds that were quoted bellow 60 at least for one week in the samples were excluded. The main results hold.

Table XIII – Robustness Checks

Episode		*Brazilian*			*Greek*	
		Merchant× Episode	Standard Deviation		*Merchant× Episode*	Standard Deviation
Beginning of the tranquil period	*t*+1	-0.038	[0.006]***		-0.023	[0.004]***
	t+4	-0.026	[0.006]***		-0.019	[0.004]***
Beginning of the crisis	*t*-1	-0.039	[0.006]***		-0.024	[0.003]***
	t+1	-0.045	[0.007]***		-0.023	[0.004]***
Crisis Ending	*t*-2	-0.038	[0.008]***		-0.031	[0.005]***
	t+4	-0.032	[0.005]***		-0.020	[0.003]***
Raw Price		-0.039	[0.006]***		-0.022	[0.004]***
Only bond prices greater than 60: Brazil[a] and Greece[b]		-0.030	[0.005]***		-0.008	[0.003]***

Fixed Effects estimates including week dummies and excluding defaulted bonds. All regressions include a constant. Robust standard errors in brackets. *** = significant at 1%. [a] 781 obs. (52 bonds). [b] 754 obs. (53 bonds).

	Brazilian	
	Merchant×Episode	Standard Deviation
Only South America[a]	-0.067	[0.009]***
Russian and Hungary Neighborhood[b]	-0.015	[0.005]***
Including Spain	-0.037	[0.006]***

	Greece	
	Merchant×Episode	Standard Deviation
Greek Neighborhood[c]	-0.014	[0.003]***
Greek Neighborhood[c,d] (without Italy)	-0.014	[0.003]***
Greek Neighborhood[c,e] (without Sweeden)	-0.017	[0.003]***
Greek Neighborhood[c,f] (without Norway)	-0.011	[0.003]***

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 Argentina, Chile, Colombia, Uruguay, and Venezuela 368 obs. (23 bonds). [b] Includes Bulgaria, China, Denmark, Egypt, Greece, Hungary, Norway, Sweeden, Turkey, and Japan 592 obs. (38 bonds) [c] Includes Bulgaria, China, Egypt, Hungary, Italia, Norway, Portugal, Russia, Spain, Sweeden, and Turkey, 516 obs (37 bonds). [d] 482 obs. (34 bonds) [e] 482 obs. (34 bonds) [f] 471 obs. (34 bonds)

V. Conclusion

In this research, I document a type of contagion, in which the transmission mechanism is shared underwriter. This phenomenon is documented for two different episodes of financial distress at time periods of time. Both episodes share a common feature of desirable characteristics that allow me to identify contagion. They are isolated and internally-produced impeding debt restructuring event in a country with a established relation 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 produce contagion.

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APPENDIX I

The List will be opened on the 3rd of March, and closed on or before the 7th of March, 1908.

REPUBLIC OF SALVADOR.

GOVERNMENT SIX PER CENT. STERLING BONDS.

ISSUE OF £1,000,000

In 10,000 Bonds to Bearer of £100 each.

Having the direct obligation of the Supreme Government of the Republic of Salvador and specifically secured by a first charge upon the Special Customs Duty of $3.60, American gold, upon every 100 kilogrammes of merchandise imported into the Republic, and upon the Export Tax of 40 cents, American gold, per quintal (100 lbs.), on a fixed quantity of 500,000 quintals, of coffee exported yearly from the Republic, such 500,000 quintals to be the first exported in each season.

The estimated annual proceeds of these two sources of revenue, payable in gold, specifically pledged to the service of this Loan is the sum of $700,000 gold, say £140,000 sterling. The Government of Salvador has issued and deposited with the Bank in San Salvador designated by the Trustees, to be held at the disposal of and to the order of the Trustees for the Bondholders, Certificates for the said Special Customs Duty and Export Tax for 21 years, that is to say, covering the whole period of the existence of the Loan.

The Bonds will be secured by a Trust Deed in favour of the under-mentioned Trustees.

TRUSTEES FOR THE BONDHOLDERS.

Mark Jamestown Kelly, Esq., Chairman of the Salvador Railway Company, Limited, 7 and 8, Idol-lane, E.C.

Henry Manuel Read, Esq., Manager, London Bank of Mexico and South America, Limited, 94, Gracechurch-street, E.C.

Interest at the rate of 6 per cent. per annum payable half-yearly, in London, at the Offices of the London Bank of Mexico and South America, Limited, on the 15th of February and the 15th of August. The first interest payment will be made on the 15th day of August, 1908, and will be calculated from the due dates of the respective instalments.

The sum of £85,000 (being 8½ per cent. upon the total nominal amount of the loan) is the amount required annually for the payment of interest and for the sinking fund for the redemption of the Bonds in 21 years. The sinking fund will be applied in the purchase of Bonds in the market should they be under par, or by yearly drawings during August in each year if the Bonds should be at or above par.

Principal and interest payable in sterling in London free of all existing or future taxes of the Republic.

Issue price £96 per £100 Bond, payable as follows :—

£5	0s.	per cent.	on Application.
£15	0s.	,, ,,	on Allotment.
£22	0s.	,, ,,	on 7th April, 1908.
£22	0s.	,, ,,	on 7th May, 1908.
£22	0s.	,, ,,	on 9th June, 1908.
£86	0s.		

The Bonds are issued under the direct responsibility of the Supreme Government of the Republic of Salvador in the terms of the General Bond (the form of which is printed in the fold of this Prospectus and are specifically secured by a first charge upon the special Customs Duty of $3.60, American gold, upon every 100 kilogrammes of imported merchandise, and upon the Export Tax of 40 cents, American gold, per quintal on a fixed quantity of 500,000 quintals of coffee exported yearly from the Republic.

The average of the exports of coffee from the Republic during the three years 1904, 1905, 1906, was 660,000 quintals, and the average yield of the Export Tax during those years was 264,000 dollars gold. The average yield of the special Customs Duty during the same three years was 523,200 dollars gold. The complete figures for 1907 have not yet been received.

The annual fixed amount required to provide the interest and sinking fund is £85,000, while the figures given in the last preceding paragraph indicate that the Revenues specifically charged for the purpose exceed £140,000 per annum. The entire proceeds of these Revenues are to be remitted fortnightly to the London Bank of Mexico and South America, Limited, which, after £85,000 has been appropriated for interest and sinking fund, and after providing for the administration expenses of the Loan, will hold the surplus at the disposal of the Government of Salvador.

With the object of providing the Trustees of the Bondholders with a permanent representative in Salvador to secure the regular remittance to London of the two Revenues specifically pledged by the Government for payment of the half-yearly coupons and sinking fund, an arrangement has been entered into with the Salvador Railway Company, Limited, which is an English Company, whereby that company shall with its own local organisation in Salvador receive fortnightly the proceeds of the said Revenues and remit them continuously to the London Bank of Mexico and South America, Limited.

The Government of Salvador has no External Debt. The payment of a subsidy of £24,000 per annum to the Salvador Railway Company, Limited, of London, is secured on specific Revenue of the Government other than the Revenues hypothecated to this Loan, and has been met with unvarying punctuality. The Interior Debt, which in 1899 stood at about 2¾ millions of silver dollars, has been reduced during the last two Administrations by purchases on the system of tenders, so that the outstanding internal bonds amount to a sum of under 3½ millions, principal and interest, of silver dollars.

		Customs.	Excise.	Other sources.	Total.
		Silver Dollars.			
1902	... ...	4,272,417.07	1,857,706.42	571,898.21	6,702,021.70
1903	... ...	4,273,133.92	1,945,706.19	573,205.58	6,792,045.69
1904	... ...	5,124,085.11	2,143,369.66	793,234.28	8,060,689.05
1905	... ...	5,567,448.17	1,924,911.07	1,044,083.83	8,536,443.07
1906	... ...	5,431,169.18	1,994,266.46	1,058,984.14	8,484,419.78
1907	(Budget estimate) ...	5,551,900.00	2,350,000.00	832,250.00	8,734,150.00

The value of the Imports and Exports during the same period was :—

	Imports.	Exports.
	Silver Dollars.	
1902	6,181,616.43	10,278,151.93
1903	6,949,073.47	14,173,863.11
1904	8,123,345.18	16,583,611.77
1905	9,776,656.22	14,098,833.15
1906	9,368,206.35	16,308,554.32

The foregoing figures show that the value of the exports of the Republic has been largely in excess of the imports. The exports are mostly made up of Coffee, Indigo, Balsam, Sugar, Tobacco, and Gold and Silver from mines worked in the country, these metals representing during the above period an average value of about $1,800,000 per annum.

The population of the country gives an average of about 139 inhabitants to the square mile, which is an exceptional density of population as compared with any of the Republics of Latin America.

The operation of the Railway system owned by the Salvador Railway Company, Limited, which connects the principal cities of the Republic, i.e., San Salvador, the capital, and Santa Ana, the principal centre of the coffee growing industry, with the Port of Acajutla, has greatly promoted the development of the country since this line was completed in 1900.

During the last few years public works of considerable importance have been undertaken by the State, and are being completed by the present Administration. The proceeds of this Loan will in part be applied to these objects and also to the repayment of recent local borrowing by the Government at a higher rate of interest.

At the Conference recently held at Washington, upon the friendly initiative of the Presidents of the United States and Mexico, the Delegates of the five Republics of Central America signed treaties which are calculated to insure permanent peace, and under such conditions a more rapid development of the great natural wealth of those countries may be expected. The transmission of the Executive Power in Salvador is effected with regularity, by popular suffrage, every four years, consecutive re-elections to the Presidential Office being barred by the Constitution of the Republic.

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