Contagion by Shared Financial Intermediary in the pre-1914 London Sovereign Debt Market

by

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Abstract

This thesis consists of one empirical essay on contagion (co-authored with Joao Manoel Pinho de Mello[1] and Marcelo de Paiva Abreu[2]). 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, given the absence of international monitoring agencies and substantial agency costs. Using a hand-collected dataset of weekly bond prices and borrower-underwriters relationships in the pre-1914 London market for sovereign debt, we explore two events of financial distress – the Brazilian Funding Loan of 1898 and the Greek Funding Loan of 1893 – as quasi-natural experiments to contagion by shared underwriter. Following the two crises, bond prices of countries that shared the same merchant bank dropped by some 3.5% 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. Two theoretical explanations can rationalize this phenomenon: information spillovers and portfolio realignment.

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1. Introduction

Recent literature on international financial contagion has recognized the existence of 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 or common external shocks. One such is informational, often called information spillovers, or the "wake up call" hypothesis (Van Rijckeghem and Weder (2000)). Another channel is mechanical: in response to a crisis in one country investors realign their portfolios when facing margins calls, affecting the asset value of other countries. Aside from explanations based on self-fulfilling crises, the literature was has not provided, theoretically or empirically, any specific mechanism that produces information spillovers or portfolio realignment. In this paper, we present empirical evidence that shared financial intermediary is a mechanism through which contagion takes place.

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

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

The first characteristic is the existence of long-term relationships between countries and intermediaries. From 1870 through 1914, many countries used the same bank as the lead underwriter of their debt. Underwriters played an active role in monitoring and advising their relational debtors, provided macroeconomic advice, debt management counseling, market-making of bonds, and direct lending services such as short-term credit advances (see Flandreau (2003) and Flandreau and Flores (2007) and section II for a description of the workings of the country – underwriter relationship).

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

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

The second characteristic is the public observability of relationships. In addition, a hard financial performance measure is available: the bond price at the London secondary market. Thus, we observe both strength of the relationship and some objective measure of financial performance, the price of the bond. In a typical empirical settings, when relationships are important (small firms, for example), little hard information on the borrower's terms of credit is available. Thus we have a unique setting for testing the hypothesis of contagion by shared financial intermediary.

Events of financial crisis satisfying the following set of conditions are considered quasi-natural experiments for testing the hypothesis of contagion by shared intermediary. First, the country in distress must have strong financial relationships with a merchant bank, the most important type financial intermediary operating in the London peripheral market. Second, the distress was triggered by internal reasons or commodity shocks, and not by a generalized financial crisis originated in the developed centers. Third, it had to be possible to find a group of other countries that had a strong relationship with the same intermediary as the country in distress. Finally, countries that shared the merchant bank with the country in distress 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 crisis in the original country. Countries that shared the merchant bank with the country in distress are treatment group, and other countries are the control group. Satisfying the conditions guarantees that the treatment is random. Thus, causality (i.e., contagion) may be inferred by comparing bond prices of the control and treatment groups around the period of financial distress.

Contagion by shared financial intermediary is not 19th century anomaly. Recent events have undermined reputation of credit rating agencies as informational brokers. AAA rated mortgage-backed securities have proven less than safe, causing suspicion on other instruments rated by credit agencies. The problem was aggravated by the difficulty in pricing these instruments because of their complexity and the sudden drop in liquidity. The analogy with our application is clear. Peripheral countries were complex and consequently difficult to price, and their bonds were "rated" by merchant banks at issuance. Distress in one country leads to suspicion on the class of assets in general, and on papers underwritten by the same merchant bank. In this sense, our results may shed light on contagion driven by uncertainty about the quality of "monitoring or rating".

The paper relates to several pieces of literature. First, we contribute to the literature on contagion. Recent work suggests that economic fundamentals cannot fully account for contagion (Kumar and Persaud (2002)). Several alternative explanations emerged. For example, common creditor spillovers happen when depositors call the creditor with exposure to the country under distress. Contagion arises when creditors sells their positions in other country's assets to fulfill their commitment to depositors (Calvo (1998), Kaminsky and Reinhart (2000)). In our case, investors that suffer looses in one country may have to close position in other countries. More interesting, information spillovers arise when investors update their beliefs about the quality of

underwriting (or credit rating) in the event of financial distress (Van Rijckeghem and Weder (2000)).

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

Our paper also relates to the relational lending literature. Theory and evidence suggest that the borrower-creditor (of financial intermediary) relationship is an important technology for producing loans. In Rajan (1992) and Petersen and Rajan (1994), repeated borrower-lender interaction alleviates informational problems as lenders acquire soft information on the borrower's project. In Boot and Thakor (1994), Bolton and Scharfstein (1990) and Carrasco and De Mello (2010) relationships 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).We document the "reverse of the fortune" of relational finance. If relationships are important, then investors update their beliefs about the relational lender´s ability to screen or monitor when one of its borrowers (or its underwriting clients) defaults. Work on corporate Initial Public Offerings (IPOs) show the importance of underwriter credibility in explaining the success of IPOs. Brau and Fawcett (2006) report that, when choosing the underwriter, CFOs care more about the intermediary's reputation and expertise than other aspects such as market-making and pricing. See also Krigman, Shaw and Womack (2000) and Carter, Dark and Singh (1998).

A clean identification strategy is only a necessary condition for inferring contagion. Establishing causation demands the documentation of the importance of relationship in the 19th century debt market. Flandreau and Flores (2007) show the importance of underwriter-country relationships in London sovereign debt market during the 1820s, a period preceding ours. They establish two facts. Significant segmentation existed in market for underwriting: "good" countries matched with "good" underwriters. Good "borrowers" tended to issue their debt with the same merchant bank. Thus, brand had value in underwriting, suggesting that the identity of the underwriter and relationships mattered. We also document the existence of stable relationship between countries and merchant banks for a much longer period 1820-1914.

The paper contains four sections including this introduction. Using the work of Flandreau and Flores (2007) and additional historical evidence we gathered, section 2 contains a description of the London market for sovereign debt. Section 3 outlines the empirical strategy, with emphasis on the episodes of financial distress that constitute our quasi-natural experiments. Data, results and identification strategy are also on section 4. Section 5 discusses the results and concludes.

2. The peripheral London market for sovereign debt and the workings of country-merchant bank relationships

From the 1820s through World War I, London was the most important market for sovereign debt. In 1913, British investment on foreign government bonds was £1.1 billion, representing a third of total overseas investment (Feis (1964)). This proportion was even higher in the late 19th century. The London sovereign debt market was divided into three segments, according to the level of financial development of its participants: colonies and British dominions, financially developed borrowers, and the peripheral market. Segments had different modus operandi regarding debt underwriting and, more importantly, borrowers in different risk classes. Except for colonies and dominions, which were formally treated differently, this market segmentation was informal. Nevertheless, when discussing financial events and bond quotations, both The [London] Times and the Investors' Monthly Manual (IMM) classified countries according to this taxonomy. We focus on the peripheral segment, where relationships between countries and London intermediaries were an important phenomenon.

The peripheral countries segment included almost all of Latin America, some Eastern European states, Asian and African countries, as well as less reputable Western European countries as Portugal, Spain and Italy. Contrary to the colonial market, this segment was not mostly unregulated. Differently from financially developed borrowers, its participants had neither developed domestic capital markets nor trustworthy official information disclosure of statistics. Most peripheral countries were far away from London, further increasing the cost of accessing country-specific information.

After 1860, underwriting of peripheral countries debt was done by two types of intermediaries: merchant banks and joint-stock banks. In the early stages of the market, commercial companies with business abroad issued debt of foreign countries, especially those from outside Europe (see Marichal (1988) and Flandreau and Flores (2007)). Merchant banks were large private investment institutions with high reputation, which practically monopolized the market of foreign debt underwriting until the 1860s. Between 1815 and 1904, the two largest British merchant banks - the N. M. Rothschild and Sons Limited (hereafter Rothschilds) and the Barings Brothers & Co. (hereafter Barings) - participated in no less than 205 foreign government bonds issues, totaling approximately £ 2 billion (Davis and Galman (2003)). Most of these issues occurred after 1870. Towards the end of the century, merchant banks faced increasing competition from joint-stock banks, which were British-owned overseas intermediaries created to finance Britain foreign trade.

Merchant banks performed several tasks. Some were bureaucratic, such as handling subscriptions and making coupon payments. More substantial tasks included acting as trustees for the bondholders and issuing a prospectus. A typical prospectus had information about the terms of the loan (currency of denomination, coupon, payment dates), about the destination of the proceedings of the loan (if any), and about the country in general.

Several peripheral countries established long lasting relations with a financial intermediary or with an international syndicate of banks. Relationships were observed to

the general public. By January 1890, 10 out 26 peripheral countries with more than one bond listed had 50% or more of their outstanding debt issued by the same intermediary. 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. Table 1 displays, for January 1890, the proportion of central government's outstanding debt issued by each countries' main underwriter. Excluding borrowers that were on default, or whose bonds were issued as a result of debt settlements, only Russia had less than 50% of their outstanding debt floated by the same intermediary. Later on in the 1890s Russia would have way more than 50% of her debt dealt by the Rothschilds.

An average investor faced significant uncertainty about peripheral borrowers' financial soundness. The history of this market is a tale of defaults and debt renegotiations. From the early 1820s through World War I, Mexico, Argentina, Greece, Portugal, Spain, Turkey, Egypt, Santo Domingo, Honduras, Paraguay, Colombia, Uruguay, Liberia, and Venezuela were part of the long list of defaulters. Renegotiation was long and complex. See Flandreau and Flores (2007) for a full account of the mishaps of the London debt market.

Given the absence of international monitoring agencies, and the difficulties in gathering country specific-information, moral hazard was a pervasive problem. A large number of prospectuses indicated an intended employment of the resources, but examples of diversion abound (Wynne (1951)). For example, the proceedings of 4% Greek Monopoly loan were earmarked to pay debt obligations. Nevertheless, roughly one third of the loan's revenues were spent in the construction of three ironclads, whose contractors were connected to the Comptoir d'Escompte, the French underwriter of the loan (Levandis (1944)). It was impossible for an investor in London learn all this information. It was also common that prospectuses to contain pledges that revenues to be used to debt payment. In many cases, pledges went unfulfilled. For example, the Turkish loans of 1858 and 1862 pledged customs duties and taxes on tobacco and salt, among other sources of public revenue. The prospect mentioned an external commission to monitor the use of the revenues. Not only the same revenues were pledged in subsequent loans, but the monitoring commission had no effective power.

The British Government took no action on behalf of bondholders. Sovereign debt contracts were subject to limited enforceability. The position of the British legal system towards defaulters and the problem of limited enforceability was a frustration among bondholders associations. The 1873 Annual Report of the Council of Foreign Bondholders stated in its page 68 that "[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, (...)." Besides the legal enforceability problem, the British government did not regularly use its military power force settlements. Tomz (2006) matches a large dataset on wars, threats of conflicts, and defaults after the 1850s, with Foreign Office diplomatic correspondence. His results indicate that the British military power was rarely used primarily to protect bondholders' interests.

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

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

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

As expected, the British investor priced the risk of peripheral debtors accordingly. Among issues of bonds outstanding in January 1890, the price offered to the public 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. Thus yields were quite high. Nonetheless, relationships could influence the evaluation of the assets. Flandreau and Flores (2007) present ample evidence that high-quality relational merchant banks such as the Rothschild and the Hambros obtained country-specific information. They were also efficient in monitoring their clients. Relational bankers superior technology stemmed both by the intermediary access to the government accounts, and by personal connections with governments representatives and local firms.

The merchant bank was normally responsible for coupon payments and debt amortization operations (Borchard (1951)). Thus she had a direct source of hard information on the debtor financial standing. Any delay or difficulties met by the borrower in fulfilling these advances were known by the bank in advance. The relationship between Brazil and Rothschilds illustrates the importance of government accounts as a direct channel of hard information. The following passage, from the report of the committee to 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)).

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

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

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

Rothschilds in the country. The correspondence displays the latest information on the Brazilian border conflicts with Argentina during the 1820s (Rothschilds Archives, RAL XI/28/215). The information gathering process also involved a considerable exchange of letters between Nathan M. Rothschilds and the Brazilian ministers in London. Brazil and the Rothschild is not an isolated example. Bulgaria and the Banque de Paris et des Pays-Bas is another (Avramov (2000)). Portugal and Crédit Lyonnais is yet another illustrative case (Flandreau (1998)).

Relations also increased the intermediary's leverage in imposing conditionality. Bondholder's associations used retaliatory actions. The most common, albeit usually unsuccessful, action was trying to prevent new issues by defaulters. Relational intermediaries went farther and imposed conditionalities on a regular basis, even during the normal operation of the relationships (Flandreau (2003)). However, relational underwriters' ability to influence debtors was partial. Even exclusive underwriters, who faced little competition, were unable to impose their will in several occasions. Consider the case of Brazil in the 1890s, when the financial situation worsened steadily. Despite several attempts, 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 (2007)). Quite importantly, the market recognized the existence of relations as disciplining devices. Bondholder often complained not to sovereign's representatives in London, but to the issuing houses.

A last piece of evidence that relationships mattered for market making comes from Flandreau and Flores (2007), who document segmentation in the London debt market. Reputable merchant banks, such as the Rothschild, matched with higher quality borrowers. When trouble arose in the low-end of the market, Rothschild countries were insulated, possibly because the market saw the Rothschild as valuable brand.

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.

3. Episodes of Distress

The identification strategy rests on selecting the appropriate events of financial distress. The Brazilian funding loan of 1898 and the Greek funding loan of 1893 are the two episodes that fulfill the following necessary conditions for identification: (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 was driven by internal reasons.

It is self-evident that conditions (i) and (ii) need to be satisfied. Conditions (iii) and (iv) are crucial for a causality, i.e., for interpreting of a drop in the price of bonds in the treatment group relative to the market as evidence of 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 is abroad, then bond prices of treatment or control countries would be contaminated, preventing causal interpretation.

If countries sharing the same merchant bank produced similar commodities, or had strong trade linkages, 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 in face of crisis. Increased variance is often confounded with contagion (Forbes and Rigobon (2002)). A commodity price shock that affects the external solvency of "treated countries" would 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 had a strong relationship with the Barings was Uruguay, who also had strong common staples with and commercial links to Argentina.

3.1 The Brazilian Episode

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

The Brazilian crisis had three main causes: political turmoil, loose monetary policy, and a shock in the price of coffee, the main Brazilian exporting commodity. 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. In March 1898, right after the Brazilian budget was published in the English press, bond prices dropped roughly 15%. Prices kept falling until July 1898, when Brazil announced a funding loan scheme: instead of paying interest on its foreign

debt, it would issue new bonds in the following 3 years. The amortization payments covered by the funding scheme were suspended for the following years. The funding loan scheme was designed with the guidance of the Rothschilds.

3.2 The Greek Episode

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

4. Data and Results.

4.1 Sample, Summary Statistics and Preliminary Evidence

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 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 negotiation took place. The unit of observation is a bond j in a week t.

The sample is composed of all bonds from peripheral country or provinces whose prices were published at The [London] Times' section Stocks and Shares, coupons payable in London. For data gathering feasibility reasons, the weekly bond price is the (previous) day price that first appears in a certain week. The search involves findings the section Stocks and Shares, coupons payable in London of The Times and reading through a table. Without the recording criteria the search would have been impractical. When bond shows no prices for the whole week, the observation is treated as missing. For the Brazilian episode, we have a sample of 90 bonds from 33 countries and provinces. For the Greek episode, the sample is composed of 84 bonds of 34 countries and provinces. Table 2 shows the size and some summary statistics on amount of outstanding debt in our sample of debtors. Table 3 has the geographical distribution of the sample. In both events, the sample consists mostly of bonds issued by Latin America and Eastern European countries, but it is overall quite spread out across countries and provinces.

The "raw" bond price contains the coupon payment. Using dates of payment, we correct weekly prices for dividend payment. At the date of dividend payment, the coupon paid is "added back" to the price of the bond, using the interest rate contracted and the period of payment (semester or quarter) at the original prospectus.

Accounting for bond payments is important because dividend payments produce sharp fluctuations in prices, which have little to do with risk assessment. Information about coupon payments is from the prospectuses published on The Times or on the Annuals Reports of the Council of Foreign Bondholders.

The decision about the beginning of the crisis period - i.e., when the market learned about the distress – is based on both the movement of prices and historical evidence. Figures 1 and 2 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, first sharp drop in prices marks the beginning of crisis period. Historical evidence also supports the choices. In the Brazilian case, it is the week the national budget first appeared in the English press. In the Greek case, it is the of financial minister resignation.

Table 2 – Sample Description

Panel A: Brazilian Episode

Bonds whose price were published in *The Times* in February 1898

	#Borrowers	Bonds	%
Total	33	90	
Countries	27	75	83.33%
Provinces	6	15	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	%
Total	£681,705,648	£2,386,100	
Countries	£665,747,148	£2,972,180	97.66%
Provinces	£15,958,500	£1,131,400	2.34%
Hungary, Russia, and Chile	**£193,236,178**	**£4,000,000**	**28.35%**
Other Governments	£488,469,470	£2,359,800	71.65%

Panel B: Greek Episode

Bonds whose price were published in *The Times* in February 1893

	# Borrowers	Bonds	%
Total	34	84	
Countries	27	70	83.33%
Provinces	7	14	16.67%
Defaulted	9	14	16.67%
Italy, Sweden, and Norway	3	9	10.71%
Other Governments	31	75	89.29%

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

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

Table 3 - Geographical Distribution of the Sample

South America	Episodes of Distress: Greek No. of Bonds	Episodes of Distress: Brazilian No. of Bonds
Argentina (central)	9	11
Buenos Aires	2	2
Cordova	1	3
Entre Rios	3	3
Santa Fe	5	6
Argentina (central and provincial)	20	25
Brazil (central)	4	-
São Paulo	1	-
Brazil (central and provincial)	5	-
Chile	5	8
Colombia	1	1
Ecuador	1	1
Paraguay	1	1
Uruguay	1	2
Venezuela	1	1
Total	**35**	**39**

North and Central America		
Costa Rica	2	2
Guatemala	2	1
Honduras	2	1
Mexico (central)	2	3
San Luis Potosi	1	1
Tucuman	1	1
Mexico (central and provincial)	4	4
Nicaragua	1	-
San Domingo	-	1
Total	**11**	**14**

Europe	Episodes of Distress: Greek No. of Bonds	Episodes of Distress: Brazilian No. of Bonds
Bulgaria	1	2
Demark	-	1
Greece	-	6
Hungary	1	1
Italia	3	2
Norway	3	3
Portugal	1	1
Russia	6	7
Spain	2	2
Sweden	3	2
Turkey	9	6
Total	**29**	**33**

Asia		
China	4	5
Japan	1	1
Total	**5**	**6**

Africa		
Egypt	5	5
Transvaal	1	1
Total	**6**	**6**

Oceania		
Hawaii	1	-
Total	**1**	**0**

Figures 1 and 2 also show the length of tranquil and crisis periods (the before and after). The tranquil period ends with the distress. Identification is cleanest when the tranquil period is shortest. However, we cannot know whether markets anticipated the distress. Thus, we stretch the tranquil period to 10 weeks to guarantee that, for at least a relevant part of the pre-treatment period, markets were unaware of the distress.

Determining of the end crisis period is even harder. We have no precise historical record on the news' flow during the period. Thus, the length of crisis period is determined empirically. Crisis ends when bond prices of the country in distress stop falling. Using this criterion in the Brazilian and the Greek cases, the tranquil and crisis period lasted 14 and 4 weeks, respectively, for both episodes. Robustness checks on the period are performed (see Table 9).

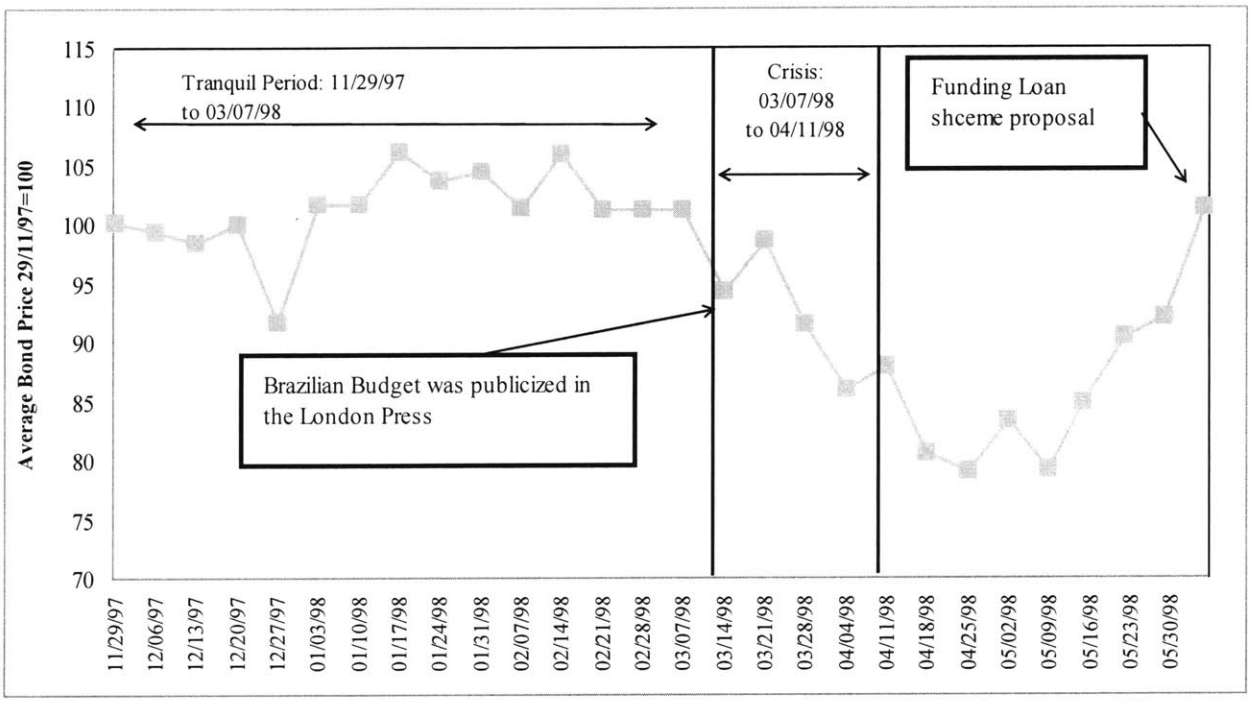
For both episodes of financial distress, the strategy consists of comparing the dynamics of the price of the bonds between two sets of countries: one composed of countries that had a relationship with the same merchant bank as the country in distress (treatment), and one that did not have (control).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

Table 4 shows the bond issues of the countries that at least one outstanding debt bond issued by Rothschilds as of February 1898. Among these countries, we classify Chile, Hungary ,and Russia as "Rothschild countries". Two cases are borderline, and the line is drawn between Russia and Turkey. Not only Turkey had a lower proportion of Rothschild underwritten debt (27.15% against Russia's 62.37%), but her debt was co-issued by Rothschild and the Imperial Ottoman Bank, with equal status. Historical records show that since 1881 the Imperial revenues had been monitored by an external bondholder's commission (Feis (1964), Wynne (1951)). Thus, the Rothschild had a relatively small monitoring role. The remaining cases are less controversial. We exclude Egypt because, besides having only a small proportion of overall debt issued by the Rothschilds, it was under foreign intervention during the Brazilian crisis period. Transvaal had 100% Rothschild concentration but only bond issue. Spain had only a negligible proportion of the overall debt issued by the Rothschild.

Table 5 displays all countries which in 1893 had at least one bond issued by Hambro. In contrast to the Brazilian crisis, all three Hambro countries had concentrated operations. Hambro underwrote not only 100% of the Norwegian and Swedish debt outstanding but also all their previous issues back in the 1870s (Wynne (1951)). Although the three Italian bonds negotiated in London only date back to the 1860s, historical records allow us to classify Italy as a Hambro country.

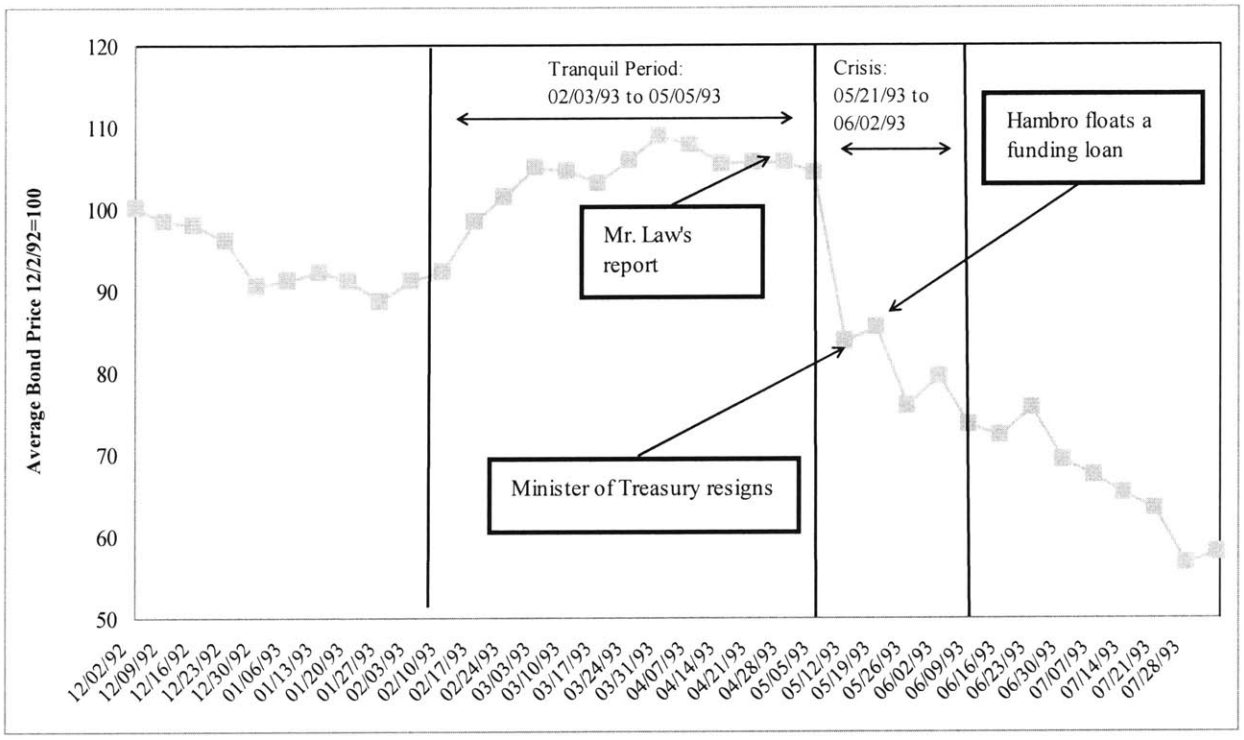
In the Brazilian episode, the sample of bonds is divided into two groups: those issued by Russia, Chile and Hungary, and the rest of the market. Analogously, in the Greek crisis, the division is between the bonds issued by Italy, Sweden and Norway and the other bonds. For the Brazilian episode (and to a lesser extent the Greek), the treatment group is quite heterogeneous, a desired feature of the treatment group because economically similar countries could be subject to common unobserved shocks.

Figure 1: Variation in the Average Brazilian Bond Prices



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

Figure 2: Variation in the Average Greek Bond Prices



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

Table 4 – Peripheral Countries with debt issued by Rothschild in 1898

Loans	Underwriter	Amount of Outstanding Debt in Feb. 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	6,157,920.00	
3.5% 1894	*Rothschilds*/Imperial Ottoman	8,130,280.00	
4% Priority 1890	Imperial Ottoman	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	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 5 - 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*.

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

Chile had a bank run in 1898, which is a potential threat to our estimation strategy. Financial situation in Chile starts to deteriorate in early July, when a bank run on Santiago banks forced the government to declare a moratorium on July 11th (Subercaseaux (1992)). Since our window of analysis ends in May, the event of financial distress in Chile does not invalidate its inclusion as a member of treatment group. Another potential stumbling block is the fact that Brazil and Chile are close geographically, but Chile and Brazil had no bilateral trade to speak of. Chile´s major export was saltpeter (50-60% of the total). Brazil main export was coffee (60% of the total) and Chile was not an exporter of any of his other exports such as rubber, sugar, tobacco.

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

Table 6 presents the summary statistics on prices for both crises, before and after the market learned about the distress. Start at the Brazilian episode. At the crisis period, bond prices of Rothschild countries were 7.38% lower than in the tranquil period. The rest of the market dropped only 3.85%. Qualitatively, the same pattern arises in the Greek episode. For Hambro countries, bond prices dropped by 1.73% fall, and 1.41% fall for non-Hambro countries. Raw data are very noisy and standard errors are quite large.

Table 6 – Summary Statistics

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

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

4.3 Empirical Strategy and Main Results

Typically, contagion is documented computing co-movement between two securities before and after some episode of financial distress. Flandreau and Flores (2007) follow this strategy. Forbes and Rigobon (2002) distinguish contagion from co-movement, which is analogous to the difference between causation and correlation. They show that correlation techniques produce inconsistent estimates for contagion because of heteroskedasticity, omitted variable and reverse causation. Heteroskedasticity hinders causal interpretation because distress increases the volatility of security prices, increasing correlation between assets prices mechanically. Identifying the origin of the distress is also tricky. Is it country A that contaminated B, or the other way around (reverse causality)? Or is it country C that contaminated both (omitted variable)? We bypass problems raised by Forbes and Rigobon (2002) by selecting episodes of distress that are quasi-natural experiments for testing contagion by shared financial intermediary. Thus, it is unnecessary to search for instruments to correct for reverse causation and omitted variable. The identification strategy is as follows. In both episodes, bonds are partitioned into two mutually exclusive sets: bonds issued by countries that had a strong relationship with the underwriter of the country under distress (the Treatment Group, T), and bonds issued by countries that did not (Control group, C). The sample is also partitioned into two periods, before (B) and after (A) the crisis in the distressed country. Let i be a country. Define the following two dummy variables:

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

We assume that for countries $i \in T$

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

and

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

$\tilde{p}_{jt}$ is the bond "corrected" price. We test whether β1 is negative. Interpretation of β1 as contagion by shared underwriter is warranted under the following unconfoundedness assumption (Rosenbaum and Rubin (1983)):

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

In our setting, unconfoundedness means that, after controlling for bond and week fixed-effects, unobserved shocks to bond prices (ε_{jt}) are mean independent of crisis periods (EPISODE) and of sharing the underwriter (MERCHANT). Unconfoundness is violated if countries with the same underwriter also had trade linkages, for example. Selection of episodes of financial distress guarantees that the only common feature in the treatment group is the merchant bank. Thus, the distress is a quasi-natural

experiment, justifying assumption (4). In this case, β1 is consistently estimated by the following model:

$$\log(\widetilde{p}_{it}) = \beta_0 + \beta_1 MERCHANT_j \times EPISODE_t + C_j + T_t + \upsilon_{ijt} \qquad (5)$$

where Cj is a set individual effects and Tt is a set of week dummies. We estimate (5) for both the mean and the median. An observation is a pair bond-week but the variation is at the country level. For this reason, we cluster observations at the country level to account for within-country correlation of bond price when estimating standard errors

The individual effect cj controls for all time-invariant country characteristics that may relational underwriter particularly valuable, 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, or any increase in the attractiveness of British bonds.

Including week dummies and taking into account time-invariant bond effects makes it more credible that assumption (4) is satisfied. The treatment group in the Brazilian episode - Hungary, Russia, and Chile – is quite heterogeneous, a desirable feature. The Greek episode treatment group - Norway, Sweden and Italy - is more homogeneous. However, no recorded concurrent independent historical event rationalizes a drop in Scandinavian bond prices (Feis (1964), Wynne (1951), IMMs of 1893). In addition, there were no immediate link commercial of financial between Greece and Norway/Sweden. Table 7 presents fixed-effects estimation results for both episodes.

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 4.5% and 3% in the Brazilian and Greek episodes, respectively. In all columns standard errors robust to (between and within) panel heteroskedasticity are reported. Results are robust to the inclusion of week dummies and to exclusion of defaulted bonds.

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

Results for the mean may be sensitive to outliers, especially because the treatment contains only three countries in both crisis episodes. We estimate the model for the conditional median and quartiles, which is more robust to outliers. Table 8 has the results. For both episodes, the estimated impact on the three quartiles is negative. Except for the 3rd quartile for the Brazilian episode, the impact is statistically significant and has a similar magnitude as the effect on the mean of the bond price distribution.

Since we make hard empirical choices, in Table 9 we present an extensive robust analysis. First, we change the length of tranquil and crisis period, reducing or augmenting by one and two weeks. We use the raw price (as opposed to the bond price corrected for coupons payments). Results are, if anything, stronger. We exclude bonds that, although not officially defaulted, had prices lower than 40. Again, results are similar.

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

Table 7 – Regression Results: Dependent Variable: Log (Bond Price)

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

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

Table 8 – Linear quartile regressions

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

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

Table 9 – Robustness Checks

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

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

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

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

5. Conclusion

We document a type of contagion whose transmission mechanism is shared underwriter. This phenomenon is documented for two different episodes of financial distress in the late XIX century. 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 an 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.

Bibliography

Abreu, M. (2007). Money Doctors in Brazil. Mimeo. Departmento de Economia PUC-Rio.

Aoki, M. and S. Dinç (2000). Relational Financing as an Institution and its Viability under Competition, in Finance, Governance, and Competitiveness in Japan. M. Aoki and G. Saxonhouse, eds., Oxford: Oxford University Press.

Avramov, R. (2000). Advising, Conditionality, Culture: Money doctors in Bulgaria in Money Doctors: the Experience of International Financial Advising 1850-2000, M. Flandreau, eds., Oxford: Oxford University Press.

Berger, A. and G. Udell (1995). Relationship Lending and Lines of Credit in Small Firm Finance. *The Journal of Business 68*, 351-381.

Bolton, P. and D. Scharfstein (1990). A Theory of Predation Based on Agency Problems in Financial Contracting. *The American Economic Review 80*, 1-25.

Boot, A. and A. Thakor (1994). Moral Hazard and Secured Lending in an Infinitely Repeated Credit Market Game. *International Economic Review 35*, 899-920.

Borchard, E. (1951). State Insolvency and Foreign Bondholders Volume I General Principles, New Haven: Yale University Press.

Brau, J. and S. Fawcett (2006). Initial Public Offerings: An Analysis of Theory and Practice. *The Journal of Finance 61*, 399-436.

Calvo, G. (1998). Balance-of-Payments Crises in Emerging Markets: Large Capital Inflows and Sovereign Governments. Mimeo. University of Maryland.

Calvo, G. and E. Mendoza (2000). Rational Contagion and the Globalization of Securities Markets. *Journal of International Economics 51*, 79-113.

Carter, R., F. Dark and A. Singh (1998). Underwriter Reputation, Initial Returns, and the Long Run Performance of IPO Stocks. *The Journal of Finance 53*, 285–311.

Carrasco, V. and J. De Mello (2010). Repeated Lending under contractual incompleteness. *Annals of Finance 6*, 51-82.

Davis, L. and R. Gallman (2003). Evolving Financial Markets and International Capital Flows: Britain, the Americas, and Australia, 1865-1914, London: Routledge.

Flandreau, M. (2003). Crises and punishment: moral hazard and the pre-1914 international financial architecture in Money doctors: the experience of international financial advising 1850-2000, M. Flandreau, eds., Oxford: Oxford University Press.

Flandreau, M. (1998). "Caveat Emptor: Coping with Sovereign risk without the Multilaterals 1871-1913. CEPR Discussion Paper, no. 2004.

Flandreau, M. and J. Flores (2007). Bonds and Brands: Intermediaries and Reputation in Sovereign Debt Markets, 1820-1830. Working Papers in Economic History wp07-12, Universidad Carlos III, Departamento de Historia Económica e Instituiciones.

Feis, H. (1964) Europe: the World's Banker 1871-1914, New Haven: Yale University Press.

Flores, J. (2007). Lending Booms, Underwriting and Competition: The Baring Crisis Revisited. Working paper in Economic History no. 07-01 (2007), Universidad Carlos III De Madrid.

Forbes, K. J. and R. Rigobon (2002). No contagion, Only Interdependence: Measuring Stock Market Movements. *Journal of Finance 57*, 2223-2261.

Hoshi, T., A. Kashyap, and D. Scharfstein (1991). Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups. *The Quarterly Journal of Economics 106*, 33-60.

Kaminsky, G. L. and C. Reinhart (2000). On Crises, Contagion, and Confusion. *Journal of International Economics 51*, 145-168.

Krigman, L., W. Shaw and K. Womack (2000). Why do Firms Switch Underwriters? *Journal of Financial Economics 60*, 245-284.

Kumar, M. and A. Persaud (2002). Pure contagion and investors' shifting risk appetite: analytic issues and empirical evidence. *International Finance 5*, 401-36.

Levandis, J. (1994). The Greek Foreign Debt and the Great Powers, 1821-1898, New York: Columbia University Press.

Marichal, C. (1988). A Century of Debt Crises in Latin America: from Independence to the Great Depression, 1820-1930, Princeton: Princeton University Press.

Mauro, P. and P. Yafeh. (2003). The Corporation of Foreign Bondholders. IMF Working paper, no. 03/107.

Petersen, M. and R. Rajan (1994). The Benefits of Lending Relationships: Evidence from Small Business Data. *The Journal of Finance 49*, 3-36.

Rajan, R. (1992). Insiders and Outsiders: The Choice between Informed and Arm's Length Debt. *The Journal of Finance 47*, 1367-1400.

Rosenbaum, P. and D. Rubin (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika 70*, 41-55.

Subercaseaux, G. (1922). Monetary and Banking Policy of Chile, Oxford: Oxford University Press.

Tomz, M. (2006). Enforcement by Gunboats. Mimeo, Stanford University.

Van Rijckeghem, C. and B. Weder (2000). Spillover through banking centers: a panel data analysis. IMF Working Paper, no. 00/88.

Wynne, W. (1951). State Insolvency and Foreign Bondholders Volume II: Selected Cases, Histories of Governmental Foreign bonds Defaults and Debt Readjustments, New Haven: Yale University Press.