The Puzzle of Sovereign Debt Collateral: Financial Globalization in the First Age of Big Data

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Abstract. *In the mid 19th century, lending to sovereign borrowers was a blind date. This, we argue, is the reason for collateral pledges frequently found in lending covenants. We show that sovereign collateral (consisting in custom revenues, sovereign properties, railways) did not serve as a conventional security that would be repossessed in case of default as previous research suggests. In fact, sovereign immunity prevented such repossession. Instead, it enabled the production of reliable fiscal data, facilitating market access: Lawyers and financiers injected collateral clauses in sovereign debt covenants to permit credible disclosure of hard to access numerical evidence on tax harvesting. The study foregrounds the importance of big law firms as financial intermediaries and the role they played in financial globalization and state building. This brings to mind parallels with the promises ascribed to "modern" FinTech methods to which the mechanism we tell provide a historical precedent.*

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"[No contracting] firm can take precautions against the repudiation of a hypothecation"

Thomas Baring, 1865

I. Introduction

In conventional analysis, contracts exist within formal institutional frameworks built on coercive enforcement (North et al. 1990). The posting of collateral in corporate lending provides an egregious instance. Collateral is a vital instrument for ensuring the performance of debt contracts. In standard corporate debt models of collateral provision, collateral is pledged because of a lack of information on the borrower's type or because of monitoring difficulties: Theory interprets collateralization as an institution that can mitigate information asymmetry and moral hazard in credit relationships. The act of posting collateral is a costly signal; as such, it helps borrowers disclose their quality to lenders ex-ante. Moreover, increasing borrowers' stakes ex-post, it limits insider incentives to mismanage resources and protects investors against dilution. A consequence is that, by decreasing the need to investigate the project behind the debt, the posting of collateral makes debt less "information-sensitive" (Berger, Frame, and Ioannidou 2011; Gorton and Ordoñez 2014).[1]

Consistent with the above, private credit markets' reliance on collateral goes far back in time. Economic agents soon understood that the pledging of assets and the creation of automatic repossession mechanisms would support lending. Building on the insight, land registries were developed in Early Modern Britain to identify and mobilize private property as security to assist lending activity (Ito 2013). In today's corporate debt markets, investors achieve collateralization with the help of an institution known as Central Securities Depository (CSD). Capturing the essence of this coercive logic, CSDs operate as trustees for the owners of the security, storing collateral and automatically transferring it to secured lenders in case of non-performance. Equally crucially, in case of dispute, courts have jurisdiction. In fact, research documents a positive link between rule of law and collateral performance and credit (Degryse et al. 2020). Likewise, Calomiris et al. (2017) show that the poor legal enforcement of collateral encourages strategic selection of the asset used as security.

Against this backdrop, a puzzling phenomenon is the historical reliance on collateral in *sovereign* lending. We call it puzzling because of the hurdles that exist on the way of creditors seeking to repossess sovereign properties. As the design of modern CSDs shows, securing creditors through tangible repossession guarantees requires borrowers surrendering control over their property. In the case of government borrowing, this amounts to a reduction of sovereignty.

[1] For further reference, we refer to the survey by Demarzo (2019).

Such an encroachment of state prerogatives is difficult to sustain because, *precisely*, of the far-reaching nature of sovereignty: While decrees or laws can be made instructing government employees to transfer to creditors the income from a certain source, decrees and laws can be made to repeal the instruction. What is more, sovereign immunity doctrines and politics place limits on foreign and domestic courts' willingness or ability to bind sovereigns.

These questions which are today intensely debated in the context of Chinese agencies' lending to developing countries (IMF and World Bank 2020) have a fascinating pre-history. The 19th century, sometimes described as the "first age of financial globalization" generalized the use of the instrument especially for loans issued in the London Stock Exchange (Jenks 1927). As Fishlow (1985) puts it "customs, land-holdings, and other natural resources" were ubiquitous in foreign government debt prospectuses (see also Jenks 1927). A famous instance which we will discuss in detail was guano, a bird manure given as collateral in a series of Peruvian loans (Mathew 1981; Vizcarra 2009). The instrument, itself the product of a long historical evolution, was later taken up by the New York Stock Exchange in the 1920s, where it was used extensively (Coleman 1936). Several aspects of this template reemerged more recently in a spate of Chinese loans, whereby the lender is secured by domestic assets such as ports. In fact, some legal scholars see the modern instrument used in Sri Lanka and other places as a reincarnation of the 19th century variant (Gelpern et al. 2021).[2]

This renders elucidation of the 19th century precedent important. In the existing literature, historical sovereign hypothecations have been understood by building on a parallel with what happens in the corporate case – that is, by emphasizing *execution* of the security. The most prominent interpretation to date is by Catalina Vizcarra (2009). Discussing the case of Peruvian contracts in the 19th century, secured with a natural fertilizer known as guano, she argues that it was an attractive security because it was an export commodity, and thus easy for creditors to grab (enforce) when it arrived in foreign markets. Because Peruvian state-owned guano could be intercepted abroad, the resulting threat would have ensured the credibility of the hypothecation and ultimately of Peru's debt. In fact, the reach of this argument is limited. Under absolute sovereign immunity as prevailed in the 19th and early 20th century courts *simply did*

[2] See Gelpern et al. (2021, p. 6), to the effect that "one needs to go back to the 19th and early 20th century to find similar security arrangements in sovereign lending." For predecessors to 19th century sovereign collateralizations, see Daru (1821, I, 203-4) and Fratianni and Spinelli (2006), documenting examples involving early borrowing by Italian Republics during the Commercial Revolution. Vührer (1886), Cauwès (1895a, b, 1896), and Vammale-Sabouret (2008), discussing the case of France's King Francis I, who ceded revenues to the City of Paris as security for a loan. Moreover, following the Glorious Revolution, the British Parliament pledged excise duties, levies on East India goods, and wine duties (Hirst 1910), while revolutionary America mortgaged revenue sources when first borrowing abroad (Dewey 1934).

not let creditors grab the collateral. Courts did abide by the principle, and securities such as guano could in fact not be executed, contrary to what Vizcarra suggests.

Another interpretation holds that hypothecations were a scam, because enforcement was impossible. In this reading, sovereign hypothecations would have been created with the complicity of law firms with deceptive intent, explaining why the instrument exhibited a *misleading* likeness with corporate collateral. As Coleman (1936, p. 674) puts it, "lawyers took over from the field of corporation law principles which, although valid in that field, were in no sense applicable to a sovereign nation." In fact, sovereign hypothecations were not meant to be enforced, being actually a "phantom security."[3] In this reading, sovereign collateral was a decoy, not "worth the paper they are written on" (Jenks 1927; Buchheit and Pam 2004).[4] However, as we shall see, the limitations encountered in the enforcement of sovereign collateral were well-known to lawyers, financiers and investors, reducing the reach of the scam theory.

Finally, a third idea is that hypothecations might exist because of the willingness of imperial powers to enforce them. In the language of Weidemaier (2010), clauses found in historical sovereign debt covenants provide a way to "contract for state intervention", because violations of provisions in covenants could give grounds for the dispatch of British gunboats. Could it be that this was the reason for the provisions of physical guarantees? We are skeptical. As emphasized long ago by D.C.M. Platt (1968), concerns over moral hazard and private sector capture led the British government to deflect bondholder requests to turn the Navy into a collection agency. What is more, if the point had been to dispatch the gunboat, it would have been rather strange to pledge an out-of-the-way-security situated right in the middle of the country, as was often the case. Once again, the argument is not fully convincing.

Focusing on the "hypothecation mania" of the mid-19th century (1849-1875) and drawing on a collection of debt covenants covering the universe of loans to sovereign entities distributed in the London stock exchange, which we assembled from archival and secondary sources and examine one by one, this paper provides a novel explanation of sovereign hypothecations. Instead of the emphasis on execution, we argue that sovereign collateral clauses were not about repossession. In fact, as we shall see, typical hypothecations did not even discuss the execution of the security. Examining more closely the language in which the hypothecations were crafted reveals a completely different purpose: Lawyers designed hypothecations as reliable data observatories. They took advantage of the fact that the burgeoning global economy left

[3] Coleman (1936, p. 674).
[4] Allen W. Dulles before U.S. Securities and Exchange Commission, Buchheit and Pam (2004, p. 21).

measurable traces and, recognizing that economic flows had fiscal implications, they put together data gathering machines. Placed under creditor control, these machines were tasked with documenting the itinerary of the fiscal resource pledged as security for the loan in question "from hand to mouth".

The interpretation of the sovereign collateral puzzle we provide is thus that, independently of enforcement, sovereign collateral was valuable through information production and the monitoring services it rendered. Drawing on information economics and finance theory, we argue that in a context of severe information asymmetries, fragmentary tax data and limited visibility over the country's fiscal process, collateralization provided creditors with the opportunity of extracting reliable evidence of a sovereign's tax harvesting activity. Collateral clauses pinpointed subsets of sovereign borrower's income generating (fiscal) activities and set precise progress-to-repayment checklists, allowing bondholders through their operatives to focus monitoring efforts.[5] Put in another way, hypothecations involved private lenders in the monitoring of fiscal policy, enabling them to observe directly the tax harvesting activity. In this sense, the hypothecation institution bears some similarity with more familiar governance institutions relied upon in corporate finance (Frydman and Hilt 2017). In fact, to the extent that sovereign collateral mirrored the features of corporate finance, it was through the creation of information governance and liability.

A critical part of the evidence we provide consists in unpacking carefully the institutional mechanics mobilized by the instrument. As we find, collateral clauses, which were *bond-specific* because default could be selective, pinpointed subsets of sovereign income generating activities and set precise progress-to-repayment checklists, allowing bondholders' operatives to focus their monitoring efforts. The mechanism checked over-borrowing because real time monitoring of the pledged resource enabled to detect credit events, easing subsequent investigations of the country's willingness and ability to pay, ultimately informing reputation formation. Sovereigns running out of collateral had to stop borrowing or reassign collateral, with immediate impact on reputation, because they sent out a signal of impending problems. The observatory system also provided for synchronized disclosure of information, limiting the risk of investors trading against superior information. In the end, sovereign collateral functioned like a data-generating engine or algorithm: The "security" was not a physical asset reassigned automatically by a third party, but a data monitoring process that was *governed*.

[5] This squares with modern interpretations of the functions of contracts when coercive enforcement is not the principal goal, such as Hart and Moore (2008), who describe contracts as "reference points" and analyze the role of contractual stipulations in the management of behavioral expectations.

At a broader level, this paper uncovers a thus far overlooked function of lawyers and law firms, identifying their role in crafting a valuable legal-financial institutions contributing to financial globalization. A heuristic way to distil the logic at play is to think of this universe as a predecessor of modern "Fintech" and "Big Data" lending, which relies on information automation technologies, as illustrated in the case of credit scoring.[6] For instance, the literature has described how new lenders harness data harvesting in contexts fraught with information asymmetries, resulting in what authors describe as a "data for collateral" substitution effect (Gambacorta et al. 2022).[7] Likewise, we argue that in the historical context we consider here, lawyer-structured sovereign hypothecations took advantage of the data which financial intermediaries were coming by, turning them into credit assessment and monitoring technologies, ultimately facilitating third party lending.[8]

To be specific, consider the case of British "merchant banks", which played a significant role as originators of sovereign hypothecations. By the very nature of their activity – they dealt with trade finance – they could form an idea of trade and therefore custom returns, since their correspondents abroad had access to foreign officials and to the captains of vessels enabling direct observation. Custom revenues being a big item in aggregate fiscal revenues, specialized merchant banks underwriting foreign trade had an informational advantage. This was a valuable piece of information: They could read first hand when booming economic activity buoyed the revenues of the country, releasing borrowing constraints. But a problem was that while individual banks did not generally have the resources for lending on their own, rendering the data trustworthy was difficult because of credibility problems. The result was that they did struggle to realize the latent value. Only a couple of very prestigious underwriters had the required status but then, they were often unwilling to risk their prestige on a risky bet.

Against this backdrop, the hypothecation emerged as a lawyer-designed piece of financial engineering that sought to address the information asymmetry. The instrument grafted on naked sovereign debt securities a legal technology that "secured" the bondholder by improving the quality of the information on the country's fiscal prospects. This was done through the appointment of monitors who would follow the money – in the example mentioned above, they

[6] See Vives (2019) for a survey and discussion.

[7] Specifically, they discuss the case of the corporate lending practices of Alibaba's online payment platform AntGroup. AntGroup's internal bank (MyBank) mobilizes transaction data produced by individual firms' interactions within AntGroup, enabling it to do away with physical collateral when making credit allocation decisions.

[8] Other studies having emphasized "digital innovation" in 19th century finance include: Thakor (2019, p.2, drawing attention on the role of the telegraph); Flandreau and Legentilhomme (2021, studying the role of financial mathematics and early data harvesting farms); and Flandreau (2003, on processing macro-financial numbers).

would follow the custom collection activity and the remittance process. Agents posted at the customhouse would provide updates, enabling investors to know if the government had transferred the dividend money as stipulated in the covenant. From there, one could track the funds all the way to the banker's counting house in London. Conversely, if a diversion occurred, bondholders would learn about it firsthand, providing a signal for mobilization. The upshot is, debt contractors were enabled to mobilize their numerical expertise.

An important consequence of this is that sovereign hypothecations involved dynamic legal features. We argue that the legalese in the covenants had not been added with deceptive intent, nor because of a frivolous confusion with corporate law. Instead, the legal language proceeded from the need to coordinate a long chain of agents, contractors and proxies, whose role and responsibilities had to be delineated. This invited the intervention of lawyers who mobilized creatively eclectic bodies of law, including trust law to try and protect the flow of money once it was in the hands of the appointed bankers, tort law to incentivize truthfulness, or international law to take advantage of admitted principles of public law such as the immunity of diplomatic agents sometimes used for securing remittances. By pragmatically drawing on these instruments and combining them, lawyers turned themselves into legal-financial architects.

The story we tell here is thus that of why and how English lawyers made a major contribution to unlock the international capital market through improved data harvesting. This had consequences for development. The emphasis on financial inclusion as a precondition for development is suggested by accounts of the import of institutions for economic growth. Yet in classic accounts, such as those provided by North and Weingast (1989), the dimension identified here is never mentioned: The perspective is domestic and national. However, departing from the conventional approach, which emphasizes the role of domestic parliaments in state borrowing, we document a process of parallel monitoring, held in foreign private hands and occurring in large part *outside* the purview of the sovereign borrower. As a result of the creation of a technology compelling sovereigns to display achievements, projects became their own security. This enabled to "collateralize development": A country could collateralize the revenues from a yet-to-be constructed railway. Fully spelling out the consequences of this regime is beyond the remit of this paper (we offer a few thoughts, though). Still, we establish the early importance of practicing international lawyers in international finance and their contribution to crafting sovereign debt contracts, at the same time as we document a so far unnoticed complementarity between processes of database building and state-making.

The rest of this paper is organized as follows. Section II discusses the actual historical

mechanics of sovereign immunity. Section III uses our library of debt covenants to demonstrate that most sovereign hypothecations had little to do with repossession. Section IV elaborates on the point by showing that in a minority of cases, a repossession mechanism or something resembling it was created. This proves a fortiori that "standard" hypothecations were *not* about enforcement. Next, Section V builds an indicator of fiscal transparency and shows that opaque countries selected in unenforceable hypothecations. Vindicating the information channel, Sections VI shows that investors were prepared to pay a significant premium for unenforceable collateral. Finally, in Section VII, we take a look at the attitude of regulatory authorities. We show that when faced with questions on the trustworthiness of hypothecation provisions they reacted by rendering contractors liable for information in covenants. This is again evidence that the main benefit of unenforceable hypothecations was disclosures. We end with conclusions.

II. The Meaning of Absolute Sovereign Immunity

1) *Sovereign Hypothecation Not a Security*

As stated, one influential view about sovereign collateral is that, thanks to clever selection of the security, it could operate as corporate collateral. A previous paper published in this Journal by Vizcarra (2009) argues that guano extracted from Peru's rich state-owned repositories in the Chincha Islands, pledged as collateral, credibly secured Peruvian bonds issued in London after 1849. As the author claims, the reason for the trustworthiness of the instrument was that *guano could be seized abroad*. According to Vizcarra (2009) the guano security was credible since its handling "did not involve meddling by the Peruvian government" the reason being that "guano revenues were collected at the point of sale abroad […] outside the jurisdiction of the Peruvian government."[9] The assumption is that creditors could collect with the help of courts of justice, but this is an incorrect assumption.

Under absolute sovereign immunity as it prevailed in the 19th century and early 20th century, and as it was understood in particular by English courts of justice, there was no way a creditor would have been able to sue a foreign sovereign abroad and ask the court to execute a collateral.[10] In the language of the textbook by John Westlake, a leading authority in international law (Westlake 1858): "Foreign states, and those persons in them who are called

[9] Vizcarra (2009, p. 359; 376). She further characterizes the hypothecation as "clean", because the Peruvian government was "not involved."

[10] Today, by contrast, under so-called qualified sovereign immunity, which developed since the 1950s, it is possible for creditors to get such verdicts. See Weidemaier (2012) and Schumacher, Trebesch, and Enderlein (2021). Repossession is another matter.

sovereigns, whether their title be emperor, king, grand-duke, or any other, and whether their power in their states be absolute or limited, cannot be sued in England on their obligations."[11] This implied that sovereign possessions were immune and, in particular, that guano remained immune *even when abroad*. It was immune, too, when handled by a government agent, because the agents of states inherited the principal's immunity.[12] Under this regime, courts *dismissed creditor attempts at laying their hands on sovereign property*. In fact, they considered such verdict against a sovereign to be an act of war.

Thus, the notion that guano could have been grabbed by creditors when it reached European shores is incorrect. What is more, not only was this well-known at the time (as Westlake's textbook proves), but it was confirmed by several decisions, such as *Smith v. Weguelin*, in which a spirited effort were made to have a court of justice assist repossession despite sovereign immunity.[13] William Smith was a bondholder who held Peruvian securities with guano clauses. In 1868, he brought a lawsuit in the court of Chancery against the agents of Peru in London, claiming that Peru had failed to amortize (reimburse) the amount of bonds stipulated in the contract, and that this had depressed prices causing him a prejudice.[14] He asked the court to direct the agents to use *money from the sale of guano physically located in London* to perform the amortization. Aware that they were on fragile grounds however, the London sovereign debt law firm representing Smith, Ashurst, Morris & Co, tried a coup. It flashed two fancy authorities: George Jessel, a renowned corporate finance lawyer who later became judge in Chancery, and the famous John Westlake himself. Together, they tried to persuade the court that sovereign hypothecations such as the guano contracts had to be understood as creating an implicit deed of trust. In the proposed legal construction, the agents of the government were reinterpreted as trustees, while the bondholders were the beneficiaries of the trust.[15]

In other words, the lawyers were attempting to construe hypothecations as executable mortgages, which would involve a trust indenture. If the court admitted the theory, then a way around sovereign immunity would have been found, rendering not only this collateral executable, but many other similar contemporary hypothecations. Nevertheless, as stated, the

[11] Westlake (1858, p. 226).
[12] On agents of sovereigns and immunity, see Story (1839, p.306) and Chitty (1841, p.278-9).
[13] Smith v. Weguelin, 1869, L.R. 8 Eq. 198, p. 212-214.
[14] Thomson, Bonar and Co. and the Peruvian company doing the shipping, the *Compañía de Consignación de Guano en la Gran Bretaña*.
[15] As the lawyers put it, "the [hypothecations in the] bonds therefore created a charge on the proceeds in the hands of the […] agents, who are *trustees* for the Peruvian Government and its *assignees*, the bondholders, and [the trustees] are bound to apply the proceeds *in accordance with the terms of the bonds*." Smith v. Weguelin, (1869) L.R. 8 Eq. 198, p. 204. Our italics. For a previous discussion of this verdict, see Borchard (1951, p.67).

maneuver failed. In his lengthy opinion, Lord Romilly M.R. took the time to debunk the deed of trust theory, deriding it as the "most singular part of the argument." If Peru wanted a deed of trust they should have created it. In no place had the covenant granted creditors "the right of intercepting or dealing with the guano" and so the construction was preposterous.[16] As the judge added, finding in favor of the plaintiffs would have created havoc, because the ruling would have enabled *every* creditor to seek the assistance of English courts to enforce collateral. Smith was dismissed with costs.[17] And so, to Vizcarra's main point – that a Peruvian default would result in "the disruption of the guano trade" (Vizcarra 2009, p. 375) and more generally that hypothecation by means of an export commodity could be enforceable, one should be skeptical of it.

2) *Hypothecations Not a Scam: A Test*

The next possibility is the one suggested by several authors and in particular Coleman (1936), that sovereigns and underwriters devised hypothecations to arouse unwarranted belief in such enforcement. Against this backdrop, one may read sovereign hypothecations as a financial innovation intended to "gaslight" investors: If they added value, it was because of unwarranted beliefs about their role.[18] We argue that this is not a very credible interpretation, because sovereign hypothecations did not occur in a dark corner of the stock exchange, but in plain sight and were subjected to intense scrutiny.

Debates on the subject were not confined to the legal insiders of Lincoln's Inn. For instance, *Smith* received large coverage. Some prominent journals such as the *Times* even printed the Judge's charge on hypothecations, while the provincial press waxed on.[19] Before that, the impossibility to enforce simple hypothecations was frequently emphasized by observers. We came across several indications in contemporary sources, one of the clearest ones being due to

[16] Smith v. Weguelin, L.R. 8 Eq. 198, p. 204.

[17] Such a decision would "enable a bondholder by the aid of the Court of Chancery practically to declare war against a foreign country." Moreover "if the Court of Chancery could seize all the guano belonging to the Peruvian government it might as well seize Peruvian vessels under the article [of the contract] which declares that all the other property and sources of revenue of the Republic should be applicable to payment of the loan."

[18] The British press often made fun of the hypothecations suggesting they were a ploy. In 1870, the satirical magazine *Punch* cautioned readers against a new Spanish Quicksilver Loan which secured lenders with government-owned mercury. As *Punch* put it, Spain may borrow on "quicksilver" but one could be sure they would repay in "remarkably slow gold." The article was titled "Beware of Pickpockets" (*Punch*, June 11 1870, p. 234). Likewise, the apocryphal description in Drummond Wolff (1908, Vol. II, pp. 56-66) of the foreign bond boilerplate in the 1860s discusses an imaginary loan with "duty on cinnamon", obviously a pun on the stench of guano. For a conspiracy theory of law as exploitive, see Pistor (2019). In a different but related vein, modern behavioral finance explains how financial entrepreneurs can take advantage of cognitive biases (Hirshleifer 2015).

[19] *Times*, May 28, 1869. Extracts of the *Economist*'s article were reprinted in several provincial newspapers such as the *Western Daily Press*, the *Bradford Observer*, etc. (*Western Daily Press*, May 31, 1869; *Bradford Observer*, May 31, 1869).

Thomas Baring, who acted repeatedly as bondholder representative (and also belonged to the great banking firm). During a bondholder gathering held in 1865, he declared flatly that, of course, no contracting firm could ever take any "precautions against the repudiation of a hypothecation."[20] This was reprinted in several journals that followed sovereign debt matters at the time. In fact, the coverage of *Smith* provided by the *Economist* a few years later consisted in *reminding* readers that the verdict was old news, merely confirming that the "creditors of a foreign government cannot enforce their rights by attaching property hypothecated to them."[21]

As a result, *Smith* does provide a wonderful testing opportunity for the hypothesis that hypothecations amounted to a scam. The reason is that an English court had stated loud and clear that enforcement of sovereign hypothecation was an option, and that he was not prepared to let spirited theories that hypothecations were mortgage be peddled around. Given this, either (i) there had been no delusion on the subject to begin with, implying that the verdict caused no surprise; or (ii) there had been delusion. If so, significant *selling* activity ought to have ensued. Moreover, not only should Peruvian bond spreads have increased, but the spreads of all bonds with like clauses should have increased too, because of the generic value of the verdict.

[Figure 1 about here]

Against this backdrop, we first looked at the data at daily frequency with a fine-toothed comb, searching for price movements and commentary, but failed to detect anything.[22] We next applied on monthly data the Bai-Perron procedure, which tests for structural breaks by finding the most parsimonious step function to describe a time series (Bai and Perron 1998). To that end, we collected the yield-spread against risk-free British consols for a representative Peruvian guano-bond and for two portfolios, a weighted and an unweighted average of collateralized Peruvian and non-Peruvian securities.[23] If no scam was involved, the test should *not* single out *Smith* (May 27, 1869) as a significant event (or, if it does, spreads should not increase

[20] *London Evening Standard* of the 23rd December 1865. The instance involved a Venezuelan repudiation. Barings would lead unsuccessful efforts at enforcing the lien before local courts of justice.

[21] *Economist*, May 29, 1869, p. 626. For one example of an earlier discussion of the same claim, see e.g. *Economist*, Oct 10, 1868, p. 1167-8.

[22] For the 1865 5% bond, the single largest weekly price variation during the period going from late April 1869 to mid-June was actually an increase of 2.28%, just after the decision. Peruvian bond prices variations around *Smith*, calculated with the help of the Economist, are as follows: For the week ending on April 30, +0.16%; week ending May 7: -2.14%; week ending May 14: 1.46%; week ending May 21: 0.64%; week ending May 28 (the day after decision): 2.28%; week ending June 4: 0.31%; week ending June 11: 0.15%.

[23] The Peruvian "benchmark" is the guano "secured" 1865 5%, which had a very active market. Another instrument, less actively traded was the 1862 4.5%. The two portfolios comprise a selection of similar hypothecations (in the language of the next section, "Type I"). The need to ensure diversity and a critical level of liquidity guided our choice. The other bonds are the Chilean 6% 1867 (custom revenues), Romanian ("Danubian") 7% 1864 (custom revenues), the Egyptian 7% 1866 (railways), and the Turkish 6% 1862 (excise on tobacco and salt).

afterwards); if by contrast there was a scam, *Smith* should be singled out *and* spreads should have risen hereafter.[24] Figure 1 depicts the result by plotting the time-series of monthly spreads for the Peruvian bond, the two portfolios and showing the structural breaks. Dashed lines capture Bai-Perron break dates, while shaded grey areas represent confidence intervals. The evidence is coherent with hypothesis (i), because no break and yield increase is detectable around *Smith*, or when breaks are singled out, yields move in a direction incompatible with the scam theory.[25] We conclude that, as the *Economist* had put it, *Smith* was old news. The verdict merely confirmed what the marginal investor already knew – that courts would not enforce hypothecations.[26]

Thinking again, the result makes a lot of sense. It underscores that it is not particularly promising to think of law firms as the handmaid of exploitation because of course, if bond sellers could pay lawyers to find ways to create deceptive instruments, bondholders could do the same with the opposite objective: Help detect abuse. In fact, as we pored through the material, a crucial dimension of the phenomenon transpired, concerning the motivations of the progenitors of the covenants. When they can be found, the names we read at the bottom of the prospectuses identify London law firms belonging to the upper crust of the profession, first class institutions that typically still exist today through some successor incarnation. Delving further, one quickly comes across evidence that the law firms in question were employed simultaneously by the buy-side of the market. It would be naïve to depict the solicitors who developed the instrument as merely double-faced. We do not say that their arts could not be used to favor some clients, but that it is more fruitful to think of the solutions they conceived as part of efforts to promote the vitality of a market from which they derived profits.

An example that could be given is Ashurst, Morris and Co., a sovereign debt law firm of whom we caught sight when we discussed the Smith verdict since they were counsels for the bondholders. Another striking case of two-sided involvement is Baxter, Rose, Norton & Co. Sources show that the senior partner, Philip Rose, was embedded in Erlanger and Co, an

[24] The same methodology is used by Vizcarra (2009, p. 378, Table 5) to study Peruvian bond prices 1830-1878. Like us, she does not identify any break in May 1869, though she does not discuss *Smith*.

[25] As seen in the chart, the verdict's date is only identified as a break date for the unweighted synthetic bond, *but the spread decreases after the break*, which is the opposite from what should happen. The algorithm breaks the time series before and after intervals in which it is approximately stable around a local mean. In order to operate the algorithm, we must choose a maximum possible number of steps, i.e. the minimal window of stability. In the reported result, we set this minimal window arbitrarily at one year, but our conclusion does not depend on such choice. Evidence available upon request.

[26] We have also confirmed our finding with the help of the yearly yield panel we use in Section V. This panel allows us for a diff-in-diff inspection of the abnormal bond return after the verdict, using comparable bonds without collateral clauses as counterfactual. We register no spike in yield for hypothecated bonds after the verdict. Results available upon request.

aggressive sovereign debt contractor (St George 1995, p.139). Simultaneously, Rose was drafting the statutes of the Foreign and Colonial Investment Trust, the first sovereign debt investment fund ever created.[27] Philip Rose was also one of the first promoters of the powerful bondholder protective organization, the Corporation of Foreign Bondholders, incorporated in 1873, and was even a cadre of its Council ever since it was created in 1868. As such, Rose would be personally involved in negotiating debt restructurings with sovereign defaulters. In fact, Baxter, Rose, Norton & Co was one of two law firms which the CFB kept on a retainer.

3) *Deus Ex Machina*

Another reason why sovereign debt contracts existed in the Age of sovereign immunity, when in fact sovereign debt was not enforceable in court, may be found in what W. Mark C. Weidemaier (2010) calls "contracting for state intervention." According to this view, sovereign debt covenants are written in expectation of state enforcement.[28] Adapted to the case of sovereign collateral, the argument might look like this: Sovereign immunity meant that English courts of justice would not engage sovereign defaulters, not that sovereign defaulters were shielded from reprisals by the English Crown. In fact, under contemporary understandings of *Droit des Gens* (as international law was known), creditors of a defaulter had a right to turn to their own sovereign if their efforts had failed. It was then up to the sovereign of the lending country to bring pressure to bear on the defaulter and enforce the claims of its subjects. This view had been first emphasized by Elmer de Vattel and it was later repeated by John Westlake and especially by Robert Phillimore, who was also a Law Officer, as those prominent lawyers tasked with advising the British Crown on points of international law were known.[29] According to Phillimore "the right of interference on the part of a State, for the purpose of enforcing the performance of justice to its citizens from a foreign State, stands upon an unquestionable foundation, when the foreign State has become itself the debtor of these citizens."[30]

But this theory, interesting as it is, stumbles on a roadblock: Since the 1820s, when the Chancellor of the Exchequer Canning had announced in Parliament that there would be no bail out for investors risking their capital in Latin America, Iberia or Greece, it had been Britain's policy to prevent private creditors from using the British Navy to execute foreign claims. The

[27] McKendrick and Newlands (1999).
[28] A similar point was made by Ahmed, Alfaro, and Maurer (2010), who liken the function of gunboats to those of a court of justice executing a defaulter, while Mitchener and Weidenmeier (2010) speak of imperial powers as contract enforcers. For a lawyer's discussion of the relation between hypothecation and intervention, see Borchard (1951, p. 257-60).
[29] Vattel (1758), 1. ii. 0. xiv. s. 216.
[30] Phillimore (1871, p. 8).

policy concern was moral hazard and ultimate capture of the Cabinet (and British policy) by private interests who would have dragged Britain into a war. The attitude was subsequently scrupulously adhered to and it was even encapsulated by the Palmerston Circular of 1848, which turned it into a doctrine. The Circular reminded British agents abroad that Britain would not go to war to enforce a debt owed to private creditors. As D.C.M. Platt demonstrated in his classic survey, Britain closely adhered to the policy and in fact, during the period under study, it was extremely careful to avoid entanglement with the bondholders (Platt 1968). One could not count on an implicit British pledge to intervene: The implicit pledge, if there was one, was that it would not.

Delving further into the matter, we come across one set up in which Britain was actually *committed* to intervene. While under British policy, private debts were excluded from the benefit of British enforcement such was not the case for debts owed to, or guaranteed by, the *British government itself*. The same applied to money owed to British investors but tied to an *international treaty ratified by Britain*, which also committed the British government. Unlike for a debt due to private creditors, non-payment of an official debt would trigger official efforts to collect. This was no secret: For instance, describing the case of the so-called Spanish Indemnity Bond of 1828, a debt which was the result of a treaty between Britain and Spain, a leading investment handbook explained that because of this, "*power is given to the British government to make reprisals upon Spain in the event of the non-payment of the dividends*."[31] But if British enforcement was expected for treaty debts only, then the theory that enforcement was in general implicit cannot be valid. Instead, enforcement would likely flow from contractual provisions. This means that the content of the contract mattered. In fact, as this was widely known, the British government was weary to float its signature and in ambiguous situations it insisted on a clarification that waved the responsibility, as we shall see. Again, British enforcement of the lien was unlikely to be the result of "implicit" assumptions.

III. Collateral as Information: Exploring Type I Hypothecations

In the vast majority of the cases, hypothecations were a technology ensuring disclosure, monitoring and ultimately reputation building. This comes out strongly from examining the manner in which the clauses were crafted. To that end, we identified the universe of bonds issued by sovereign entities (new capital calls) in the London Stock Exchange during the foreign

[31] Field (1838, p. 166). Likewise, Britain's intervention in Mexico in 1861 was not in breach of the Palmerston Doctrine, because there had been in fact a default on debts secured by treaty (Costeloe 2003).

debt boom era of 1849-1875. As we found, this is composed of 116 individual issues.[32] We then set to collect systematic information on each individual loan. As we found, of the thirty-two entities participating in this boom more than half issued collateralized loans: 67 loans or 58% of a total of 116 loans.[33] This extensive reliance on the instrument motivates our description as a "hypothecation mania."

To be able to document each covenant involved we did strive to identify the contents of the "general bond" which stipulated the obligations of the borrowers and lenders. When it was not possible to retrieve it, we sought to retrieve at least the complete prospectus (in the lucky case, it contained the full text of the general bond). We also worked to retrieve additional documents, which were often part of the overall documentation of loans. This could be substantial. For instance, the Bolivian loan of 1872 was a maze of documents and contracts yielding a 158 pages' volume when put together (Anonymous 1873).

Our efforts to retrieve primary and circumstantial material took us to the London Stock Exchange archive at the Guildhall in London and we also consulted the archive of underwriters. We spent a good deal of time examining, for instance, domestic laws and contexts as they are often crucial to illuminate the architecture of some covenants and understand in particular what the legal architects who drafted them attempted to achieve. For a couple of early loans information was retrieved from relatively detailed contemporary investor handbooks (Fenn 1855, 1869; Evans 1856). But in general, we found that the complete documentation did vastly exceed the few lines typically found in such sources. Although they have been used extensively by previous writers our experience is that they have to be treated with prudence.

Having examined this material for many bonds, we reached a conclusion which differs substantially from that of previous authors, such as Buchheit and Pam (2004). In their discussion which views hypothecations as exploitative, they complained that the language in which collateral repossession was couched was too "vague." In fact, for the vast majority of the

[32] For a relevance of this period, see Jenks (1927). Year 1849 was chosen because it was when the first Peruvian guano bond was designed, and because this loan was said to have inspired subsequent copycats (Clarke 1859). For that reason, it may be taken as marking the onset of the "hypothecation mania." The guano loan was not patient zero, however. Predecessors include the Portuguese 5% loan of 1823 (secured by the revenues from the Soap and Tobacco monopolies; see Flandreau, 2021); or the Spanish 3% loan issued in 1842, already secured with Quicksilver (Evans 1856, p. 216). The end date is provided by the collapse of the boom and the release of the Select Committee's findings that hypothecations never led to repossession following default (Select Committee, 1875).

[33] 22 entities accounted for 92 bonds. Turkey and Russia account for the largest number of loans, resp. twelve and thirteen bonds. They are followed by Egypt (nine bonds), and Chile, Brazil and Argentina (seven bonds each). Most bonds (98, among which 56 hypothecations) were issued after year 1860. At least one hypothecation was issued each year, except for year 1860 and 1874, and hypothecation issuance activity decreased only at the end of the cycle, in year 1874 and 75. We document issuance activity per year and bond type in Appendix Figure A.1.1.

hypothecations, provisions were not *vague*, they were *absent*. Most of the time it was clear that in the instance of a default creditors would be on their own. This type of covenant represents actually the bulk of the loans with a hypothecations clause, as we found, 55 out of 67 loans (82%). We will refer to these as Type I: Their distinctive trait is that the asset pledged as security was *never transferred under the custody of a third party* and there was in particular *a complete absence of robust repossession provisions*. This of course is fully consistent with the notion, already emphasized, that nothing at all *secured* the hypothecation in the conventional sense.

As we found, the general style in which such hypothecations were performed consisted in an abstract formula whereby sovereigns did "bind" themselves to pledge or did "solemnly pledge to hypothecate" a designated asset or set of assets as "security" for the "due payment of the interest and amortization of a loan."[34] The covenant typically recited the characteristics of the hypothecation, stating the nature of the asset, its location and describing relevant features. But that was it. When the loan was described as a first "charge" on a designated source, it only meant what it said, that the money was to be paid over from that source, but the source remained under the control of the sovereign. Under Type I, the asset was *not* put in the hands of an independent third party tasked with transferring it to the creditor, or executing it in case of non-performance It was quite the opposite: In the original guano contract of 1849, Art. 7 of the covenant indicated that even guano shipped abroad remained the "exclusive property" of the Peruvian government.[35]

[Figure 2 about here]

Does that mean that the hypothecations were a mere performance and ritual? Not at all. We argue that if repossession was not described, it was because it had never been the intent in the first place. In fact, the pledging of physical securities was an element of information on fiscal prospects, helping investors form an opinion on credit worthiness, in a context fraught with statistical challenges. Consistent with this, Type I hypothecations focused on identifying a revenue source, describing its earning capacity of and quantifying the worth. This was done, either as annual cash flow or as capital value and simultaneously, the contract documented the cash flow or nominal value of the loan, enabling calculation of a sustainability ratio often mentioned explicitly. From language in the covenants, the intention was to provide numerical evidence of ability to pay. For instance, if the debt service/revenue ratio was low the prospectus would speak of a solid security, since a high cover made it more likely that the debt be

[34] Another frequent expression was the description of the hypothecation as a "charge" on a designated asset or revenue stream.
[35] Evans (1851, p. 220).

serviced.[36] In Figure 2, we show the distribution of the various forms of revenues pledged. As can be seen, pledging the income of the customhouse was a favorite, which makes sense given the importance they had in the tax system of many sovereign borrowers.[37]

The guano contracts epitomized the informational logic we argue was at work. Against the backdrop of a takeoff in the international demand for fertilizers, the state-owned guano deposits in the Chincha Islands emerged in the 1840s as a major source of fiscal revenue. The beauty of guano deposits owed to the fact that, since they were concentrated in a few places, they could be approached by agents of creditors, meaning that investors had a real time, uniquely precise view of the "sovereign wealth" of the country. Indeed, available number suggest that in the early 1860s for instance, guano returned about 80% of the income of the Peruvian state.[38] Everything happened as if the entire wealth of Peru was sitting in a conspicuous place for everyone to see. This massive improvement in visible sovereign wealth rendered debt repayment much more likely and what is more, lenders could know in almost real time the rate of depletion. That the hypothecations turned Peru into a very successful borrower should not come as very surprising.

Generalizing on the insight, the Type I hypothecation boilerplate was aimed at creating a technology to observe the tax harvesting activity. Always, we find that the covenants made efforts to align the incentives of such agents with those of the investors, the instrument for this being the law. In cases, the merchant bankers who had contracted the loan provided the monitoring technology themselves, the legal mechanism ensuring the truthfulness of disclosures being that bankers had fiduciary duties. In other cases, the hypothecation did set up of a dedicated agency tasked with following the money, appointing "trustees" remunerated on the proceeds of the loan. They were not trustees in the sense envisioned by the defendant's counsel in *Smith* (they did not have control of the asset) but they were employed by the bondholders and directly responsible to them. The involvement of British consuls provides another instance. They were natural stakeholders of the hypothecation food-chain because, by their very functions, they were experts in their country of residence's trade and its economic prospects. Another advantage was that British consuls cumulated an official and a private commercial role: On the one hand, mauling diplomatic officials provided a *casus belli*, the result being the dividend money was safe once it was with them. On the other hand, their incentives

[36] On the early history of debt sustainability ratios, see Flandreau (2003).
[37] For instance, Mazzuca (2021) in the case of Latin America.
[38] *Statesman's Year-Book* (1866, p. 568).

could be aligned with those of the creditors by turning them into agents for the bondholders.[39]

Beyond the boilerplate element, each covenant did bear witness of a significant drafting ingenuity at work in each hypothecation. Consider for instance the prospectus for the Imperial Moorish Loan 5%, issued in 1862 in the name of Sultan Muhammad IV of Morocco.[40] The general bond had provided for the hypothecation of one half of Morocco's annual custom revenues, valued at £323,000, out of which the annual interest and amortization, or £38,000, would be serviced (Art. 5). As Art. 6 of the general bond recited, this was "ample" security (a £161,5000 annual cash flow for a £38,000 commitment). Art. 5 also stated that the British consul in Morocco did "certify" the reliability of the estimates of Moroccan custom revenues. In this case, "Special Commissioners" were tasked with receiving from Moroccan officials the dividend money (Art. 2). They would pay the money over to the agents of Robinson, Fleming in Morocco, the merchant bank which originated the deal and serviced the coupon in London.[41] The transfer of funds worked like this: Each semester, and no later than six weeks before the coupons became due in London, the Commissioners were to receive the funds and they would transfer them immediately.

The role played by the Special Commissioners in this particular hypothecation enables us to delve deeper on the role of the British government. The contract drew opportunistically on the institution of Special Commissioners, itself a byproduct of the role Britain played at the time as mediator in a dispute between Morocco and Spain. On the one hand, because they were officials, they were protected by international law. On the other hand, underscoring our earlier point about contracting for imperial intervention, the covenant *explicitly* limited the responsibility of the British government. It was specifically provided that Britain had no role to play regarding the underlying asset (the custom revenues). British authorities had requested the injection of language that would remove any perception that Britain would have a role to play beyond dutifully transferring the amount of money the Commissioners received. As Art. 4 recited: "Her Majesty's Government are not liable for the payment of a larger sum of money

[39] Parsing sovereign hypothecation clauses, we find further elaborations that drew inspiration from innovations in the field of corporate debt contracts, such as "Lloyd Contracts", then popular in railway finance. Named after corporate lawyer J. Horatio Lloyd who had pioneered them, they were a kind of smart contract stipulating payment of the contractor in bonds of the railway company, encouraging contractor to deliver in time. For instance, the Honduras 1870 bond prospectus emphasized that the engineering firms were committed "under heavy penalty, to complete the second section [of the railway] at the end of 1871." *Times*, June 21 1870. On "Lloyd bonds" see Pollins (1957a, b). Again, we reach the conclusion that corporate lawyers were involved in the drafting of contracts, not because of flawed conceptions that sovereign collateral was like corporate collateral, but because the expertise of corporate lawyers was useful to draft complex covenants.

[40] *Morning Post*, January 13, 1862. We give this example to facilitate reference.

[41] Specifically, the agents would send the drafts to London, enabling creditors to cash the dividend on the due date (Art. 3).

than that which they [will] receive from the custom duties so hypothecated." One could not be clearer.

A powerful implication of the above was creditor coordination. Once traceability had been arranged with the help of the law, sovereign debt could be mapped into a transparent repayment algorithm punctuated with "forks" where debtors had to perform. Creditors were provided with initial input (the statistical data) and simultaneously with a machinery that gave them the opportunity to observe the tax harvesting process and the extent to which borrowers did stick to the plan. By observing whether or not borrowers adhered to the pre-set critical path, investors could update perceptions of trustworthiness. The transparency of the system, which mobilized a long chain of responsible informants, gave borrowers the possibility to accumulate reputational capital through scrupulous adherence to the template, while failure to complete assigned tasks and refusal to correct behavior revealed a riskier type. What is more, disclosure occurred in a coordinated fashion. Evoking parallels with Bloomberg, "collateral news" were disclosed simultaneously to all creditors at the behest of contractors, typically through press announcements and postings inside the London Stock Exchange, limiting the risk for individual operators to trade against superior information.[42]

At the other end of the tether, the structuring of information provision assisted creditors in case of default and what is more, it enabled a more precise identification of default. In the previous example of the Moorish loan for instance, failure to provide the dividend six weeks before the coupons became due was a signal for action. Sensing an impending default, holders of the bond in question could gather and start lobbying. In fact, mentions can occasionally be found regarding the procedures that would be applied in the event of a default, including the mode of voting that would govern the creditor body. In addition, the information modules put together under Type I hypothecations could be plugged into other institutions, creating positive externalities. For instance, as shown by Flandreau (2013, 2022) creditors were allowed under the law of the stock exchange to strike down new issues by sovereign defaulters. Against this backdrop, news that there had been a violation of any stipulation in the contract would trigger the rule because they would enable bondholders to characterize the default. Although at no point repossession of the asset was at stake, litigation before the stock exchange committee (the market's court of arbitration), was strongly supported by the manner in which hypothecations were crafted. To repeat, since the stock exchange committee *could not ordain physical repossession of sovereign collateral any more than the Court of Chancery* the mechanism at

[42] See e.g. *London Evening Standard*, March 2, 1864.

hand drew entirely on a purely informational logic.

IV. Contracting for Repossession: The Case of Type II Hypothecations

The significance of the absence of repossession provisions in Type I hypothecations is made even more salient when we consider the alternative template in contract data, a minority instrument to which we refer as Type II, representing 12 out of 67 sovereign bonds with collateral and 10% of the total number of issues. We list these bonds, with their characteristics and the sources for the prospectuses, in Table 1. Unlike Type I, Type II *did* include provisions attempting to give creditors tangible control over the security, thus replicating the desirable features of classic corporate securities.[43] Although our focus is on Type I hypothecations, examining this minority template is important as it enables to make three related relevant points. First, contract drafters understood the difference between hypothecations with and without repossession provisions. Second, when they introduced such provisions they made them explicit and often emphasized them, which goes against interpretations of enforcement as implicit. Third, examining this group helps situate the element of truth in existing stories of imperial enforcement: As we shall see, a number of Type II hypothecations included diplomatic provisions which later paved the way for intervention.

[Table 1 about here]

At bottom, therefore, Type II hypothecations may be characterized as "contracting for repossession." Given the potent implications of sovereign immunity, we can see that the problem which the drafters of sovereign contracts were attempting to solve was huge. They were attempting to adapt the mortgage instrument to the sovereign debt context which, one way or the other, involved a loss of sovereignty. Whether this could be sustained – whether the sovereign could really be "shackled" – was another can of beans. Against this backdrop, two alternative contractual strategies are found. In the first variant lawyers sought – through clever legal engineering – to "lower" sovereign collateral to the level of private property so as to enable execution. The effect was that governments could be handled as quasi-corporate creatures. The second tactic used a symmetrical logic: It recognized the exceptionality of sovereign collateral, but sought to exploit political custom and international law, which, as we have seen, offered a carve out to sovereign immunity. By taking advantage of peculiar circumstances or instruments, covenants could "piggyback" on diplomatic provisions, enabling to "elevate" enforcement into

[43] The number 12 is likely an upper bound, because in order to avoid the risk to contaminate pure sans repossession Type I bonds with Type II, we have erred on the side of caution, and marked as Type II any bond containing traces of executability.

the diplomatic sphere (See Table I).

As just said, one way to create enforceable collateral was to put it within the reach of creditors. An example is the Bolivian loan of 1872, a railway and navigation project designed by Baxter, Rose, Norton & Co. The main architect, Philip Rose, whom we already mentioned, was an expert in the law of trusts. In crafting the Bolivian loan, he had built on the judge's opinion in *Smith* that he would recognize a deed of trust if he saw one. The Bolivian loan thus mobilized an actual deed. The money from the loan was put in a strongbox at the Bank of England and trustees were appointed to handle it on behalf of the bondholders. As per the deed, the funds were only released upon evidence that the project proceeded according to plan.[44] The upshot was that, through that subterfuge, English courts were involved in the management of sovereign debt. The robustness of the instrument was later demonstrated when, following the Bolivian default of 1873, bondholders applied to English courts asking for the money in trust to be released and were eventually successful.[45]

Another instance is provided by a group of loans to Spain and Italy that relied on mortgages under the respective countries' domestic laws. For instance, the Spanish Quicksilver Loan of 1870, enabled execution of the sovereign property in case of default, because the pledging to creditors of state-owned Almaden mercury mines was inscribed under the Spanish mortgage law of 1860 on the country's mortgage register, giving jurisdiction to Spanish courts and in theory at least, authority over the sovereign. In case of non-performance, the Rothschild bank, trustee for the bondholders, was tasked with executing the security, and the expectation was that the court would have enforced the lien. Of course, the extent to which such hypothecations were robust (or perceived as robust) hinged on the solidity of the rule of law, understood here as the power of courts to bend the sovereign.[46] Other factors may have played a role, too: It is possible for instance that Rothschilds might turn out to be a formidable champion.[47]

Under yet another variant, the sovereign did pledge personal property. This was used for a group of Egyptian covenants known as "Khedive Loans." As the name suggests they were not loans to Egypt but loans to the Khedive (the country's ruler) in his *private* capacity. At the time they were issued, however, enforcement was problematic, because, unlike the previous

[44] See Anonymous (1873). One of the trustees was Horatio Lloyd, the inventor of the eponymous smart contracts discussed in footnote 39 above. See Flandreau (2016).
[45] Flandreau (2016, p. 113-117).
[46] On the Spanish mortgage law of 1860 see Pantoja and Lloret (1861); Martín (1980).
[47] Compare with Chabot and Santarosa (2017, p.32) who claim incorrectly that the hypothecation meant that upon default, creditors would have been able to lay their hand on exports of quicksilver (Vizcarra's suggested mechanism).

examples, no court was available for handling a dispute between creditors and the Khedive. Not coincidentally though, the Khedive started negotiating the creation of Mixed Courts under joint Egyptian and international authority just when the first loan was crafted. When the Mixed Courts were created in 1875, they had jurisdiction on disputes involving the Khedive's land and properties "so long as no question of acts of sovereignty arose."[48] It is suggestive, too, that in stock exchange list, several Type II hypothecations were listed not under "foreign loans" but under so-called "Miscellaneous securities."

As said, the other logic mobilized in Type II loans rested on enlisting diplomatic support. The most characteristic product of this approach was the loan to the Commission of the Danube in 1869, a supra-sovereign entity. Established as a result of the Treaty of Paris of 1856 which settled the Crimean War, the Commission was run by a committee of countries signatories of the Treaty. The loan gave as collateral the "tolls and duties" levied at the mouth of the Danube on the Black Sea and granted to bondholders "full powers of receivership in case of default."[49] In addition, the loan was guaranteed by the Commission's member countries: In the event of a default, the guarantors of the loan, with majority stake in the Commission, would be called in to make up for the difference and as a result they would be incentivized to enforce the receivership.

In our library of covenants, we find several incarnations of this logic. An example is provided by the Ottoman loan of 1855. As in the case of the loan to the Danube Commission, there was both a security and a guarantee, because the British government had underwritten the loan. Default would turn the loan as an official loan from Turkey to Britain, and the British government would have grounds to intervene. The above-mentioned Khedive loans, after the courts were created, also harnessed a similar tactic: The Mixed Courts being the product of an international agreement, and so failure to comply with a decision would amount to a treaty breach, giving Britain grounds to intervene. Another example is the pledging of the so-called Egyptian Tribute in several Ottoman loans.[50] The Tribute was the rent Egypt paid to its overlord (the Ottoman Empire) as price for independence. Because the Tribute was the product of an international convention which Britain ratified, Britain was interested in the outcome, giving it

[48] See Hoyle (1986, 1987, p. 437).
[49] Prospectus for the European Commission of the Danube, 4% loan, *London Standard*, March 8, 1869.
[50] See e.g. Office of the Egyptian Tribute Bondholders League (1876). The Tribute was used in Turkish loans issued in 1854 and 1871, though these had no British guarantee. It resulted from the London Convention of 15 July 1840 and of the Treaty of London of 1840, followed by the Firman (decree) of February 1841, the latter granting the Khedive hereditary government of Egypt in return for the payment of a Tribute. We refer to the Appendix A.2 for details.

oblique jurisdiction in case of diversion.[51]

Because Type II hypothecations involved contracting for intervention, they provided powers with diplomatic agency when default occurred and we suspect that this is has influenced the beliefs reviewed earlier pertaining to contracting for intervention as the main explanation for hypothecations at large. In several cases, the presence in contracts of Type II provisions did indeed pave the way for violent enforcement, providing a "legal origin" to international control.[52] For instance, when the Khedive refused to comply with the decisions of the Mixed Courts, it enabled Britain to interfere because the Khedive had broken a treaty.[53] The Danube Commission loan may likewise be cast as an anticipation of the "Receiverships" later imposed to Turkey and Egypt. But to repeat, this was a wholly different logic than the one mobilized in Type I and a marginal specimen. In fact, their examination brings light on what was "missing" in Type I hypothecations and as a result, on what they were really about. In the rest of the paper therefore, we shall leave Type II aside (but discuss it in the Appendix and when relevant).[54]

V. Explaining Unenforceable Sovereign Collateral: The Role of Fiscal Opacity

We now show that Type I sovereign collateral was used in information poor environments, and specifically, when fiscal data was fragmentary, missing or not up-to-date: Collateralization disclosed certified information on identified sovereign *revenues*, lessening information asymmetries and relaxing lending constraints.

1) Statistical Evidence

As said, among the 116 loans we have identified, 67 had hypothecations, Type I accounting for the majority of them, or 55, and the rest (12) being Type II. Table 2 provides summary statistics of loan characteristics, enabling to compare Type I hypothecations with the two other instruments (non-hypothecated and Type II). As shown, Type I hypothecations provided more information on the object of the loan. They also displayed a higher yield spread over British consols at issuance.[55] Finally, Type I hypothecations involved smaller deals (5 million pounds

[51] In fact, Britain's agency was admitted for instance by Turkish authorities who recognized the unique political nature of both the Egyptian Tribute and the English guaranteed loans. Rose and Staniforth (1876, p. 11) speak of the "exceptional position of the [Turkish] Loans of 1854 and 1871, guaranteed by the Tribute of Egypt, and the legal and moral considerations which gave to the holders in those Loans rights which they would not hesitate to enforce." For more details on the Ottoman settlement, see Clay (2000).

[52] This point is not emphasized in the literature on the subject; See for instance Birdal (2010), Tunçer (2015) and Queralt (2022).

[53] For indirect evidence on this point, see Wynne (1951, p. 600 ff.).

[54] Results are robust to alternative econometric treatments. In particular, all our findings are robust to adding Type II related observations back and controlling for them See Appendix, esp. Table A.3.1.

[55] British Consols' yields are from Klovland (1994)'s Appendix Table 1.

on average compared to 9 million pounds for non-hypothecated), shorter maturities (28 years versus 44 years), and defaulted more often (a 54 percent default rate against the 8.2 percent of non-hypothecated bonds).[56] All this speaks of riskier deals and riskier borrowers and it is accordingly consistent with the interpretation we put forward, that hypothecations have much to do with an attempt at resolving underlying information asymmetries, ultimately enabling market access of riskier borrowers.[57]

[Table 2 about here]

Another intriguing element in Table 2 is the fact that Type I hypothecations involved much more rarely a prestigious underwriter than non-hypothecated bonds. To put it differently, ordinary underwriters made a stronger show amidst Type I hypothecations than among non-hypothecated loans. This makes sense, because recent research has identified reliance on prestige as an instrument to address information asymmetries in sovereign debt markets. By attaching their name to an issue, prestigious underwriters such as Rothschilds or Barings signaled the creditworthiness of the issue, removing the need for information acquisition (Flandreau and Flores 2009, 2012a, 2012b, Flandreau et al. 2010).[58] If this is true, then Type I hypothecations offered an *alternative* monitoring technique when, for instance, prestigious banks would refuse to shoulder the reputational risk. A consequence of this is that the instrument should have enabled less capacious bankers to participate in the sovereign debt market, explaining the negative association. The following delves deeper on this crucial point.[59]

2) Measuring Opacity

The rise of systematic, regularly updated and comparable fiscal data is a recent phenomenon. Later reconstructions used in modern research downplay the fact that more often than not, such data were *not* in the public domain.[60] Fiscal data was fragmentary apart for a handful of countries. Many states treated fiscal information as proprietary and did not feel the urge to

[56] A similar point is made by Coleman's (1936) in his empirical study of the NYSE in the 1920s.
[57] Another aspect which we did not pursue further, though it is consistent with our argument, is that hypothecations ought to have been associated with "new" states that were yet untested, including Latin American nations, as well as "old" European nations that experienced recent political redefinitions such as Italy, Denmark or Hungary. This is consistent with Diamond (1989) and Tomz (2007) on the role of reputation in mitigating information asymmetries.
[58] See Indarte (2021) for a similar claim.
[59] We are agnostic regarding the association between prestige and Type II hypothecations. On the one hand, by enabling to enforce a lien, Type II could help deliver market access in the absence of a prestigious underwriter. On the other, precisely because they involved enforcement, they might have benefitted from the involvement of a prestigious underwriter, able to project power in court. In our database we find illustrations of both cases. The Bolivian loan of 1872, underwritten by an ordinary firm, illustrates the first logic. The case of Spanish Quicksilver Loan of 1870, may be given as illustration of the second.
[60] See Flandreau (2003); Flandreau et al. (1998); Flandreau and Zumer (2004).

disclose. In other cases they simply did not know, including because of political dislocations, civil unrest and other difficulties complicating the process of data acquisition.[61] Although some powerful underwriters controlling market access were able to bring pressure to bear on sovereign borrowers and extract relevant numbers privately, this was not something that was within the reach of ordinary lenders. What is more, this situation tended to create an informational hold-out situation, because the prestigious underwriter had no reason to communicate the intelligence.[62]

This meant that lending was a blind date. Against this backdrop, it fell upon economic journalists to try and create a level playing field. After some failed attempts, a milestone was the launch of the *Statesman Yearbook* by Frederick Martin in 1864 (Steinberg 1966).[63] It aimed at piecing together a comprehensive picture of "macro-political" facts, including economics. The *Yearbook* documented the policy regime, demographics, exchange rates and provided fiscal data, covering budget forecasts, realized budgets (accounts) and debts. The editor worked with official national sources: When they were missing or not up to date, he approached embassies. Martin's ultimate goal was to report such information as it stood for the current year. The *Yearbook* soon acquired a strong reputation in financial markets. According to a prominent member of the London stock exchange, the *Yearbook* had in fact rendered fiscal data "accessible to anyone" (Cohen 1876, p. 691).

As explained by Steinberg, Frederick Martin never tried to make guesses. Instead, he did strive to update his series and, because of this, the *Statesman's Yearbook* can be relied upon for constructing country measures of fiscal transparency. Since each year provided Martin with an opportunity to update tax revenue figures, we can infer that failure to update captures missing data. The *Yearbook* can thus be exploited to produce indicators of the quality of fiscal information publicly available. In this way, we generate consistent panel data on fiscal opacity. The method works as follows: Going volume by volume, we construct a country specific transparency index. Calling t the year of the *Yearbook* edition and $l(i_t)$ the information lag for

[61] This is how a Venezuelan official described the data situation in 1865 (at a time when the country relied on hypothecations): "In the actual situation, after five years of civil war, without [...] an account of the Treasury, the Government can only offer what the last official data anterior to the war permit, and it requires at least the completion of one fiscal year to know approximately what is the real amount of the revenue." (*London Standard*, 22 December 1865).

[62] Note that a prestigious underwriter really faces a trade-off. It may have a comparative advantage in the production of trustworthy hypothecations (because of its superior reputation), while at the time production of information might help deflect liability in the event of a default. There is evidence that Baring experimented with this, making an aggressive entry on the market for hypothecations in the early 1860s. For discussion of a related point see Flandreau and Flores (2012).

[63] Landes (1958) describes Horn (1859), a predecessor attempt.

country *i* at date *t*, we first generate the information lag series. In the ideal situation of perfect fiscal transparency, the information lag is zero: The most recent figures for country *i* in volume 1864 correspond to 1864, and so on.

[Figure 3 about here]

If we are to plot on the *x*-axis the year of the *Yearbook* edition and on the *y*-axis the year of the most recent budget available, then we see that the 45-degree line corresponds to full transparency (Frederick Martin's number is up-to-date). Any delay in collecting/releasing new figures has the curve falling below the 45-degree line. The further below is the line, the less transparent is the country. In Figure 3, we plot actual transparency lines. "Dashed" countries issue at least one Type I hypothecations, while "Solid" countries do not hypothecate at all.[64] The figure underscores, first, the extent of contemporary fiscal information problems: In general, information arrived with a significant lag. Even more important, we note the persistently inferior transparency performance of hypothecating countries.

3) Opacity and Collateralization

We now study the effect of transparency on collateralization, using a linear model. The explained variable is a sovereign's decision to hypothecate and the explanatory variable is the speed at which the *Statesman Yearbook* reported data updates, a measure of opacity. Regarding controls, the estimation strategy is aimed at disentangling risk from opacity. In other words, the main confounder being country risk (because less transparent sovereigns were likely to be riskier too) the estimation needs to account for this. To address these concerns, we include a variable capturing country risk. Another phenomenon which may contaminate the results is that, because the *Yearbook* was treated as a reference, the editor of the *Yearbook* might have intensified data collection efforts when a loan took place (because he received more inquiries) a possibility for which there is anecdotal evidence. So we include another dummy controlling for whether a recent issue occurred. If we ignored this, estimation might understate true correlation, because we'd *underestimate* true opacity.

To measure opacity, three alternative indexes of updating speed are used. The first ("Recent Data") is a dummy variable taking value one if revenue information for sovereign *s* reported in *Yearbook* volume *t* is less than two years old. The second ("Updated Data"), is a dummy taking value one if revenue information for a given sovereign in *Yearbook* volume *t* is different from the same sovereign's entry in volume *t−1*. The last ("Age of the Data"), is a discrete variable recording how old is the latest revenue information published in volume *t* of the *Yearbook*

[64] Type II (not shown in the chart) also occurred in statistically challenged environments.

regarding each sovereign. The prediction we make is that the more recent the data, or the better it is updated, and the more recent the update, the smaller the incentive to hypothecate.

Finally, the model looks like this:

$$(1) \qquad Currently\ Hypothecating_{cy} = \alpha_y + \beta Information_{cy} + \delta Risk_{cy} \ldots + \gamma Recent\ Issuance_{cy} + \epsilon_{cy}$$

The dependent variable, Currently Hypothecating$_{cy}$, is a dummy equal to one if sovereign *c*'s last bond issued up to current year *y* is a Type I hypothecation. α_y is a year-of-issuance fixed effect, accounting for possibly spurious differences between one edition of the *Yearbook* and the other. *Information*$_{cy}$ is one of the three proxies for transparency. *Risk*$_{cy}$ is one of two country-risk controls: Either the lagged volume-weighted country spread for sovereign *c*, computed using our yield panel,[65] or the country's lagged GDP per capita in 2011$ as documented by the Maddison Project, which we treat as a proxy of then known country's resources (Bolt and van Zanden 2020). Finally, *Recent Issuance*$_{cy}$ is a dummy equal to one if country *c* issued bonds in the last two years.

[Table 3 about here]

Table 3 shows results. We employ the Recent Data dummy as information measure in columns (1) and (2), the Updated Data dummy in (3) and (4), and the Age of Data measure in (5) and (6), each time alternatively controlling for risk with one of the two measures described above. The Table depicts a strong negative relationship between transparency and Type I hypothecations, consistent with Figure 3: The less opaque the country, the less frequent are hypothecations. Irrespective of the risk and information proxies, we find a 20 to 30 percent negative correlation between recent/updated information and currently accessing the market with a Type I bond. Put otherwise, a drop in the quality of fiscal information below "at most two years old" implies an increase by approximately 30 percent in the probability that the last bond issued is a Type I. Meanwhile, whichever the initial and resulting age of the data, the effect of a failure to update on the probability that the last bond issued is a Type I is about 20%. Finally, in columns (5) and (6), we show that an additional one-year lag in the information disclosed correlates with a 5 to 14 percent greater likelihood of tapping the market with a Type I bond. In other words, a 5-year lag would mean an increased probability to hypothecate

[65] When the lag average spread is not available, we replace the missing control with the first available non missing average yield and we control with a dummy. Results are not affected if we would drop all these observations (they would actually be stronger). Available upon request.

between 25% and 70%. For absolutely opaque countries, hypothecations were a *sine qua non*.

4) Information Substitutes

Next, we harness the fact that alternative information production technologies co-existed with the hypothecation solution. Underwriter reputation has been shown to play a prominent role in debt markets both today (Chemmanur and Fulghieri 1994) and historically (Flandreau and Flores 2009). Concretely, in the case of sovereign debt, prestigious brands would pledge their seal of approval, thus removing the need for further information acquisition and rendering sovereign securities "information insensitive" (Flandreau and Flores 2012a, 2012b, Gorton 2017). Against this backdrop, one effect of lack of association with a prestigious underwriter is that it created pressure to surrender information through Type I hypothecations data workouts.

Reinforcing this point, there is anecdotal evidence of competition between prestigious underwriters and hypothecations, in that countries that sought to soften the tight conditionality to which they were subjected by prestigious banks, such as Rothschilds, sought to advertise their development potential by displaying relevant data through Type I hypothecations. An episode from the history of Italian borrowing is given as illustration. Following the First War of Italian Independence (1848-1849) Piedmont needed an external loan. Working with Rothschilds was attractive because it had ensured good terms previously (Cavour 1962). But Rothschilds were using their leverage to prevent Italy's aggressive policies (the economic mechanism is described in Flandreau and Flores 2012). As a result, Piedmont switched in 1851 to an ordinary underwriter, Hambro (Hearder 1994). Hambro had previously arranged collateralized bonds for the Kingdom of Denmark and it arranged one for Piedmont too, pledging state railway lines under construction.

[Table 4 about here]

Armed with our proxies of fiscal transparency, we can thus test whether this substitutability effect holds in practice. This is done by adding to Equation (1) a prestigious underwriter dummy, equal to one if the underwriter is either Rothschild or Barings, the two most prominent operators according to contemporary sovereign debt league tables (see Flandreau et al. 2009). Suppose our hypothesis is true and Type I bonds do substitute for prestige. In that case, we should observe a negative and significant relationship between a "Currently Prestigious" dummy, taking value one if the most recent underwriter is a prestigious one and the dummy tracking whether the sovereign's most recent bond is a Type I. Moreover, we include Information_{cy} to ensure that we compare countries with similar fiscal opacity levels.[66] Table 4

[66] Other controls are the same as in Equation (1).

shows across all specifications a robust *negative* correlation between an active relationship with a prestigious underwriter and issuance of Type I hypothecations. The effect is large: Fixed other characteristics, a sovereign that issued its most recent bond with the help of a prestigious underwriter is 50 to 35 percent less likely to have employed Type I clauses in that same bond. This confirms the substitutability hypothesis. One way to think of it is to say that, if they did not find a prestigious signature underwriting the loan, then investors did ask for a monitoring technology documenting the pathway of their money "from hand to mouth."

VI. The Value of Unenforceable Collateral

To close the analysis, we show that sovereign collateral was valuable. In this section, we give evidence that, absent repossession upon sovereign default, investors still appreciated hypothecation clauses and that this translated in market access at better terms. To show this we establish that Type I hypothecations enabled to improve terms compared to what the *same sovereign* would pay at the *same time* on a loan without collateral clauses. For this purpose, we exploit the fact that some sovereigns floated both hypothecated and non-hypothecated bonds and estimate the spread reduction. The model used is the familiar panel regression with fixed effects, often employed in the literature on historical bond spreads. Using this model enables us to introduce a Type I *premium*, that is, other things being equal, to show that Type I hypothecations enjoyed a lower yield (equivalently, traded at a higher price).

Specifically, the equation we consider is:

$$(2) \qquad Yield\ Spread_{bcyt} = \eta_{ct} + \beta\ Type\ I_{bcy} + \Gamma X_{bcyt} + \epsilon_{bcyt}$$

In Equation (2), $Yield\ Spread_{bcyt}$ is the spread over British consols, recorded for bond *b* issued by sovereign *c* in year *y* and measured in year *t*. The primary independent variable, $Type\ I_{bcy}$, is a dummy variable taking value one if the bond includes Type I collateral clauses and zero otherwise. η_{ct} are fixed effects. X_{bcyt} is a matrix of covariates including the log of the total issue size (to control for liquidity) and the log of maturity (to control for bond and time specific ex-ante risk born by the bondholders). Moreover, X_{bcyt} includes dummies for (a) whether the bond is a perpetuity,[67] (b) the presence of an explicit project purpose on the bond's prospectus and (c) for the prestige of the underwriter. Finally, ε_{bcyt} is the standard error, clustered at the country

[67] To avoid losing information, we replaced perpetuities' infinite maturity by an arbitrary number higher than the highest maturity recorded. We also include a perpetuity dummy to account for perpetuity-specific characteristics.

and year-of-bond-issuance (*cy*) level.[68] Our object of interest is the estimate of parameter β, the difference between the yield-spread of Type I bonds and non-hypothecated bonds, which is the value of unenforceable hypothecations.

There are reasons to believe that this empirical strategy underestimates the true effect of hypothecations. First, by its very nature, the identification approach which relies on countries that issued simultaneously both hypothecated and non-hypothecated bonds, is bound to focus on "borderline" cases, for whom the non-hypothecation was a possibility. Very opaque countries had no alternative but to select into hypothecations so that the (high) price they would have paid had they issued a non-hypothecated bond is not observed. Second is the problem of information spillover. Although as explained holders of hypothecated bonds enjoyed a set of excludable services including such things as the appointment of trustees, non-hypothecated loans benefited from the informational spill over accruing to public communications of information generated by the instrument. If this is the case, then our estimate of the value of hypothecations provides a lower bound.

In order to estimate Equation (2), we assemble a panel of yields for the loan issues in our database, looking up in the *Course of Exchange*, the end-of-year bond prices from the 116 bonds in our library of contracts. Next, we computed each bond's yield using the precise amortization profile described in the bond documentation (Flandreau and Legentilhomme 2021). This important adjustment, typically not done in the current literature (at best, authors take maturity alone into consideration) is made possible because we obtained the original documentation, enabling us to calculate rigorous yield-to-maturity. Also, in line with recent research showing that liquidity effects can have severe impact on prices independently from credit (Chavaz and Flandreau 2017), we only focus on the period between 1864 to 1875 when the sovereign lending gained momentum resulting in intense bond trading activity. Note that, as bond *issues* also intensified after that, most of the data a priori available (upward of 70%) is in fact located in this timeframe so that the sacrifice, made in the name of measurement precision, is limited.

Missing observations reduced the sample to 106 bonds. We further dropped 10 loans, because the data could not be used.[69] We also exclude from the baseline regression the 11 Type II hypothecations because of idiosyncratic behavior (but include them in robustness regressions

[68] In this way, we account for the correlation in the returns of bonds issued by the same sovereign in a limited span of time, which may otherwise unduly inflate the results' significance. The significance of our results is robust under multiple clustering schemes, as we show in the Appendix, Figure A.3.1.

[69] Eight were dropped because of short maturity resulting in atypical behavior and two because they were amalgamated with another issue, generating duplication. In theory the last two might have been used but we decided to err on the side of caution.

in the Online Appendix). The cleaned up dataset has 85 bonds and 640 observations. As said, identification of the effect of Type I hypothecations is made with the help of countries that floated at some point Type I and non-hypothecated bonds that were subsequently traded simultaneously, enabling identification. A priori, this represents six entities out of 32 borrowers -- namely Argentina, Chile, Denmark, Hungary, Italy, Turkey. But because Hungary's only Type I hypothecation had a very short maturity, it could not be used so that in the end there are five identifying countries in the baseline results. They account together for 25 bonds, a little below a third of the library of covenants. These bonds account for 192 individual yield observations contributing to identify $\hat{\beta}$ (the value of hypothecations) in the country fixed effect specifications (which uses 640 observations), and for 135 observations in the country-time fixed effects specification (which uses 544 observations). So again, identification is made possible with the help of a subset of observations representing a little less than a third of the total.[70]

[Table 5 about here]

Results are shown in Table 5. The first two columns, which do not include any control, confirm what we already know, that sovereigns issuing Type I securities were riskier: yield spreads were 350 to 476 basis points higher for Type I bonds. Next, columns (3) to (6) introduce fixed effects. First, columns (3) and (4) show the estimate of the hypothecation premium when we include country fixed effects only. Comparing bonds with and without Type I clauses issued by the same sovereign, we find that the yields on Type I bonds stood at an average spread of 76 to 108 basis points below non-hypothecated counterparts. Second, columns (5) and (6) add more stringent country-year fixed effects. This time, we find that hypothecations produced a yield reduction of 57 and 85 basis points (a highly statistically significant result).

To give a sense of magnitudes, we compare the above numbers to average unconditional yield spreads. The average spread for countries employing at least one Type I bond stood around 679 basis points, while the spread for countries not employing any hypothecation whatsoever was 253 basis points. Against this backdrop one way to go is to compare our estimated effect of Type I hypothecations to the difference between the two, or 426 basis points. Comparing the average premium we estimated to this difference, we see that it ranges between 13 and 25 percent of the disadvantage the average bond by a hypothecator traded at, a sizable saving on borrowing costs especially given that, as we suggested, these are lower bound estimates. To

[70] The 135 observations belong to the same 25 bonds. The drop from 192 to 135 is due to the drop of Turkey data before 1874, as Turkey did not float a Type I before 1874, only Type IIs. To mitigate sample selection concerns, in Table A.3.3 we estimate Equation (2) using different sovereigns' average yields to control for risk. This strategy is less precise, but exploits all variation available. The results confirm what we display in Table 5.

sum up, our lower bound estimate of the value of unenforceable hypothecations points to the fact that, even if they offered no recourse upon default, Type I clauses were an effective tool to lower the cost of capital.

VII. Proof-Of-Stake: Regulating Hypothecations

In this Section, we provide a final argument supporting our theory that sovereign collateral was information. We do this by focusing on a debate that developed in the mid-1870s. The question at hand was whether hypothecations ought to be outlawed. As evidence emerged suggesting that the information provided by contractors in at least one hypothecation had been manufactured, some critics charged that hypothecations were a red herring and asked that they be done away with. But, as we show, both investors and regulators reacted in an opposite fashion. They did not rule out hypothecations but created incentives to deflect the risk of data manipulation, in fact *bolstering the information content of hypothecations*. We argue that this response is consistent with our view that hypothecations were seen as a valuable information technology that deserved to be supported. It is inconsistent with the alternatives, that hypothecations were meant to secure repossession, or that they were scam, or that they relied on imperial enforcement.

The event that triggered the hypothecation controversy was a confidence crisis that erupted in 1872, on the back of the revelation by *The Economist* that collateral information in one recent prospectus had been doctored. In the Spring of 1872, Honduras sought to issue a new loan enabling a major infrastructure project. It consisted in a "ship railway" loan that would transport vessels across the Central American Isthmus by train. The general bond gave as security the railway line and surrounding lands and, as was standard in Type I hypothecations, it described the value of the project, assessing the earning potential of the railway. A few days only before the loan was launched, the *Economist* published an article written under the supervision of editor Walter Bagehot. With the support of international trade statistics, it deconstructed the numbers in the prospectus. The conclusion was that the contractors had massively inflated the gross amount of trade through Cape Horn (which the project sought to capture), so as to increase the estimated earning potential of the ship railway project.[71]

Amidst a general outcry, the project was immediately shelved, but sovereign hypothecations at large came immediately under attack in the media. Simultaneously, the foreign government debt boom of the 1860s and early 1870s ground to halt, observers suggesting that the Honduras

[71] *The Economist*, May 25, 1872, p. 639. On the episode, see Flandreau (2016); Miranda, (2017); Grant, (2019), Flandreau and Legentilhomme (2021).

scandal had been the pivotal event because it exposed a weakness with Type I hypothecations. Specifically, the Honduras scandal suggested that Type I hypothecations might have created unmanageable conflicts of interest. In particular, closer examination of the general bonds revealed that in cases clauses had been added by the agents of foreign governments in order to remove liability. In the Costa Rica loan of 1872 (pledging a railway), an article in fact lifted "responsibility, liability, or trust whatever" for the contractor.[72] As discussed in Clarke (1879), in other cases, contractors appeared in the covenant as "agents" of the foreign governments, thus enjoying immunities, and in particular, evading responsibility for false data.[73]

The language used in hypothecation covenants became suspect, in fact threatening the whole economic logic on which hypothecations rested. Because of the resulting "Lemons" problem, hypothecation regulation started being debated in Parliament, besieged by requests to legislate. Very soon, however, the discussion took a deliberate turn towards the creation of reinforced incentives for truthful disclosures rather than the abolition of hypothecations. In March 1875, corporate lawyer and sovereign debt activist H.B. Sheridan M.P. tabled a "Foreign Loans Registration Bill."[74] The bill would have compelled contractors to register the data in government loans with the so-called Registrar of Joint Stock Companies. Created as part of the Joint Stock Companies Act of 1844, the Registrar held available to investors against a modest fee, basic company information, such as the statutes, the name of the company promoters, and annual shareholder lists. The system was aimed to foster accurate disclosures, because under the provisions of the Act, when registering a new company with the Registrar, the promoters of a new company had to sign a statutory declaration that the information was accurate to the best of their knowledge.[75] If it later surfaced they had been dishonest, they could be made responsible for investors' losses.[76]

By placing sovereign debt data under the authority of the Registrar, Sheridan's was seeking to stabilize hypothecations. Taking a cue from the mechanism at play in the Joint Stock Company Act, the Sheridan Bill provided that intermediaries who would have falsified information on "particulars of revenue and taxes" of a borrowing government would be guilty of misdemeanor and made liable of losses suffered by investors. In clear, promoters attempting

[72] *London Evening Standard*, May 4, 1872, art. 15.
[73] Likewise, such had been the case in the Honduras loan (See Flandreau 2016).
[74] PP 1875 (60) (94): "A bill to provide for the compulsory registration of foreign loans."
[75] It had been amended by the Joint Stock Companies Act 1856. See Taylor (2013) for a discussion.
[76] As explained in a contemporary legal publication, "where false or untrue in any material particular, the person willfully making such a false declaration would be deemed guilty of misdemeanor." Solicitors' Journal, Nov 3, 1877

a Honduras would be liable. The Bill thus demonstrated that creditors understood sovereign hypothecations as valuable because of the information they contained. It shows that they knew fully well that the collateral could not be enforced yet they still wanted to be able to rely on the intelligence conveyed by the covenants. Indeed, when asked about the economic logic underpinning his Bill, Sheridan responded that if investors could be sure that all the hypothecations were accurately stated in the prospectus, "states would find it much easier to raise money here."[77] This is consistent with our evidence that hypothecations lowered borrowing costs through an information channel.

Though Sheridan's concerns were widely shared, a debated point was how to proceed exactly. One observer described the Sheridan Bill as purporting to turn the Registrar into a "Certifying Tribunal for Foreign Loans."[78] The British government was reluctant to let a state-sponsored bureaucracy meddle with foreign government numbers as it may become a source of friction with foreign governments or send the signal that the Foreign Office had vouched for the numbers. A prudent Chancellor of the Exchequer committed the Bill to a parliamentary committee, the Select Committee on Loans to Foreign States, which was assigned the broader task of examining the experience of sovereign debt origination and in particular the role played by hypothecations in the process. It was also tasked with coming up with suggestions for regulation.[79]

In fact, the proposal that came back in the Select Committee's *Report* a few months later harnessed the same logic as the Sheridan Bill, but stripped it from the entanglement with the Registrar.[80] Contractors should be required to provide in the prospectus a full statement of the "revenues, lands, forests, public works, or other property upon which the proposed loan is secured, and of prior charges, if any, upon such security" and the disclosures would have to be truthful under penalty of perjury.[81] Again, the recommendation aimed not at the *extinction* of hypothecations but at the *improvement* of their informational content.

As we discovered by examining the archive of the London stock exchange, the matter circled back to the London stock exchange committee: this was logical because this governing body of the London stock exchange had the power to make listing requirements. Accordingly, it was

[77] Select Committee (1875, p. 274).
[78] Cohen (1876, p. 692) speaks of hurdles involved in the creation a "Certifying Tribunal for Foreign Loans."
[79] The Chancellor was Sir Stafford Northcote. See Select Committee (1875). On the episode, Marichal (1989); Flandreau (2016).
[80] Importantly the report noted that hypothecations were not enforced. Combined with no recommendation to abolish them, this shows an awareness that they were not about enforcement (see Select Committee 1875; p. xlv, p. 151).
[81] Select Committee (1875, xlix).

encouraged by lawmakers to consider an adaptation of its rules so as to acclimatize the Select Committee's recommendations.[82] On Friday, January 21 1876, a special meeting of the sub-Committee for Rules and Regulations took up the suggestion. It recommended that "a statutory declaration be required from Contractors & Agents [of foreign government loans]."[83] The proposal was subsequently adopted and after that, no application for any sovereign debt issue could be made without the underwriters filling up an affidavit with a sworn declaration before a notary public that they were submitting the data "conscientiously believing the same to be true."[84]

As was the case for false statements to the Registrar, underwriters making wrongful disclosures were therefore subjected to penalties, because they could be sued for the full extent of the losses incurred by investors. In other words, the mechanism enabled to discourage information manipulation.[85] Instead of securing lenders by having courts of law assist with collateral repossession, non-enforceable collateral secured lenders by enabling them to sue underwriters who had misrepresented the data, rendering hypothecation *information* safer. The manner in which regulators intervened shows that they understood what we have been arguing throughout this paper, that sovereign collateral clauses were an information technology, not a repossession technology. After that, reliance on sovereign hypothecations, far from coming to a head, continued to prosper throughout the rest of the 19th century and in fact, well into the 20th century.

VIII. Conclusions

Why do sovereigns hypothecate their own assets when the lien cannot be enforced easily, precisely because of sovereignty? Understanding this ancient practice has recently acquired urgency, as Chinese agencies lending to developing countries in Africa and elsewhere insist on being given ports or other national assets as security. Departing from current claims in the literature, this paper has argued that the historical precedent for this new trend -- the phenomenon of "sovereign hypothecation" -- was neither a scam aimed at persuading investors

[82] The question of criminalizing intermediaries was first discussed during the interview of Herman de Zoete, Chairman of the Stock Exchange, by the Select Committee (Select Committee 1875, p. 29). It came back once again in the interview of George Webb Medley, who recommended that "all statements of agents, contractors, brokers, on [prospectuses ought] to be made by statutory declarations, and the parties making them to be held civilly and criminally responsible for them" (Select Committee 1875, p. 277-8).

[83] Archive LSE, MS14612/1, Minutes of the Committee for rules and regulations. Showing the import of the Select Committee's suggestion, the regulations considered were said to be "with special reference to the recommendation in the Report of the Select Committee of the House of Commons."

[84] Slaughter (1880).

[85] The text used in those declarations derived from the Declarations Act of 1835 (1835 c. 62).

they held a real security, nor the result of deft exploitation of loopholes in sovereign immunity. Though it is possible that such considerations have mattered in certain individual cases, we argued that sovereign debt collateral written into 19th century sovereign debt contracts could not and would not be enforced and what is more, the investing public understood it. And yet investors were prepared to pay an economically significant premium for collateralized bonds *sans* repossession technology.

In addressing this puzzle, we emphasized an information channel: The inclusion of reliable descriptions of sovereign assets, of their location, value and earning potential, served to document individual countries' "fiscal wealth." In fact, Peru's famous guano bonds offers a characteristic illustration. The valuable deposits in the Chincha and other state-owned islands contained enough guano to enable the country to cover about 80% of its expenditure for the foreseeable future. Put in another way, the identification of the deposit was a fivefold increase of the country's tax base. The case of the guano contracts captures the underlying logic of sovereign hypothecations and shows why they were valuable: They were powerful instruments to secure otherwise difficult fiscal data. Thus it is that in a world where trade developed more rapidly than information on individual countries' tax bases, the circulating wealth was turned into data to grease the wheels of international finance.

One important contribution of the paper moving forward is to draw the attention of students of international macroeconomic history on the production and administration of fiscal data. Here, we have interpreted sovereign debt instruments as data generating machines, which is a new take on the meaning of sovereign contracts. This has led us to outline the role played by law firms in structuring financial flows and "building" credit worthiness. The resulting data generating machines and their legal underpinning are important to study in their own right but also because, once brought to life, they did acquire an autonomous existence, providing building blocks to an already maturing global information economy. It is this "biology" of the international numerical order whose under-studied character we want to flag for future consideration.

We do not claim that sovereign hypothecations did not have significant downsides, as our discussion of the Honduras "hack" indeed, suggests.[86] But what we claim is that they did matter in ways not yet identified and which our study reveals. In our research, we came across suggestions that the externalization of fiscal data could have adverse effects for state capacity.

[86] This also means that we take no side in the ongoing debate on the efficiency of Fintech and ability at including borrowers. At present, empirical evidence hints to both challenges (e.g. Buchak et al. 2020) and opportunities (e.g. Gambacorta et al. 2022, and Vives 2019 for further references).

In Venezuela for instance, the custom house was the security given to foreign lenders, turning it into a target of raids by rival Caudillos (war lords and military leaders) a political equivalent of asset stripping. Likewise Peru, the vulnerability of the guano to capture by foreign rivals led Peru to become embroiled in the "guano wars." It would be interesting to examine more carefully individual experiences and in particular unpack the political economy of hypothecations.[87]

Circling back to the modern case of Chinese agencies lending to the governments of developing countries in Africa and elsewhere, we suggest that it can be useful to resituate the phenomenon in the long arc of sovereign hypothecations studied here. We do not mean to imply that they are similar in a narrow technical sense to the institution that developed in the 19th century. We have shown that in such matters, the devil is in the detail: close consideration of contractual provisions and of the law and politics of their implementation is necessary before drawing any conclusion. Yet one possible interpretation of the modern reliance on what seems to be, once again, a rather elusive kind of "collateral", may be that, in the absence of any solid repossession instruments, Chinese agencies have been led to rediscover something which 19th century lenders already knew: That knowledge is a form of ownership.

[87] On Venezuela, Eastwick (1868). On the relation between civil war, debt and state making in Latin America, a good introduction is Centeno (2002). See also Mazzuca (2021), for a recent discussion that has echoes in our findings.

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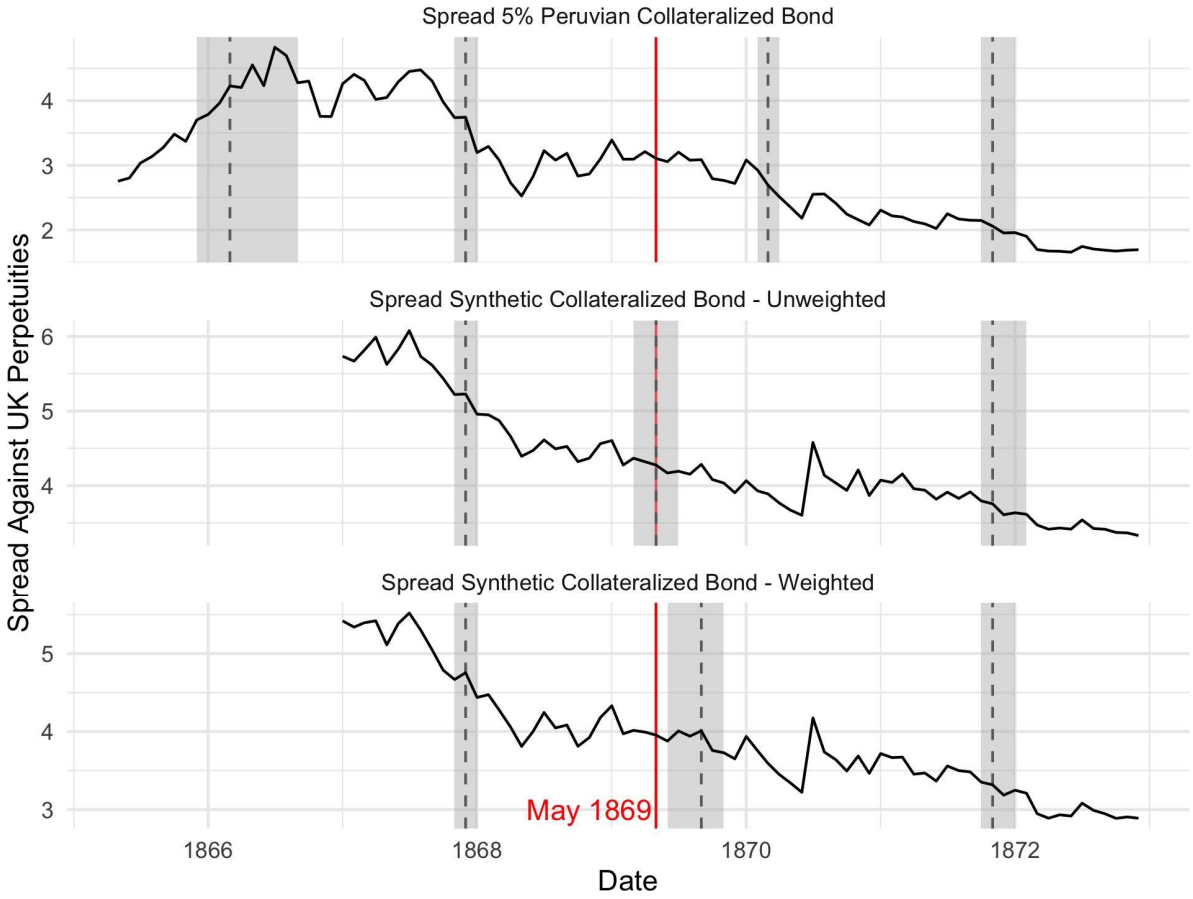
Figures

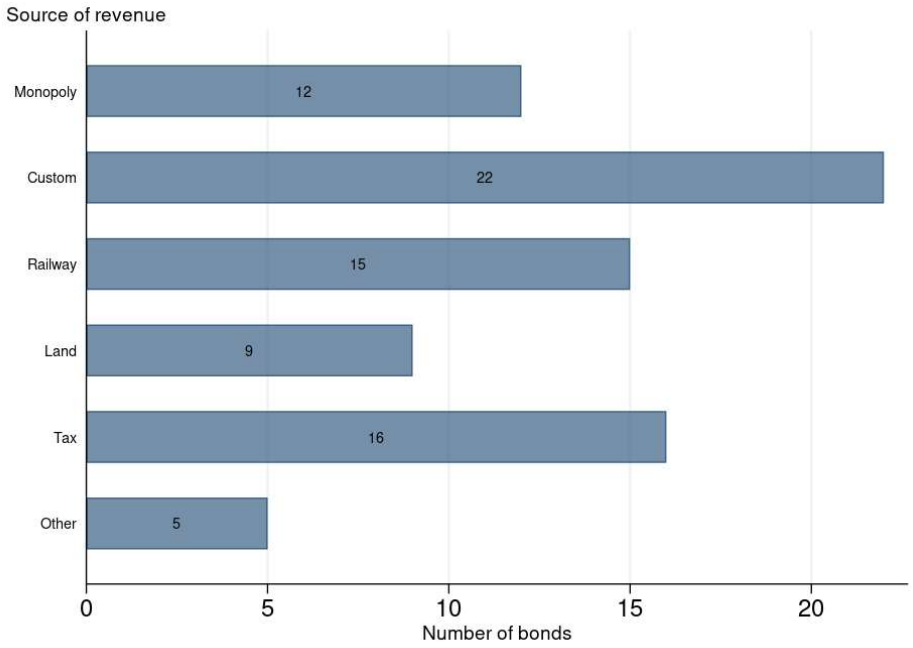
Figure 1
Smith v. Weguelin Verdict Did Not Impact Spreads



Note: From the top, the Figure reports the graphical results of performing the structural break test on, first, the Peruvian 1865 5% bond's spread series; second, the spread series for the unweighted portfolio composed of the Chilean 6% 1867 (custom revenues), the Romanian ("Danubian") 7% 1864 (custom revenues), the Egyptian 7% 1866 (railways) and the Turkish 6% 1862 (excise on tobacco and salt); third, the spread series for the same portfolio of bonds, weighted for issuance size. Dashed lines represent break dates; gray areas cover 95% confidence intervals; the red solid line tracks the month of Smith v Weguelin's verdict.

Figure 2

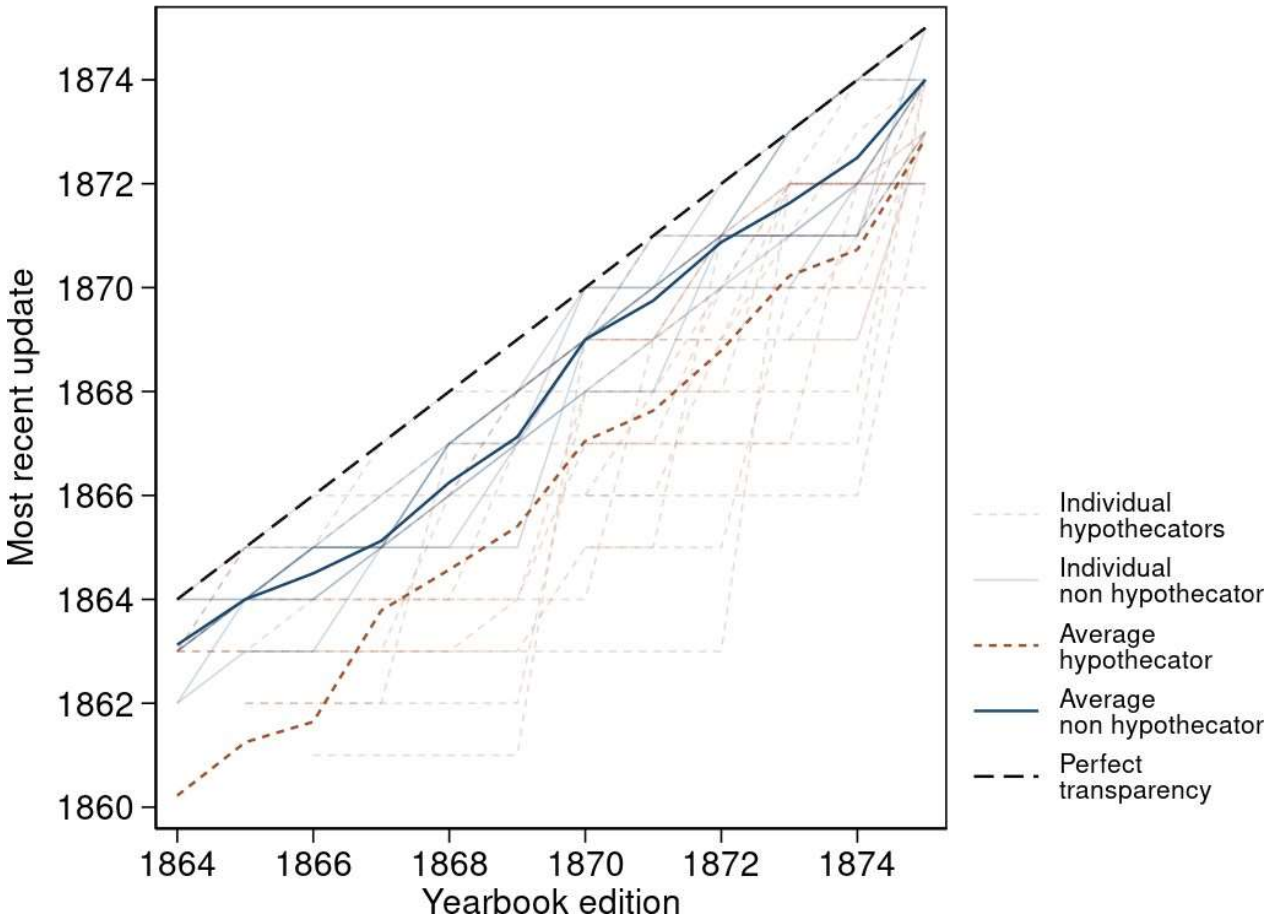
Collateral Clauses Description



Note: This Figure presents summaries of prospectus characteristics for the fifty-five Type I bonds, focusing on the sources of revenue behind the pledges. The "Monopoly" category includes all pledges backed by guano revenues; tobacco revenues; revenues from salt; revenues from coal and mahogany; from mercury; from fish and locks; from a navigation company. The "Custom" category includes all revenues from custom houses, pledged in the majority of Type I prospectuses. The "Railway" category includes all pledges of railways and revenues from railways, while the "Land" category includes pledges of land or of revenues from land. The "Tax" category includes all pledges of revenues from provincial taxes; "octrois", octrois being taxes on the movement of goods for sale within a state; taxes on the sale of small animals and the manufacture of oil; taxes on liquor and coffee; personal (income) tax; taxes on slaughterhouses; the sale of stamps and licenses. The "Other" category includes pledges of a reserve fund, company shares, rice, and a compensation payment from Russia to Denmark, for Denmark's renunciation to imposing tolls on navigation in the Oresund. The number on each bar counts how many bonds pledge that specific revenue or physical asset. Categories are not mutually exclusive, as each bond may pledge multiple items.

Figure 3

Collateral Clauses and Transparency



Note: The Figure summarizes the availability of revenue figures in the Statesman Yearbook, distinguishing between sovereigns that issued Type I collateralized bonds (red, short-dashed lines) and sovereigns that did not issue any hypothecation (blue, solid lines). On the x-axis, we list the year of publishing of each issue of the Yearbook. On the y-axis, we list the year of the most recent update for each sovereign's revenue figures. We represent perfect transparency as continuously updated and current figures available each year, i.e. the dark, dashed line.

Tables

Table 1
A Summary with References for Type II Securities

Nb	Loan	Security	Instrument	Court/Enforcer
1	Republic of Bolivia 6% 1872	Profits from transp. companies held in trust	Deed of Trust	British Court of Chancery
1	Commission of the Danube, 4% 1869	Tolls on Danube	Receivership of company	Any court of justice of signatories
3	Khedive's Private Loans of 1866, 1867, 1870	Personal property of Khedive	Recovery against Khedive	Mixed Courts? (not created until 1875)
1	Italian State Domain Loan of 1865	Real estate	Mortgage	Italian courts
1	Italian Tobacco Loan of 1868	Tobacco Monopoly	Mortgage	Italian courts
2	Ottoman Egyptian Tribute Loan, 6% 1854 Ottoman Egyptian Tribute Loan, 6% 1871	Portions of the Egyptian Tribute	International Treaty	British gov.? (no formal guarantee)
1	Ottoman Egyptian Tribute Loan, 4% 1855	Portion of the Egyptian Tribute	British gov. guarantee	British gov.
1	Spanish Quicksilver Mortgage Loan 5% 1870	Quicksilver mines incl. equipment &c.	Mortgage	Spanish courts
1	Swedish Provincial Mortgage Loan	Landed estates	Mortgage	Swedish courts

Source: Authors, from sources marked in Table. See Appendix A.2 for full details on each loan and legal design.

Table 2

Descriptive Statistics for the 116 Bonds List

Non-Hypothecated

	Mean	S.D.	Min	Max	N.
Purpose	0.449	0.503	0	1	49
Sinking Fund	0.633	0.487	0	1	49
Spread at Issuance	2.999	1.54	1.557	8.254	41
Prestige	0.531	0.504	0	1	49
Bond Volume	9.065	19.775	0.358	120	49
Maturity	44.23	23.649	4	100	37
Bond Default	0.082	0.277	0	1	49

Type I Hypothecations

	Mean	S.D.	Min	Max	N.
Purpose	0.673	0.474	0	1	55
Sinking Fund	0.873	0.336	0	1	55
Spread at Issuance	4.642	1.812	1.609	9.33	48
Prestige	0.055	0.229	0	1	55
Bond Volume	5.198	8.608	0.2	36.8	55
Maturity	27.873	20.476	1.5	100	55
Bond Default	0.545	0.502	0	1	55

Type II Hypothecations

	Mean	S.D.	Min	Max	N.
Purpose	0.500	0.522	0	1	12
Sinking Fund	1	0	1	1	12
Spread at Issuance	3.689	2.113	0.608	6.83	11
Prestige	0.167	0.389	0	1	12
Bond Volume	11.072	26.235	0.135	94.005	12
Maturity	35.167	31.550	13	100	12
Bond Default	0.500	0.522	0	1	12

Note: This Table presents descriptive statistics for the cross-section of bonds, broken down by hypothecation status of the bond. Purpose is a dummy taking value one if the bond's prospect includes a description of the purpose for which the debt is underwritten; Spread at Issuance records the yield spread at which the bond is presented to the market by the underwriter, the benchmark being the risk-free bond; Prestigious Underwriter is a dummy taking value one if the bond is underwritten by either Rothschild or Baring; Bond Volume records the issuance in millions of pounds; Maturity records the maturity in years, with missing Maturity observations in the "Non-Hypothecated" panel due to perpuities. Bond Default is a dummy recording whether the bond ever defaults between its issuance and 1880, based on the account in Lucas Nash (1881).

Table 3

Countries Issuing Type I bonds Were Less Transparent

Dependent Variable: Currently Hypothecating

Information Measure:	Recent Data		Updated Data		Age of the Data	
	(1)	(2)	(3)	(4)	(5)	(6)
Info. Measure	-.3019***	-.3303***	-.2311***	-.2218***	.0521***	.1448***
	(-6.11)	(-4.05)	(-4.98)	(-2.65)	(5.29)	(6.22)
Recent issuance	-.0894*	.0123	-.0862*	.0261	-.0785	.0039
	(-1.82)	(0.16)	(-1.72)	(0.33)	(-1.38)	(0.05)
Lag Wgt. Spread	.0255***		.0296***		.0271***	
	(4.67)		(5.42)		(4.45)	
Lag GDPPC		-.1031***		-.1215***		-.0626*
		(-2.78)		(-3.23)		(-1.75)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	.3788	.1206	.3567	.0644	.3188	.2269
Observations	341	154	341	154	280	153

Note: The Table presents results from the estimation of Equation (1) using different information availability proxies as controls. The dependent variable "Currently Hypothecating" is a dummy taking value one if the last bond issued by sovereign *c* is a Type I hypothecation. Information proxies are: A dummy taking value one if the revenue information for sovereign *c* reported in Yearbook volume *y* is less than two years old (first two columns); a dummy taking value one if revenue information for sovereign *c* in Yearbook volume *y* is different from information for the same sovereign in volume *y*−1 (second two columns); a discrete variable recording how old is revenue information published in volume *y* of the Yearbook regarding each sovereign *c* (last two columns). Each pair of columns alternatively controls for country risk with the lag of volume-weighted spreads, or with lag GDP per capita. Errors are heteroscedasticity robust; t-statistics are in parenthesis.

*p<0.1; **p<0.05; ***p<0.01

Table 4

Hypothecation and Prestigious Underwriters Were Substitutes

Dependent Variable: Currently Hypothecating

Information Measure:	Recent Data		Updated Data		Age of the Data	
	(1)	(2)	(3)	(4)	(5)	(6)
Currently Prestigious	-.4858***	-.3801***	-.5025***	-.4161***	-.4437***	-.3463***
	(-8.16)	(-3.83)	(-8.35)	(-4.13)	(-7.03)	(-3.73)
Information Measure	-.2173***	-.2692***	-.1541***	-.1738**	.041***	.1289***
	(-4.70)	(-3.39)	(-3.57)	(-2.17)	(4.45)	(5.68)
Recent issuance	-.0587	.0383	-.0555	.0517	-.057	.0283
	(-1.30)	(0.52)	(-1.22)	(0.69)	(-1.09)	(0.41)
Lag Wgt. Spread	.017***		.0198***		.0183***	
	(3.35)		(3.88)		(3.19)	
Lag GDPPC		-.1101***		-.1258***		-.0712**
		(-3.11)		(-3.52)		(-2.07)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R2	.483	.1987	.4687	.1609	.424	.2925
Observations	341	154	341	154	280	153

Note: The Table presents results from the estimation of Equation (1) using different information availability proxies as controls. The dependent variable "Currently Hypothecating" is a dummy taking value one if the last bond issued by sovereign *c* is a Type I hypothecation. Information proxies are: A dummy taking value one if the revenue information for sovereign *c* reported in Yearbook volume *y* is less than two years old (first two columns); a dummy taking value one if revenue information for sovereign *c* in Yearbook volume *y* is different from information for the same sovereign in volume *y−1* (second two columns); a discrete variable recording how old is revenue information published in volume *y* of the Yearbook regarding each sovereign *c* (last two columns). Each pair of columns alternatively controls for country risk with the lag of volume-weighted spreads, or with lag GDP per capita. Errors are heteroscedasticity robust; t-statistics are in parenthesis.

*p<0.1; **p<0.05; ***p<0.01

Table 5

Type I Hypothecations Helped Lower Cost of Debt for Risky Sovereign

Dependent Variable: Yield Spread

	(1)	(2)	(3)	(4)	(5)	(6)
Type I	4.761***	3.504***	-.7631***	-1.083***	-.5698***	-.8513***
	(3.62)	(2.69)	(-3.33)	(-3.16)	(-2.85)	(-3.36)
Perpetuities	2.534**	4.58***	.2875	.9064**	.5474	1.073**
	(2.62)	(3.43)	(0.65)	(2.07)	(0.98)	(2.36)
Prestige	.1171	.0625	-.523	-.5885	-.5448	-.6352
	(0.09)	(0.05)	(-1.03)	(-1.24)	(-0.82)	(-1.10)
Log of Volume		.1003		.1823**		.186**
		(0.29)		(2.46)		(2.39)
Log of Maturity		-2.328**		-.9852***		-.8381***
		(-2.07)		(-3.66)		(-3.57)
Purpose		.7482		.4051**		.3341**
		(0.79)		(2.60)		(2.24)
Year FE	Yes	Yes	Yes	Yes		
Country FE			Yes	Yes		
C.try*Year FE					Yes	Yes
Adj. R2	.2132	.2438	.7608	.7633	.9729	.9767
Observations	640	640	640	640	544	544
Type I Obs.			192	192	135	135

Note: The Table presents results from the estimation of Equation (2). The first two columns report estimates that only absorb common year of trade fixed effects; the second two columns add country fixed effects; the last two columns absorb all country-year specific variation via country-year fixed effects. The last line (Type I Obs.) records the number of observations that identify the Type I parameter in the country and country-time fixed effects regressions. Namely, the number of observations belonging to countries floating both Type I and non-hypothecated bonds (column (3) and (4)), and those belonging to countries floating both Type I and non-hypothecated bonds at the same time (column (5) and (6)). Errors are clustered at the country-year of bond issuance level, with 80 country-year clusters over the first four columns and 72 country-year clusters over the last two columns; t-statistics are in parenthesis.

*p<0.1; **p<0.05; ***p<0.01

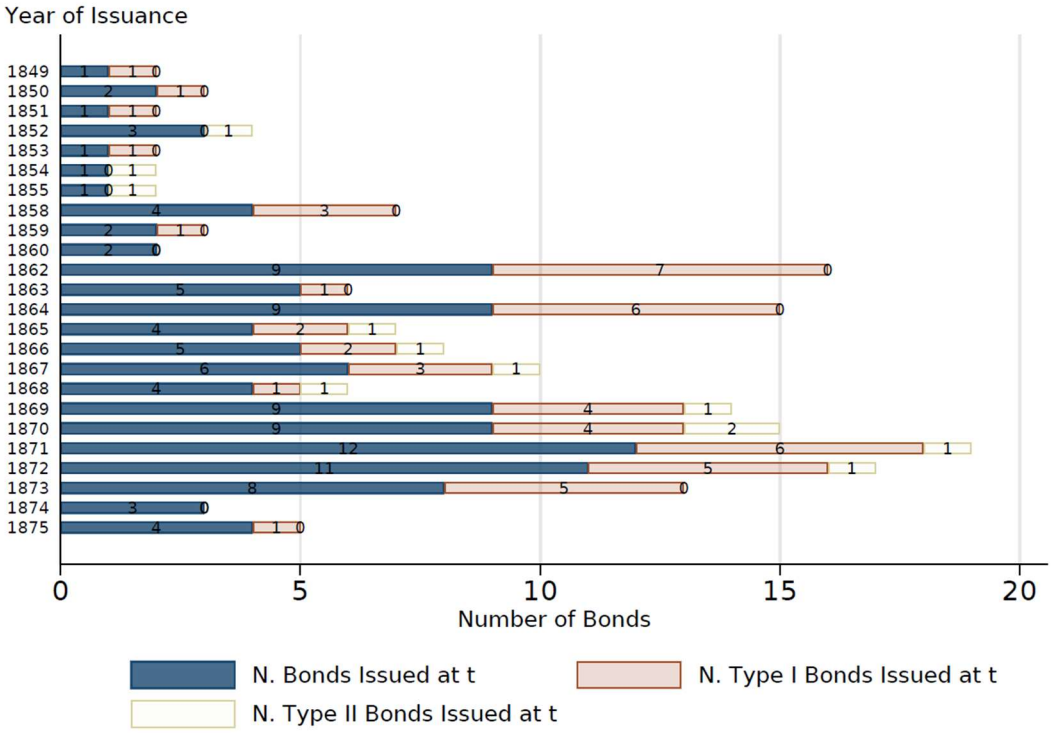
Appendices

A.1) Bond Issuance over Time and Type

In Figure A.1.1 below we document the mid-century boom-bust episode (1849-1875) on which the paper does focus. The Figure shows bond issuance per year (number of issues) identifying Type I, Type II and non-hypothecated bonds.

Figure A.1.1

Bond Issuance over Time and Bond Type



Note: This Figure documents the distribution of bonds over year of issuance. From the left, darker bars count the number of non-hypothecated bonds issued that year, lighter bars count Type I bonds, and transparent bars count Type II bonds.

A.2) Type II Hypothecations and the Associated Quasi-Repossession Mechanisms

In this Appendix, we provide a discussion of individual Type II hypothecations, proceeding in alphabetical order. As indicated in the text, Type II hypothecations distinguished themselves

from the rest in that they made some effort at creating a template enabling some form of repossession of the collateral. So, what warrants in our approach inclusion of a given debt in this Appendix is the presence of a mechanism that may be interpreted as conducive of repossession or quasi-repossession. Accordingly, the following discussions identifies in what respect it may be argued that such a template was created and emphasizes the mechanism, legal or other, which could a priori likely to secure that effect. An interesting question would be to study systematically their individual performance. However, we do not discuss the ability of individual Type II hypothecations in actually reducing borrowing costs. Our experimentations with the data suggests that the impact of the arrangements varied a lot from one to the next. But in A.3 below we show that on *average* hypothecations could be a powerful instrument. In what follows, we offer some comments on some bonds which appeared to have almost completely eliminated default risk through the instrument. We also quote previous research on some individual bonds when relevant.

A.2.1) Bolivian Loan, 6 %, 1872

The Bolivian loan of 1872 is one of the most complex piece of legal-financial engineering in our population of sovereign debt contracts. The project that gave rise to the loan was an attempt to throw Bolivia open to trade via the Amazon River with the help of the construction of a waterway through tributaries of the Amazon and a railway line. A group of promoters acting as agents for the government of Bolivia received navigation and construction rights and launched three companies: A navigation company (the National Bolivian Navigation Company or NBNC), a railway company (the Madeira and Mamoré Railway Company) and a construction company (Public Works Construction Company) to build the road (Flandreau 2016). The plan foresaw the division of custom revenues accruing from the trade this would create between the government (one-fourth) and the navigation company (three-fourth). Both revenue streams were pledged as special security to the bondholders. In particular, should the government fail to service the loan, the three-fourth of the custom revenues collected by the company would be paid over to the bondholders.

A unique feature of the arrangement was the setting up of two detailed deeds of trust (Anonymous 1873). The first granted bondholders, through the agency of trustees, the right to inspect the books of the navigation company and, in case profits enabling to cover the creditors were being withheld, the trustees had the right to enter "at once as receivers into possession of all property and assets of the company." In clear, in case of sovereign default, the bondholders would become the owners of the company. However, this had to involve the cooperation of local authorities. The second trust, was the more powerful element: It provided that the trustees to "retain out of the proceeds of the loan […] a sum equal to the contract price of the railway,

and temporarily invest and apply the same from time to time in payment for the works as they proceeded."[88]

Since most of the money remained within the control of the bondholders, the security was material. Some observers rationalized that given the limited credit Bolivia enjoyed and the fairly reasonable price of the issue, the trust was the reason for the success met by the Bolivian loan at launch: According to the opinion of the Lord Chancellor Hugh Cairns: "I think it is obvious that if the money had not been placed in the hands of the trustees the loan would not have been obtained."[89] In the end, the project itself collapsed on the back of flawed calculations. The Bolivian government suspended the payment of the interest on the loan, and since the road had not been completed, no revenues could be paid over to creditors. There was no receivership created but the trustees were able to safeguard the money. They suspended the construction in order to avoid the dilapidation of the trust. As the funds at the Bank of England had been wisely invested in then booming US securities, the deposit kept increasing in value. Eventually, British courts declared themselves competent and eventually ordered the release of the funds to bondholders (Flandreau, 2016). While this was rather messy, the epilogue does confirm that through the help of a deed of trust, assets could be detached from a sovereign's reach and plausible collateralization could be achieved.

A.2.2) Commission of the Danube Loan, 4% 1869: International Law and International Receiverships

This loan gave as collateral the "tolls and duties" levied at the Sulina mouth of the Danube on the Black Sea by the European Commission of the Danube. The Commission was an international administrative entity established by the Treaty of Paris that settled the Crimean War in 1856. Austria, France, Prussia, Russia, Sardinia, Turkey and the United Kingdom supervised the supra-national entity, vested with the authority to manage and improve the circumstances of international navigation on the Danube river. In November 1865, a public act signed by Austria, France, Italy, Prussia, Russia, Turkey and the United Kingdom placed the Commission, its officers, works and establishments "under the protection of international law." This meant that the stakeholders would abide by the *droit des gens* to settle differences. In 1869, the Commission raised £135,000 on the London stock exchange offering as security to creditors the tolls on the Danube river and "full powers of receivership in case of default."[90]

To understand how this would play out, and why we are dealing here with a plausibly enforceable lien, the important element is that the loan was guaranteed by France, Italy, the North German Confederation (Prussia), Turkey and the United Kingdom. In the event of a

[88] Prospectus, *The Times,* January 20, 1872.
[89] See Flandreau (2016, p.114 and 359).
[90] Prospectus for the European Commission of the Danube, 4% loan, *London Standard*, March 8, 1869.

default, these countries, which had a majority stake in the Commission, would be called in to make up for the difference and simultaneously they would take care of implementing the receivership system. In other words, a group of sovereigns would manage the collateral, acting collectively and abiding in their intercourse with one another by the rules of international law. The issue spread stood at 75 basis points above British Consols. Since trading of this instrument was limited, the premium likely reflected illiquidity. This spread is among the lowest extant for a Type II hypothecation.

A.2.3) Egypt: The Khedive's Private Loans of 1866, 1867, 1870

The Egyptian loans of 1866 "Loan of the Viceroy of Egypt" (7%), 1867 "Egyptian 9% Vice Roy loan", and 1870 "Mortgage loan of His Highness the Khedive of Egypt (7%)" pledged, not the revenues of Egypt but various forms of private property belonging to the ruler of Egypt. This created grounds, in theory at least, for repossession. In fact, albeit they are listed under "Egypt" in contemporary sources, the official price list of the London stock exchange was careful to list them under "miscellaneous" rather than "Foreign stocks."[91] An open question was what would be the treatment of such claims in case of default. As it turned out, the relevant jurisdiction was Mixed Courts, whose jurisdiction encompassed matters that had to do with the "Khedive's land and that of his family, so long as no question of acts of sovereignty arose" Hoyle (1986, 1987). Note that at the time the Khedive loans, the Mixed Courts were only a vague project and they did not come into being until 1875. The important point is that a formal repossession mechanism was at least contemplated.

A.2.4) "Daira" Loans of 1866 and 1870

The loan of 1866 (known as the "Viceroy's Private Domains Mortgage Loan") was, according to the terms of the prospectus, guaranteed by the "immense private property of his Highness Ismael Pasha, Viceroy of Egypt". The prospectus especially pledged a "mortgage of 364,930 *feddans* (about 375,000 acres) of cultivated lands, hypothecated in due legal form to that effect by His Highness." A deed of hypothecation (or "*Kachf*") was deposited at the Bank of England, enabling the creditors to secure it in case of non-performance. In effect, the grantor of the security was the Daira, the administrator of the private domains of the Khedive. The prospectus recited the merit of the security vested in the reputation of the Daira, stating that the

[91] For instance, the *Investor's Monthly Manual* (December 30, 1871, p. 398) lists the Egyptian loans of 1866 and 1870 under "Egypt", but marked them as "secured on private domains". But the journal did not identify the loan of 1867 in the similar way, perhaps because as we explain below the deed of hypothecation was not in the hands of the bondholders but in the hands of the Egyptian government.

Daira's "acceptances or obligations" have always been "taken up by capitalists in preference to all other negotiable securities in Egypt."[92]

The Khedive loan of 1870 (also known as the "Daira Sanieh Loan") was similar in legal/financial design to the 7% 1866 Viceroy Loan. It likewise involved the Daira and a deed of hypothecation was deposited at the Bank of England. Rather than being for land managed by the Daira as in 1866, the pledge was both for "the whole of the free revenues" of the Daira and for 150,000 feddans of land to be devoted to the cultivation of cane sugar (an estimate of the expected value of the total production of sugar was provided).[93] Because of the involvement of a private company, the Daira loans evoke parallels with the company mortgages put together in the Italian and Spanish government loans discussed below.

A.2.5) Mortgage Loan of His Highness the Khedive of Egypt, 9% 1867

Also known as Mustapha Pasha's Domains Loan of 1867, it had served to purchase land for Royal Prince Mustapha Pasha (Landes, 1958, p.106). The loan, signed by the Khedive, gave as security the Khedive's personal "free revenues" plus a guarantee by the Egyptian government. In this case, unlike with the two loans previously discussed, there was no deed of hypothecation for the creditors. Instead, the Egyptian government kept the title deeds of the property purchased for Royal Prince Mustapha Pasha as security, so that the Egyptian government would seize the collateral and take up the service in case of non-performance by the Khedive.

A.2.6) Italian Government: Loans through Private Companies

Unlike other Italian or Sardinian loans (the predecessor state of unified Italy), such as the Maremmana railway 5% bond of 1862, which had a Type I hypothecations, two Italian loans – the State Domain Loan of 1865 and the Italian Tobacco Loan of 1870 – were found to have created a genuine repossession mechanism. In both cases, they achieved this goal by creating a private entity, owned by a combination of domestic and foreign investors and responsible for servicing the loan. The chosen route was an Act of Parliament, which formally recognized the repossession right. For that reason, though they were understood to be government loans, the two loans ended up like under the "miscellaneous" section of the London stock exchange official price list rather than under "foreign funds", just like the the Khedive loans, because technically, the actual borrower was private.

- *State Domain Loan, 5%, 1865*

[92] *The Times*, March 21, 1866. The Daira ran the Khedive's own possession and especially his cotton plantations (see Landes, 1958).
[93] *Times*, April 26, 1870.

The goal of the Italian minister of finances Q. Sella in crafting with his international financial advisors the State Domain loan had been to externalize to a private company – the Italian Land Company – the liquidation of state domains to obtain cash for the Government. The result was the creation of a financial entity that would supervise the sale of land. That entity would be owned by banks and other financial intermediaries who advanced money to the government against the security of a mortgage on state lands held by the Italian Land Company.

As said the arrangement, which led to the adoption of a convention between the Italian government and the Italian Land Company, was ratified by the Parliament.[94] The agreement placed the Company under the supervision of a royal commissioner and tasked it with issuing the loan (Art. 15). The proceeds of the loan would enable the company to make an advance of a countervailing value to the Italian state (Art. 7-11). Italian treasury bills registered under the name of the Company secured the bonds, and a mortgage on the lands to be sold secured the bills in turn. The convention stipulated that a law would substitute for the inscription of the security in the mortgage registries (Art. 12). As the liquidation of the state lands proceeded, the outstanding debt was progressively reimbursed and the mortgages cancelled. Because of this peculiar arrangement, and although in the last analysis this was evidently a government loan, it was not listed under foreign stocks in the official stock exchange price list. Just like the Khedive Loans, this loan was listed under "miscellaneous".[95]

- *Italian Tobacco Loan, 6%, 1870*

The Tobacco Loan is reminiscent in several respects of the State Domains loan. On July 26, 1868 a convention was signed between the Italian government, the *Regìa Cointeressata* (a partnership of Italian and foreign capitalists who acquired the right to farm the country's state monopoly over tobacco) and, finally, representatives of Stern brothers, the contractors of the loan.[96] The convention stipulated that the capitalists were pledging to provide the Italian treasury with 180 millions of gold lire in effective capital. Article 5 of the convention stipulated that a share of the company's profits would be set aside annually to fund interest and amortization charges of a loan. Article 23 described instead the money transfer process.[97]

The convention did not detail what would happen in the event of a default, but the legal material shows the logic. It trickled down from the fact that the *Regìa*, rather than the Italian Treasury, was responsible vis-à-vis creditors. The profits of the *Regìa* earmarked to pay creditors were sent each year to the *Cassa dei Depositi e Prestiti* (an institutional investor with

[94] Anonymous (1865).
[95] But the *Investor's Monthly Manual*, puts it under Italian government debts.
[96] The leader of the syndicate was the *Credito Mobiliare Italiano*.
[97] Ceci (2015) for details on the history of the tobacco monopoly. The Convention of July 25, 1868 and the text of the law that approved it are in Regno d'Italia (1868, p. 445 ff.).

custodian responsibilities) or to the *Banca d'Italia* (the Bank of Italy), which assumed trusteeship functions. These institutions acted as assignees of the revenues of the *Regìa* for the benefit of creditors. The Treasury was then to take care of paying the bondholders from these funds. If the money was diverted, then creditors would be able to secure a freeze of the funds in the future. As a result, the arrangement created a repossession system.

A.2.7) Ottoman Loans of 1854, 1855 and 1871: International Treaties

Three Ottoman Loans pledged separate portions of the so-called "Egyptian Tribute" an annual payment to the Turks by Egypt, formerly a possession of the Ottoman Empire, which had to pay for its freedom. The Tribute arose from a series of international treaties backed by foreign powers, giving them some authority to monitor the use of the money by Egypt. In one of them (the 4% Ottoman Loan of 1855), the resulting mechanism came closest to giving creditors formal repossession rights. This was because it empowered the British and French governments, who guaranteed the loan, to take over the collateral.

A.2.8) Ottoman Egyptian Tribute Loan, 6% 1854

The Turkish loan of 1854, issued on the eve of the Crimean War, was backed by an assignment from the Egyptian Tribute. Multiple statements in the media, both at the time and afterwards emphasized the unique character of the hypothecation.[98] Such statements stressed two aspects. First, observers argued that there was an instruction from the Sultan to the Khedive to direct a portion of the money from the Tribute to the bondholders via the Bank of England. Second, the *firman* (Ottoman decree) providing for the rights of creditors was deposited at the Bank of England.[99]

Our reading is that, per se, this did not achieve anything beyond what existed under Type I hypothecation. Could the borrower, at will, redirect the funds before they would reach the reliable agent (such as the Bank of England)? The answer is that of course she could. Rose and Staniforth (1876, p.12) report that at one point in 1876 the Turkish government was "determined upon issuing an order to the Khedive to remit the Tribute direct to Constantinople" (as opposed to the Bank of England). This shows that issuing a new decree was always possible. Similarly, depositing of the *firman* for the loan in the Bank of England has been described by Anderson (1964, p.50) as ensuring that it would be safe "from all risks of emendation" (a view shared by Du Velay, 1903, p. 140). However, of course, a new decree could be issued.[100]

[98] For examples of strongly partisan views on the responsibility of the British government, see Office of the Egyptian Tribute Bondholders League (1876) and Shee (1876).
[99] Fenn (1855, p.265) and Du Velay (1903, p.140).
[100] Modern authors who have been impressed by such views include Dyson (2014).

In our understanding, what made (or might have made) the hypothecation unusual was its status under international law. This had to do not with the hypothecation mechanism per se, which was generic, but with the nature of the asset hypothecated. The Egyptian Tribute was the product of an international treaty, of which Britain had been part, giving partial authority to the British government. Such obligation resulted from the London Convention of 15 July 1840 and of the Treaty of London of 1840, followed by the *firman* of February 1841 that granted the Khedive hereditary government of Egypt in return for the payment of a tribute.[101]

Unlike the enforcement of private claims, the enforcement of intergovernmental claims was as we explained a rule by which the British state did abide. Here, we speculate, the reasoning of supporters of the view that the pledging of the Egyptian Tribute created special rights may have been that the British government had grounds to bring pressure to bear on the Khedive of Egypt. The prospectus nodded at this by emphasizing that the loan had been "negotiated with the knowledge of the English Government; that her Majesty's Government is satisfied that the loan and the appropriation of the above-mentioned 30 million piasters, £282,000 per annum, of the Egyptian tribute are duly authorized by his Majesty the Sultan."[102] The media and subsequent discussion by bondholders amplified the meaning of the endorsement.[103] We should remain circumspect. Still, some form of imperial enforcement was conceivable.

Our examination of the evidence suggests that markets favored the Egyptian Tribute loan of 1854 compared to other Ottoman loans. For instance, it traded at an average 20% premium compared to another similar 6% Turkish loan, made in 1858, a Type I hypothecation, secured by custom duties and the "*octroi*" (internal custom) in Constantinople.[104] Another piece of evidence is that when the Ottoman default took place in the 1870s, it was stated that all the creditors of Turkey were to be treated equally "the only exceptions being in the case of the Loans of 1854, which, owing to the political and legal questions involved, it was desirable to deal with exceptionally."[105] A similar claim was made for the loan of 1871 discussed below. As a result, Rose and Staniforth (1876) noted that "His Highness [the Grand Vizier]

[101] The *firman* stipulating the terms of the tribute was itself dated May 1841. For the text of the decree, see Shee (1874, p.548).

[102] Fenn (1855, p. 266). The initial amount of the loan had been £5,000,000, the interest being 6% and the amortization 1%, the annual sum that was initially necessary to meet annual charges was 350,000£, and the security pledged, or 282,000£ produced an 80% coverage ratio. In the end, as only £3 million were raised and the annual charge came to 210,000£. This left a margin of about £75,000 that would be pledged for Ottoman "Egyptian Tribute" Loan, 4% 1855.

[103] A little before the loan was launched, the *The Times* claimed that the "English government will likewise give a formal intimation that the claims of the subscribers will always be regarded as entitled particularly to their support." *The Times*, August 12, 1854; The Chronicle read the prospectus as meaning that the English government gave its "assurance that the hypothecation of the Egyptian tribute [. . .] is properly secured to the subscribers of the loan." *Morning Chronicle*, August 17, 1854.

[104] The loan of 1858 had a shorter maturity, which should have favored it, yet our evidence suggests that the Egyptian Tribute traded at a premium of about 20% on average. The inference we make is that the security raised its value. Data available from authors.

[105] Rose and Staniforth (1876, p.21).

understands the exceptional position of the Loans of 1854 and 1871, guaranteed by the Tribute of Egypt, and the legal and moral considerations which gave to the holders in those Loans rights which they would not hesitate to enforce."[106] For its part, the British government remained willing to remind to the Porte the special status of the Tribute Loans at large, thus vindicating expectations.[107] This gives a semblance of plausibility to repossession, unlike what happened under Type I hypothecations.

A.2.9) Ottoman Egyptian Tribute Loan, 4% 1855

The background of the loan was also the Crimean war and more specifically, the June 27, 1855 convention between Britain, France and Turkey providing for the joint guarantee by France and Britain of a loan of up to 5,000,000£ to fight Russia. According to Art. 3, the two guarantors were secured by a) the available balance of the Egyptian Tribute (the "Egyptian Tribute" Loan of 1854 not having been fully subscribed, there was a balance of 75,000£ available as security), as well as b) the custom duties of Syria and Smyrna.[108] These securities were designated in the Ottoman "Egyptian Tribute" Loan issued in August 1855 (Ayres, 1857, p.371). Because of the international guarantee, Britain had a right over these instruments.

Against this backdrop, the spread-at-issue of this loan, compared to consols, was very low (60 basis points). The high price which the loan commanded in capital markets has been mentioned by previous writers who generally emphasize the guarantee alone (Al, 2012; Esteves and Tunçer, 2016). Ayres (1857) describes the stock as affording a "secure investment in the market" because of the joint guarantee. Nevertheless, from a legal point of view, an important aspect was the presence of an international treaty because it interested Britain in the outcome and thus involved it in receivership activities. Combined with the guarantee, it turned Britain into the assignee of the security in case of default. According to lawyer Lord St Leonard (later a Lord Chancellor): "By the Convention [of June 1855] we became, with France, assignees of [the Egyptian] Tribute [and of the Customs of Smyrna]" pledged in the loan".[109]

Contemporary debates both in the Commons and House of Lords underscore existing understandings of, and concerns vis-à-vis, the legal and political implications of the lien created. In the same speech, Lord St Leonard emphasized that the pledges in the loan of 1855 ought to be considered from the vantage point of the political consequences in case of non-performance. On the one hand, the British government was eager not to take any financial responsibility upon itself, which required the pledges be maintained, because, as Lord

[106] Rose and Staniforth (1876, p.11)
[107] See response to the Chancellor of the Exchequer, Sir Stafford Henry Northcote, to a parliamentary question: "As I mentioned yesterday, the Governments of England and France have made a joint representation to the Government of the Porte on the subject of the Tribute Loans generally." House of Commons, Hansard, "Turkey—Loans of 1854 And 1855—Explanation—Question", March 9 1877 Volume 232, Columns 1652.
[108] Shee (1874, p.529). For details, see Ayres (1857).
[109] Hansard, House of Lords, August 6, 1855, Column 1857.

Clarendon put it "the obligations […] might possibly be evaded."[110] On the other hand concerns were voiced that France would use the pretext of a lapse of payment by the Turks to invade Egypt or seize Syria, which further demonstrates that the existence of international treaties was understood as enabling repossession of the collateral.[111]

In conclusion, if the bondholders felt secure, it was because the British and French government were themselves secured through a right to repossess the assets pledged. Formally, the hypothecation created a valid trust under international law, whose beneficiaries were the bondholders and whose assignees and trustees were the guarantor government(s).

A.2.10) Ottoman Egyptian Tribute Loan, 1871

The Ottoman 6% loan of 1871, initially for £5,700,000, was the last loan issued with the security of the Tribute of Egypt. On top of the general revenues of the Turkish Empire, it pledged "the portion of the Tribute now payable to the Porte [Ottoman Empire] by the Khedive of Egypt not applicable" to the loans of 1854 and 1855 (*Times*, September 5, 1871).[112] Like the two other Khedive Loans, the Tribute Loan of 1871 offered a guarantee that had a peculiar status in international law. Unlike the loan of 1854 and 1855, this loan did not include any mention of the role of the British government, opening questions as to its relative standing (see Office of the Egyptian Tribute Bondholders League, 1876, p.11 ff).[113]

Summarizing, we have, a) The Loan of 1854 with British "recommendation" and the Egyptian Tribute as security; b) The Loan of 1855, with international guarantee along with Tribute and custom receivership enforceable by international action; c) The Loan of 1871, with only the Egyptian Tribute. As inspection of the parliamentary debates after the Turkish default suggests, there was a hierarchy in the British government mind, between the Loan of 1855 on the one hand, and the loans of 1854 and 1871 on the other hand.

A.2.11) Swedish 4% Mortgage Loan, 1852

We rank this loan (also loan as the "Provincial Loan") under Type II because the documentation speaks of the loan being backed by a registered mortgage and designates the

[110] Hansard, House of Lords, August 6, 1855, Column 1865.
[111] See Anderson (1964).
[112] The mechanism was the same as the one used before, that is, the interest and sinking fund was to be channeled through the Bank of England and from there paid to the bondholders via the intermediaries for the loan. The reason why there was a still room for using the Tribute was that it had been raised in 1866 to 150,000 purses or £705,000, after the Sultan "sold" to the Khedive of Egypt various privileges. After deducting the amount that was sent out for the service and amortization of the two previous loans, £422,000 remained as available balance, of which £399,000 were to be directed for the annuity of the new loan (£5,700,000 times 6 percent interest and 1 percent accumulative sinking fund = £399,000).
[113] Following the Ottoman default, efforts were made to secure the official support for this loan, through a parliamentary bill (see *Truth*, January 18, 1877).

district courts as the relevant legal venue. We were not able to secure detailed information on the legal significance of such mortgages before Swedish law and so the characterization remains tentative. While this loan is treated as a Type II in the baseline regression, we admit the possibility that it was a Type I and conduct robustness test below, estimating the model under the alternative sorting assumption.

A.2.12) Spanish Quicksilver Mortgage Loan, 5% 1870

This famous loan gave as collateral the quicksilver mines of Almaden, which belonged to the Spanish government.[114] It belongs to the Type II genus, because in the event of a Spanish default, Rothschilds, who acted as agents and trustees for the bondholders would have become receivers of the mines. As explained by Martín (1980) on the basis of the contract between the House of Rothschild and the Spanish government, which the prospectus only summarized, the loan and the security were to be "legally registered."[115] This harnessed the Spanish Law of 1861, which enabled to mortgage a designated physical property to secure lenders.[116] The security was inscribed in a publicly accessible national registry, preventing re-hypothecation of the security.[117] In case of non-performance, creditors owned the right, upheld by Spanish courts, to seize the asset. So, had the Spanish government missed a payment on the quicksilver loan, the House of Rothschild would have been able (in principle at least) to seize the mines of Almadén along with all the "machinery, buildings, works belonging to the Spanish State" which had been hypothecated too.

If the Spanish government had disputed the appropriation, it would have had to battle Rothschilds in Spanish courts. Possibly, the government would have been able to weigh on judges. On the other hand, Rothschilds, with many investments in the country and connections in the political and business elites, were themselves formidable adversaries (see López-Morell, 2016, p.179). In other words, the bankers certified the arrangement, which they could do either because they knew that the legal process was robust enough to protect them or because they were confident in their ability to litigate successfully. This provides an interpretation for why the Quicksilver loan of 1870 was spared when other Spanish loans were defaulted upon in 1872. This was also anticipated because the Quicksilver loan traded above other obligations.

[114] We are extremely grateful to Alberto Gamboa for help clarifying this entry. Compare Chabot and Santarosa (2017, p.32) saying that this loan "established the legal machinery to assure the mine's output was under the control of the bondholders." But the mechanism they describe ("legal difficulties selling quicksilver abroad") is the incorrect one hypothesized by Vizcarra in the case of guano. They also write incorrectly that mercury production was "hypothecated […] to the underwriters of the Quicksilver Loan", which is not true either. The underwriters (Rothschilds) were trustees not beneficiaries).

[115] The text of the contract with Rothschilds (Art. 1) began with declaring that the loan would be accounted for in the "Property Registry."

[116] For the text and a contemporary discussion of the Spanish law of 1861, see Pantoja and Lloret (1861).

[117] Indeed, the prospectus indicated that the loan was "secured by a mortgage deed legally registered at Madrid and Almadén; all the machinery, buildings, works, belonging to the State, forming part of the stated property, being hypothecated as well as the mines" (Quicksilver loan prospectus, *The Times*, May 31, 1870).

To sum up, while significant uncertainties must have existed, the quicksilver collateralization did create a genuine repossession mechanism. Comparing the yield on "secured" Spanish debt and on "risk-free" British Consols, we see a spread is 330 basis points (6.5% when British consols yielded about 3.2%). This is large but on the other hand, an even larger spread is observed if we now look at unsecured Spanish debt. For instance, the perpetual 3% 1869, yielded 9.70% at the time of the Quicksilver issue, a 640 basis points premium over consols.[118]

A.3) Hypothecations and Yield Behavior (Section VI)

A.3.1) Accounting for Type II Hypothecations

As indicated in the text, the benchmark estimates displayed in Table 5 ("Type I Hypothecations Helped Lower Cost of Debt for Risky Sovereign") were calculated while *excluding* Type II hypothecations. As we explained, the reason was that, because of their idiosyncratic features, Type II ran the risk of contaminating results and were accordingly excluded from the baseline. We now return to this important point, enriching the estimation of Equation (2) by taking them into account. That is, we used the same model as before (Eq. 2), but augmented it by including Type II hypothecations *and* controlling with a Type II effect.

Doing this is interesting in itself and as a robustness test, but it has another advantage: Injection of the Type II data in the regression analysis provides a way to increase the size of the sample used to identify the effect of Type I hypothecations. Indeed, some countries issued, say, Type I and Type II, but no unsecured bonds. The information in the corresponding bond prices was thus "thrown out" in the baseline model, while it can be exploited in the specification considered now. In addition, countries that issued Type II and non-hypothecated bonds, but no Type I now contribute to estimating Type I effects through estimation of Type II and the indirect bearing this has on the estimation of Type I effects. In practice, the number of individual spread observations belonging to countries serving to identify Type I rises from 192 (country FE) and 135 (country-time FE) to 311 and 296 respectively, while the number of bonds goes from 25 to 38. The additional observations come from Italy, Egypt, and Turkey. Moreover, the regression uses 60 observations from Type II bonds by Sweden and Spain, which only issue Type II and non-hypothecated bonds.

Turning to the anticipated effect of Type II bonds, remember that they operated as a mortgage, and so, if they were robust, we expect this to reduce the yields of bonds enjoying this security (compared to alternatives). In particular, a Type II hypothecation that would closely replicate the features of a genuine mortgage would be expected to reduce the yield

[118] On the capacity of such legal arrangements to protect against government predatory behavior, see Peña-Mir (2019).

below *both* unsecured loans and Type I loans (since the latter only have an informational value). In the case of the 1855 Turkish Bond, for instance, Al (2012) has shown that this was indeed the case: This bond traded much higher than other non-hypothecated loans.

In what follows, we estimate the impact of Type II hypothecations in the same model as before (Eq. 2). Results are shown in Table A.3.1. As for Type I, we control parametrically for the Type though of course, the effect of any individual Type II dispositive is expected different from the next (because they were very different from one another. The results imply three relevant facts: First the estimated Type I premium remains consistent across all specifications. If anything it shows a bit stronger than in the baseline (column (3) through (6), first line). Second, the Type II premium is large, ranging from 180 to 210 basis points: Bearing in mind that this is an *average* effect, such a large premium suggests that at least some of the 11 Type II bonds with usable yield observations were benefited by much lower yields (higher bond prices). The implied pecking order across instruments is the one which one would expect in view of our discussion: Other things being equal, and subject to feasibility constraint and other political opportunity costs, it was better from the vantage point of capital costs to have a Type I hypothecation than nothing, and better to have a Type II hypothecation than a Type I hypothecation.

[Table A.3.1 about here]

A.3.2) Estimating the Value of Type I Hypothecations: Alternative Method

Table 5's columns (3) through (6) display estimates of the Type I premium secured with the help of country fixed effects or country-time fixed effects. As explained, this strategy allowed us to identify the difference between the yield of Type I and non-hypothecated bonds for the same sovereign, or for the same sovereign at the same time. This is a powerful method but as it forces us to focus only on sovereigns that floated both types of bonds, a downside is that the Type I premium is identified over a subset of observations, throwing out valuable information. In particular, some countries that made an extensive use of hypothecations, like Peru, do not contribute to the econometric results because they never issued a non-hypothecated bond.

Here we consider an alternative strategy to estimate the effect of Type I hypothecations. It builds on the intuition that unobservable factors are essentially "country risk", itself captured by sovereign spreads. If we stack each country's average spread in a single variable, we can use it as a control for risk in place of one dummy variable per country, or country-time. Including this variable in a regression, we can then compare yields on Type I and non-hypothecated bond not only for those countries that issued both Type I and non-hypothecated bonds, but across different countries that have similar spreads and issued *either or both* Type I or non-hypothecated bonds. Such conditional comparison is arguably inferior in purity to the approach in the text. But it allows to use almost all observations in our dataset and it offers a way to test

the robustness of the effect we have detected. In particular, if the Type I premium estimated in Table 5 is just due to fixed effects imposed restrictions, we should expect this framework to return a very different estimate. But in fact we show that we can still identify a significant and negative Type I premium controlling for risk in this alternative way.[119]

[Table A.3.2 about here]

In Table A.3.2, column (1), we measure country risk with average volume-weighted spreads for each sovereign. We find that the yield on Type I bonds by countries with similar average yield-spreads stood at 71 basis points lower than their non-hypothecated counterpart. This number is to be compared to the result of the country fixed effect regression in Table 5, column (4). Performing this comparison, we see that the estimated premium is 30 basis points less than what obtained with country fixed effects, but still statistically and economically significant and well within the range of Table 5 estimates.

In column (2), we measure country risk, instead, with the lag of the average volume-weighted spread for each sovereign at each time. We document that the spread of Type Is issued by sovereigns whose average spread last year was similar was 55 basis points lower than equivalent non-hypothecated bonds. This number can be compared to the one obtained in the country-time fixed effect regression displayed in Table 5 column (6), and the two are almost identical.

Finally, to mitigate endogeneity concerns, we modify the risk measure in Table A.3.2 column (2) excluding for each bond-time observation, the lag spread of the same bond. We display the result in column (3). It shows that the spread of Type Is by sovereigns whose *other* bonds' spread last year was similar was 72 basis points lower than their non-hypothecated counterparts. This number should be compared to Table 5 column (6), and it is 30 basis points larger.

In conclusion, this alternative approach to measuring the Type I premium yields estimates that are economically and statistically significant and close in magnitude to what we find employing fixed effects methods. Which is, we have one more proof against our Table 5's results being due to sample selection or a small sample aberration.

A.3.3) Alternative Type II Allocations

In this final robustness exercise, we examine the sensitivity of our estimates to alternative

[119] This alternative control for risk implies that we compare bonds also across issuers. Though, riskier issuers are not only constrained through high yields, but also through shorter maturities and smaller loan volumes. For this reason, when we do away with fixed effects, having a complete array of controls is important to ensure a meaningful comparison of similar bonds. As a consequence, in Table A.3.2. we always include variables tracking the presence of project purpose in the prospectus, for the log of bond maturity and volume, for whether the underwriter is prestigious and whether the bond is a perpetuity.

definitions of what counts as Type I or Type II bond.[120] The coding of collateral clauses as Type I or II carries a degree of subjectivity because archival material has to be interpreted by the researcher. In this section we use again the Specification Curve and experiment with changes in allocations of Type I/Type II securities (Simonsohn, Simmons, and Nelson 2020). Specification Curves plot many estimates of the same parameter under alternative specifications and are a useful tool to distil the sensitivity of results to modelling choices. In what follows we use them to gauge the effect of re-allocating individual securities in the other group.[121]

Figure A.3.1 plots point estimates and confidence intervals for estimates of the effect of Type I hypothecations, always including all controls but modifying the sorting of bonds each time. At the bottom of the graph, we record with black dots allocation modifications. The Figure shows that results are robust to perturbations. Hypothecated bond spreads range at about 350 basis points above the average non-hypothecated bond yield. At the same time, we always detect a statistically and economically significant within-country Type I premium against non-hypothecated bonds of about 100 basis points.

[Figure A.3.1 about here]

[120] Robustness to clustering is "mechanical", thus we do not comment it, but we limit to notice that our standard errors do not change. We remind the reader that the baseline clustering scheme, marked as cy in Figure A.3.1 counts as belonging to the same cluster all observations belonging to bonds issued in the same year by the same sovereign, or issued in multiple years through multiple tranches of the same bond.

[121] The code employed to obtain the graphs builds on the code made available by Hans H. Sieversten at https://github.com/hhsievertsen/speccurve.

Table A.3.1

Inclusion of Type II Bonds Does Not Affect Results

Dependent Variable: Yield Spread

	(1)	(2)	(3)	(4)	(5)	(6)
Type I	4.431***	3.395***	-.8574**	-1.112**	-.6675**	-.9338**
	(3.54)	(2.99)	(-2.50)	(-2.42)	(-2.11)	(-2.27)
Type II	1.413	.8075	-2.016***	-2.303***	-1.833***	-2.123***
	(1.55)	(0.87)	(-3.81)	(-3.81)	(-3.31)	(-3.55)
Perpetuities	2.326**	4.084***	1.407**	2.258***	1.551**	2.353***
	(2.47)	(3.40)	(2.11)	(3.26)	(2.01)	(3.12)
Prestige	-.3783	-.3175	-1.744***	-1.728***	-1.776**	-1.776**
	(-0.33)	(-0.29)	(-2.67)	(-2.86)	(-2.30)	(-2.57)
Log of Volume		.0027		.166*		.1831**
		(0.01)		(1.68)		(2.04)
Log of Maturity		-1.929**		-.9508***		-.915***
		(-2.40)		(-3.71)		(-3.57)
Purpose		.7079		.4431**		.427*
		(0.92)		(2.01)		(1.73)
Year FE	Yes	Yes	Yes	Yes		
Country FE			Yes	Yes		
C.try*Y.r FE					Yes	Yes
Adj. R2	.2129	.2456	.7479	.7533	.9423	.9507
Observations	726	726	726	726	627	627
Type I Obs.			311	311	296	296

Note: The Table presents results from the estimation of Equation (2) adding back the observations due to Type II bonds, while singling them out with a Type II dummy. The first two columns present the results that only absorb common year fixed effects; the second two columns, add country fixed effects; the last two columns, absorb all country-year specific variation via country-year fixed effects. The last line (Type I Obs.) records the number of observations that identify the Type I parameter in the country and country-time fixed effects regressions. Namely, the number of observations belonging to countries floating both Type I and non-hypothecated bonds (column (3) and (4)), and those belonging to countries floating both Type I and non-hypothecated bonds at the same time (column (5) and (6)). Errors are clustered at the country-year of bond issuance level, with 91 country-year clusters over the first four columns and 82 country-year clusters over the last two columns; t-statistics are in parenthesis.

*p<0.1; **p<0.05; ***p<0.01

Table A.3.2

Alternative Controls for Country-Risk

Dependent Variable: Yield Spread

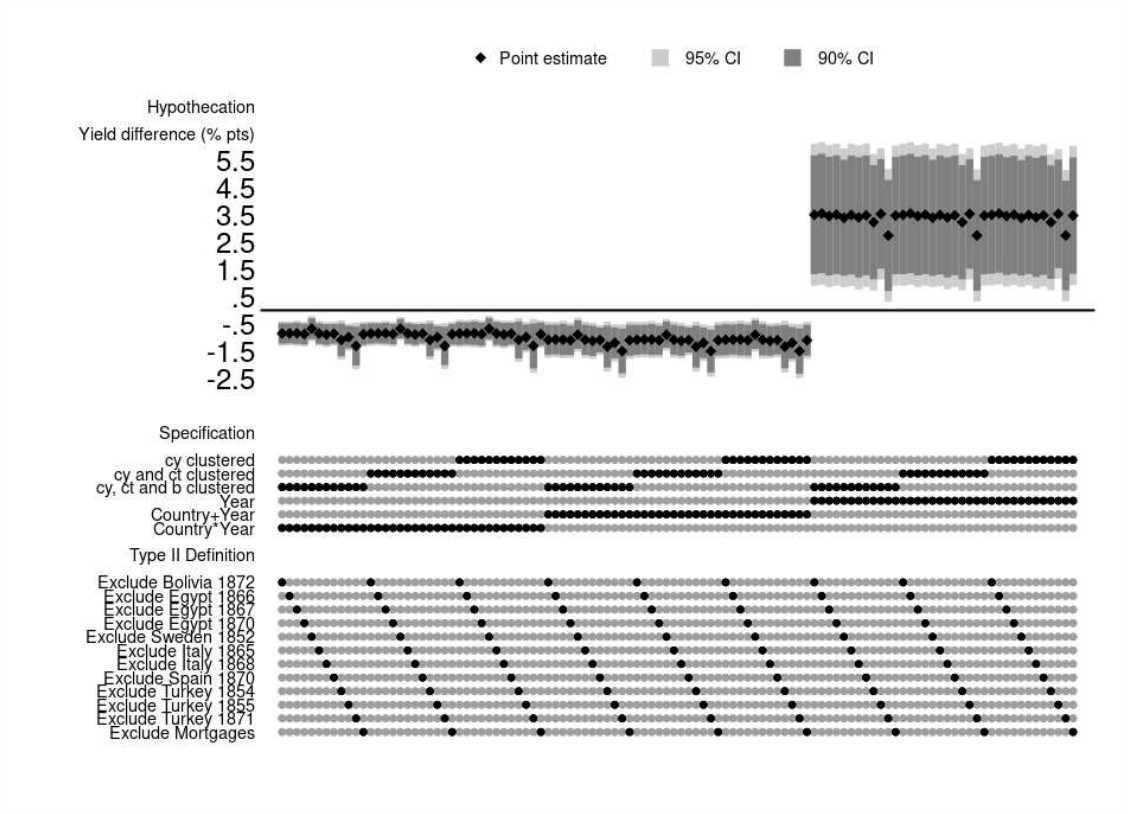
	(1)	(2)	(3)
Type I	-.7108**	-.5562*	-.7223**
	(-2.31)	(-1.94)	(-2.33)
Perpetuities	.628*	.476	.5293
	(1.75)	(1.38)	(1.38)
Log of Volume	.1225*	.1359*	.1874**
	(1.88)	(1.73)	(2.32)
Log of Maturity	-.5495***	-.7533***	-.7525***
	(-2.88)	(-3.93)	(-3.49)
Prestige	-.4786	-.4936	-.5735
	(-1.35)	(-1.34)	(-1.53)
Purpose	.3181**	.5033***	.5513***
	(2.24)	(2.90)	(2.84)
Vol. Wgt Yield $_{c}$	Yes		
Vol. Wgt Yield $_{c,t-1}$		Yes	
Adj. Vol. Wgt Yield $_{c,t-1}$			Yes
Year FE	Yes	Yes	Yes
Adj. R2	.7677	.9163	.9316
Observations	640	594	507

Note: The Table presents results from the estimation of Equation (2) controlling for country-risk with average yields instead of fixed effects. The first column presents the results that use the average country yield-spreads over the whole sample, in place of the country FEs; the second column employs the lag yearly averages of each country's bonds yield-spreads, in place of the country-year FE; the last column employs the lag of yearly averages of each country's bonds yield-spreads computed excluding each time the bond related to the *bcyt* observation, in place of the country-year FE. The number of observations changes across column-blocks with the risk proxy employed. It works as follows: When using sovereign average yield (column 1) all observations are included, as all such observations belong to sovereigns with more than one yield data recorded. When using the yearly lag of sovereign yield, we lose 46 observations (column 2). These observations are due to bonds belonging to sovereigns that lacked other priced bonds the year before. Finally, when computing yearly lag of sovereign yields excluding for each bond its own lagged data point, we lose 133 observations (column 5) due to bonds by sovereigns without at least two priced bonds last year. Errors are clustered at the country-year of bond issuance level.

*p<0.1; **p<0.05; ***p<0.01

Figure A.3.1

Specification Curve for Table 5 – Results are Robust to Type II Allocations



Note: The Figure presents a specification curve for the estimation of Type I hypothecation's effect on yield spreads in Equation (2). We record estimates as black diamonds and 95% confidence intervals as grey shaded areas. Black dots below the plot mark the combination of clustering scheme, fixed effect and definition of Type II hypothecations under which we obtain each estimate. Under "Specification", the first three lines record the clustering scheme. "cy clustered" stands for the country-year of issuance of the bond scheme we adopt in Table 5. "cy and ct clustered" stands for doubly clustered errors at the country-year of bond's issuance level, and at the country-year of yield observation's level. "cy, ct and b clustered" adds a further clustering layer at the bond level. The second three lines record the fixed effect scheme. A black dot to the right of "Year" signifies that we obtained the estimate only absorbing fixed effects for the year in which the yield spread observation was recorded; "Country + Year" that we absorbed country and year fixed effects separately; "Country*Year" that we absorbed joint country-year fixed effects. Under "Type II Definition", we record which bonds or group of bonds we stopped counting as a Type II. For example, a black dot to the right of "Exclude Italy 1868" implies that we did not count the Italian Tobacco loan as a Type II hypothecation, but only as a Type I. We thus only dropped observations relative to the other 10 Type II hypothecations with yield-spread observations and proceeded estimating Equation (2) including the Italian Tobacco bond's observations.

A.4) A list of all bonds we document

Table A.4.1
The Bond Sample

Bond	Hypothecation Status	Pledge	Yield Observations	Prospectus Source mm/dd/yyyy
Argentine 1866 I (First issue)	0		5	*Times*, 01/04/1866
Argentine 1868 II (Second issue of 1866)	0		8	*The London Standard*, 06/16/1868; *Times*, 06/16/1868
Argentine 1871 (6% Public Works)	1	Customs revenues	5	*The London Standard*, 04/03/1871 and 04/04/1871; *The Morning Post*, 04/03/1871 and 04/04/1871
Argentine 1872 a (7% Entre Rios)	1	Slaughterhouse tax revenues	4	*Times*, 01/24/1872
Argentine 1872 b (6% Hard dollar)	0		4	*Times*, 02/06/1872
Argentine 1873 (Buenos Ayres)	0		2	*Times*, 12/13/1873
Argentine 1874	0		0	*Times*, 07/27/1874; *The Globe*, 07/27/1874
Austria 1852 5%	0		6	*The Morning Chronicle*, 05/25/1852
Belgium 1874 (3% Public Works)	0		2	*The London Standard*, 03/06/1874
Bolivia 1872	1	Navigation company revenues	4	*Times*, 01/20/1872
Brazil 1852	0		12	*The London Daily News*, 08/02/1852; *The Manchester Courier,* 08/07/1852
Brazil 1858 (Imperial Brazilian 4.5%)	0		12	*The London Daily News*, 05/26/1858
Brazil 1860	0		12	*Times*, 03/21/1860
Brazil 1863	0		12	*Times*, 10/08/1863
Brazil 1865	0		11	*Times*, 09/14/1865
Brazil 1871	0		5	*Times*, 02/24/1871
Brazil 1875	0		1	*Times*, 01/20/1875
Chile 1858	1	Railway shares	12	*The London Daily News*, 11/26/1858
Chile 1866 (A&B)	1	Tobacco monopoly's revenues	2	*The London Standard*, 02/27/1866; *The Morning Post*, 02/28/1866; *Times*, 02/28/1866
Chile 1867 A	1	Custom revenues	9	*Times*, 01/17/1867 and 01/18/1867
Chile 1867 B	0		9	*Times*, 06/29/1867
Chile 1870	1	Railway and its revenues	6	*Times,* 01/31/1870
Chile 1873	1	Railway	3	*Times,* 03/29/1873
Chile 1875	1	Railway	1	*Times,* 04/02/1875

Colombia 1863 (New Grenada)	1	Salt mine's revenues and railway	12	*The Morning Post*, 09/22/1863
Costa Rica 1871 I	1	Custom revenues	5	*Times,* 05/09/1871
Costa Rica 1872	1	Tobacco monopoly and railway's revenues, plus revenues from liquor and coffee taxes	4	*Times,* 05/04/1872
Denmark 1849 5%	1	Land tax revenues	0	Fenn (1855)
Denmark 1850 5%	1	Land tax revenues	0	*The London Standard*, 03/18/1850
Denmark 1863 (A.B.C.)	0		11	*The London (Evening) Standard,* 02/26/1863*; Times,* 02/27/1863
Denmark 1864 (A.B.C.)	0		11	*Times,* 01/13/1864; *The London Standard*, 01/13/1864; Fenn (1869)
Denmark 1864 (Debentures)	1	Denmark-Russia's treaty sound due's revenues	11	*Times,* 11/30/1864
Egypt 1862 a II	1	Revenues of the Delta	12	*Times,* 08/01/1862
Egypt 1862 b I	1	Revenues of the Delta	12	*Times,* 04/07/1862
Egypt 1864	1	Revenues of the Provinces of Dokahlieh, Oharkieh, and Behera	12	*Times,* 11/15/1864
Egypt 1866 a (Railway Debentures)	1	Railway revenues	8	*Times,* 01/17/1866 and 01/18/1866
Egypt 1866 b (Viceroy Ismael Pasha)	1	Part of Ismael Pasha's private estate	10	*Times,* 03/21/1866
Egypt 1867 (Viceroy Mustapha Pascha's)	1	Titles of government properties	8	*Times,* 11/21/1867
Egypt 1868	1	Salt, fish, and locks monopolies' revenues; custom revenues; lesser cattles, oil manufacture and government properties.	8	*Times,* 07/16/1868
Egypt 1870 (Daira Sanieh)	1	Khedive estates' revenues and land	6	*Times,* 04/26/1870
Egypt 1873	1	Railway revenues; land tax revenues; personal tax revenues	3	*Times,* 07/26/1873
European Commission of the Danube 1869	1	Danube navigation tolls	0	*The London Standard*, 03/08/1869
France 1870	0		5	*Times,* 10/25/1870
France 1871	0		5	*Times,* 06/28/1871
France 1872	0		4	*Times,* 07/27/1872
Germany 1870	0		1	*Times,* 12/14/1870
Germany 1871 (Second emission)	0		1	*Times,* 01/26/1871
Guatemala 1869	1	Custom revenues	7	*Times,* 04/05/1869
Honduras 1867 (Railway loan)	1	Railway revenues; railway shares	8	*Times,* 11/11/1867
Honduras 1870 (Railway loan)	1	Railway revenues; railway	6	*Times,* 06/21/1870
Hungary 1872	0		0	*Pall Mall Gazette,* 01/02/1872; *Times,* 01/02/1872

Hungary 1873 (Government loan)	0		3	*Times,* 01/21/1873
Hungary 1873 (Treasury Bond)	1	State domain and revenues from their sale	2	*The London Standard,* 12/11/1873
Italy 1851 (Sardinian 5%)	1	Railway	12	*The Morning Post*, 07/01/1851
Italy 1862 (Maremmana Railway)	1	Railway and its revenues	12	*The Morning Chronicle*, 02/20/1862; *Times*, 02/20/1862
Italy 1863 (5% Rentes)	0		12	*Times*, 03/17/1863
Italy 1865 (State-Domain)	1	State domain and revenues from their sale	11	*Times*, 01/17/1865
Italy 1868 Tobacco	1	Tobacco monopoly's revenues	8	*The London Standard*, 10/06/1868; *The Globe*, 10/07/1868
Italy 1869 (Anglo-Italian)	0		0	*Times*, 10/09/1869
Japan 1870 (Customs loan)	1	Custom and railway revenues	6	*Times*, 04/26/1870
Japan 1873	1	Rice	3	*Times*, 01/14/1873
Liberia 1871	1	Custom revenues	5	*Times*, 08/08/1871
Mexico 1864 (Anglo-French)	1		12	*Times*, 04/12/1864
Morrocco 1862 (Imperial Moorish)	1	Custom revenues	12	*The Morning Post*, 01/13/1862
Paraguay 1871 (Public Works)	1	Custom revenues; state lands; railway	5	*Times*, 11/23/1871
Paraguay 1872 (Public Works)	1	State land	4	*The London Standard*, 06/01/1872
Peru 1853 4.5%	1	Guano revenues	0	Fenn (1855)
Peru 1862	1	Guano revenues	6	*Times*, 01/08/1862
Peru 1865 (Consolidates 5%)	1	Guano revenues; guano reserves	8	*Times*, 02/23/1865
Peru 1870	1	Guano and custom revenues; State land; railway	6	*Times*, 06/04/1870
Peru 1872	1	Guano revenues; railway; guano reserves	4	*Times*, 03/20/1872
Portugal 1862	0		12	*Times*, 07/21/1862
Portugal 1867	0		8	*Times*, 12/19/1867
Portugal 1869	0		7	*Times*, 11/03/1869
Romania 1864 (Danubian)	1	Custom revenues	12	*Times*, 11/28/1864
Romania 1867 (Danubian)	1	Custom revenues; land revenues	8	*Times*, 02/20/1867
Russia 1850 4.5%	0		12	*The Morning Chronicle*, 01/15/1850
Russia 1859 (Imperial Russian)	0		12	Fenn (1869)
Russia 1860	0		12	*Times*, 06/26/1860
Russia 1862	0		12	*Times*, 04/29/1862; *The Morning Post*, 04/29/1862
Russia 1864 (Anglo-Dutch)	0		12	*Times*, 04/19/1864
Russia 1866 (Anglo-Dutch)	0		10	*Times*, 11/19/1866; *The London (Evening) Standard*, 11/20/1866
Russia 1869 (Government)	0		6	*Times*, 04/13/1869
Russia 1870	0		6	*Times*, 01/26/1870
Russia 1871	0		5	*Times*, 03/09/1871
Russia 1872 (consolidated)	0		4	*Times*, 03/20/1872

Russia 1873 (consolidated)	0		3	*Times*, 11/28/1873
Russia 1875	0		1	*Times*, 04/13/1875
San Domingo 1869	1	Revenues from coal, guano and mahogany monopolies.	7	*Times*, 07/27/1869
Spain 1869 (Dollar)	0		7	*Times*, 04/22/1869; *The London Standard*, 04/22/1869
Spain 1870 (Quicksilver Mortgage)	1	Mercury mines' and their revenues	6	*Times*, 05/31/1870
Spain 1871 (Consolidated External debt)	0		4	*The Morning Post*, 09/01/1871
Spain 1872 (Consolidated External debt)	0		4	*Times*, 12/10/1872
Sweden 1852 (4% Mortgage Loan)	1	Mortgage of Gothenburg's estates	4	*The Evening Mail,* 10/04/1852; *The Shipping and Mercantile Gazette,* 10/05/1852; *The London Daily News*, 10/06/1852
Sweden 1864	0		8	*Times*, 04/12/1864
Sweden 1868	0		8	*Times*, 07/13/1868; *The London Standard*, 07/13/1868
Sweden 1875	0		0	*Times*, 06/28/1875
Turkey 1854 (6%)	1	Egyptian tribute	12	Fenn (1855); *The London Daily News*, 08/12/1854 and 08/15/1854; *Times*, 08/16/1854; *The Morning Advertiser*, 08/17/1854
Turkey 1855 (4% Guaranteed)	1	Egyptian tribute	12	Ayres (1857); *The Evening Mail,* 08/13/1855; *The London Daily News*, 08/16/1855
Turkey 1858 I (Imperial 6%)	1	External and internal (octroi) custom revenues	12	*The London Daily News*, 08/30/1858;
Turkey 1858 II (Imperial 6%)	1	External and Internal custom revenues (octrois)	12	*The London Daily News*, 10/06/1858
Turkey 1859 (Imperial 6%) (III 1858)	1	External and Internal custom revenues (octrois)	0	*The London Daily News*, 12/06/1859
Turkey 1862	1	Tobacco and salt monopolies' revenues, plus stamp and licenses' revenues	12	*The Morning Post*, 03/25/1862; *Times*, 03/25/1862
Turkey 1865	1	Items previously pledged plus a special reserve fund	10	*Times*, 05/01/1865
Turkey 1869	1	Danube, Adrianople, Salonique's tithes; revenues from a sheep tax	6	*The London Standard*, 03/04/1869
Turkey 1869 (Treasury bond)	1	Aleppo and Adana, Syria, Janina, Trebizond, Koulah, Archipelago, Hudavindiguar,	0	

		Bosnia (except Yeni Bazar), Aidin and Menteche's tithes; surplus from sheep taxes; Bagdad's revenues		*The London Standard*, 12/14/1869
Turkey 1871 (Egyptain Tribute Loan)	1	Egyptian tribute	5	*Times*, 09/05/1871
Turkey 1872 (A.B.C.)	1	Danube, Adrianople, Salonique, Anatolia's tithes	3	*The Belfast News-Letter*, 06/06/1872
Turkey 1873	1	Tobacco monopoly's revenues	2	*Times*, 10/8/1873
Turkey 1874 (General debt)	0		1	*Times*, 09/16/1874
Uruguay 1864 (Montevideo - European loan)	1	Custom revenues	7	*Times*, 12/12/1864
Uruguay 1871	1	Custom revenues	5	*Times*, 10/21/1871
Venezuela 1862	1	Custom revenues	12	*The Morning Post*, 08/01/1862
Venezuela 1864	1	Custom revenues	12	*Times*, 04/07/1864

Source: Authors, from sources marked in Table. Note: The reference for the prospectus in the media or in investors' handbook is given to the reader for ease of reference as it can be easily retrieved from conventional newspaper databases. In practice additional documentation was typically secured.

Appendix References

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