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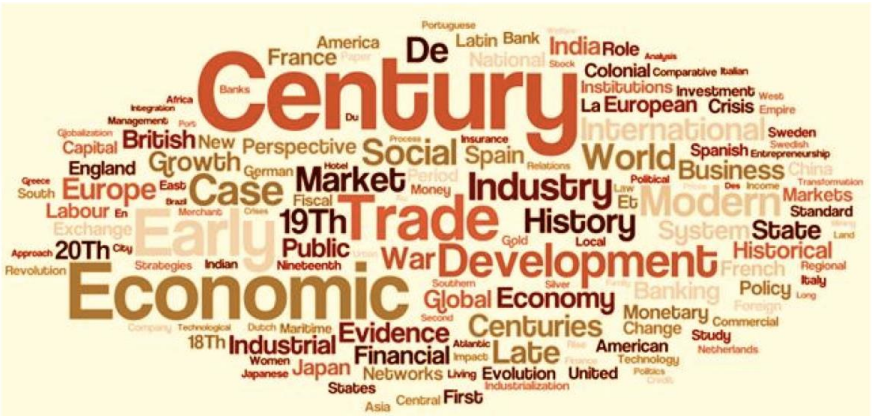

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New Paradigms and Old Promises: Central Banks and the Market for Sovereign Debt in the Interwar Period[◊]

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Abstract

This paper analyses the motives behind the establishment of central banks during the interwar period. We argue that most governments with difficulties in accessing financial markets established central banks, as this was a general recommendation provided by contemporary money doctors. However, even if central banks served to facilitate the issue of foreign loans on the New York financial market, we find that governments with central banks did not obtain more favorable terms for those loans. Our analysis further demonstrates that investors concentrated on macroeconomic achievements such as inflation and monetary stability, and whether a lender-of-last resort facility existed, regardless of whether or not this was pursued by a central bank.

Codes JEL: N00, N1, N20, E50, H63
Keywords: money doctors, central banking, great depression, sovereign debt.

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Introduction

Central banks count among the institutions that are most constantly under severe scrutiny, particularly during financial crises. Their work occasionally triggers negative overreactions in the public opinion given their general lack of transparency and the technical nature of their business. In the most extreme cases, there are economists who are not even convinced of their usefulness. Historically speaking, there is a long-dated, passionate debate on the conveniences and disadvantages of having a public institution, rather than a set of private actors, that concentrate many of the most relevant and sensitive tasks of an economy, including note-issuing, financial regulation, monetary policy and ultimate liquidity provision to financial entities. As we now know, previous disagreements among policy-makers have led to a persistent transformation of central banks. Their present duties have been successively acquired along with our own understanding of the meaning of modern central banking (Capie et al. 1994; Singleton 2010; Ugolini 2017).

Given the uniqueness of the central banks' role in their national economies, and the controversies that they have continuously generated, it is no wonder that while the first central banks have a long history, their emergence worldwide is a rather recent phenomenon, taking place mostly during the long 20th century (Capie et al. 1994). The apparent benefits of central banks for financial development has been downplayed by many economists because successful cases of monetary stability, crisis management and financial development were achieved in the absence of central banks in certain countries such as Australia, Canada, Scotland, Switzerland and the US (Dowd 1992).[1] A main implication stemming from these historical cases is that alternative models of monetary and financial management may appear and endure in contexts of high economic growth.[2]

On the contrary, economists and economic historians who disregard free banking experiences argue that such banking frameworks behaved rather poorly in terms of monetary and financial stability, which condemned them to disappear (Sechrest, 1988; Carr and Mathewson, 1988; Cowen and Kroszner,

[1] (Goodhart 1988) provides a brief summary on the works that stress the US experience with free banking from a positive perspective.
[2] See Smith (1936) for a discussion on the emergence of central banking in Europe and the US. The Austrian school has persistently advocated for market solutions as explained in Ugolini (2017).

1989; Sechrest, 2008). The Federal Reserve was thus established in 1913, partly as a response to the 1907 crisis, even though this type of institutional shift was undertaken in other countries more than a decade later.[3] Overall, the interwar years witnessed the big bang of central banks. While in 1910 its total number was 20, this figure more than doubled in 1940, and did not stop increasing during the whole twentieth century (161 in 1990).[4] The reasons for this sudden and general transition are rather puzzling if we focus on the history of economic ideas, as opinions in the 1920s on the advantages of central banks remained strongly divided. The assessments on the functions and targets attributed to these new institutions were still largely eclectic.[5]

This paper analyzes the motives for the establishment of central banks during the interwar period. From our perspective, while in the 1930s central banks were established in response to the effects of the Great Depression, a major force behind the wave of new central banks during the 1920s were financial markets. With the end of World War I, the restoration of international trade and the reconstruction of the productive basis of formerly belligerent countries emerged as the main tasks for economists and policy-makers. A main condition to meet this target, as perceived by contemporaries, was the restoration of the pre-war gold standard regime, which would end with the prevailing monetary chaos. The immediate task for governments around the globe was to establish independent and autonomous central banks. The "Brussels consensus", an informal agreement that served as a roadmap of recommendations to achieve these goals, was the result of the 1920 international conference between governments and private agents. The Genoa conference that followed in 1922 further consolidated the will of several policy-makers to expand the number of central banks worldwide, a framework that would enhance international cooperation and facilitate the introduction of an international gold-standard regime.[6]

Adopting this new paradigm required a set of government initiatives in countries where either central banks were absent, or where a commercial bank had assumed the role of a government bank,

[3] On the history of the Federal Reserve, see Bordo and Roberds (2013).
[4] Figures from Capie et al. (1994).
[5] An overview on this debate and its link with the currency vs banking school controversy, see Schwartz (1989).
[6] See Sayers (1976), Fior (2008), Decorzant (2011).

being granted certain privileges and exclusive rights. The transition could therefore be accompanied by a set of adjustments that could damage the interests of privileged banks or social groups that may have benefited from their proximity to these financial intermediaries. While certain countries may have hesitated to implement the necessary reforms, a further, almost infallible incentive to establish central banks, were capital markets. As international investment recovered, governments seeking for external funds would be prone to embrace the remedy proposed. Moreover, the very laudable "Lords of Finance", Benjamin Strong at the Federal Reserve of New York and Montagu Norman at the Bank of England, were confirmed believers in the benefits of central banks. As a result, the stabilization programs that they promoted in the world (mainly in Central and Eastern Europe, but also in certain countries in Africa, Latin America and Asia) all foresaw, as a preliminary condition for financial support, the establishment of central banks or the reconversion of government banks in the countries in which such institutions already operated. Other "missionaries of the world", "money doctors", or merely underwriting banks — be it Princeton's Professor Edwin Kemmerer, the League of Nations or JP Morgan— strongly encouraged the authorities of countries in which they intervened to adopt this principle of good monetary management.

Therefore, the establishment of a central bank was perceived as a main requisite to access international financial markets. An additional and relevant question, to which this paper aims to respond, is whether adopting a central bank had an impact on the terms of the loans contracted by foreign governments in New York, as such a consensus would have implied. We provide empirical evidence that demonstrates that financial markets predictably reacted positively to the announcements of the foundation of new central banks, although the reaction was less consistent than the one expected after such a "consensus policy" was implemented. Moreover, when we analyze access market conditions, we do not observe any difference between countries with and without central banks. Our analysis shows that governments from countries where money doctors intervened also established central banks with a higher degree of autonomy than in most other countries in our sample. However, the conditions attached to their loans remained less advantageous. On the contrary, markets seem to have differentiated countries with and without market mechanisms or institutions (central banks or others) that acted as lenders of last resort. This would imply that, while the functions that would be today pursued by central

banks were considered relevant, investors were indifferent as to whether central banks were in control.

This paper is organized as follows. We first provide a brief historical overview on the relationship between foreign advising, central banks' foundations and external borrowing. We then test whether financial markets reacted positively to the news of the establishment of central banks, and whether this reassessment had a long-term effect. For this we pursue a set of structural break tests on the series of government bond spreads quoted on the New York Stock Exchange. In certain cases, we observe a decline in the spreads, though only occasionally significant and persistent. Thereafter, we pursue an econometric analysis of the factors that determined the borrowing costs for countries accessing financial markets. Our results demonstrate that the presence of a central bank did not have a significant impact on borrowing costs, while, on the contrary, the presence of a money doctor consistently augmented the cost of the new loans. However, investors seem to be highly sensitive to outcomes in terms of inflation and exchange rate stability, but also on whether a lender of last resort mechanism existed, regardless of whether this was pursued by a central bank. We discuss these results in a final, concluding section.

Money doctors and the Big Bang of central banking

In the aftermath of World War I, several initiatives were discussed through which international cooperation intended to restore economic activity. Some of these initiatives were discussed in a conference in Brussels organized by the newly formed League of Nations. It gathered technical experts from several countries to agree on certain common principles and produce a set of recommendations on economic policies. A main result from the conference was the formation of the Economic and Financial Committees of the League of Nations, which later adopted the Brussels resolutions in their operative procedures to support countries in financial distress. Among these resolutions, the establishment of central banks of issue was recommended, and if foreign capital was required, “some form of international control might be necessary” (League of Nations, 1920).

Obviously, this general communiqué counted in gaining the support of certain discrete yet well-known actors that promoted the establishment of central banks. Sayers (1976) provides a detailed

description on how Montagu Norman perceived “effective central banking” and how central banks could cooperate. The issue of “formal autonomy and substantial independence” was considered a key aspect and had received considerable support among other central bankers since the early 1920s. These principles (cooperation between central banks and autonomy) were further accepted in international documents and were later embodied in the statutes of the central banks established under the reconstruction schemes sponsored by the League of Nations (Sayers, 1976:159).[7]

Another principle directly related to reserves management and the operation of the international gold standard was ”exclusiveness”, meaning that central banks could only establish relationships with other central banks. Smith (1936) had identified international monetary cooperation as the main reason in that period for the establishment of central banks. Therefore it was expected that the newly established central banks would open an account with one of the “gold centres”, the Bank of England or the Federal Reserve of New York, as this was perceived as a key element for the well-functioning of the gold exchange standard (Cottrell, 1997). Furthermore, following the report that emanated from the Genoa conference, central banks could also utilize "approved assets” as gold reserves (foreign exchange, in practice being mainly sterling pounds and dollars) thereby coordinating and centralizing the demand for gold.[8]

While the League of Nations became very active in Central and Eastern Europe in the 1920s, other money doctors had already become important actors in colonies and sovereign countries around the world. In Latin America, money doctors had been very active since the 19th century and the experiences of foreign advising in the 1920s would lead to a wave of new central banks. Drake's (1994) account on the advent of central banks in the Andean countries wonders how countries with different problems all adopted the same economic models as dictated by Edwin Walter Kemmerer, then the most active American money doctor, and suggests that the main incentive for governments in those countries was to attract foreign investment, as had been recognized by Kemmerer himself.[9] Drake (1994) further

[7] The Genoa conference of 1922 served as the forum to formalize the general principles of central banking and international cooperation. See Cottrell (1997) and (Decorzant 2011).
[8] A recent discussion of reserve management by contemporary central banks can be found in Eichengreen and Flandreau (2014)
[9] Edwin Kemmerer had also been very active in the debate on the establishment of the Federal Reserve in the US. On the intellectual history of E. Kemmerer see Gomez Betancourt (2008).

humorously depicted the ”Kemmerer model” as a common receipt that could have been mailed to those interested if monetary technology was all that policy-makers needed.

For different reasons, Kemmerer was invited to several countries around the world. According to Eichengreen (1994), Kemmerer evoked the "desire to attract American capital”, along with "the presumption that the US was not looking for political aggrandizement” and "the expansion and prosperity of the American economy” as the three reasons for which Latin American countries strongly solicited the advice of North American financial experts. Díaz Fuentes and Marichal (1999) suggest that this framework led to the appearance of central banks in Latin America. In contrast to most cases in Europe, these authors identify political factors and the economic climate of the 1920s as the main reasons behind the wave of new central banks. While there was an evolutionary path in the formation of central banks in Europe, this was a rather sudden institutional innovation in the Americas (Marichal, 2007).

In Tables 1 and 2 we have summarized certain features of the central banks founded during the interwar period.[10] Table 1 shows the dates of the enactment laws, the official name of each bank and the name and nationality of the foreign advisors in each case. Table 1 provides certain preliminary hints on the relevance of financial markets on government's decisions to establish these new institutions, as we show below.

<Table 1 around here>

a) National origin of the money doctor. A first feature in Table 1 concerns the identity of the money doctors. It confirms the obvious fact that European countries, British colonies and British dominions received assessment from British money doctors, while American citizens were mainly active in Latin America. Economic, political and geographic factors may explain this fact. The upsurge of foreign investment from Britain, Continental Europe and the US also led to a geographical division of the work undertaken by money doctors. In certain regions, nevertheless, this distribution was still disputed in the 1920s. According to Sayers (1976), during that period there were several financial

[10] Table 1 excludes cases in which State Banks were reformed to become central banks, such as Austria, Bulgaria and Egypt. These cases are included and enumerated in Table 8.2 in Schenk and Straumann (2016). We did not include Brazil because the mission led by Otto Niemeyer, while recommending the establishment of a central bank, did not lead to its foundation and the country continued operating without one until 1964.

missions from the Bank of England to Latin America, many of them also encouraging the formation of central banks. This is at odds with the fact that, by that time, Latin America had become a main destination of capital invested from the US during the 1920s (Lewis 1938; Drake 1989; Bértola and Ocampo 2013). However, British predominance during the 19th century had some lasting effects in the interwar period. Abreu and Souza (2011) argue that in 1930, Brazil and Argentina still had a low share of dollar loans in their total foreign debt stock. Furthermore, other Latin American governments sought to reinforce their economic relations with Britain, which was still considered as the alternative to the increasingly closed US market during the 1930s.

b) Level of autonomy. The presence of a money doctor guaranteed that the new central bank adhered to the principles to which creditor central bankers, underwriting banks and policy makers had agreed in Brussels and Genoa,. A main principle was the level of autonomy that central banks were expected to adopt to be able to conduct a sound economic policy. The last column of Table 1 shows an autonomy index estimated by Dehay and Levy (2000) for the countries that were included in their sample. This index is based on the legal status of a certain number of central banks and considers the legal capacity of each central bank to independently decide on its own management, its policy formulation and whether external limitations on lending existed.

Even if the number of banks analysed by Dehay and Levy is limited as compared to the total number of existing central banks, the figures that they obtain show that the index is relatively high (i.e. highly autonomous) for countries having established a central bank with the presence of a money doctor. Peru shows the highest value of this index (0.84) once it was reformed under the advice of Kemmerer in 1931. A similar case can be found with Poland, where the autonomy index of its first central bank is one of the lowest of the table. Its level of autonomy improved under the reforms promoted by Kemmerer in 1927. In the case of Turkey, the presence of different foreign advisors did not prevent the government from establishing a central bank with a modest level of autonomy according to the Dehay-Levy index. This may be related to the timing of its foundation, as by 1930 capital markets were already difficult to access. We return to this point below.

In general terms, Dehay and Levy's index confirms the fact that the central banks established in the 1920s adopted a higher level of legal independence than those established before and after that

decade. This was particularly the case for those central banks founded under the auspices of money doctors.[11] According to the observations in Dehay and Levy's sample (not shown in Table 1), the central banks with the highest levels of independence during those years were: Switzerland (0.87), Ireland (0.73), Peru (0.73), Bulgaria (0.70), Austria (0.72) and Hungary (0.69). From this group of countries, money doctors had been absent in Switzerland, Ireland and Czechoslovakia, while only the Swiss and the Irish central banks were established before the interwar period. In the Irish case however, the Bank adopted a set of reforms in the 1920s, adopting a more autonomous framework. The particularity of this period is that the average level of central banks' legal independence had risen since 1918 (first year analyzed by Dehay and Levy), while after 1934 there is a slight decline that continues until 1938 (last year included in the analysis).

As we show below, the evolution identified in terms of the autonomy levels of newly established central banks suggests that its peak in the 1920s was closely interlinked with sovereign debt markets. For governments willing to access foreign capital markets, it was not sufficient to found a central bank. Money doctors and underwriting banks strongly advocated for their independence, and this can be best illustrated by the Polish case. The Bank of Poland was first established in 1924, but the autonomy of the Bank was severely constrained by the government. With the continuous decline of the zloty and the necessity for a new foreign loan, Poland solicited the presence of Edwin Kemmerer, who recommended a set of reforms that included granting more autonomy to the central bank (Smith, 1936). Also in these reforms, the presence of a permanent foreign advisor to the board of the bank was a condition further requested by underwriting banks. While the government first opposed these measures, it finally accepted the conditions in October 1927 and issued the loan two weeks later (Rosenberg, 1999: 180; Peterecz, 2013:243).

<Table 2 around here>

c) Timing of foreign loans. Table 2 presents a relevant feature that relates the emergence of central banks and capital markets. We have listed the government loans (national or provincial) issued

[11] Abreu and Souza (2011) utilize the methodology introduced by Grilli et al. (1991) to measure the level of autonomy of the central banks as designed by the proposals of Niemeyer in Brazil and Kemmerer in Chile in the 1920s. They estimate a score of 12 out of 16 points, while the Bank of England obtained 13 points. The authors also measured a score of 11 for the central bank approved in New Zealand in 1933 and 10 for Argentina in 1935.

in the aftermath of the foundation of each central bank during the 1920s. In most cases, the time span between the enacting law of the new institutions and the issuing of new loans was less than a year. Furthermore, governments issued at least one new loan during the year that followed, the two notable exceptions being Mexico and Ecuador.[12] In both cases, however, governments attempted but failed to borrow in the financial market of New York. The main reason was the inability of both governments to resume debt service from previous defaults. In the case of Mexico, the government actively sought to obtain a foreign loan, but was unable to bypass the impediment it faced in obtaining diplomatic recognition from the US government. During those years, Mexico's post-revolutionary regime was still very unstable, and this constituted a major obstacle to reach an agreement with investors in its defaulted public debt. Interestingly, the funds that the government had saved from the resumption of debt service along with a successful issue of an internal loan, allowed the government to pursue its project. Not unexpectedly, this central bank also diverged from the Genoa principles, as its degree of autonomy from the state was rather low.[13]

The case of Ecuador resembles its Mexican counterpart, even though the role of the money doctor was more relevant. Once the mission headed by Kemmerer published a favorable report on the country's economy in 1927, Kemmerer himself strongly encouraged the US government to support the issue of a new loan, arguing that Ecuador's government had even accepted the permanent presence of foreign advisers for the management of budgetary and monetary policies. The U.S. State Department strongly opposed any new loan in the 1920s. Even so, Ecuador's government managed to contract a small advance from a Swedish Match Company in March 1927, just after the Central Bank was established and with the active intermediation of Kemmerer.[14]

Notwithstanding these two exceptions, we can still assert that the link between sovereign debt markets and money doctoring experienced a historical height during the 1920s and this strongly contributed to the foundation of new central banks. Furthermore, even for countries that decided not to

[12] Eichengreen (1994: 120) tests the mean's differences between the volumes of foreign loans in the two and three years before and after Kemmer's visits in South America. He finds that these differences are only significant for long-term national loans.
[13] On this episode see Zebadúa (1994) and Oñate (2000).
[14] Drake (1989:164), Rosenberg (1999:221) and Pineo (2010:98).

appeal to a money doctor, establishing a central bank could provide a signaling effect on the commitment of a government for a policy change contributing to monetary stability. This institutional reform was particularly relevant for countries with difficulties in accessing capital markets. As shown in Tables 1 and 2, Czechoslovakia appears as the sole country that founded a central bank without a money doctor, even if the country suffered tense economic conditions in the early 1920s. However, the resulting Czech National Bank mirrored to a large extent the structure and statutes of the recently reformed central bank of Austria, which had been accomplished with the support of the League of Nations (Schubert 1999). Without the insistence and international visibility of a money doctor, the Czechoslovakian government took a longer time to establish its central bank than its Austrian or Hungarian counterparts. Finally, and as we may have assumed, the government issued a foreign loan some months after the foundation of the central bank. Contemporaries perceived, nevertheless, that the loan's price had been expensive.[15]

d) The effects of the Great Depression. The arrival of the Great Depression and the impossibility of accessing capital markets had strong effects on this process of money doctoring. Without the promise of new foreign loans, money doctors could be safely ignored and the prescribed medicine discarded. However, the breakdown of the system still lagged a couple of years behind the onset of the crisis. The cases of Turkey, Peru and Brazil provide illustrative examples. The Turkish government initially invited Kemmerer in 1924. However, due to several factors, the government ended requesting the services of G.Vissering from the Central Bank of Netherlands and close ties with Kemmerer and Norman in 1928. Trask (1964) argues that the Turkish government sought (but failed to obtain) a foreign loan in the US in 1930, the same year when the central bank was established.

In Peru, the government reformed its central bank in 1931 as suggested by Kemmerer. It also accepted the presence of permanent foreign advisors (to the Ministry of Finance and the central bank), but they were marginalized when it became clear that no loan would be issued (Rosenberg, 1999). In the case of Brazil, a country that is strikingly absent from Tables 1 and 2, the original project in the early 1920s was to establish a central bank intended to reform the Banco do Brasil, which operated as a

[15] Karel Englis, former Finance Minister and second Bank governor complained a decade later (Englis, 1937). Eichengreen (1994) argues that money doctors served more generally to boost foreign investment and to lower the costs of foreign loans. We analyze this issue in the last section.

government bank. The British money doctor Edwin Montagu was called but his recommendations failed to be implemented, as the government was unable to secure a loan from London. Again, in 1931, Otto Niemeyer insisted on the necessity of either converting the Banco do Brasil into a formal and independent central bank, or establishing a new and privately-owned central bank. Finally, with the perceived impossibility of accessing international capital markets, Brazil definitively rejected the idea.[16]

This transition from the boom to the bust phases of the lending cycle had further consequences on the features of the central banks established and on their monetary policies. During the 1920s, the establishment of a central bank, though important, was only one of a set of general principles on the management of economic policy. This step was expected to be followed by the type of monetary policy that would lead to the adoption of a gold standard regime. The sequence of events obviously shifted in the 1930s. In fact, the central banks founded after 1930 —and also those established in the 1940s— commenced to diverge from the Genoa principles to the extent that governments were obliged to step in through a more active management of their economies. In particular, the international context of the 1930s rapidly imposed new restrictions after the collapse of the gold standard, the impossibility of accessing international capital markets and the fall of international trade and its effects on public revenue. Money doctoring, though still present, was more cautious about its proposals, if not openly reluctant to prescribe the recurrent medicine in vogue some years before. Hermann Max, a German and Chilean professor who advised countries in Central America and Venezuela in the late 1930s and early 1940s, was very critical of the gold standard regime (Helleiner, 2014).[17]

How did financial markets welcome new central banks?

A point of departure to quantify the relevance of financial markets on governments' decisions to found a central bank is to analyze the performance of their bond prices in secondary market prices. For countries suffering difficulties in accessing capital markets, the roadmap was straightforward. A money

[16] Moreover, the press strongly criticized Niemeyer's project, disqualifying as unrealistic his proposal to establish a "colonial type bank". See for instance *Journal do Commercio*, *Retrospecto Commercial*, 1931.
[17] While Congdon (2007) considers that central banking's supposed Keynesian shift in the 1940s is a misstatement, Singleton (2011) situates the "first central banking revolution" during those years, in which the institutional arrangements changed to allow for more joint work between governments and central banks.

doctor would be called in, policy reforms would follow and a foreign loan would be issued. If this route was accompanied by an increase in bond prices, the incentive to contemporary policy-makers from borrowing countries could be easily grasped. Establishing a central bank and adhering to the Brussels consensus was seen as a rational decision that could serve to attract foreign investment and lower borrowing costs. Moreover, the declining risk perception related to the presence of money doctors may have nourished the desire of other countries to follow the same model, expanding thereby the demand for foreign advisors and increasing the number of central banks worldwide. We would expect therefore that money doctoring and new central banks would trigger a downward effect on risk premia.[18] Flores Zendejas and Decorzant (2016) show precisely that, similar to the debated IMF-effect on foreign investment, the adoption of League of Nations' stabilization plans was consistently correlated with increases in bond prices. However, Abreu and Souza (2011) utilize a regime change analysis for Argentina, Brazil and Chile and show that the presence of money doctors in those countries did not have any significant impact on secondary market bond spreads.

While the mere presence of a money doctor could have had an influence on country risk indicators on its own, other subsequent effects may have followed with the introduction of new economic policies. Therefore, testing the effects of money doctoring on country risk should differentiate those stemming from the credibility gains of the announcement of a new economic regime and those resulting from its actual implementation. The constitution and design of a central bank or the adoption of the gold standard belong to the policies of the new regime. Furthermore, isolating each individual effect on bond prices permits us also to capture the different dynamics in place in the two decades analyzed.

Finally, and as we described in the previous section, the narrative "money doctor—new central bank – foreign loan" suffered a major impact with the onset of the 1929 financial crisis. Money doctors, while still active, lost influence on the economic policies of the countries that they visited. Therefore, we would expect that the new economic policies, including new central banks, should have lost credibility. As a result, the effects on bond prices should be less relevant than during the 1920s.

[18] See Eichengreen (1989) for an analysis of the Kemmerer missions.

A first anecdotal case is Poland. As mentioned above, the first tentative effort to introduce a new fiscal and monetary regime was pursued after a period of hyperinflation, when the new central bank was established in January 1924 and the new currency (the zloty) tied to gold. The fixed parity lasted about one year, and, after a continuous loss of reserves by its central bank, the zloty was allowed to fluctuate. Even if the government had been able to secure different loans from foreign markets, access to this source of finance became increasing difficult given the continuous political and economic crisis and the consequent rise in the risk premia of Polish government bonds (Pease, 1986). The banks that had underwritten the first Polish loan issued in New York strongly encouraged the government to appeal to a money doctor. Kemmerer arrived in June 1926, and among the recommendations issued after his mission, there were a set of fiscal and monetary reforms that included a reorganization and introduction of new statutes for the central bank. The reform also modified the minimum required reserve ratio and provided more autonomy to the institution.

Figure 1 shows the evolution of the spreads of the Polish government bonds quoted on the NYSE. The upward trend observed during 1925 and early 1926 suddenly reverses at the time of the coup d'état of May. This sudden decline precedes the announcement of Kemmerer's arrival. A second strong decline roughly coincides with the adoption of the new reserves ratio (monetary issue had to be backed by a 37.5% ratio to gold reserves). By the time the new central bank was finally founded in October, the risk premium had already stabilized around two per cent below its peak of six percent. Overall, the Polish case shows that the change in the political regime was the most relevant event that led to the decline in the spreads, while Kemmerer's visit and the implementation of the reforms only consolidated the downward trend.

<Figure 1 around here>

A deeper and systematic analysis on the effects of money doctoring and of the foundation of new central banks can be pursued through structural break tests. We used bonds' secondary market prices and calculated their respective spreads (measured as the difference between the yield of each bond and the yield of the US Treasury bond). The observations are monthly and our sample covers the period from 1923 to 1935. We have included in our analysis the cases of governments with bonds quoted on

the New York Stock Exchange who established a new central bank.[19] These countries were Argentina, Canada, Bolivia, Chile, Colombia, Czechoslovakia, Greece and El Salvador. Other than the cases of Argentina, Canada and El Salvador, central banks were established in the 1920s, before the onset of the Great Depression.

To know whether structural breaks are present in our data, we perform a Bai-Perron test for multiple breaks. Bai and Perron (1998) and Bai and Perron (2003) generalized the test originally proposed by Andrews (1993), allowing multiple unknown structural changes in a linear model. An advantage of this kind of test is that there is no need to predefine the number of breaks nor the dates on which the breaks occur.[20] Here we test for the presence of changes in the mean of the series such that we employ a constant as a regressor. We chose a trim-rate of 15% so that we can perform the test allowing up to 5 breaks. This rate guarantees that each "regime" has at least 15% of the observations.

Table 3 summarizes the tests' estimates. For each country we performed the test using all available data. The results indicate that we cannot reject the presence of at least two breaks in the mean of the series at a 5 percent confidence level. According to the F-statistics, Chile and Greece's spreads present two breaks; Bolivia, Canada, and El Salvador three; Colombia and Czechoslovakia four; and Argentina five. Figures 2 to 8 show the spreads of the countries included in the analysis, as well as the structural break dates obtained by the Bai-Perron test, the averages for each regime, and the date of establishment of each central bank. The vertical line represents the foundation of the central banks. For visual purposes, the regimes of each country are presented either in a logarithmic scale, or divided into two sub-periods.

While structural break dates do not coincide with the establishment of the central banks, we find that for most of the countries the spreads fell after the establishment of the central bank, regardless of whether this was before or after 1929. Spreads decreased for Argentina, Colombia, Czechoslovakia, El

[19] The prices of these bonds were kindly communicated by Marc Flandreau. The loans included were the following: Argentina: 1926 6 percent external loan; Bolivia: 1927 7 percent external loan; Canada: Canada Dominion 4 percent bonds; Chile: External 7 percent loan; Colombia: 5 year external gold notes at 6.5 percent until 1927; then 6% 1927; Czechoslovakia: 8% 1922; El Salvador: 1923 8 percent external loan; Greece: 7% 1924 external loan.

[20] The algorithm developed by Bai and Perron (2003) selects sequentially a model up to l+1 breaks when the sum of squared residuals is sufficiently small compared with the sum of residuals of the model with l break. Put differently, it first compares a model without breaks (l=0) versus a model with 1 break (l+1=1). Then, if the statistic indicates that the sum of squared errors of the model with 1 break is sufficiently small, the next step is to test a model with 1 break (l=1) vs a model with two breaks (l+1=2), the process repeats until the sum of squared errors of model with l+1 breaks is not sufficiently small.

Salvador, and Greece. Spreads around the dates in which central banks are established are nevertheless below the average level within the respective regime. For these countries, however, the subsequent regime (i.e. the regime that follows the central banks' foundations) also presents higher spreads.[21]

How could we interpret these results? The narrative on a central bank's foundation differs for each country. Therefore, the dates identified in the structural break tests may not coincide with the news communicated to investors. A review of the press from London and New York permits us to test whether news on central banks coincided with structural breaks and, more generally, with major changes in the risk premia. We present a summary of the main articles published in Table 4 and the behavior of the risk premia at the end of the day as reported in the press. Interestingly, the coverage given by the press to the new central banks varied considerably. We found hardly any news on Bolivia, while Canada attracted a lot of attention. Even then, spreads only barely reacted. This striking fact may lead us to think that the establishment of a central bank may not have been the only element on which investors were focusing. So for instance, in the case of Canada, Bordo and Redish (1987) argued that already in the early 20th century, all elements of traditional central banking were undertaken either by private institutions or by the government. According to these authors, the establishment of the central bank responded to political expediency that aimed at influencing the general perception of the government's proactivity against the effects of the Great Depression, rather than to banking or monetary needs.

Financial Market access: did central banks matter?

In this section we provide a detailed analysis on the macro and microeconomic factors behind the borrowing costs paid by governments seeking access to the capital market of New York during the 1920s. While several papers have previously analyzed the determinants of risk premia in the secondary market, we have followed a different perspective by focusing on the primary market. Looking at the precise costs at which governments issue new loans allows us to obtain a precise measure on the advantages of having a central bank, controlling for other variables, the identity of the country and the

[21] In Argentina, we cannot know whether spread increased or decreased in the next regime because the central bank foundation took place in May of 1935, and we used the data until November of that year.

presence of a money doctor. Moreover, we replicate to a certain extent the approach by Flandreau, Gaillard and Panizza (2010), which has also looked at the primary market, and has emphasized and included the role of underwriters' market shares and the possibility of conflicts of interest among commercial banks. Nevertheless, these authors do not consider the institutional framework of a country as a main determinant of borrowing costs. We test whether institutions, money doctors and central banks directly or indirectly affected spreads at issue, as suggested by contemporaries. The model specification is the following:

$$spread_t = f\left(\sum_{i=1}^{k} \beta_i X_t\right) + u_t$$

Where the dependent variable is the spread at issue for each loan for country *i* during the years 1922-1929. The first set of regressions tests the effect that having a central bank has on risk premia controlling for macroeconomic factors. The variables that we introduced in the vector X_t include monetary variables (inflation, depreciation rate, a gold standard dummy variable and a ratio of gold reserves to monetary issue) and those related to public finances (ratios of deficit and debt service to public revenue).[22] We have also added a central bank dummy variable (1 for countries with central banks, 0 otherwise). We also differentiate between seasoned and new borrowers. Seasoned borrowers are defined as the governments that had issued a loan in New York before the period under study, or whose bonds issued in Europe had been cross-listed in the Stock Exchange of New York. We expect them to issue loans at a lower spread than new borrowers. Finally, we have introduced the identity of the underwriting bank, as specified by its market share, to control for the potential certification effect as specified in Flandreau, Gaillard and Panizza (2010).[23]

A summary of the results is shown in Table 5. The results regarding the macroeconomic controls correspond roughly with our expectations, though none of them was consistently significant. Table 5 shows the relevance of microeconomic variables, including the underwriter's market share and whether the borrower is seasoned. Most importantly for our purposes, the central bank dummy variable does not

[22] For James (1992), public deficits were the main factor behind the changes in spreads in the interwar period. On precise sources and definitions of each variable, see the Appendix.
[23] We have also included an investment bank dummy variable to test for conflicts of interest among commercial banks, but excluded them given the lack of relevant results.

appear as an important factor driving spreads, and its sign is even contrary to what might have been expected. In other words, the results from this first set of regressions suggest that the existence of central banks did not lower the costs of governments' new loans.

Nevertheless, while the regressions from Table 5 lead us to be skeptical about the role of central banks in shaping investors' perceptions, it is difficult to draw any definitive conclusions. A closer look at the data, and on the features of each central bank, could provide a different outlook. Central banks were designed differently in each country, and their performance could have been strongly conditioned by the country's particular institutional settings or by government's particular preferences and abilities to exert pressure on new central banks. Moreover, central banks established in a distant past could have developed a record that was more or less positive, and this could have also conditioned the expectancy on that bank's future performance. Tackling these issues may be a necessary step to elucidate the link between the existence of a central bank and a government's borrowing costs.

In Figure 9 we provide an initial insight on third factors affecting these links. We have plotted an "Autonomy" indicator on the X-axis and the spreads at issue on the Y-axis. The indicator we use is the one constructed by Dehay and Lévy (2000), whose ranking goes from 0 to 1, defined as less to more independent.[24] Figure 9 shows that there was a group of countries with a higher degree of legal independence and higher level of spreads at issue.[25] This group of countries, which we have represented in red, were those where a money doctor had participated in the establishment (or reform) of a central bank. As mentioned before, the general practice of foreign advisors was to emphasize the importance of having a central bank free from political intervention. Hence, the statutes of the new central banks were designed accordingly. We can observe in Figure 9 that their level of legal autonomy was higher than the sample's average, and also compared to countries that had a longer tradition of central banking, such as France or Japan. Differentiating these two groups of countries (with or without a money doctor) allows us to separate the link between autonomy and spreads, with governments with higher autonomy of their central banks having lower borrowing costs.

[24] These authors also construct an indicator based on the central banks' turnover, which they define as a de facto independence indicator. Given the fact that this is an ex post measure of independence, which contemporary investors could not assess, we have excluded it from our analysis.

[25] Below we call this indicator an "autonomy" indicator, which in the strict sense of the word differs from independence, though it is useful to differentiate from a second indicator utilized in a further analysis.

Table 6 summarizes the main results considering the general level of autonomy, and controlling for the presence of a money doctor and for institutional quality. The sample of countries for which the indicator is available and that were active in the financial market of New York is considerably reduced. However, we can still observe that the result for the variable autonomy is expectedly negative and significant. Table 6 confirms that higher autonomy levels lowered the spreads at issue. Moreover, there is a general improvement in the reported results regarding the macroeconomic variables, mainly for the depreciation and the deficit estimates. We have also analyzed the importance of the general institutional framework, for which we utilized the Polity2 variable from the Polity IV dataset. Its relevance is equally validated by the results. Finally, we have included a dummy variable for the countries with money doctors. Table 5 reports a "limited" money doctor variable, including only countries where the League of Nations intervened.[26] Given the monitoring task pursued by the League, we have decided to drop the underwriter variable, as financial intermediaries were also expected to monitor the economic performance of borrowing countries, a task that was highly valued as shown by its importance on the pricing of government loans. Interestingly, this variable enters the regression with a positive and significant parameter, demonstrating that the League (and other money doctors) facilitated market access but did not necessarily diminish borrowing costs.

In order to broaden our sample, we have included a second indicator of central bank independence. This indicator was constructed by Michael Bordo who utilizes a dummy variable for countries with independent central banks. A main drawback of this indicator is that it is considerably less precise than the one constructed by Dehay and Levy (2000). It does not allow us to differentiate between countries without a central bank and countries with one although not independent. Nevertheless, this indicator does provide information on whether a central bank with the features promoted by the Brussels consensus helped countries diminish their borrowing costs.

We have further included a dummy variable on whether the country possessed a formalized mechanism of lending of last resort. This function was not generally recognized in many of the central banks' statutes as it could have been in conflict with the main mandate, which was to preserve the value

[26] We also included a wide money doctor variable including countries where Kemmerer served as the money doctor. No major differences were observed, but results can be provided upon request.

of the currency. However, an institution acting as a lender of last resort could have had an impact on spreads given its capacity to prevent banking crises, a major risk to the economy and to a government's capacity for repayment. A main contradiction emerges because central banks did not systematically act as lenders of last resort, while other institutions and governments did. In the 19th century, for instance, the US had the New York Clearing House which could issue clearing house certificates and suspend convertibility during banking panics. However, in the early 1930s, the FED faced a massive banking crisis and as a result, one third of US banks failed. Bordo and Redisch (2005) have remarked that, on the contrary, Canada, which by then had no central bank but a clearing house that operated by an association of the chartered banks, had no banking failures.

The results are shown in Table 7. We have included the variables of central bank independence (CBI) and the variable of lender of last resort (LLR). While the sign of the estimated parameters for CBI corresponds to our expectations, its significance is negligible. On the contrary, the variable LLR is systematically significant and has a negative sign. This is an interesting result given its general implications on the functions of central banking and its impact on default risk. The existence of an LLR mechanism could act as a banking crisis prevention device, which could have broader positive effects on the economy and a government's fiscal position. However, whether it was a central bank that acted as LLR was irrelevant. We have utilized an interaction variable in column 4, CB LLR, which is a dummy for countries whose LLR was its central variable. While the negative sign holds, it is not significant. Finally, Table 6 reports both definitions of money doctors, with MoneyDoctor all including governments from countries where either the League of Nations or Kemmerer intervened. We do not observe any major differences between them, and they are all moderately positive and significant, as we had previously estimated.

Robustness check

Our results may depend upon the macroeconomic conditions that led certain countries to establish a central bank. Countries that achieved a certain level of macroeconomic stability are expected to be more likely to establish a central bank and issue a foreign loan, leading to a situation in which the application of the classical regression models on this sample of countries does not guarantee consistent

unbiased estimations of the parameters. The kind of bias is called in the literature as sample selection bias.

In order to address this issue, we first elaborated a balance table, or difference-in-means table (Table 8). It allows us to conduct data analysis and explore the differences between two groups. It also permits us to test whether the macroeconomic context of countries with and without a central bank was different in the year when the government issued a bond. The third column shows whether there is a statistically significant difference between the means of each variable. The two groups are statistically different in their average gold reserves, depreciation rate, debt service to revenue and in the spreads. However, the significance of these differences is variable, suggesting that the main results obtained above may not be conditional upon these differences.

Table 9 summarizes the results using a Heckman Sample Selection Correction method (henceforth Heckit model). The Heckit model is a generalization of a Tobit model and it is widely used to correct the bias caused due to an individual's decision to participate in the sample ((J. Heckman 1976; J. J. Heckman 1979). It involves the simultaneous estimation of two multiple regression models. Whereas one model is used to examine the substantive question of interest, the other (i.e., the selection model) is used to detect selection bias and to statistically correct the substantive model for selection bias (Cameron and Trivedi 2005).

The model behind Table 9 assumes that the spread at issue is the dependent variable. The variables used in the selection model are those that may have conditioned the establishment of a central bank. The selection equation should contain at least one variable that is not in the outcome equation. We included those variables that allow us to compare the results from the previous section, but also those variables that permit us to distinguish countries with and without central bank according to the balance table (Table 8). The reported results for the spread equations are interpreted exactly as if we observed the spread data for all countries in the sample. The coefficients refer to the marginal effects of the regressors in the underlying regression equation. By default, the model presents the Wald test that all parameters in the regression equation are zero, which in our case is rejected. We considered two set of variables in the selection model and did not find a consistent set of results to explain whether a central bank is established in the country; nevertheless, the effects of the macroeconomic variables on spreads

were not substantially different. Interestingly the variable on money doctors showed a persistent and significant positive effect on spreads.

Conclusions

The general consensus on the convenience of establishing central banks in order to conduct an orthodox and efficient monetary policy was rapidly embraced by governments worldwide in the interwar period. Supporters of this paradigm, who consistently criticized the more liberal free banking setting in many 19th century economies, applauded this intellectual victory. However, a more pragmatic initiative was pulling the strings. International capital markets became the underlying force behind the wave of new central banks that emerged in the interwar period. Previous works that looked at the political economy of central bank emergence in the 1920s were mainly concentrated on national experiences. Some of them included external factors, such as the promise of securing new loans, as a key incentive to have governments claim that central banks would provide definite solutions to currency instability. This paper is the first to quantify and qualify the idea that central banks served to facilitate financial market access under favorable borrowing conditions.

In a sense, the results of our investigation should not be very surprising, as they are dependent upon the fact that new central banks and money doctoring went hand in hand. Money doctors were specialized in assessing borrowers that were by definition the riskiest in the market for sovereign debt. Furthermore, as we now know, the interwar monetary record (in terms of currency and banking crises) of countries having founded a central bank was not necessarily more satisfactory than countries where central banks were absent. The capacity of interwar central banks to act as lenders of last resort under the gold standard was limited due to potential contradictions with the monetary regime, as the sterling crisis of 1931 or the painful Credit Anstalt banking panic showed. Contemporaries were certainly aware of these fragilities, the more so for countries that had historically suffered from monetary instability and were more prone to default on debt denominated in foreign currency.

Hence, our results suggest that there were no contradictions between contemporary perceptions on what central banks were capable (or incapable) of doing and what they effectively did during and after the

Great Depression. Governments willing to raise a loan in New York did not obtain lower borrowing costs simply by establishing a central bank. Several subtleties were considered, such as the legal independence or the more general institutional setting, two factors driving spreads at issue. The existence of an LLR could be relevant to investors, independently of whether it was pursued by a central bank. This confirms previous comparisons of cases, such as the US and Canada, where a central bank (in the US) did not deter banking crises from happening, whereas Canada's more robust banking structure did. These different settings would then have broader consequences on their economies, and therefore, on the costs related to public debt.

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Tables and Figures

Table 1. Establishment of central banks

Enactment Law	Country	Name	Foreign Advisor	Nationality of Foreign Advisor	Dehay and Levy Independence Index
30.06.1921	South Africa	South Africa Reserve Bank	Sir Harry Strakosch	Great Britain	0.63
09.03.1922	Peru	Banco de Reserva del Perú /	None	-	0.73
Reformed 03.09.1931		Banco Central de Reserva del Perú	Edwin Walter Kemmerer	US	0.82
11.07.1923	Colombia	Banco de la República de Colombia	Edwin Walter Kemmerer	US	NA
20.01.1924	Poland	Bank of Poland	None	-	0.48
Reformed 13.10.1927			Edwin Walter Kemmerer	US	0.56
24.05.1924	Hungary	National Bank of Hungary	League of Nations	International / Great Britain	0.69
07.01.1925	Mexico	Banco de Mexico	Inspired by E.W. Kemmerer	US	0.64
23.05.1925	Czechoslovakia	National Bank of Czechoslovakia	None	-	0.62
22.08.1925	Chile	Banco Central de Chile	Edwin Walter Kemmerer	US	NA
30.06.1926	Guatemala	Banco de Guatemala	Edwin Walter Kemmerer	US	NA
04.03.1927	Ecuador	Banco Central de Ecuador	Edwin Walter Kemmerer	US	NA
07.12.1927	Greece	Bank of Greece	League of Nations	International / Great Britain	NA
19.07.1928	Bolivia	Banco central de Bolivia	Edwin Walter Kemmerer	US	NA
11.06.1930	Turkey	Central Bank of the Republic of Turkey	Gerard Vissering /Leon Morf	Netherlands / Switzerland	0.49
06.03.1934	India	India Reserve Bank of India	Hilton Young Commission	Great Britain	NA
19.06.1934	El Salvador	Banco Central de Reserva de El Salvador	Frederick Francis Joseph Powell	Great Britain	NA
03.07.1934	Canada	Bank of Canada	Sir Charles Addis	Great Britain	NA
27.11.1933	New Zealand	Reserve Bank of New Zealand	Otto Niemeyer	Great Britain	NA
28.05.1935	Argentina	Banco Central de la República Argentina	Otto Niemeyer (add note)	Great Britain	NA
05.11.1936	Costa Rica	Banco Nacional de Costa Rica	Hermann Max	Chile	NA
08.07.1939	Venezuela	Banco Central de Venezuela	Hermann Max	Chile	NA

Source: South Africa: (Bordiss 2014; Padayachee and Bordiss 2015); Peru: (Salinas 2011); Colombia: (Banco de la República 1990); Poland: (Von Thadden 1995); Hungary: (Peterecz 2013); Mexico: (Nodari 2019); Czechoslovakia: (Köhler-Baur 2010); Chile: (Corbo and Hernández 1997); Guatemala: (Dosal 1995); Ecuador: (Almeida 1994); Greece: (Christodoulaki and Penzer 2004); Bolivia: (Drake 1989); India: (Reserve Bank of India 2005); El Salvador: (Aufricht 1961); Canada: (Dumett 1999); New Zealand: (Hawke 1973); Argentina: (Lorenzutti 1996); Costa Rica: (Corte Suprema de Justicia 2000); Venezuela: (Crazut 1970).

Table 2. Central banks and foreign loans

Date - Enactment Law	Country	Date of first arrival of Foreign Advisor	External loans during same year or one after establishment of Central Bank	Place of issue	Date of issue
30.06.1921	South Africa	January 1920	South Africa Consolidated 6 per cent	London	November 1921
09.03.1922	Peru	-	Peru Ext. 1922	New York	July 22
11.07.1923	Colombia	March 1923	City of Medellin; City of Bogotá	New York	June and October, 1924
20.01.1924	Poland	-	Poland Ext 1925	New York	February 1925
24.05.1924	Hungary	November 1923	Hungary 1924	International issue	July 1924
13.10.1927	Poland	June 1926	Poland Ext 1927	New York	October 1927
07.01.1925	Mexico	July 1917	None	None	
23.05.1925	Czechoslovakia	-	Czechoslovakia Ext. loan 1925	New York	October 1925
22.08.1925	Chile	July 1925	Chile Ext. loan	New York	October 1926
30.06.1926	Guatemala	June 1924	Guatemala External loan 1927	New York	May 1927
04.03.1927	Ecuador	October 1926	None	None	
07.12.1927	Greece	15 June 1927	Greece Stab & Refugee 1928	International issue	January 1928
19.07.1928	Bolivia	March 1927	Bolivia Ext. 1928	New York	September 1928

Source: Same as Table 1. Dates and Figures on loans were kindly provided by Norbert Gaillard.

Table 3. Multiple breakpoint tests

Country	# Breaks	Break Test	F-statistic	Critical value	Country	# Breaks	Break Test	F-statistic	Critical value
Argentina	5 breaks	*1931M04, 1933M12, 1929M11, 1924M12*			**Colombia**	4 breaks	*1931M09, 1929M11, 1927M01, 1925M03*		
154 obs		0 vs 1 *	115.26	8.58	153 obs		0 vs 1 *	483.16	8.58
		1 vs 2 *	108.72	10.13			1 vs 2 *	75.51	10.13
		2 vs 3 *	23.1	11.14			2 vs 3 *	149.47	11.14
		3 vs 4 *	35.41	11.83			3 vs 4 *	14.82	11.83
		4 vs 5 *	39.88	12.25			4 vs 5	1.35	12.25
Bolivia	3 breaks	*1931M09, 1929M10, 1925M08*			**Czechoslovakia**	3 breaks	*1931M09, 1930M09, 1927M02*		
154 obs		0 vs 1 *	498.35	8.58	123 obs		0 vs 1 *	225.53	8.58
		1 vs 2 *	14.08	10.13			1 vs 2 *	11.08	10.13
		2 vs 3 *	105.49	11.14			2 vs 3 *	15.02	11.14
		3 vs 4	1.15	11.83			3 vs 4	49.6	11.83
							4 vs 5	0	12.25
Canada	3 breaks	*1926M12, 1924M12, 1931M05*			**El Salvador**	3 breaks	*1931M09, 1930M03, 1927M02*		
154 obs		0 vs 1 *	375.1	8.58	123 obs		0 vs 1 *	166.87	8.58
		1 vs 2 *	78.11	10.13			1 vs 2 *	15.54	10.13
		2 vs 3 *	62.99	11.14			2 vs 3 *	12.54	11.14
		3 vs 4	10	11.83			3 vs 4	10.33	11.83
Chile	2 breaks	*1931M12, 1933M12*			**Greece**	2 breaks	*1932M03, 1934M01*		
154 obs		0 vs 1 *	278.32	8.58	132 obs		0 vs 1 *	428.96	8.58
		1 vs 2 *	17.88	10.13			1 vs 2 *	19	10.13
		2 vs 3	7.68	11.14			2 vs 3	5.27	11.14

Source: Authors' own estimations. */ Significant at the 0.05 level.

Table 4. Central Banks – press reports and spreads' changes

Country	Date	Title	Source	Absolute change in spreads (basis points)
Argentina				
	January 15, 1935	Central Bank for Argentina	[Times]	27
	January 18, 1935	Argentina plans a CB	[NYT]	27
	March 3, 1935	Argentina adopts new bank system	[NYT]	6
	March 23, 1935	Central Bank for Argentina	[FT]	6
	March 23, 1935	Argentina revises financial system	[NYT]	6
	April 23, 1935	Argentine Central Bank	[WSJ]	-13
	May 1, 1935	Ernesto Bosch heads new Argentina Bank	[NYT]	3
	June 7, 1935	Central Bank opened	[NYT]	-10
	September 5, 1935	Bank of Argentina holds reserve ratio	[NYT]	-9
	October 10, 1935	Bank of Argentina reports for month	[NYT]	-8
	November 29, 1935	Argentine Gold Reserves Drop to 143.8%	[WSJ]	-6
	December 9, 1935	Argentina Sells to Banks Series of Short-Term Notes	[WSJ]	0
	December 10, 1935	Central Bank of Argentina Holds Less Gold Abroad	[WSJ]	0
	December 26, 1935	Argentine Reserve Ratio Up	[WSJ]	0
Bolivia				
	August 28, 1928	Bolivia to return to gold standard	[WSJ]	-11
	November 22, 1928	Bolivia Studies Central Banking	[WSJ]	7
	December 24, 1928	Central Bank for Bolivia urged	[NYT]	15
Canada				
	January 26, 1934	New Legislation in Canada.	[Times]	1
	February 6, 1934	Central Bank for Canada.	[Times]	11
	February 23, 1934	The Bank of Canada	[FT]	11
	February 27, 1934	Canada's Central Bank	[FT]	11
	February 23, 1934	Canada to have a CB	[NYT]	11
	February 25, 1934	A Canadian CB	[NYT]	11
	March 10, 1934	Central Bank for Canada.	[Times]	3
	March 26, 1934	Canada's Central Bank	[FT]	3
	June 6, 1934	For Canada taking bank gold	[WSJ]	0
	June 13, 1934	Canada's Elastic Currency System	[FT]	0
	June 23, 1934	"Canada's Central Bank."	[FT]	0
	June 26, 1934	Canada rejects gold basis bank	[NYT]	0
	July 11, 1934	Canada CB to open about Jan.1	[NYT]	4
	September 7, 1934	Canada picks head for CB	[NYT]	-8
	September 8, 1934	Central Bank of Canada	[WSJ]	-8
	September 11, 1934	Canadian Banking: G. T. Towers, Appointed Governor of New Central Bank,	[WSJ]	-8
	September 14, 1934	Banker to be powerful	[WSJ]	-8
	September 17, 1934	Canadian Central Bank Offer	[WSJ]	-8
	September 18, 1934	Many in Canada seek CB stock	[NYT]	-8
	October 17, 1934	Canadian Bank delayed	[NYT]	8
	October 27, 1934	Canadian Central Bank Offer	[WSJ]	8
	December 14, 1934	Bank of Canada	[WSJ]	5
	December 30, 1934	Bank of Canada to open March 1	[NYT]	5
Chile				
	January 1, 1925	Chile plans CB	[NYT]	-11
	May 18, 1925	Chile's National Finances	[Times]	8
	June 5, 1925	Banco De Chile	[Times]	8
	July 6, 1925	Finances of Chile	[FT]	7
	August 24, 1925	Central Bank for Chile	[Times]	-14
	September 29, 1925	Chile's New Central Bank	[WSJ]	3
	December 3, 1925	Chile Central Bank	[FT]	8
Colombia				
	February 10, 1923	The Republic of Colombia	[Times]	
	May 26, 1923	Colombian Congress called	[WSJ]	-5
	August 15, 1923	Colombian currency is both gold and paper	[WSJ]	-13
	August 25, 1923	Fiscal plan for Colombia	[NYT]	-13
	October 11, 1923	Americans reform Colombian finances	[WSJ]	-20
	October 16, 1923	Colombian Situation Better	[WSJ]	-20

Czechoslovakia				
	February 13, 1925	Communique from League	[NYT]	5
	March 21, 1925	Bank of issue for Czecho-Slovakia	[WSJ]	3
	September 6, 1925	Czechoslovakia plans a new bank	[NYT]	0
	November 10, 1925	Capital of new institution oversubscribed	[FT]	1
El Salvador				
	June 28, 1934	Salvador bank officers named	[NYT]	7
	July 4, 1934	Salvador shifts funds	[NYT]	207
	October 11, 1934	Salvador engages Reich expert	[NYT]	20
Greece				
	September 3, 1927	National Bank of Greece	[FT]	0
	September 6, 1927	Refinancing Greece	[FT]	0
	September 13, 1927	Greece & the League	[FT]	0
	December 22, 1927	Ionian Bank	[Times/ FT]	-2

Sources: Wall Street Journal, Times, Financial Times, New York Times.

Table 5. Central Bank and spreads at issue

	(1)	(2)	(3)	(4)
Deficit	0.372	0.334	0.195	0.137
	(1.12)	(0.89)	(0.53)	(0.41)
Inflation	1.206	1.167	2.133**	1.876*
	(1.53)	(1.25)	(2.76)	(2.66)
Depreciation	0.742	0.729		
	(0.58)	(0.55)		
Central Bank	0.217	0.317	0.197	0.138
	(0.91)	(1.26)	(1.08)	(0.72)
MajorUnderw	-0.724***	-0.569*	-0.470*	-0.466*
	(-3.54)	(-2.15)	(-2.22)	(-2.18)
Gold			-0.459*	-0.607**
			(-2.03)	(-2.92)
Seasoned			-1.117***	-1.125***
			(-4.35)	(-5.02)
Reserves				-0.194
				(-0.37)
Constant	3.436***	2.965***	4.069***	4.136***
	(12.06)	(4.43)	(7.95)	(7.33)
Year effects	No	Yes	Yes	Yes
N	60	60	60	60
Adj. R2	0.189	0.148	0.443	0.499

Note: for tables 5-7, dependent variables are spreads at issue. t statistics are shown in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6. Autonomy and spreads at issue

	(1)	(2)	(3)	(4)
Deficit	0.565***	0.627***	0.699**	0.558*
	(4.69)	(3.94)	(3.64)	(2.25)
Inflation	0.339	0.330	0.377	0.239
	(0.99)	(0.97)	(1.05)	(0.65)
Depreciation	-2.168**	-2.161**	-1.949*	-2.132**
	(-2.94)	(-2.87)	(-2.72)	(-2.82)
Autonomy	-3.143***	-3.097***	-2.799**	-4.104***
	(-4.76)	(-4.66)	(-3.71)	(-5.16)
MajorUnderw	-2.271***	-2.129***		
	(-11.72)	(-8.33)		
Polity2		-0.009	-0.115***	-0.224**
		(-0.89)	(-7.0)	(-2.95)
MoneyDoctor League			1.197*	1.222*
			(2.73)	(2.77)
Autonomy-Polity2				0.162
				(1.34)
Constant	6.294***	6.243***	5.076***	5.956**
	(12.74)	(12.58)	(9.93)	(13.97)
N	27	27	27	27
adj. R^2	0.827	0.819	0.754	0.751

Note: for tables 5-7, dependent variables are spreads at issue. t statistics are shown in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7: Lender of Last Resort and spreads at issue

	(1)	(2)	(3)	(4)
Deficit	1.115***	0.855**	0.777**	1.063***
	(3.74)	(2.77)	(2.79)	(3.59)
Depreciation	-2.370**	-2.474***	-1.906**	-2.005*
	(-2.98)	(-3.65)	(-2.97)	(-2.65)
Inflation	0.618	0.408	1.175*	1.270
	(1.09)	(0.87)	(2.06)	(2.02)
MoneyDoctor League	0.910*	1.091*		
	(1.97)	(2.58)		
CBI	-0.151	-0.066	-0.0816	
	(-0.73)	(-0.31)	(-0.37)	
LLR		-0.836***	-0.911***	
		(-3.85)	(-5.67)	
MoneyDoctor all			0.791***	0.838***
			(4.27)	(4.72)
Seasoned I			-0.722	-0.68
			(-1.99)	(-1.96)
CB LLR				-0.275
				(-1.42)
Constant	3.001***	3.671***	4.297***	3.620***
	(23.56)	(23.56)	(12.19)	(10.26)
N	43	43	43	43
adj. R^2	0.370	0.434	0.542	0.478

Note: for tables 5-7, dependent variables are spreads at issue. t statistics are shown in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 8. Balance table

	(1)		**(2)**		
	No central bank		**With Central Bank**		**t -test Diff**
Variable	**N**	**Mean/SE**	**N**	**Mean/SE**	**(1)-(2)**
Deficit	28	-0.265	44	-0.292	0.027
		[0.080]		[0.048]	
Reserves	24	0.259	42	0.115	0.144***
		[0.049]		[0.028]	
Inflation	23	0.005	41	0.005	0
		[0.022]		[0.028]	
Depreciation	27	0.061	40	-0.016	0.077**
		[0.036]		[0.016]	
Polity2	28	2.643	45	3.089	-0.446
		[0.884]		[1.093]	
Spreads	28	2.777	45	3.165	-0.388*
		[0.163]		[0.127]	
Dservice/Revenue	19	0.401	37	0.229	0.172***
		[0.049]		[0.030]	

The value displayed for t-tests are the differences in the means across the groups.

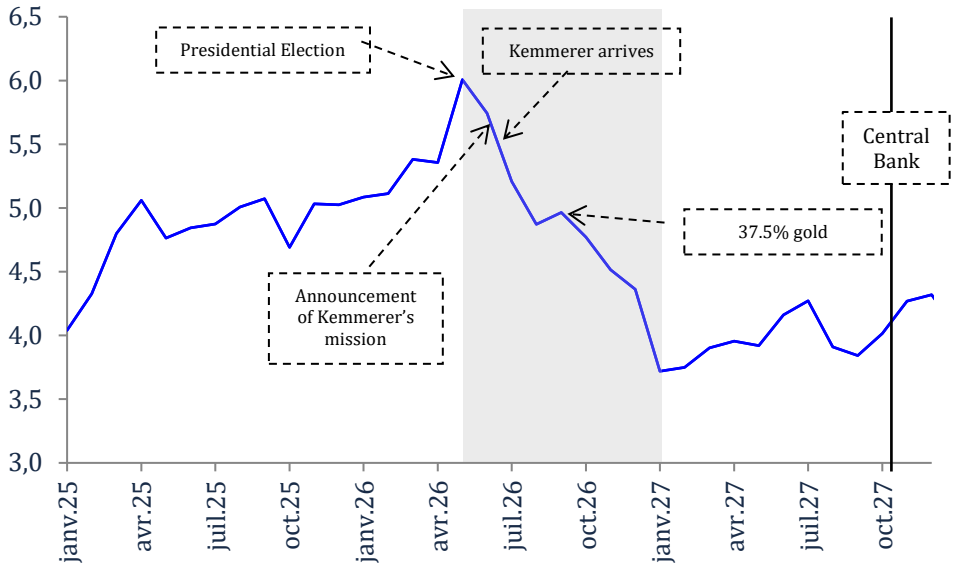
***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 9. Heckman Selection model

	Spreads	Central bank	Spreads	Central bank
	(1)	(2)	(3)	(4)
Deficit	-2.068***	-0.229		
	(0.672)	(0.485)		
Inflation		-2.689		
		(1.661)		
Depreciation		-1.28		-3.439***
		(0.855)		(0.395)
Money Doctor all	2.461***	1.161***	1.738***	-0.304
	(0.478)	(0.327)	(0.478)	(0.403)
Gold standard	0.104			
	(0.146)			
Majorunder	0.568		0.271	
	(0.350)		(0.406)	
Dservice/Revenue			5.596***	-4.856***
			(1.092)	(1.024)
Reserves			6.720***	-3.393**
			(0.991)	(1.297)
_cons		-0.303		2.374***
		(0.250)		(0.390)
athrho	16.6		-15.97	
	(243.43)		(141.82)	
lnsigma	0.488***		0.296**	
	(0.116)		(0.114)	
Wald	85.05***		211.87***	
Observations	60	60	49	49

Note: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Spreads and Kemmerer's arrival: the case of Poland



Source: See text.

Figure 2. Argentina's spread

5 structural breaks: 1924M12, 1926M11, 1929M5, 1934M4,1933M12

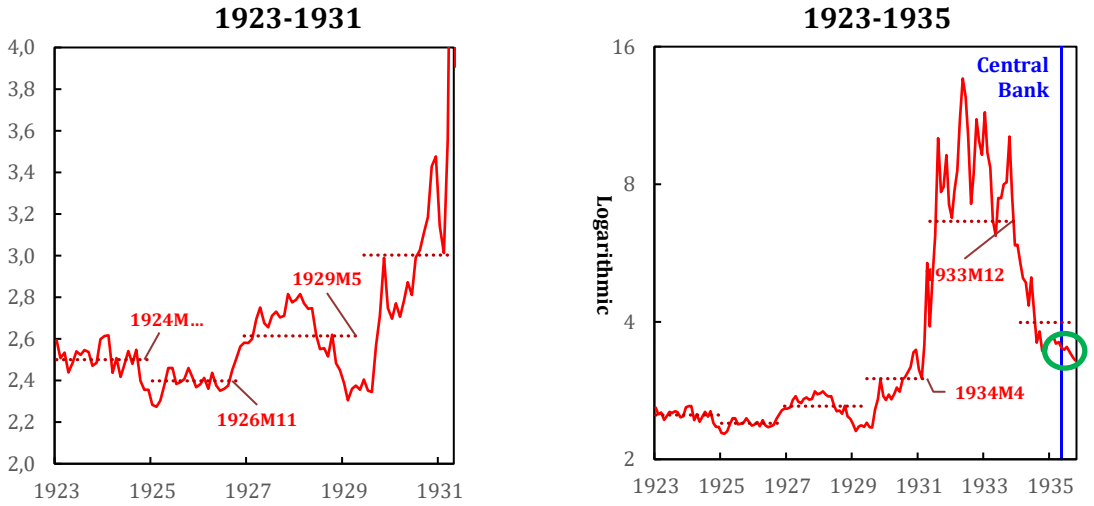
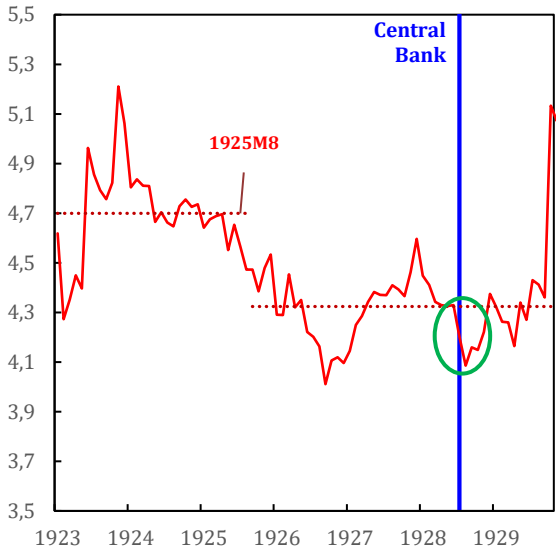


Figure 3. Bolivia's spread

3 structural breaks: 1925M8, 1929M10, 1931M9

1923-1929



1923-1935

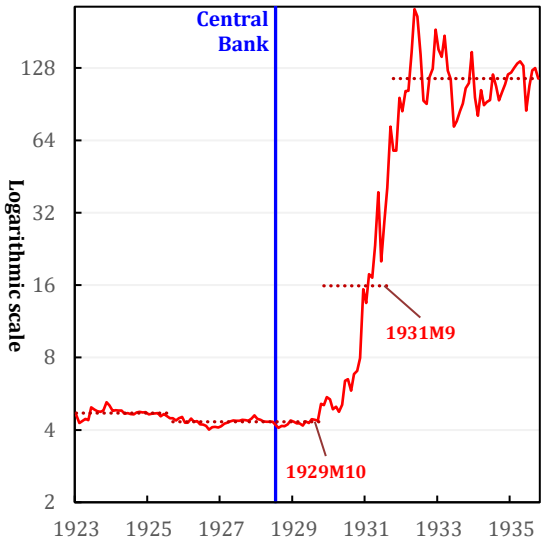


Figure 4. Canada's spread

3 structural breaks: 1924M12, 1926M12, 1935M5

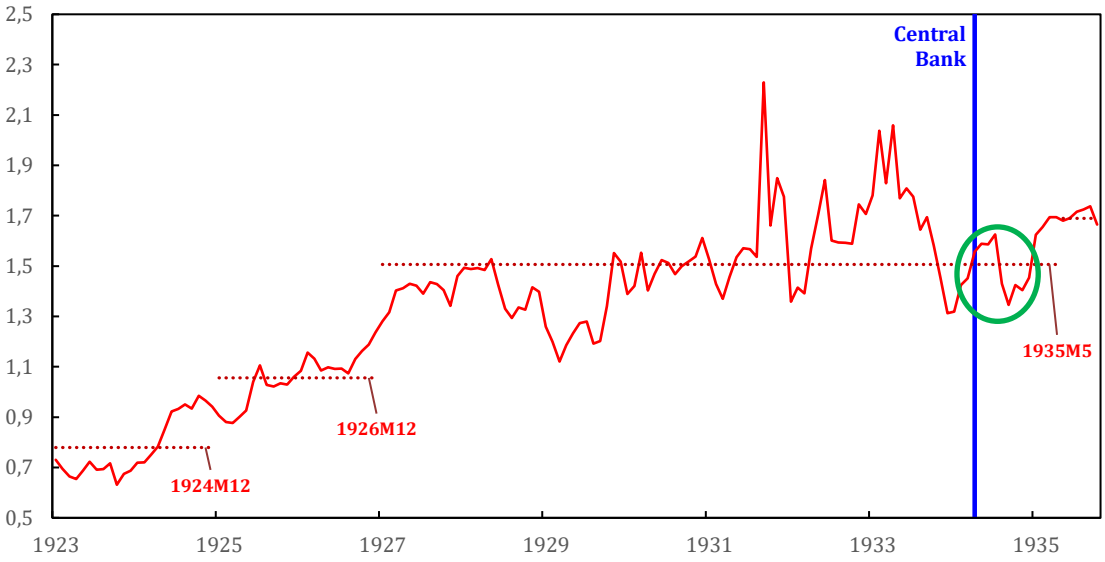


Figure 5. Chile's spread

2 structural breaks: 1931M12, 1933M12

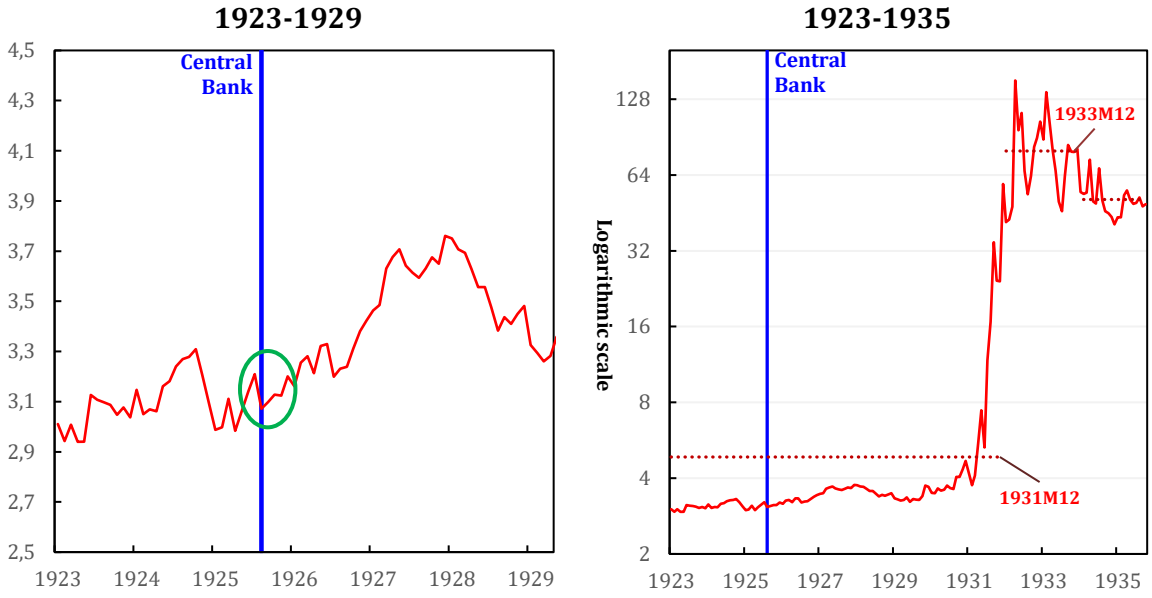


Figure 6. Colombia's spread

4 structural breaks: 1925M3, 1927M3, 1929M11, 1931M9

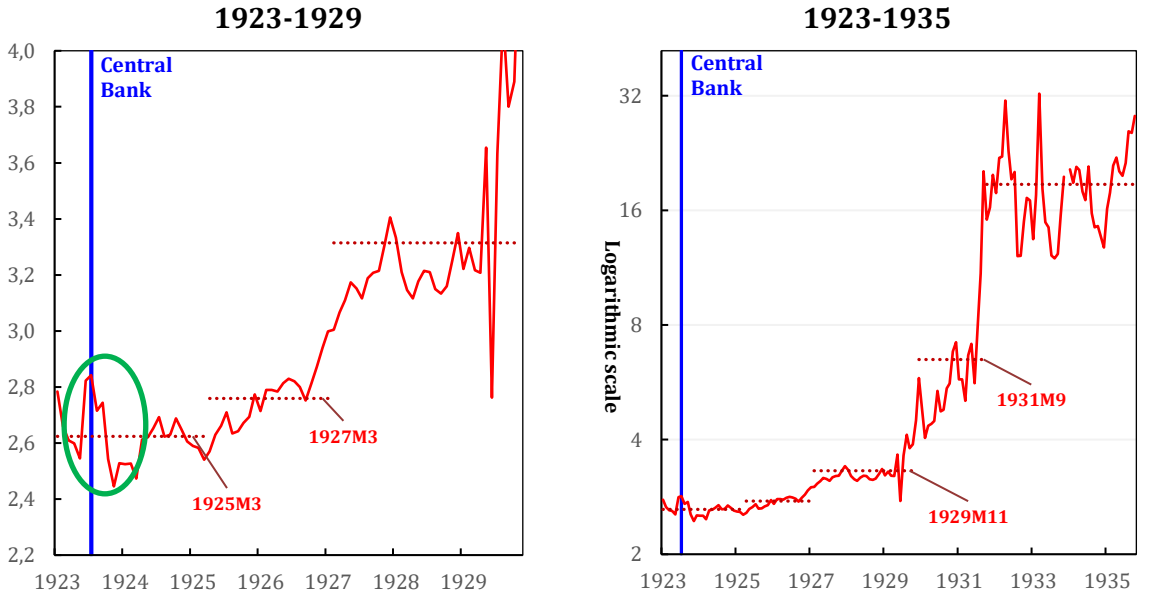
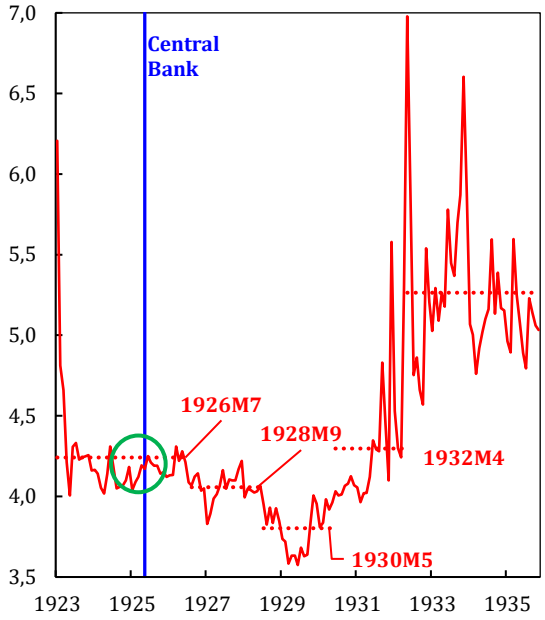


Figure 7.

Czechoslovakia's spread

4 structural breaks: 1932M4, 1926M7, 1930M5, 1928M9



El Salvador's spread

3 structural breaks: 1927M2, 1930M3, 1931M9

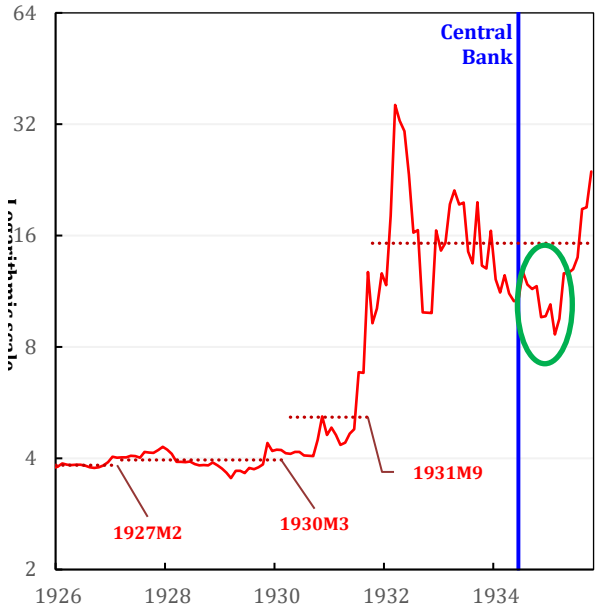


Figure 8. Greece's spread

2 structural breaks: 1932M3, 1934M1

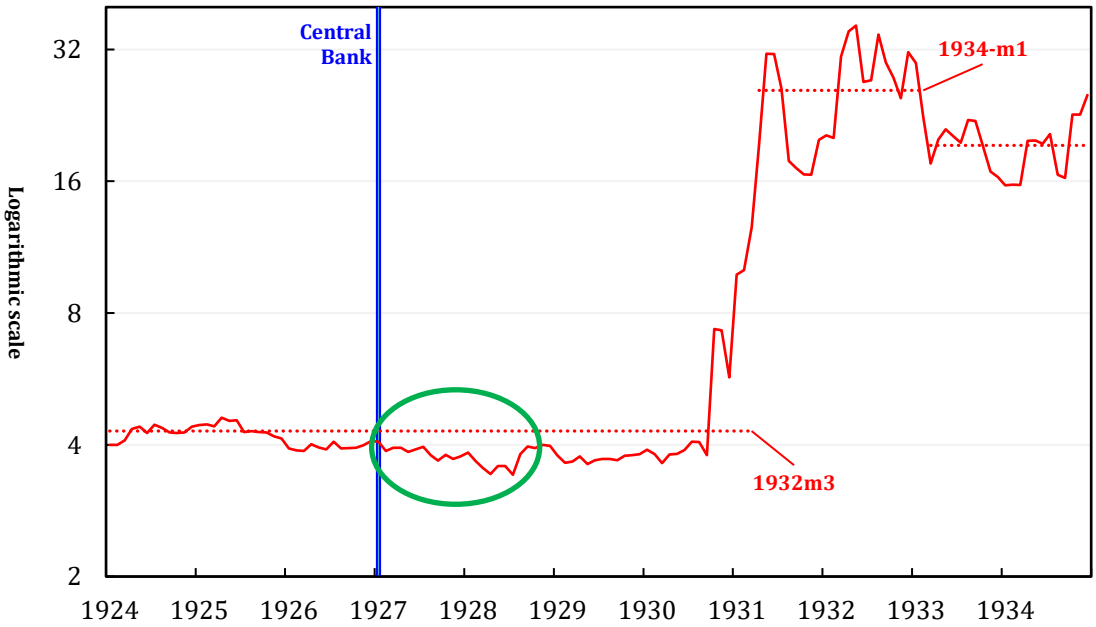
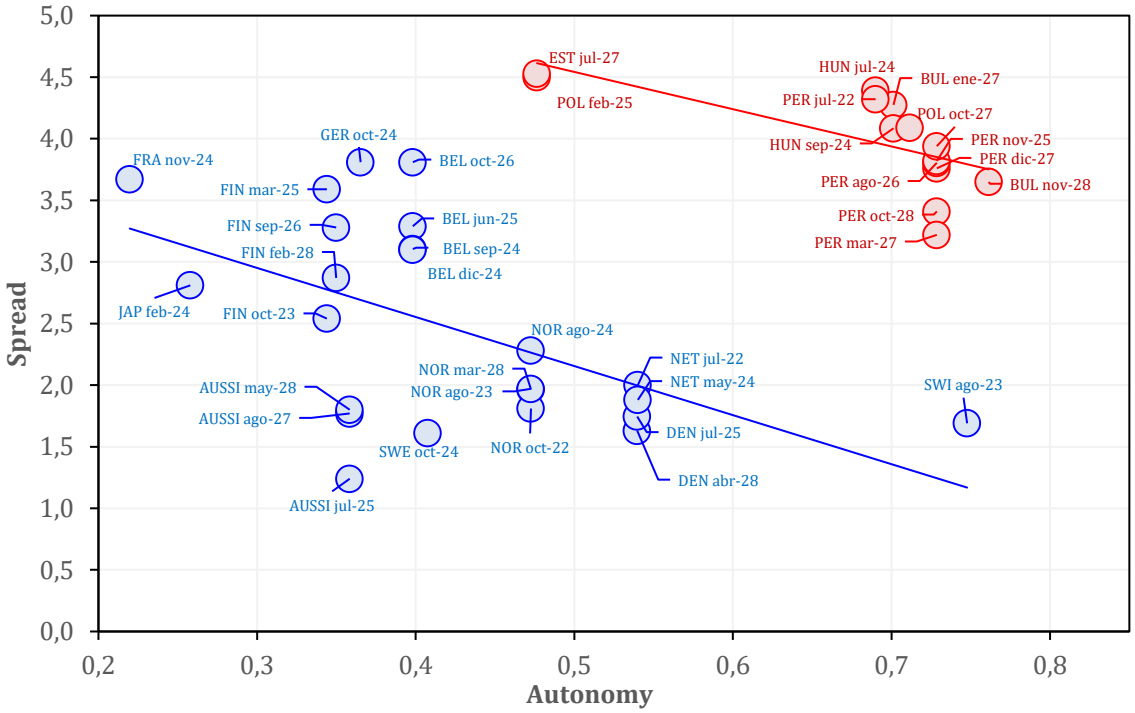


Figure 9. Spread at issue vs central bank autonomy



Source: See text.

Appendix. Data and Sources

I. Public Finance

Data on public revenues and expenditures of central governments (1922-1929, local currency) was taken from the following sources:

(a) Austria, Australia, Belgium, Bulgaria, Colombia, Costa Rica, Czechoslovakia, Denmark, Estonia, Finland, Germany, Greece, Hungary, Irish Free State, Italy, Norway, Sweden: The (League of Nations. Economic and Financial Section 1927), using the Public Finance Summary of Budget Accounts. First years for Austria were completed using (Moody, n.d.), Republic of Austria.

(b) Argentina: (Ferreres and Fundación Norte y Sur 2010) Bolivia (Peres-Cajías 2014), Brazil, Chile, Cuba, and El Salvador: MOxLAD Database / Latín American Statistics.

(c) Belgium (1924-1925), Czechoslovakia (1924), Finland (1923), France (1924), Greece (1924), Netherlands (1922-1924), Norway (1922 to 1923), Poland (1925): International Historical Statistics Europe (1750-2005).

(d) Switzerland (1923): Historical Statistics of Switzerland on line, Public Finance.

(e) Uruguay: Database from: Instituto de Economía, Universidad de la República.

III. Gold Reserves

Annual data (December of each year) was taken from Board of Governors of the Federal Reserve System, 1943, Banking and Monetary Statistics, 1914-1941. Data is drawn from table 160 “Gold reserves of central banks and Governments”, whose figures are classified by countries, from December 1913 to 1927 on an annual basis and from June 1928 onwards on a monthly basis. Gold reserves are presented in millions of dollars from 1914 to 1934 when Gold was valued at $20.67 per fine ounce although at $35 thereafter. Chile (1922), Netherlands (1922), Norway (1922): Michael Bordo online database.

IV. Depreciation Rate

The depreciation rate is calculated with Exchange Rate data from the Statistical Year-Book of the League of Nations. We constructed the depreciation Rate for almost all the countries in accordance with the data selected from the table “Cours du New York” where the figures represent the number of United States cents for one monetary unit of the respective country according to the buying rates in New York, taking the yearly figures as the average of the twelve-monthly figures. For Finland, Netherlands, and Norway we used the data included in Michael Bordo's online database. And in the case of Switzerland we consulted the data from Historical Statistics of Switzerland Online of the table Wechselkurse fur Sichtdevisen in der Schweiz 1875-1907 und 1913-1992 (in Franken) in the section Money and Credit.

V. Inflation

The inflation is calculated with the Index Numbers of Wholesale Prices data from the Statistical Year-Book of the League of Nations. The indices given in the table are all expressed in percentages of 1913 or 1914 (=100). In certain cases, the conversion of an index on to a new base without recalculating it from the original quotations yields results that are different from those which would have been obtained by recalculating the index on the new base from the original quotations. We used this information for calculating the inflation of the following countries: Argentina, Austria, Australia, Belgium, Brazil, Bulgaria, Chile, Costa Rica, Colombian, Cuba, Czechoslovakia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Netherlands, Norway, Peru, Sweden, Switzerland, and Uruguay. For the case of Bolivia: Peres-Cajías (2014).

VI. Money Doctor

This dummy variable adopted the value of 1 if a country was assisted by the League of Nations or Edwin W. Kemmerer, and 0 otherwise. Information regarding the countries assisted by the League of Nations comes from Flores Zendejas and Decorzant (2016), countries assisted by Kemmerer information can be found in Carlos Marichal's website on " Nueva Historia de las Grandes Crisis

Financieras".

VII. Polity2

Revised Combined Polity Score: This variable was taken from the Polity IV Project: Political Regime Characteristics and Transitions, 1800-2009 Dataset Users' Manual.

VIII. Lender of Last Resort and Central Bank Independence

VIII. The variables ExistLLR and CBI Annual Data for ExistLLR (1 if lender of last resort exists, 0 otherwise), and CBI (1 if Central Bank Independent, 0 otherwise) were taken from Michael Bordo's dataset from his webpage. This author mentions that the problem with this latter variable is that it adopts the value of 0 in periods when either there is no central bank or when there is a central bank that is not independent.

IX. Autonomy

This indicator was taken from the aggregate index of Appendix 3 in Dehay Eric and Nathalie Levy (2004), which considered 19 characteristics of central banks for its construction. We found Information available for Austria, Australia, Belgium, Bulgaria, Denmark, Estonia, Finland, France, Germany, Hungary, Japan, Netherlands, Norway, Peru, Poland, Sweden, and Switzerland. The index is coded on a scale from 0 to 1, with 1 being the highest level of independence.

X. Gold Standard

This dummy variable adopts the value of 1 if the country was on the gold standard, and 0 otherwise. The information regarding when the Gold Standard was adopted for each country and the year they left the system comes from the data set available in Michael Bordo's online database.