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**Bonds, Foreign Creditors, and the Costs
of the Mexican Revolution**

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Abstract

In this paper we study the impact that the Mexican Revolution had on Mexico's economy by looking at the effects of political instability on the public finances and the relationship of the government and its foreign creditors. The predominant view of the economic historiography sustains that political instability had only a short-term effect on growth. In particular, the literature overlooks the importance of political instability to disrupt the relationship between Mexico's government and its foreign creditors. We sustain that political instability had more than a short run effect on the government finances because it perpetuated the government's incapacity to access foreign funds, which could have helped to control the volatile political atmosphere. We make a narrative account of Mexico's debt renegotiation agreements during the 1920s and show how these agreements were suspended only because unexpected military rebellions and internal armed conflicts. We also run econometric tests to explore whether investors in London really believed the only option of the Mexican government was to default on its foreign debt early in the 1920s. We show that investors did not discount defaulting as the only option at the beginning of the decade, as the literature assumes, but they continued to react significantly to announcements and debt negotiations throughout the decade. Finally, we argue that not having access to new debt issues was the penalty that induced Mexico's government to negotiate two agreements to resume payments. We conclude Mexico could not get back to borrowing in international debt markets in the 1920s because political instability hindered its capacity to make regular payments and build a credible commitment with international creditors. This was costly for the country because the government never had the financial capacity to establish law and order, but still ended up diverting resources to fight wars and insurrections, which could have been used to promote growth.

Resumen

Mirando los efectos de la inestabilidad política sobre las finanzas públicas y las relaciones del gobierno con sus acreedores extranjeros, estudiamos el impacto que la Revolución Mexicana tuvo en la economía. La visión predominante de la historiografía económica afirma que la inestabilidad política tuvo únicamente efectos de corto plazo sobre el crecimiento. En particular, la literatura ignora la importancia que tuvo la inestabilidad política para interrumpir las relaciones entre el gobierno Mexicano y sus acreedores extranjeros. Nosotros afirmamos que la inestabilidad política

tuvo más que efectos de corto plazo en las finanzas del gobierno, ya que perpetuó la incapacidad del gobierno para acceder a fondos extranjeros que pudieron haber ayudado a controlar la volátil atmósfera política. Hacemos un recuento de los acuerdos de renegociación de deuda del gobierno mexicano durante los años veinte y mostramos que éstos fueron suspendidos por rebeliones militares inesperadas y los conflictos armados. También implementamos pruebas econométricas para explorar si los inversionistas en Londres realmente creían, a inicios de los años veinte, que la única opción del gobierno mexicano era incumplir sus pagos. Mostramos que los inversionistas no descontaron el default como la única opción al principio de la década, como lo asume la literatura, sino que continuaron reaccionando significativamente a los anuncios y renegociaciones de deuda a través de este periodo. Finalmente, argumentamos que el no tener acceso a emitir nueva deuda fue el castigo que indujo al gobierno mexicano a negociar dos acuerdos para reanudar sus pagos. Concluimos que México no pudo contraer nueva deuda en los mercados internacionales durante los años veinte por que la inestabilidad política minó su capacidad de honrar regularmente sus obligaciones y de construir un compromiso creíble con sus acreedores internacionales. Esto fue costoso para el país por que el gobierno nunca tuvo la capacidad financiera para reestablecer el estado de derecho y promover el crecimiento, sino que utilizó los recursos disponibles para combatir las insurrecciones.

Introduction

What were the costs of the Mexican Revolution? What impact did political instability have on Mexico's growth path? This is the first one in a series of papers that looks at these questions using newly assembled databases of financial data. In this paper we study the impact that the Mexican Revolution had on Mexico's economy by looking at the effects of political instability on the public finances and the relationship between the government and its foreign creditors.

For a long time neglected, the economic history of the Mexican Revolution (1910-1920) has recently begun to get the attention of scholars who are trying to assess its economic costs and consequences. According to Womack (1992), most of the historiography considered that, during the violent years of the Revolution, "there could have been nothing but destruction, upheaval, and ruin: a veritable productive disaster"¹. This conclusion was not result of factual analysis; rather it was based on the Spenserian idea that there can be no "progress" without "order".

Today, there is consensus in the literature that even if the Revolution had a negative economic impact in the short run, it allowed for an era of rapid economic growth as soon as the most violent period was over (in 1920).² There are two explanations of how growth was resumed after 1920. For some, the Revolution destroyed pre-modern institutional arrangements that curtailed Mexico's capacity to grow. Thus, it opened the way for a more prosperous era of growth than what Mexico could have achieved otherwise.³ For others, the Revolution was only an interruption of the previous growth path, which the country simply resumed later.⁴

In this second stream of the literature, the work by Haber, Razo, and Maurer (2003) has taken the debate of the economic effects of the Mexican Revolution to the realm of detailed quantitative history. Their analysis shows that while some sectors, such as petroleum extraction, prospered in the midst of turmoil, others, such as banking, suffered a hard blow and did not fully recover after several decades. Yet, most of the sectors of the Mexican economy showed the following pattern: "output and investment fell sharply during the civil war of 1914-1917 but (...) quickly recovered their former levels and rates of growth, even though the political system continued to be unstable until 1929."⁵ This conclusion leads the authors to sustain the broader

¹ John Womack (1992), pp.392.

² See Reynolds (1970); Vernon (1963); Solís (1967, 1970).

³ Tannenbaum (1933 and 1950); Vernon (1963); Cumberland (1968)

⁴ Although this thesis was not explicitly developed it was suggested in de la Peña (1975); Rosenzweig (1965); Valadés (1948); Gilly (1994); Keasing (1975); Jean Meyer (2004).

⁵ Haber, Razo, and Maurer (2003), pp.14.

hypothesis that “there is no necessary connection between political instability and economic stagnation.”⁶

We believe that the argument that the Mexican Revolution had a negligible effect on economic growth downplays the impact that political instability had for one crucial sector of the Mexican economy: the government. We test the hypothesis that the political instability generated after the civil war years of the Mexican Revolution did not have a significant impact on Mexico’s growth path. We look at the effect the Revolution had on the ability of the government to achieve economic stability and promote growth, by studying the capacity it had to issue foreign debt.

We sustain that political instability had more than a short run effect on the government finances because it perpetuated the government’s incapacity to access foreign funds to control the volatile political atmosphere, placing it in a vicious circle. In order to fight political upheavals the Mexican government had to increase military expenditures and sacrifice debt payments. Even after 1917, when the most anarchic years of the Revolution (1914-1916) were over, political instability forced the government to incur in huge military expenditures that generated great fiscal deficits. Unexpected increases in military expenditures to fight rebellions complicated the payment of the external debt service, which was a necessary condition for the country to access more funds in international capital markets. Thus, Mexico could not benefit from the important flows of foreign capital other Latin American countries obtained during the 1920s. This limited the Mexican government’s ability to pacify the country, invest in reconstructing infrastructure left from the pre-revolutionary years, and make the social expenses that would provide widespread popular support.⁷

Most of the literature that has studied the financial situation of the Mexican government during the 1920s, stresses that it was in constant need of resources to fight the political instability generated by the Revolution (Zebadúa, 1994; Aboites, 2003; Uthoff, 2005). Between 1880 and 1910, Mexico had experienced rapid economic growth under the dictatorship of Porfirio Díaz. The Díaz’s government developed a large railroad network, made the country the second largest exporter of silver, re-established the credibility of Mexico in foreign debt markets, and allowed for the largest industrial expansion in the nation’s independent history. In 1910, Díaz decided to have a presidential election to legitimize his regime. In the election, his contender, Francisco I. Madero, alleged electoral fraud and several armed groups around the country rebelled against the Díaz regime. After a few months of uprisings, Madero secured the presidency. Madero ruled from 1910 to 1913, but was unable to satisfy the demands of the armed groups that supported him. In 1913, Victoriano Huerta, the chief of the armed forces

⁶ Haber, Razo, and Maurer (2003), pp.15.

⁷ Marichal (1989), pp. 171-200 ,describes the loan boom that Latin America lived in the 1920s.

organized a Coup d'Etat against the president and tried to elect himself as a new president. Many governors and generals around the country did not recognize Huerta and between 1914 and 1917 these different armed groups fought a violent civil war to control the country. By 1917, the group of Venustiano Carranza had clearly established itself in power and by 1920 Mexico was ready to have its first democratic election after the civil war years. Again, a general, Alvaro Obregón, who disagreed with the chosen presidential candidate, organized a rebellion and rapidly controlled the country. He then easily won the 1920 presidential election. From 1920 on, Mexico had a fragile quasi-democratic regime that lived under the permanent threat of military uprisings. Government revenues started to improve after the civil war was over, but much of the budget had to be used to buy the loyalty of army generals and to fight the constant military and religious rebellions.

We suggest that if it had not been for the political instability that prevailed after the Revolution, Mexico would have been able to make payments on its foreign debt and would have (most likely) gotten new loans. Mexico stopped making coupon payments on its foreign debt in 1914. Then, in April 1917, Mexico announced it would resume payments on its foreign debt. The negotiations between the Mexican government and the representatives of the bondholders were slow before 1920. In 1922 the first debt agreement was signed between the two parties. But, by 1924, this agreement was suspended because a rebellion forced the government to increase war expenditures. In 1925, a second agreement was signed. But, in 1928, the government had to stop payments, mainly because a series of violent political events and rebellions complicated the payment of the debt service.

The outstanding literature on the issue of foreign debt defends the hypothesis that it was optimal for the Mexican government to default given the game and the payoffs that it faced in the post civil war years, especially in 1924. The hypothesis is that Mexico could not have borrowed more because there were no credible penalties foreign creditors could impose on it, which would give enough incentives for creditors to provide new loans and for Mexico to reestablish payments. For this reason the cancellation of the 1922 debt agreement between Mexico and the United States would have been the optimal strategy for the government that took power in 1924. The theory would be the following:

Picture a sovereign borrower, like Mexico, which promises to repay a loan over a period of years at a certain interest rate. Each year, when the interest and principal payments come due, the sovereign must decide whether to repay or renege. If the sovereign reneges, the lenders must then decide whether to

impose a penalty.⁸ The key insight is that lenders will not lend more than the present value of the penalty they can credibly impose (...) Therefore, if the sovereign governments want to increase their debt limit, they must increase the ability of lenders to impose penalties upon them.⁹

Given this game, the optimal response of the government was to default on its foreign debt. This would allow it to concentrate on forging alliances internally and to rebuild the domestic banking system. The situation was tough for Mexico in 1924 because, according to Haber, Razo, and Maurer (2003), it “was subject to few penalties by foreign lenders short of sending in the Marines to dislodge the government, something the United States was in no way prepared to do.” Therefore, even if Mexico wanted to repay its debts, “it was extremely unlikely that foreigners would extend more credit”.

The analysis of this literature suggests that Mexico broke with foreign creditors, not as a consequence of political instability, but because there were no penalties that could induce it to repay or that would provide creditors with incentives to extend a new loan (or underwrite a new debt issue). This argument raises at least three broad testable hypotheses. If defaulting was the optimal response of Mexico in the 1920s, because the government knew that there were no penalties creditors could impose that would induce it to resume payments, then we would expect the following to be true:

- 1. We would not expect to find Mexican officials renegotiating with foreign bondholders throughout the 1920s. Even if 1924 was the year when the payoffs made the suspension of payments optimal, we would not expect any debt negotiations thereafter. If there were no penalties to induce the Mexican government to pay and there was no possibility for the country to get a new loan, the equilibrium of this (non-repeating) game was defaulting in the first chance the government had.*
- 2. We would expect to find that investors trading Mexican debt in London discounted the price of bonds once and for all at the beginning of the game (during the civil war years or as early as 1920) or, at the latest, in 1924. We would not expect to find political events having a large and significant effect on the bond prices in London later in the decade.*
- 3. We would not expect to find there was any creditor-imposed penalty, like begin banned from international debt markets, which could induce Mexico to resume its debt service. We would not expect to find that the*

⁸ Penalties in the sovereign debt/country risk literature are understood as any actions that creditors can take to induce payments from the sovereign borrowers. Common penalties include invasions, trade embargos, blocking borrowers from further debt issues, confiscating a country's assets (in the country or in a foreign country), and any other punishments that can actually induce payment. See, for example, Eaton, Gersovitz, and Stiglitz (1986), pp. 490.

⁹ Haber, Maurer, and Razo (2003), pp. 102.

chances of Mexico getting a loan, if it had resumed payments, were any good. Finally, we would not expect to find creditors being able to impose penalties such as the repossession of important Mexican assets.

In this paper, we show that defaulting was not the government's dominant strategy during the 1920s. Mexico suspended payments only as a consequence of unforeseen political instability, in the form of army rebellions and internal armed conflicts. In fact, we show that the government had every intention to resume payments after the civil war years (1914-1916) were over and throughout the 1920s.

We use monthly prices of the Mexican debt to study how investors discounted the announcements and debt renegotiations of Mexico. We use monthly data to look for possible major structural breaks in the series. First, we want to see if investors discounted heavily the price of Mexican bonds (increased the implicit risk premium) at the beginning of the 1920s, once the armed conflict was over. Second, we expect to find 1924 was the year when investors did their major rediscounting of the price of Mexican bonds, just like Haber, Razo, and Maurer (2003) suggest. According to their view, there were not enough penalties to force Mexico to pay after 1924. Therefore, investors should have perceived the Mexican government was never going to pay again when it announced the suspension of payments in the summer of 1924. Finally, according to the narrative on the history of debt renegotiations we present, we would expect to find that investors thought Mexico wanted to pay, but were disappointed when it lacked the funds to do it whenever instability hit the government finances.

We find that investors trading Mexican debt in London got optimistic every time Mexico signed an agreement to resume payments and got pessimistic every time an internal armed conflict pushed the government to suspend payments up until the late 1920s. The valuation of the Mexican debt in London fluctuated according to the government's capacity to pay, which, in turn, depended on whether there were internal armed conflicts or not. In fact, our tests suggest the most important and unpredictable change in the risk premium series came when it was clear Mexico was not going to fully meet the 1927 payment promised to creditors (in the summer of 1927).

Finally, we argue that if the Mexican government wanted to resume debt payments in the 1920s it was because there were penalties that induced it to do so. We show that there were two main penalties that foreign creditors imposed on Mexico. First, Mexico was banned from debt issues, even when it was a good prospective borrower. Most "emerging economies" were borrowing significant amounts in international markets during the 1920s. This was a strong incentive for Mexico to get back into these markets, especially because its indebtedness levels were low compared to those of other similar economies. Second, we describe how creditors got to run the National

Railways of Mexico, in receivership, and were allowed to use all net earnings to pay for part of Mexico's foreign debt. This action changed the payoffs of the game for both parties and certainly changed the "present value of the penalties" that foreign creditors could impose on Mexico.

The series of debt renegotiations of the 1920s by themselves are proof enough that government officials in two different administrations (the Obregón Administration, 1920-24 and the Calles administration, 1924-28), did not think defaulting was the optimal strategy for the Mexican government. There were two major debt re-scheduling agreements between Mexico and the International Bankers Committee (IBC), one in 1922 and another in 1925. The IBC was a committee of international bankers led by J.P. Morgan, who represented most of the holders of Mexican sovereign debt, state government bonds, and bonds of the nationalized railways. The 1922 agreement proposed Mexico would pay 30 million pesos per year (about US\$15 million), from 1923 to 1927, and deferred all the interest and amortization charges in arrears to annual payments that would begin in 1928.¹⁰ The 1925 agreement followed the same tone, but also included putting the national railways into receivership (under IBC control) and making the company responsible for the railway debt. The railway debt represented about half of Mexico's total debt.¹¹ Thus, by getting the IBC to run the railways and pay the service of the railway bonds, Mexico automatically changed the penalties creditors were de facto imposing, it restarted payments on a large part of its debt, and reduced the government debt burden by almost a half.

Mexico's debt agreements proposed a scheme of payments that were a credible way to get back into sovereign debt markets. In fact, these types of re-scheduling agreements were common among "emerging markets" around that time. For instance, Argentina and Brazil had done similar renegotiations in the past, reducing the debt service burden for a few years and suspending amortization payments for 5 to 10 years. Argentina did it after the 1890 Barings crisis and was able to issue new external debt as early as 1897.¹² Brazil had two debt re-scheduling agreements before the Great Depression, one in 1898 and another in 1917. In both of them, Brazil asked for a break in amortization payments and delayed interests for 13 years. Still, Brazil was the largest single borrowing Latin American country in the 1920s.

If Mexico was looking for a solution to the debt problem and if creditors did not discount defaulting as the only option, then it should follow that there were creditor imposed penalties that induced the Mexican government to resume debt payments. For instance, Mexico wanted to pay in order to access new loans. Closing access to credit was the incentive the IBC used to get Mexico to renegotiate. Then, it should follow that there was a positive

¹⁰ Zebadúa, 1994, pp. 184-254.

¹¹ Pani, 1926, pp. 105-106.

¹² Marichal, 1989, pp. 163-170.

probability that the amounts the Mexican government expected to borrow were larger than the repayments of the debt it made to creditors. If there were no new loans waiting for Mexico, as (Haber, Razo, and Maurer (2003), suggest, then defaulting would have been the equilibrium of the game very early in the 1920s (by backward induction in a game that was not going to be repeated).

We sustain that the Mexican government expected new external loans and the threat of being excluded from foreign credit markets induced it to look for a solution. This was a credible penalty because most large Latin American countries and “emerging markets” were issuing new bonds during the 1920s.¹³ And since Mexico’s profile was better than or at least as good as that of other Latin American sovereign borrowers, then Mexico must have had good chances of getting a new loan.

The financial situation of the Mexican government was, in fact, tempting for some creditors. The country received money during the 1920s in small amounts and received offers for larger amounts.¹⁴ We use the data that was available to investors in the *Investor’s Monthly Manual* and other sources to show how Mexico’s debt burden was lower than that of other developing countries borrowing in London (Table 4). The size of Mexico’s debt service relative to its revenues was not as large when compared to other borrowers (the exception being Argentina and Chile). Mexico’s budget deficits did not look worse than those of Argentina and Chile, two countries that were able to place new issues of debt during the 1920s.

Yet, the Mexican government did not get larger loans because a new debt issue would have needed the underwriting of one or several members of the IBC. This committee included some of the most influential bankers of New York and Europe (e.g., J.P. Morgan, Kuhn Loen and Co., National City Bank, and Chase National Bank, Glyn, Mills, Currie & Co., Morgan, Grenfell, & Co., Banque de Paris et des Pays-Bas, and others).¹⁵ If there was a syndicate of banks that could help Mexico to get a new loan, it had to be formed with some of the members of the IBC. Therefore, the game was all about credibility *vis a vis* the IBC and Mexico failed to build a credible commitment with the committee during the 1920s.

Instability, then, hindered the capacity of the Mexican government to credibly commit to pay its foreign debt and convince the IBC to provide a new loan. The Mexican government’s difficulty at generating a cash flow to pay

¹³ Marichal (1989), pp. 171-200.

¹⁴ In 1922 Speyer & Co. seemed to have been ready to make new loans to the Mexican government. However, its inclusion into the IBC impeded it from making independent deals with the Mexican government. See Zebadúa (1994) pp. 210-211. Below we explain how Mexico’s government almost obtained from the IBC a credit of 20 million dollars for five years guaranteed with oil taxes. A deal that failed at the end as a consequence of the pressure put by the oil companies against it. Pani (1926) pp. 101-102. In late 1924 the Texan banker J.L. Arlitt agreed with the Mexican government of issuing bonds of 6% in gold dollars for a ten year loan of 50 million dollars. Only a small part of these bonds was actually subscribed. (Zebadúa, 1994, pp. 259-262).

¹⁵ Turlington (1930), pp. 277 shows all the members.

the debt service was to a large extent related to the problems generated by political instability. Most of the increases in military expenditures that were necessary to deal with instability were paid with the money Mexico could have used to make annual debt payments. During the 1920s, after the civil war was over, the share of military expenses reached 30% for most years, up from around 20% during the pre-revolutionary era (Table 1).

Perhaps the clearest example of our argument is the fact that the resumption of interest payments after 1922 was going to be relatively cheap for Mexico. The Mexican government had to pay between 30 and 50 million pesos (\$15-25 million US dollars) per year in interests to the International Bankers Committee between 1923 and 1928. This represented only between 11%-16% of government revenue during those years. However, the Mexican government could not resume payments because in December of 1923 General De la Huerta led a threatening rebellion that the government had to fight using funds destined for debt payments (and by borrowing from domestic lenders at onerous rates). Later in the decade, other rebellions complicated the commitment of the government to respect the debt agreements.¹⁶

One could argue that not having foreign credit was not crucial for Mexico's development because not paying the interests on the debt saved the government money that could be used to other more important ends. But, we find most of these savings were used to finance military expenditures and to pay for debt contracted to fight insurrections. In addition, during the 1920s the Mexican government did not pay salaries to bureaucrats and soldiers in a timely manner. In fact, the deserter generals that organized the insurrections could easily recruit soldiers given the frustration of soldiers who were not receiving a salary on time.

A large debt issue could have helped the government in at least two ways. First, it could have issued a new debt to pay the salaries it owed. Second, a new loan could have helped the government to cut the number of employees and soldiers by paying them good liquidations. The impossibility of boosting the public finances with a foreign loan just made the government more vulnerable to further insurrections.

Finally, one could argue that the Mexican government did not need foreign creditors because it could have survived borrowing domestically. This was initially hard because until 1925 the banking system was almost inexistent and any loans the government could obtain came with extremely high interest rates because of the illiquid credit market (and to compensate for the risk of having the government overthrown). For example, before the creation of the central bank in 1925, "the normal interest rate around the Republic in 1924 was of between 18% and 24% annually."¹⁷ Still, after the creation of the

¹⁶ Pani (1926), pp.98-102.

¹⁷ This is according to declarations of Alberto Mascareñas, director of the Central Bank, in a conference he gave in 1928, as cited in Torres Gaytan (1990), pp. 173.

central bank rates fluctuated between 7% for inter-bank loans to 10% for regular loans.¹⁸

We divide the paper into four sections. In section 1, we make a narrative account of the financial situation of the Mexican government after the Mexican Revolution, with an emphasis on its capacity to build a credible commitment to pay foreign creditors after every debt renegotiation. In section 2, we explain the methodology followed to test our hypotheses and describe our data sources. In section 3, we present the main findings that support our argument. Section 4 concludes.

1.- The Failed Attempts to Build a Credible Commitment in the 1920s.

In this section we describe the continuous negotiations of the government with foreign creditors throughout the Revolution and the 1920s. The Mexican government was continuously negotiating the resumption of interest payments on the debt, hoping that reestablishing relations with foreign creditors would provide access to new funds. The negotiations and the agreements were suspended over and over mostly as a consequence of the political instability that prevailed during most of the 1920s.

The Mexican government had done many renegotiations and defaults on its foreign debt during the nineteenth century. Loans of the Mexican government were floated early in the independent life of the country. Mexico declared independence in 1821 and the first issues of debt followed a few years later. In fact, different governments throughout the century were able to float debt, but the political instability that followed independence made it hard for them to find a stable source of revenue to pay the service of the external debt regularly. Many debt renegotiations took place during the first decades of the century, but the short life of most national governments and the continuous wars between Liberals and Conservatives did not allow the different governments to respect those agreements.¹⁹

In 1886, the government of Porfirio Diaz reached an agreement with foreign bondholders and resumed payments on the foreign debt. Two years later Mexico had its first successful debt consolidation.²⁰ By this time, the country was much more stable politically and government sources of revenue had increased as a consequence of this stability. After 1888, the Mexican government was able to consolidate and refund its sovereign debt in better terms at least in 1899, 1904, and 1910. By 1910, the government of Diaz had

¹⁸ Torres Gaytan (1990), pp. 173

¹⁹ Bazant (1995).

²⁰ D'Olwer (1964), pp. 1006-1010; Bazant (1995), pp. 134-137.

achieved such a high esteem in foreign financial markets, that most of the debt issued during his regime was in foreign hands. For example, his finance minister, Jose Ives Limantour, organized the purchase of several lines of railways that belonged mainly to British and American interests. For this purpose the government of Diaz issued mortgage bonds to pay for the control of these companies. Mexican bonds quoted in London enjoyed their most stable quotations during this period (Figure 1).

In 1908, Diaz declared that Mexico was ready for democracy and promised he was ready to surrender to a democratically elected successor. In the presidential election of 1910, his contender, Francisco I. Madero, alleged Diaz committed electoral fraud and several armed groups around the country rebelled against the Diaz regime. After a few months of uprisings, Madero secured the presidency. The economy continued to prosper, but Madero was not able to satisfy the demands of the armed groups that had supported him.²¹ Civil unrest continued until 1913, when Victoriano Huerta, the chief of the armed forces organized a Coup d'Etat against President Madero and tried to elect himself as a new president. Many governors, generals, and armed groups around the country did not recognize Huerta as president and rebelled against him. Until 1914 Huerta had been able to pay the coupons on the external debt and secured a new loan from a syndicate of foreign and domestic banks. The new loan helped him to fight the insurgents, but not for long. The insurgents created a united front that overthrew Huerta in 1914. The united front fell apart after the fall of Huerta and there was a violent war between the different armed groups to control the presidency. Among those groups were the armies of Emiliano Zapata, Francisco (Pancho) Villa, and Venustiano Carranza. At the end of 1916 the group of Carranza had dominated Mexico City and most of the conflict zones.

In 1917, once the government of Venustiano Carranza had achieved some internal peace and a new Constitution had been drafted, the Mexican government had two options. It could default on the foreign debt or it could try to negotiate a foreign loan and resume Mexico's foreign debt service. They chose the latter without much hesitation. Only this time Mexico's bargaining position was different.²² The 1917 Constitution had abrogated the property rights of foreigners exploiting mines and oil wells in the country. According to article 27, land was property of the nation, but left unclear whether this was retroactive or not. In any case, the interest of foreign nationals, mostly Americans living in Mexico, was severely threatened and the US State Department took it seriously.

The first negotiations for a new loan for the Carranza government started in New York in early 1917. But the loan did not materialize because the bankers, under pressure from the State Department, ended up asking for a

²¹ Méndez Reyes (1996).

²² Uthoff (1998).

U.S. government guarantee for the loan. The State Department wanted the bankers to pressure Mexico to recognize damages to American citizens caused by the Mexican Revolution and wanted the Mexican government to protect the property rights of foreign nationals, especially the oil companies.²³

It seemed like Mexico was in no position to resume payments on its foreign debt without the support of a foreign loan. Pacifying the country required large amounts of money. Keeping generals and their armies loyal usually implied the government had to distribute payments and subsidized loans among the many revolutionary generals. Even with the rapid increase in customs revenue from the export of oil and other raw materials to the countries at war, the government was running a deficit. In Table 1, we can see that during the Carranza presidency more than half of the expenditures were going to the Ministry of War and Marine.

In 1918, the Carranza government started a negotiation with J.P. Morgan, Speyer and Co., and other banking houses to organize a “refunding of the Mexican debt into a single comprehensive issue of bonds...” (Turlington, 1930: p. 275). In the proposed plan the Mexican government was willing to offer custom revenues as a security for the loan. American envoys were allowed to study the situation of Mexico’s finances during this time.²⁴ But, financiers in New York were expecting Mexico to commit certain fiscal revenues for the payment of the loan in the budget submitted to Congress. The Mexican budget did not include such guarantees, mostly because the government finances were committed with military expenditures to keep the armies and generals under control, and the possibility of a loan faded away.

In February 23, 1919, bankers and representatives of foreign bondholders from the United States, England, and France, created the International Bankers Committee (IBC). The IBC included the most prominent and influential commercial and investment banks of the time. It was designed to be a powerful negotiator between bondholders and the Mexican government. No major bank in the world would have been able to build a syndicate to lend to Mexico without having a selection of IBC members. In fact, the IBC, with the support of the State Department, could block any new loans that any competitor banks could offer to Mexico. Under the IBC agreement, Mexican debt bondholders would adhere to the IBC agreements with the Mexican government voluntarily. At its peak the IBC represented 97% of Mexico’s debt holders (in 1925). J.P. Morgan took the lead and named one of his associates, Thomas Lamont, chairman of the committee.²⁵

The Mexican government, again, had the option of renegeing on the debt and not recognizing the IBC. Instead, the Carranza administration immediately recognized the IBC and started cooperating with them. With J.P. Morgan

²³ Zebadúa (1994) pp.116-133.

²⁴ McCaleb (1921) and Lill (1919).

²⁵ For information on the IBC see Turlington (1930), especially pp. 276-277.

leading the IBC, it would have been easier to convince bondholders of changing the conditions for Mexico's resumption of payments and, possibly, accessing a new loan issued by a syndicate of banks from the committee.²⁶

Between the last months of 1919 and the beginning of 1920, the Mexican government tried to clarify the property rights confusion started by the new constitution and promised to resume interest payments on the foreign debt. The government was actually willing to negotiate the constitution in order to resume payments, and why not, obtain a new loan. At the end of 1919, the government unveiled plans to reorganize its financial office in London and to resume interest payments on the foreign debt. Also, in Mexico, the government promised to respect all the vested interests, whether acquired before or after the adoption of the constitution. These actions sent a very positive signal to creditors. Figure 2 shows the reaction of investors in London, the price quoted for the Mexican bonds went up rapidly after these announcements.

Yet, the Mexican government had to suspend the resumption of interest payments in April of 1920. During this month the electoral tensions between the government and the opposition candidate, the powerful general from the state of Sonora, Alvaro Obregón, escalated into a military conflict. The government tried to impose a general loyal to Carranza as regional commander in the northwest of the country. This challenged the powerful group of generals of Sonora (e.g., Alvaro Obregón, Plutarco Elias Calles and Adolfo De la Huerta) and the state started a war against the federation. The country was divided into two groups of army generals, those supporting the Sonora group and their leader (Alvaro Obregón) and those supporting President Carranza. The Obregón faction dominated the military campaign and Carranza was assassinated in May 20 as he was fleeing Mexico City towards Veracruz. The extraordinary expenses of this military campaign were so large that the resumption of debt payments was suspended until a new government was elected.²⁷ To insure the triumph of Obregón in the 1920 presidential election, General De la Huerta was named provisional president. He recognized the constitution and monitored the presidential election. General Obregón won the election as the official candidate (Meyer, 1991; Matute, 1980).

During the administration of President Obregón the renegotiation of the debt became a priority. Obregón started his presidency during the prosperous post-World War I years. Demand for Mexican oil and minerals continued to increase rapidly and Mexico's fiscal revenue reached historical levels. As we can see in Table 1, 1920 was the first year when the Mexican government had a fiscal surplus since the civil war was over. Fiscal revenues grew almost 40% in that year alone. Moreover, in July 7, 1921, Minister of Finance Adolfo De la

²⁶ Zebadúa (1994), pp.139-148.

²⁷ Zebadúa (1994), pp.149-153.

Huerta introduced a new tax on oil exports. The tax was designed to obtain funds for the resumption of payments on the external debt.²⁸ This put Obregón in a comfortable position to resume payments on the foreign debt.

In June 16, 1922, Minister of Finance De la Huerta and Thomas Lamont signed a debt agreement to resume Mexico's debt payments. Mexico recognized all capital, amortization and interest payments of all the sovereign debt issued until 1910 (excluding the debt contracted by the administration of Victoriano Huerta in 1914), some states' debt, and all the bonds the Porfirio Diaz government had issued to buy the National Railways. The total assumed added up to exactly £ 145,173,759 (about \$1.5 billion pesos). All the interest and amortization payments in arrears since 1914 were going to be paid in 40 annuities of equal amounts, beginning in January 1, 1928.²⁹ Also, the Mexican government offered to resume the debt service by making annual payments of \$30 million pesos beginning in 1923, adding 5 millions extra every year until 1927.³⁰ To make this payments Mexico committed the total oil export taxes, the 10% tax on railroad profits, and the net earnings of the National Railways. All the sinking fund payments that Mexico was supposed to make were suspended until 1928. After 1928, the debt service was going to be resumed according to the original debt contracts.³¹

If Mexico did not think there was anything to win from resuming payments, why would it go through the hassle of organizing such debt renegotiation? One could argue that the main objective of Obregón was to get recognition of the United States and that is why he worked so hard to solve the debt problem.³² But if getting recognition had been the first priority, the Mexican government would have focused its diplomatic efforts on recognizing damages to American citizens done during the Revolution years and in negotiating the property rights provisions of the Constitution, which were crucial to gain American recognition.³³ Instead, Minister of Finance De la Huerta focused on renegotiating the debt in 1922, while the agreements on the property rights of foreigners had to wait until 1923. In 1923, Mexico and the United States created a commission to assess material damages done to American nationals during the Revolution and to allow Oil Companies operating before 1917 to keep their concessions, against the intentions of the 1917 Constitution. After the negotiation was over, the agreements, known as the "Bucareli

²⁸ Bazant (1995), pp. 193.

²⁹ All the interests over those funds were actually waived. Thus interest and amortization funds in arrears amounted \$400 million pesos.

³⁰ The annual payments would be paid part in specie and part in "scripts" payable in 20 years (with no interest for the first five years and an interest rate of 3% for the last 15 years). Turlington (1930), pp. 394-397,

³¹ The complete agreement can be found in Turlington (1930), Appendix VIII.

³² This is, for example, the argument of Jan Bazant (1995), pp. 199.

³³ The United States promised recognition of the Obregón presidency under three conditions. First a Mixed Claim Commission had to be created, the non-enforcement of the retroactive provisions of the constitution, and the recognition of the foreign debt. See Turlington (1930), pp. 281.

Agreements,” needed only the approval of Mexico’s Congress to become law.³⁴

If the debt agreement was just for show, we would not expect Mexico to have paid about \$15 million dollars (\$30 million pesos) in 1922 for the first annual deposit of the debt agreement. Moreover, the IBC lent \$350 thousand dollars that Mexico was missing to complete the first payment. In 1923, the Mexican government apparently paid back the IBC and made another deposit to build a reserve for the payment of 1924. The Ministry of Finance sent the IBC \$700,000 dollars as a part of the second payment of the agreement, which was going to total about \$18 million dollars (\$35million pesos).

Political instability hit hard again at the end of 1923. In mid-1923 President Obregón had settled on General Plutarco Elias Calles to run as the official candidate for the presidential election of 1924. The followers of Obregón were divided with this decision and a large political group decided to support Minister of Finance De la Huerta for president. De la Huerta resigned in September and by December a group of the best army generals convinced him to rebel against the government. Fighting this rebellion proved a difficult task for the Mexican government. The government finally won once the “Bucareli Agreements” were signed by Congress. Only then, did the U.S. give recognition to Mexico’s government and sold a shipment of arms to the country on credit.³⁵ The uprising cost the Mexican government about \$60 million pesos, almost twice the price of the debt service for the year 1924.³⁶

Right after defeating the De la Huerta rebellion, in February 1924, Mexico started negotiations with IBC for a loan that would help it finance the interest payments for the year of 1924. The loan requested was for \$20 million dollars payable in 5 years. The government offered all the oil production taxes as guarantee. Minister of Finance Alberto J. Pani, who substituted De la Huerta, later declared that the government was expecting a “happy ending” to the negotiations of this loan.³⁷

The hopes of getting a new loan were erased when the IBC rejected the loan proposal on the grounds that oil tax receipts were decreasing rapidly together with oil production. Then, the Mexican president refused to pay the amounts owed for 1924 and blamed the former Minister of Finance for the lack of funds. The 1922 agreements were officially suspended in June 30, 1924, until new funds could be devised to pay bondholders.³⁸ By the time the Mexican government cancelled the debt agreement, it had deposited \$1.4 million dollars in the IBC account in New York.³⁹

³⁴ Zebadúa (1994), pp.136-137.

³⁵ Meyer (1991), pp. 132-133.

³⁶ Bazant (1995), pp. 200.

³⁷ Pani (1926), pp.101-102.

³⁸ Bazant (1995), pp. 200.

³⁹ Turlington (1930), pp. 201, footnote 122.

According to Haber, Razo, and Maurer (2003), this is the moment when it was optimal for the government to default on its foreign debt. However, the Mexican government continued hoping new loans would come. In September of 1924, Minister of Finance Alberto J. Pani, contracted a loan with J.L. Arlitt, of Austin, Texas. The 6% loan of \$50 million dollars was going to be used to resume payments on the foreign debt for 1925 and to reduce the “floating” internal debt, which increased rapidly after the De la Huerta rebellion. The transaction was cancelled because J. L. Arlitt failed to comply with all the legal details of the loan.⁴⁰

In August of 1925, Minister Pani announced the creation of a Sole Bank of Issue in Mexico, Banco de Mexico. The IBC complained about the establishment of this bank because it supposedly was created with funds that had to be destined to the payment of bondholders. Yet, the funds used to open this central bank came directly from the accumulated specie reserves of the Monetary Commission, the board in charge of regulating the gold standard in Mexico. This did not stop the International Committee from continuing the negotiations of a new debt agreement. In fact, new debt negotiations started in New York at the beginning of October.⁴¹

The new debt agreement was signed in October 23, 1925, by Minister Pani and Thomas Lamont, of the IBC. The document added three main modifications to the 1922 agreement. First, it announced the deferment of the payments overdue for 1924 and 1925, to annual payments beginning January 1, 1928 with a 3% interest rate. Second, the government “ceased to be directly responsible for the obligations of the railways.” The interests in arrears of the railway debt were also deferred to 1928, with annual payments of \$2.5 million pesos for 39 years. Third, the railways were to be returned to private management at the end of 1925. The entire earnings of the railways were going to be used by the IBC to pay interests to the holders of railway debt. The agreement was approved by the Congress in January of 1926 and the railways were returned to private management then.⁴²

The 1925 agreement reduced the debt burden of the Mexican government significantly. From the \$1,561,438,348 pesos assumed in 1922, now the government took responsibility for \$890,201,892 pesos of debt. Also, following this reduction in the principal, the annual obligations of the Mexican government for 1926 and 1927 were reduced from \$45,000,000 and \$50,000,000 pesos to \$21,385,690 and \$22,023,802 respectively.⁴³ This allowed the government to make the 1926 payment in its entirety.

Thus, Mexico changed simultaneously its debt burden and the present value of the penalties imposed on it. In other words, Mexico provided foreign

⁴⁰ Zebadúa (1994), pp. 261-262.

⁴¹ Turlington (1930), pp. 306.

⁴² Turlington (1930), pp. 306-308, Bazant (1995), pp. 201-205.

⁴³ Pani (1926), pp. 104-105.

creditors another penalty to induce it to repay its debt. The National Railways were now controlled by its creditors and Mexico had guaranteed the payment of the railway debt using the net earnings of the company. In case the net earnings were not sufficient, the government was committed to pay from its own revenues. The interest of the government in making sure the service of the railroad debt was met stems from the fact that the National Railways were bought with mortgage bonds. If the Mexican government or the company did not repay the bonds, there was the threat that the owners of the bonds could start a bankruptcy process that could lead to the repossession of the lands owned by the company (Bazant, 1995).

At the end of 1926, Mexico was paying its debt and had given its creditors a tangible asset to extract cash flows. Mexico had done its part of the deal so far. New loans should have been in the natural sequence of the game, or at least after a couple of years of try-out period. Unfortunately for Mexico's government, before new loans were offered, the political instability and deteriorating economic conditions hurt the country's public finances again.

In 1926, the Mexican government made the payment to the IBC in its entirety. It used all the export taxes and the oil production taxes, which each amounted \$10 million pesos. The payment for the year was exactly \$21, 219,000. Therefore, the government had to set aside revenues from other sources to complete the payment.⁴⁴

There were three forces that affected Mexico's capacity to pay in 1927 and forced it to suspend payments in 1928. First, the oil export tax revenues kept falling rapidly together with oil production.⁴⁵ Second, there was another uprising in October 1927 organized by Generals Serrano and Gomez, who opposed the re-election campaign of General Obregón. This rebellion forced the government to increase military expenditures. The government increased the size of the army and bought a new shipment of arms from the United States. Finally, the Calles administration, started an open campaign against the Catholic Church in 1926. In January of 1927, the government's open criminal prosecution of priests generated a wide popular uprising in central Mexico. This uprising is known as the "Cristero War." Fighting the "Cristero War" took its toll on the 1927 budget too and the government ran a deficit for the first time since 1924. Moreover, military expenditures were kept relatively constant around \$85 million pesos, even when total expenditures were falling (Table 1). In 1928, total military expenditures were budgeted at

⁴⁴ The government also paid \$5.35 million pesos to the bearers of railways bonds guaranteed by the government. See Turlington (1930), pp. 313, footnote 145.

⁴⁵ Contemporaries blamed the falling production on the "rapid exhaustion of flush oil production in Mexico, the necessity for operating wells at a lower rate, depression in the world oil market, a hugely increased yield in the United States, and competition with Venezuelan oil." See Schneider (1928), pp. 88. Haber, Maurer, and Razo (2003), chapter 6 defend the exhaustion of wells as the main reason for the oil sector decline.

above 30% of government expenditures for the first time since the De la Huerta rebellion.⁴⁶

In 1927, it was clear Mexico was not going to make the full payment of interests due for the year. Oil revenues were fell short of expectations and with more pressure to pay for military expenditures it could not divert resources to make the debt payments. Moreover, the National Railways were not in good shape either. At the end of the year, the government had to borrow \$6 million pesos from the IBC to meet the 1927 annual payment.⁴⁷

In 1928, Mexico had to resume payments on the sinking fund of the debt and the government signaled it was not ready to disburse the \$70 million pesos due in that year. Mexico, once more, requested the IBC a new negotiation to reschedule debt payments (Turlington, 1930: 314). To make matters worse, the president-elected for the 1928-1932 term, once again General Obregon, was assassinated in July, 1928. As a consequence, some of the generals loyal to Obregon rebelled in that same year. Mexico continued to perpetuate the cycle of political instability and violence. The government budget for 1929 had to include an increase in military expenditures to 33% of expenditures (reaching \$90 million pesos per year).

The opportunity of the 1920s was lost with the advent of the Great Depression and the contagion of defaults in Latin America. The debt game was never going to be the same for foreign creditors and Latin American countries. Mexico reached a new debt agreement in 1929, but had to cancel it because of the effects of the Depression. This country continued the cycle of negotiations until it reached a definitive agreement in 1946.⁴⁸

2.- Data and Methodology

Studying the impact of the Mexican Revolution on the Mexican government finances required us to complete the government budget series existent using primary sources. The revenues and expenditures series of Mexico were incomplete in most official and academic publications. The historical series usually ended in 1910 and started again in 1925 (or 1923 when the reports of Minister of Finance Alberto J. Pani are used). We reconstructed the budget figures using the budgets submitted to Congress and published in the daily *El Democrata*, and in the *Mexican Year Book* of 1920-21. Data for the period 1914 to 1918 was not available from these sources given the complicated situation of the public finances during the civil war years (1914-1916) and the initial disorder of the Carranza government in 1917 and 1918. From the detailed budget data (not included here to save space, but available upon

⁴⁶ Meyer (1991), pp. 128, 149, and chapter 4 for the "Cristero War."

⁴⁷ The amount borrowed was repaid to the IBC in 1928. See Turlington (1930), pp. 313.

⁴⁸ Marichal (1989), pp.213.

request), we separated the expenditures of the Ministry of War and Marine, in order to see the toll that the war took on the public finances.

We describe the changes in the debt service and built debt service series following the agreements of 1922 and 1925 using the narratives of Turlington (1930), Pani (1926), and Bazant (1995). Finally, we also used these sources to describe the changes in the penalties imposed on Mexico, such as the move to put the National Railways of Mexico in receivership under the supervision of the IBC.

For comparing Mexico's debt burden to that of other Latin American countries, we compiled data on population, revenues, expenditures and exports published in the *Investor's Monthly Manual* every semester. The data was very incomplete and imprecise, but we wanted to work with data that investors had at their disposal. We also draw comparisons across countries with data compiled by Turlington (1930), which reflects debt burden for a group of countries for which the League of Nations had available data for the year 1925.

For testing the impact that announcements of the Mexican government had on the quotations of the Mexican bonds in London, we constructed a monthly series of Mexican bond risk premium from 1900 to 1929 following the standard methodology of the literature that studies county risk.⁴⁹ Therefore we define the risk premium implicit in the price of Mexican bonds as the difference between the Mexican bond yield in London and the British Consols yield (the risk-free asset):

$$\text{Risk premium} = \text{Yield}_{\text{MEX}} - \text{Yield}_{\text{UK}},$$

where the yield of the Mexican bonds ($\text{Yield}_{\text{MEX}}$) is defined as the ratio of the coupon payment to the monthly market price (the British Consols bond is estimated in the same way using Consols with a 3% coupon rate). The Mexican bond prices used refer to the *Investor's Monthly Manual* quotations of Mexican gold bonds of 1899 with a 5% coupon rate. This source provided continuous quotations from 1900 to 1929, including the civil war years (1914-1916). The British Consols monthly quotations were taken from the NBER Macroeconomic History database.

This paper makes an important assumption in order to study the behavior of bondholders in London. The Mexican bonds were in default since the last quarter of 1914. Therefore, there were no coupon payments made on these bonds that would allow us to estimate the yield properly. Nevertheless, we wanted to work with the movements of Mexican bond prices in London in relation to a benchmark risk free asset such as the consols rate. For that

⁴⁹ For instance see Sussman and Yafeh (2000) for a discussion.

reason we assumed that the Mexican bonds paid coupons (of 5%) throughout the period to construct our series of risk premium. This allows us to study the price movements of Mexican bonds “clean” of variation in the risk free asset. We know that using this methodology introduces a bias in our series, but we do not believe that modifies our results because the bias affects all of our observations after 1914 and we avoid using the data to make comparisons between the pre-1914 and post-1914 levels.

We follow two methodologies to study whether there were any events or announcements of the Mexican government that significantly altered the risk premium series. First, we follow a somewhat modified version of the event study of Sussman & Yafeh (2000), who looked for structural breaks in the series of Japanese bonds risk premium from 1870 to 1914. Second, we use the methodology suggested by Hansen (2001). We do not study short term variations, because we are not so concerned with the magnitude of the shocks in a month to month basis. We only use econometrics to study whether there were events which significantly changed the structure of our time series. The magnitude of short term effects on the series are not provided econometrically, but are discussed using the graph of the risk premium.

We run a somewhat modified version of the methodology of Sussman & Yafeh (1998), looking at structural changes using the ex-ante knowledge of some of the relevant announcements and events that might have mattered for bondholders. We run a simple model, which mimics Sussman and Yafeh’s model, and run Chow breakpoint tests using the ex-ante selected events. In this case the model we use has the form:

$$\ln Y_t = \beta_0 + \beta_1 \ln Y_{t-1} + \beta_2 \ln Y_{t-1} * EVENT_{long} + \varepsilon_t,^{50}$$

where $\ln y_t$ is the logarithm of the risk premium in period t , and $EVENT_{long}$ is a dummy variable that multiplies $\ln y_{t-1}$. The variable $EVENT_{long}$ has a value of zero until the moment of the event we select ex-ante according to historical research and it takes the value of one thereafter. The Chow breakpoint test simply runs an F test and a Likelihood Ratio Test (using a Chi-square statistic) to see if the model with and without the dummy significantly alters the value of the coefficients. We present a table with the events and their effects on the series with the Chi-square statistic and its p-value.

Yet, Chow breakpoint tests have been criticized in the literature because they allow small breaks to pass the Chi-squared test too easily (Hansen, 2001). The methodology of Hansen (2001), recursively looks for structural breaks in the US productivity time series. We follow Hansen and look for significant structural breaks in the series of Mexican bond risk premium.

⁵⁰ We acknowledge that the functional form selected for this test does not follow conventional time series specifications, but it yields heteroskedasticity-consistent residuals with no serial correlation. Therefore, we believe this is actually no a bad model to run the Chow breakpoint test.

Unlike Hansen we are not looking for a unique and maximum structural break, we are looking for the most significant structural breaks in the series, and whether they happened before or after 1924. The advantage of this methodology is that the researcher does not have to ex-ante select dates or events where the series should have breaks, it iteratively looks for breaks in the series by recursively running Chow tests of structural breaks in all of the points of the data (except for the beginning and end of the series). For this test, we model the risk premium series in the simplest possible way, using first-order autoregression,

$$y_t = \alpha + \rho y_{t-1} + e_t$$
$$Ee_t^2 = \sigma^2$$

where y is the first difference of the risk premium series and e is a series of serially non-correlated shocks (Hansen, 2001: 117). The idea behind the model is that given we assume the series is stationary the parameters should be constant over time. There is a structural break if the parameters change at some date in the sample period. We look for the break points by iteratively running Chow tests from the observation $t+10$. We run this test using the complete sample 1900-1929 and different smaller samples. The results were not radically altered, so we present a graph of the Chow Chi-squared statistic for the sample 1914-1928.

The Chow test for each point simply computes a Likelihood Ratio Test to see if the model before and after the breakpoint have stable coefficients. Computing the critical values for the Chow test (Chi-squared) statistic is more problematic. As Hansen (2001) describes, the right critical values to use change if we are doing an iterative estimation of Chow tests and will depend on the number of parameters, sample size, and other factors. For simplicity we estimated Quandt Likelihood Ratio Statistics (QLRS), which under some conditions meet the criteria described in Hansen (2001). So we ended up running the model with standard errors and we imposed a homoskedasticity restriction to our residuals. This will allow us to present the most likely structural break in the series. We present a graph with all the QLRS-Chow statistics (using every data point as a possible break-date) and plot the critical values.

3.- Findings

3.1.- Defaulting as the optimal strategy: Mexico in the eyes of bondholders

If defaulting was the optimal strategy for Mexico and if bondholders believed Mexico was not going to repay, then we would not expect to find bondholders reacting to the different debt negotiations and announcements significantly. In this section we test this hypothesis using the quotations of Mexican bonds in London to study the reactions of investors when announcements were made.

We test our hypothesis looking for three possible major structural breaks. First, the strict version of the test would require that investors had discounted heavily the price of Mexican bonds (increased the implicit risk premium) at the beginning of the 1920s, once the armed conflict was over. Second, we would expect 1924 to be the date when investors did their major rediscounting of the price of Mexican bonds, just like Haber, Razo, and Maurer (2003) argue. According to their view, there were not enough penalties to force Mexico to pay after 1924. Therefore, investors should have perceived the Mexican government was not going to pay when they announced the suspension of the 1922 agreement in the summer of 1924. Finally, according to the narrative we have provided on the debt renegotiations, we would expect that investors actually thought Mexico wanted to pay, but were disappointed at the lack of capacity to pay whenever instability hit the government finances.

Figure 1 and 2 show the graph of the estimated risk premium of the 1899 Mexican bonds quoted in London. It is easy to see that the 1920s were a period of high volatility for the data. Figure 2 shows a closer look at the fluctuations in risk premium implicit in the prices of the bonds from 1914 to 1929. It is clear from this figure that creditors were reacting to different announcements and were changing their expectations from positive to negative throughout the period according to the actions of the Mexican government and the outcomes of the debt agreements.

The short-term jumps in the series plotted in Figure 2 are clearly responses to the Mexican government's announcements of resumption of payments or lack of capacity to pay. From eyeballing the data it is obvious that the suspension of the 1922 agreement had a strong effect on investors' expectations, putting the level of risk premium around a different mean. But, the 1925 agreement brought hope back and sent positive signals to investors, until political instability hit again in 1928 and Mexico did not deposit the annual payments for that year.

Using dates selected ex-ante and a Chow breakpoint test methodology, similar to Sussman and Yafeh (2001)'s, we find that the only significant

breakpoints took place. This supports the idea that investors discounted Mexico's actions early in the decade. Table 6 shows the Chow breakpoint test for some of the most relevant events of this series. We truncated the sample to include only the period when Mexico was not making regular coupon payments, so we worked with the sample January of 1915 to December 1928. It is interesting to see that the only events that introduce significant breaks in the series are the US recognition of the Carranza government in 1917 (allowing Mexico to negotiate a new loan with foreign bankers), the signature of the 1922 debt rescheduling agreement, and its suspension in June 1924. No other event introduces a significant break. This means that bondholders cared very much about the big events before 1924, but there was no major break in the series after the suspension of payments in 1924 using this method.

Yet, chow breakpoint tests have been criticized in the literature because they allow small breaks to pass the F-test too easily. So we look recursively for structural breaks in the series following the methodology of Hansen (2001). This method assumes each data point can be a structural breakpoint and estimates Chow tests recursively to measure stability in the coefficients before and after each point. We estimate Quandt Likelihood Ratio Statistics using robust standard errors, which makes it harder for breaks to be statistically significant.

The series of QLRS are plotted in Figure 3 together with a graph of the risk premium for the 1920s. The breakpoint test series are not perfectly aligned with the risk premium series because the breakpoint tests were estimated using a model in first differences. The peaks in the QLRS-Chow statistics denote events that are more likely to be causing a structural break in the series. The first peak denotes the impact of the Mexican government resuming payments after the Mexican Revolution's most violent years were over. The second one reflects the effect of the suspension of the 1922 debt agreement on investor's expectations. Finally, the third peak shows the impact that the 1925 agreement and the prompt annual payments by Mexico had on the risk series.

If we use the strict critical values of the Quandt LR Statistic we find that the only significant major breaks in the series would happen after 1925. This test would tell that the 1917 and 1924 breaks would not be significant, therefore leaving the post 1925 reactions to debt agreements and the suspension of payments as the only candidates for major structural breaks. The most important break happened when it was clear Mexico would not meet the 1927 payments. The oil export taxes fell short of expectations and it was clear the railroads were not going to make enough earnings to pay its bonds either. At the end Mexico borrowed \$6 million pesos from the IBC and the quotation of the bonds went up again (risk premium went down).

The results of this econometric test do not mean that the discounting of bonds investors made in 1924 was not large and relevant. This test just helps

us to say that investors were actually still reacting significantly and radically to what was happening after 1925. They still cared about Mexico's actions and, at least before 1928, they reacted radically when their expectations of Mexico not meeting payments.

What is impressive about the positive response of investors to the debt agreement of 1925 is that in London there were strong feelings against Mexico after the 1924 suspension of payments. In October of 1925, the Investor's Monthly Manual published an editorial warning investors about Mexico's intentions (it was the only editorial about Mexico in the whole decade). The editorial explicitly asked for caution on the latest debt announcement and detailed the history of Mexico's sovereign debt until that year. It read:

*Hope springs eternal in the investor's breast. But in regard to Mexico it has sprung so often only to fade away that the latest announcement with regard to the Mexican government's intentions must be read with sober caution.*⁵¹

So, we would have expected investors to react with "sober caution" in 1925 and 1926. Instead, the quotations of 1899 Mexican bonds went up from its July 1925 price of 35% of face value, to a level of 50% in June 1926. The risk premium estimates went down from 10.28% to 5.6% in the same period. Even though the risk premium of bonds was clearly at a higher plateau, bondholders were optimistic about Mexico's actions.

These results imply at least three things for the hypothesis we test. First, foreign bondholders did not believe Mexico was going to stay in default forever after 1914. Second, foreign bondholders certainly cared about the debt agreement of 1922 and discounted heavily the actions of the government when this agreement got suspended (as both Chow tests showed). Finally, according to the iterative Chow test, the most important event for bondholders, in the sense of altering radically their valuations of the bonds, was the debt agreement of 1925 and, especially, when Mexico unexpectedly fell short of expectations to meet the 1927 debt payments. Therefore, there is no definitive evidence that defaulting in 1924 or earlier was discounted by investors as the only solution Mexico had to the debt problem. Investor's hope lived on for a few more years.

3.2.-Foreign creditor's penalties on Mexico

If the Mexican government was so eager to renegotiate its foreign debt and resume payments, then it should follow that the penalty of being banned from foreign financial markets was very costly to this country. If there had been no new possible loans for Mexico, then one wonders why the Mexican government went through the hassle of negotiating two debt agreements and making some

⁵¹ "Mexico and Foreign Investors", in *Investor's Monthly Manual*, October, 1925, pp. 558-559.

annual payments. The Mexican government paid only because there was hope that new debt issues were feasible. We explore the implications of this hypothesis below.

According to the experiences of other Latin American economies Mexico should have been getting credit somewhat fast after resuming payments in the 1920s. Debt restructurings were a common occurrence in “emerging economies,” especially in Latin America. Argentina rescheduled payments to its federal and provincial debts after the Barings crisis of 1890. In 1893, in what is known as the “Arreglo Romero,” the Argentinean federal government assumed all state debts, got a reduction of almost 30% in annual interest payments for 5 years, and suspended the amortization of the debt until 1898.⁵² Argentina got back to issuing new debt quickly in the 1890s. There is a bond issue as early as 1897.

Brazil also had two major debt restructurings before the Great Depression. In 1898, it got a loan to pay the interests of the next three years. This agreement also suspended the amortization of the debt for 13 years! The second restructuring came in 1914, when it got a loan to pay for the debt service. The deal included a suspension of amortization payments until 1927 and a suspension of interest payments until 1917.⁵³ Brazil also got rehabilitated in world debt markets quickly. According to the *Investor's Monthly Manual*, in the 1920s alone, Brazil was the largest issuer of debt of all the Latin American economies (this includes sovereign, state, and municipal debts) (Table 4). There are loans made to the state of Sao Paulo as early as 1921 and sovereign debt issues in 1927.

Most of the large economies in Latin America were issuing debt in the 1920s. As mentioned, Table 4, shows Brazil was the champion of new issues during the 1920s. This country, including state and municipal debt, issued almost £47 million pounds sterling of new debt between 1920 and 1929. Argentina and Chile placed new issues too, getting £3.5 million and £10.5 million pounds sterling respectively during the decade.

Mexico would have been a great candidate for a new debt issue in the 1920s. As Table 4 shows, according to the information provided to investors in the *Investor's Monthly Manual*, Mexico was the country with the lowest debt burden *per capita* in the region. While Argentina and Chile had debt *per capita* ratios of over £10, Mexico had £4 pounds of debt per head. Brazil with its large population had slightly more than Mexico, with a debt of £5 *per capita*.

Even though this is the information that investors observed, this data underestimates the debt burden assumed by the government in 1922 and overestimates it after 1925. The total debt assumed by the government, including state bonds and the railway mortgage bonds, amounted over \$1,500

⁵² Abreu (1999), pp. 7

⁵³ Abreu (1999), pp. 8-14.

million pesos (£145 million). If the population of Mexico was estimated at 15 million inhabitants, we would get a debt *per capita* of less than £10. This would put Mexico still below Argentina and Chile, according to Table 4. After 1925 Mexico's debt burden would have been reduced by almost one half, therefore lowering Mexico's debt *per capita* even more.

In Table 5, we show a comparison of Mexico with a broader cross-section of countries. The data compiled by Turlington (1930) compares Mexico in 1925 with Argentina, Belgium, Brazil, Chile, France, Great Britain, Italy, the Netherlands, Norway, Peru, Spain, and the United States. We included the two scenarios Turlington (1930) works with, one in which Mexico has a debt of \$1 billion pesos and another in which Mexico assumes the payment of reparations to American citizens caused by the Mexican Revolution (amounting \$2 billion pesos). In the first case the debt *per capita* of Mexico is the lowest of all nations included. Even if we assume Mexico was going to pay reparations to foreigners we would get a debt *per capita* of about £13 pounds or 133 pesos, an amount that still looks smaller than most countries (except Brazil and Peru).

If we look at the budget deficits reported in the *Investor's Monthly Manual* we would find Mexico was not the worst borrower. Table 3 shows the budget deficit or surplus reported by this publication between 1917 and 1928. According to this data, Mexico did not look that bad compared to Chile and Argentina. In fact, when we look at the actual data reported by the Ministry of Finance to the IBC (presented in the last column) we see that Mexico was in better shape than Argentina and Chile, with the exception of 1923 and 1924 (when fighting the De la Huerta rebellion put a severe toll on Mexico's finances).

According to the debt agreements Mexico reached, the debt burden to the government did not look high compared to other countries. When we look at the debt service proposed by Mexico in the 1922 agreement and the actual payments made throughout the 1920s, we can see that the debt burden of Mexico was about 15% of revenues for most years, reaching 16% in 1927. The internal debt increased the debt burden, but most of this increase was the product of the short-term debt contracted to fight the De la Huerta rebellion in 1923-24.

Mexico's proposed debt service was not that large compared to data for other countries around 1925. According to the data presented in Table 5, most countries used 30% of their revenues to pay the debt service. In Latin America, only Chile and Peru paid less than 30% of revenues for interests and amortization, and they still had larger debt burdens than Mexico. In Table 2, we can see that the annual payments of Mexico for 1925-1928 were less than 20% of revenues.

In sum, Latin American countries that did debt restructurings like Mexico's usually got loans to rehabilitate the country. Also, many of these countries

were issuing debt in the 1920s, after debt renegotiations similar to those of Mexico. Most of the borrowers had higher debt burdens and worse government expenditure profiles than Mexico. Then, one wonders why Mexico did not get a new loan during this decade.

In fact, Mexico's profile was tempting for some creditors. The country received money during the 1920s in small amounts and received offers for larger amounts. There was a loan offer in 1925 from J.L. Arlitt, of Austin, Texas and an actual loan of £1.15 million pounds from the Loan Bank.⁵⁴ More loans were not obtained, because they depended on the underwriting of the members of the IBC. So, the game was all about credibility *vis a vis* the IBC and credibility is something Mexico could not accomplish during the 1920s. As we have mentioned before, the IBC represented over 90% of the Mexican debtholders.⁵⁵ The committee included some of the most influential New York Bankers. For instance, the IBC included J.P. Morgan, Kuhn Loen and Co., National City Bank, and Chase National Bank.⁵⁶ If there was a syndicate of banks that could help Mexico to get a new loan, it had to be formed from within the members of the IBC.

Instability, then, hindered the capacity of the Mexican government to commit to pay its foreign debt and convince the IBC to provide a new loan. The Mexican government's difficulty at generating a cash flow to pay the debt service was to a large extent related to the increase in military expenditures that were necessary to deal with instability. During the pre-revolutionary period the debt burden was always close to 20% of revenues and military expenditures were also around 20% of expenditures (Tables 1 and 2). During the 1920s, after the civil war was over, the share of military expenses increased to above 25% of total expenditures, reaching 30% in most years.

In Table 2, we can see that had there not been rebellions, such as that of 1923, the money necessary to make foreign debt payments would have been met more regularly. For example, the \$60 million pesos that the government had to spend to fight the 1923 rebellion, would have paid the 1924 interest payments (\$40 million pesos) and would have helped to make the 1925 payment (of \$45 million pesos). Also, if the Mexican government had been able to pacify the country during the 1920s and reduce military expenses to around 15% of the budget, as Minister of Finance Pani intended, then Mexico would have been able to divert at least \$40 million pesos (half of the military expenditures) to make debt payments every year. But, instability did not allow the Mexican government to reduce military expenditures and it had to suspend payments three two times during the 1920s.

⁵⁴ Reported in "Mexico and Foreign Investors", in *Investor's Monthly Manual*, October, 1925, pp. 559.

⁵⁵ Turlington (1930), pp. 299. This is the number of bondholders that deposited their titles one the 1922 debt agreement was signed. But Mexico had previously agreed to negotiate external debt issues only with the IBC.

⁵⁶ Turlington (1930), Appendix VIII, contains the full list of members.

We believe the evidence shows that Mexico could not get out of the financial difficulties generated by instability, because it was not able to get a large loan that could help it to reorganize the public finances, resume debt payments, and show coercive power to deter any new rebellions. Our counterfactual is that it would have been easier for Mexico to show a credible commitment to foreign creditors if it had not been for the extraordinary expenditures the government had to make to fight rebellions. If the government had been able to make debt payments in time, Mexico probably would have been able to take advantage of its low debt burden and positive outlook to issue new debt.

Conclusion

We developed an argument of how political instability affected the capacity of the Mexican government to obtain new loans and regularize its expenditures pattern. After the Revolution the Mexican government had to spend on average more than 30% of total revenues on the Ministry of War and Marine. Moreover, the increases in the expenditures to fight rebellions did not allow Mexico to repay its foreign debt service continuously for more than two years over the whole 1920s. Even when different administrations did an arduous diplomatic work to build credibility in international financial markets, political instability hindered the efforts to show the commitment to repay the debt in practice.

Investors in London did not discount defaulting before 1924 as the only option of the Mexican government. They reacted positively to every debt renegotiation of the Mexican debt. Also, we found that evens that forced Mexico to suspend payments had terrible negative effects. We show that the most important breaks in the series came at the end of the 1920s and not before 1924 like the literature had argued. Most of the big disappointments to investors came when Mexico's lack of capacity to pay would force it to suspend payments. This usually happened when political instability put pressure on the government to increase military expenditures instead of paying the debt service.

Revolutions can have long-lasting effects when it comes to reorganizing the government finances and the political life of a country. In the case of the Mexican Revolution, the rapid growth of the demand for mineral products, oil, and other commodities helped Mexico to grow faster in the 1920s and 1930s than in the pre-revolutionary period. However, we hope our argument convinces the reader that if the Mexican government finances had not been hit so hard between 1914 and 1929 by political instability, Mexico would have achieved even higher rates of growth after the Revolution.

References

- Aboites Aguilar, Luis (2003), Excepciones y privilegios. Modernización tributaria y centralización en México 1922-1972, Mexico City, El Colegio de México.
- Bazant, Jan (1995), Historia de la deuda exterior de México, 3a ed, Mexico City, El Colegio de México.
- Cumberland, Charles Curtis (1968), México: the struggle for modernity,. New York, Oxford University Press.
- D'Olwer, Luis Nicolau (1964), "Las Inversiones Extranjeras", in Daniel Cosío Villegas (ed.), Historia moderna de México: Vida económica, vol 2, Mexico City, Hermes, pp. 973-1177.
- Gilly, Adolfo (1994), La Revolución interrumpida, Mexico City, Era.
- Glass Cleland, Robert (ed.) (1922), The Mexican Year Book 1920-21, Los Angeles, Mexican Year Book Publishing Co.
- Keesing, Donald E. (1975), Employment and lack of employment in Mexico, 1900-1970, Williamstown, Mass., Williams College, Center for Development Economics.
- Lill, Thomas R, (1919). National Debt of Mexico; History and Present Status. New York, Searle of Nicholson and Lill C.P.A.s.
- Marichal, Carlos (1989), A Century of Debt Crises in Latin America, Princeton, Princeton University Press.
- McCaleb, Walter Flavius (1921), The Public Finances of Mexico, New York, Harper Collins.
- Méndez Reyes, Jesús (1996), La política económica durante el gobierno de Francisco I. Madero, Mexico City, INHERM.
- Meyer, Jean (2004), La Revolución Mexicana, Mexico City, Tusquets.
- Meyer, Lorenzo (1968), México y los Estados Unidos en el conflicto petrolero (1917-1942), Mexico City, El Colegio de México.
- NBER Macroeconomic History database
- Pani, Alberto J. (1926), La política hacendaria y la Revolución, Mexico City, Editorial Cultura.
- Rosenzweig, Fernando "La Industria"
- Torres Gaytan, Ricardo (1990), Un siglo de devaluaciones del peso mexicano Mexico D.F., Siglo XXI Editores, 6th edition.
- Turlington, Edgar (1930), Mexico and Her Foreign Creditors, New York, Columbia University Press.
- Uhtoff López, Luz María (2005), "La fiscalidad y la revolución constitucionalista", en Luis Aboites Aguilar y Luis Jáuregui (cords.), Penuria sin fin. Historia de los impuestos en México siglos XVIII-XX, Mexico City, Instituto de Investigaciones Dr. José María Mora, pp.161-188.
- Uhtoff López, Luz María (1998), Las finanzas públicas durante la Revolución, Mexico City, Universidad Autónoma Metropolitana.
- Womack, John Jr. (1978), "The Mexican economy during the Revolution 1910-20" Marxist Perspectives, 1-4, pp. 80-123.

Zebadúa, Emilio (1994), *Banqueros y revolucionarios: la soberanía financiera de México, 1914-1929*, Mexico City, El Colegio de México.

T a b l e 1

Mexican government revenues and expenditures (million current pesos)

	Revenues	Expenditures	Surplus or Déficit	As a % of Revenues	Ministry of War and Marine	As a % of Expend.	Taxes paid by the Oil industry	As a % of Revenues
1910	106	95	11	11%	19	20%		
1911	111	101	10	5%	20	20%		
1912	212	202	10	6%			0.49	0.23%
1913	164	153	10	6%	29	19%	0.77	0.47%
...								
1918	146	179	-32	-22%	129	72%	12	8%
1919	131	203	-73	-12%	134	66%	17	13%
1920	251	213	39	15%	132	62%	51	20%
1921	280	271	-5	-2%	153	57%	63	22%
1922	261	384	-122	-47%			88	34%
1923	264	348	-84	-32%	126	36%	62	24%
1924	284	298	-14	-5%	107	36%	54	19%
1925	337	292	45	13%	93	32%	47	14%
1926	329	329	0	0%	97	29%	41	13%
1927	307	310	-3	-1%	99	32%	26	8%
1928	311	287	23	8%	98	34%	18	6%
1929	322	276	47	15%	103	37%	19	6%
1930	289	279	10	3%	86	31%	22	8%
1931	256	226	30	12%	68	30%	22	9%
1932	212	212	1	0%	61	29%	24	11%
1933	223	246	-23	-10%	60	25%	28	13%

Source: Data for 1910-1912 from Mexico. INEGI. Estadísticas Historicas de Mexico, INEGI, Mexico, 1991. Data for 1911-1913 from Turlington (1930), Appendix I. The estimates for 1918 revenues and expenditures, 1919 expenditures, 1920 revenues and expenditures, and 1921 expenditures were taken from The Mexican Year Book 1920-1921 pp.323-326. Data for 1919, 1921 and 1922 revenues and on the taxes paid to the oil industry come from Meyer (1981), pp.35. Data on expenditure for 1922 comes from Gilly (1987), pp. 55. From 1923 to 1925 data from Pani (1926), pp.163-188, 1926 from Sterret and Davis (1928), pp. 50, 60, 255. From 1927 on data from México, Secretaría de la Estadística Nacional, Departamento General de Estadística, Anuario Estadístico de los Estados Unidos Mexicanos 1938, México: DAPP, 1934, pp. 280-281.

Foreign debt service of the Mexican government, 1901-1928

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INTEREST

Sources: For Revenues and actual debt service for the 1920s same as Table 1. Debt Service before 1910 from Zabludowski (1984), pp. 204. Payments under the 1922 and 1925 agreement are estimates mostly taken from Turlington (1930).

1901	63	14				22%
1902	66	17				25%
1903	77	16				21%
1904	87	15				18%
1905	93	16				18%
1906	103	18				17%
1907	115	18				16%
1908	112	22				19%
1909	99	26				26%
1910	106	27				26%
1911	111	27				24%
1912	12	25				12%
1913	164	26				16%
1914-1922	0	0				
1923	264	30	41	30	16%	11%
1924	284	1.4	72	35	25%	12%
1925	337	0	84	40	25%	12%
1926	329	21.385	50	45	15%	14%
1927	307	22.023	57	50	19%	16%
1928	311	0	34	140	11%	45%
				70		23%

T a b l e 3

Deficit or surplus as a % of revenues in other latin american countries (according to the investor's monthly manual)

	BRAZIL	CHILE	ARGENTINA	MEXICO (IMM)	MEXICO ACTUAL
1917		10%			
1918		11%	-41%		-22%
1919	53%	-47%	-16%		-12%
1920	39%	-20%	11%	-0.4%	15%
1921	26%	-4%	-13%	-34%	-2%
1922		1%	-9%	4%	
1923		-22%	-4%		-32%
1924	15%	24%	3%		-5%
1925	14%	24%	0.12%	-2%	13.3%
1926	31%	-11%	-0.11%	3%	0.03%
1927	22%	0.4%	-11%	-6%	-1.0%
1928	24%	2%	0.12%		7.56%

Source: *The Investor's Montly Manual*, 1920-1929 and Table 1.

T a b l e 4

Total debt quoted in london and debt *per capita* in the largest latin american economies

	1929	1920	1914	1910
MEXICO				
TOTAL DEBT QUOTED	£60,700,000	£60,700,000	£60,700,000	£40,700,000
POPULATION REPORTED	16,290,000	15,115,612	14,855,000	13,607,259
NEW ISSUES PER PERIOD	£0	£0	£20,000,000	
DEBT <i>PER CAPITA</i>	£4	£4	£4	£3
ARGENTINA				
TOTAL DEBT QUOTED	£105,634,298	£102,118,851	£96,166,107	£89,956,507
POPULATION REPORTED	10,616,814	8,284,266	7,467,878	6,489,000
NEW ISSUES PER PERIOD	£3,515,447	£5,952,744	£6,209,600	
DEBT <i>PER CAPITA</i>	£10	£12	£13	£14
BRAZIL				
TOTAL DEBT QUOTED	£178,624,020	£131,646,520	£123,646,520	£110,246,520
POPULATION REPORTED	36,870,962	27,473,579	23,070,969	19,910,646
NEW ISSUES PER PERIOD	£46,977,500	£8,000,000	£13,400,000	
DEBT <i>PER CAPITA</i>	£5	£5	£5	£6
CHILE				
TOTAL DEBT QUOTED	£51,624,092	£41,097,592	£41,097,592	£29,475,492
POPULATION REPORTED	4,004,014	3,870,022	3,459,951	3,248,224
NEW ISSUES PER PERIOD	£10,526,500	£0	£11,622,100	
DEBT <i>PER CAPITA</i>	£13	£11	£12	£9

Source: *The Investor's Monthly Manual*, 1920-1929

Note: Total debt and new issues include sovereign, state and municipal debts (called "foreign corporation" in the Investor's Montly Manual) of these countries.

T a b l e 5

Debt burden in selected countries according to the league of nations

COUNTRY	AMOUNT OF DEBT IN MILLION PESOS	DEBT <i>PER CAPITA</i>	ANNUAL DEBT SERVICE IN MILLION PESOS	DEBT SERVICE AS A % OF NORMAL REVENUES
ARGENTINA	2180	218	156	30%
BELGIUM	4278.5	549	238	41%
BRAZIL	2681.4	88	96	35%
CHILE	831	208	60	24%
FRANCE	37742	902	1253	40%
GREAT BRITAIN	76337	1608	3114	40%
ITALY	5172.1	127	308	36%
NETHERLANDS	2405.4	324	106	20%
NORWAY	730.76	261	40	29%
PERU	224.3	49	18	21%
SPAIN	5050	230	226	30%
UNITED STATES	39300	340	1500	19%
MEXICO (2 BILLION)	2000	133		
MEXICO (1 BILLION)	1000	66.7		

Source: Turlington (1930), pp. 335. Original data from the League of Nations, converted to Mexican pesos by Turlington at the exchange rate of 10 pesos per pound.

Note: The two scenarios for Mexico represent an approximation of the debt burden after the 1925 agreement (1 billion pesos) and an estimate of the total debt of Mexico if the country were to pay for reparations on damages to foreign citizens caused by the Mexican Revolution.

T a b l e 6
Chow breakpoint test

Sample 1915-1928				SQUARE VALUE
DATE				
FEB-17	NEW CONSTITUTION	No	4.3	0.118
APR-17	GOVERNMENT ANNOUNCES MEXICO WILL PAY	No	3.7	0.158
AUG-17	US RECOGNIZES THE GOVERNMENT OF CARRANZA	YES (AT 10% SIG.)	4.9	0.086
AUG-20	GENERAL OBREGON 'S REBELLION	No	0.8	0.674
APR-22	FIRST FORMAL DEBT RE-NEGOTIATION AGREEMENT IS SIGNED	YES (AT 10% SIG.)	5.6	0.062
DEC-23	DE LA HUERTA REBELLION	YES	10.5	0.005
JUN-24	THE 1922 DEBT AGREEMENT IS SUSPENDED BY THE MEXICAN GOVERNMENT	YES	11.1	0.004
JAN-25	CENTRAL BANK OF MEXICO IS CREATED	No	4.6	0.100
DEC-25	NEW DEBT AGREEMENT IS APPROVED	No	3.4	0.183
JAN-27	CRISTERO WAR STARTS	No	1.1	0.586

Note: OLS estimations run with $\ln Y_t = \alpha + \beta_1 \ln Y_{t-1} + \beta_2 \ln Y_{t-1} * \text{EVENT}_{\text{long}} + \varepsilon_t$, where $\ln y_t$ is the logarithm of the risk premium in period t , and $\text{EVENT}_{\text{long}}$ is a dummy variable that multiplies $\ln y_{t-1}$. The variable $\text{EVENT}_{\text{long}}$ has a value of zero until the moment of the event we select ex-ante according to historical research and it takes the value of one thereafter. The estimates have heteroskedasticity-consistent errors with no detectable serial correlation. We could not find significant breakpoints for any other events, even if they are not included in this table.

Figure 1
Risk premium implicit in the 1899 mexican bond quotations in london, 1901-1929

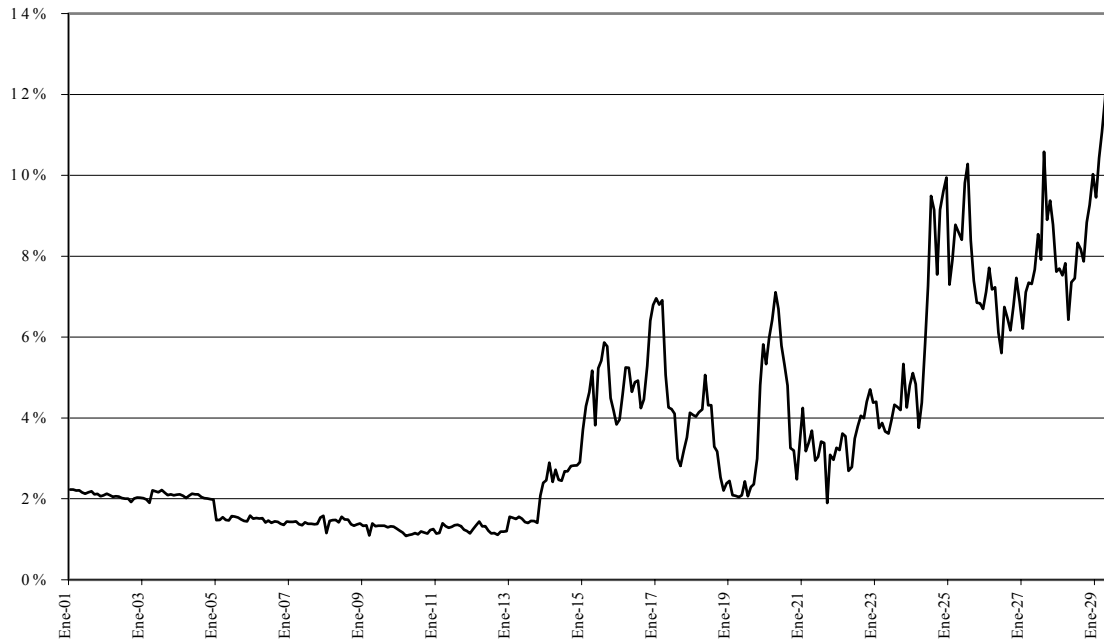


Figure 2
Monthly risk premium of the Mexican bonds and relevant events, 1914-1929

