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ABSTRACT

The literature on sovereign defaults has focused on adverse shocks to debtors' economies, suggesting that defaults are of an idiosyncratic nature. Still, many of the sovereign crises are of a systemic nature, clustered around panics in the financial centers. Crises in the financial centers are rare events and their effects on the periphery can only be captured by examining long episodes. This paper examines sovereign defaults in Latin America from 1820 to 1931. We find that systemic crises are different. The international collapse of liquidity is at their core. Default spells and recovery rates are also affected by liquidity crashes.

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I. Introduction

The debate on sovereign defaults surged in 1982 in the midst of the Debt Crisis but mostly died out in the late 1980s. In the midst of the Eurozone crisis, sovereign defaults have become again the focus of attention in both policy and academic circles. This time around, it is not emerging markets at the core of these expected defaults. Sovereign defaults have come back with a vengeance; now developed countries are the ones expected to default. Which countries will default? How protracted the renegotiation process will be? How large the losses will be? When will the defaulting countries return to international capital markets?

Importantly, the latest sovereign crises start in the aftermath of the financial crisis in the United States that rapidly spreads to other financial centers and, naturally, also affects the periphery. In contrast, sovereign crises since the 1980s mostly erupt in the midst of good global conditions and with a healthy financial center.¹ It is impossible to assess the outlook of the European countries in crisis by comparing these sovereign crises to those of the 1980s and 1990s. It is important to study a similar type of sovereign crises. However, while sovereign crises in the periphery happen fairly often, crises in the financial center are rare events. Only longer episodes can help us to understand the scope of the current crisis. Thus, this study examines the evidence from the first episode of financial globalization starting at the end of the Napoleonic Wars and ending with the Great Depression, which is witness to panics in London, Paris, New York, Frankfurt, and Berlin, the financial centers of those times. These one hundred years of crises will allow us to untangle the effects of fragilities in the periphery and in the financial center.

Sovereign debt defaults and renegotiations have been the bread and butter of Latin American countries since the first defaults in the 1820s. During the first period of financial globalization (1820-1931) there are sixty seven defaults across all countries from the richest, like Argentina, to the poorest, like Bolivia. There are episodes of systemic crises across the region but other crises are of an idiosyncratic nature. Also, some sovereign crises are long lasting, with

¹ There is one important exception. The sovereign defaults in Latin America in the early 1980s are also clustered around a major banking crisis in the United States. The U.S. commercial banking crisis that starts in 1980, in the midst of a recession and with collapsing real estate prices, leads to about 1,400 bank failures (See Boyd and Gertler, 1993 and 1994, for an analysis of this crisis). Still, with many countries having controls on international capital flows in the 1970s and 1980s, the crisis does not spread widely in the periphery.

default spells longer than thirty years, while others only last one year. As our estimates indicate, investors' losses also vary dramatically, ranging from 2 to 90 percent. These sovereign crises will be the focus of our work.

Pervasive sovereign crises, particularly following the Debt Crisis in the early 1980s, gave impetus to a flourishing theoretical literature on sovereign defaults. As stressed in Eaton and Gersovitz (1981) seminal paper, in this literature, defaults occur following adverse shocks to the domestic economy. In this model with lack of debtors' commitment, payment is enforced by the threat of financial autarky.

With calmer markets in the late 1980s and early 1990s, interest in this literature languished. The Russian default in 1998, the bailout packages to Mexico in 1995 and the Asian countries in 1997, and especially the Euro crisis in 2010 have, however, rekindled interest in the topic. While the theoretical literature still focuses on adverse shocks to the debtors' domestic economy as the trigger of defaults, the center of attention of this recent literature has shifted in two directions. The first branch of this literature examines what type of shocks can explain the frequency of sovereign crises and the countercyclical behavior of interest rates in emerging markets. For example, the calibration exercise in Aguiar and Gopinath (2006) shows that while sovereign defaults occur in bad times, adverse transitory shocks to economic activity rarely trigger defaults. It is adverse shocks to the permanent component of output that explain better the frequency of defaults observed in the data. The second branch of this literature examines the debt restructuring process, including the default spells and the losses of investors once an agreement is reached. As examined in this literature, delays in debt restructuring may be seen as inefficient. Since defaults occur in bad times, debtors lose access to international capital markets when they need it the most. Creditors lose too since they cannot share any resources of the sovereign while they are in default. Still, delays can be beneficial. Restructuring when recoveries start, will allow the sovereign to allocate more resources to service the debt and investors will be able to recover a larger part of their assets (see Bi, 2008). Moreover, once recoveries start, the debtor will be more likely to comply with the terms of the agreement. (see Benjamin and Wright, 2009). Debt recovery rates are also affected by creditors and debtors bargaining power as shown in Yue (2010). However, it is unclear from this model what triggers those changes in bargaining power.

Still, both old and new models have only domestic shocks at the core of defaults and restructurings. In these models, international investors are always ready to lend to countries at risk free rates if they evaluate that the sovereigns are committed not to default and at higher rates if creditors think the sovereigns might not honor their contracts. None of these models have paid attention to adverse shocks to financial centers despite the fact that many sovereign defaults in the periphery are systemic and clustered around panics and crises in the financial center. It is at those times that international liquidity collapses and even non-defaulters cannot borrow. When world capital markets are in disruption, sovereigns will have more incentives to default and default spells will become longer. The bargaining power of investors will decline since they cannot offer new credit. If an agreement is reached, this loss of bargaining power of investors will impact adversely the debt recovery rates. None of these aspects of sovereign crises have either been explored in the empirical literature.

In this paper, we aim to fill this void in the literature. This paper creates an anatomy of debt defaults and links this anatomy to the economic and financial evolution of the global economy, the financial centers, and the periphery. Our one hundred years of defaults allow us to examine not only those defaults that are solved rapidly but also those that are protracted with countries defaulting several times on the same bonds. We can keep track of the renegotiations and the cumulative investors' losses. We can also examine the type of domestic and global shocks that trigger long renegotiation episodes as well as large investors' losses. These one hundred years of defaults allow us to study whether rare events, such as crises in the financial centers, are at the core of many of the sovereign crises in the periphery. Our main results can be summarized as follows.

First, most of the defaults in Latin America during the first episode of financial globalization are clustered around panics in the financial centers. Seventy percent of the defaults occur around the 1825 crisis in London; the 1873 crisis in Vienna, Amsterdam, and Frankfurt; the 1890 Baring crisis in London; the 1914 crisis at the start of the First World War, and the 1929 crisis in New York and London. It is around these crises that international liquidity collapses. Even non-defaulters lose access to international capital markets.

Second, a collapse in international liquidity not only triggers defaults in the periphery but also, if persistent, prolongs default spells and leads to smaller recovery rates. With international

capital markets in disruption, creditors cannot entice sovereigns to settle the default, investors' bargaining power declines and so do debt recovery rates.

Third, whether systemic or idiosyncratic, defaults occur in bad states, following permanent adverse shocks. Defaults are not triggered by transitory shocks in economic activity. Importantly, restructurings occur in the midst of persistent recoveries. Also, as the odds of persistent recoveries increase, so do debt recovery rates.

Fourth, idiosyncratic crises are different. A debt overhang problem is at the core of most of these crises, with countries renegotiating many times on the originally issued bonds. Countries do not regain access to international capital markets in the aftermath of these periodic restructurings. After serial defaults, recovery rates are mostly zero.

Fifth, idiosyncratic liquidity also matters. We identify idiosyncratic liquidity shocks with shocks to government revenues. We find that a collapse in idiosyncratic liquidity triggers defaults. We also find that a positive shock to idiosyncratic liquidity during renegotiations improves the sovereigns' bargaining power as debtors can finance their expenses without accessing international capital markets. This leads to a decline in debt recovery rates.

The rest of this paper is organized as follows. Section II presents a chronology of Latin America borrowing cycles and sovereign defaults. Section III provides a higher resolution picture of defaults in the seven largest economies in Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. This section examines in detail the debt build-up before the defaults, the characteristics of the defaults, the renegotiations, and the duration of the default spells. Importantly, this section also computes debt reduction rates at the time of the restructuring of the debt. Section IV presents the global and idiosyncratic indicators we constructed for the 1820-1960 period. We extend our sample to 1960 to examine the long default spells following the Great Depression in 1931. Section V examines what triggers defaults. Section VI studies the shocks behind long- and short- default spells as well as those leading to large and small debt recovery rates. Section VII discusses the findings and possibilities for future research.

II. Borrowing Cycles and Defaults

Mostly all Latin American countries gain independence from Spain and Portugal in the early 1800s. The new independent countries immediately eliminate the restrictions to trade

imposed on the colonies by Spain and Portugal. International trade restarts and participation in international capital markets soon follows, with all governments floating bonds in London. This bonanza is in part fueled by the sharp decline in England's military spending following the end of the Napoleonic wars and the monetary injections of the Bank of England. The first Latin American country to float bonds in London is Colombia in 1820. By the end of 1825, the total issuance by Latin American countries has reached 20 million British pounds. It is not just sovereign borrowing, international investors also finance new firms to exploit mineral resources in Latin America. Overall, the early years of the 1820s are characterized by global growth and increases in international trade.

The boom ends in the summer of 1825 when the Bank of England raises its discount rate to stop the drain of reserves triggered by England's import boom and the outflow of capital. There is a stock market crash in October, a banking panic in December, and numerous bankruptcies. The financial debacle in London rapidly spreads to continental Europe, with bankruptcies of major banks in Germany, Italy, Amsterdam, Saint Petersburg, and Vienna. The crisis extends rapidly to Latin America as overseas loans are cut off. The crisis also triggers a major fiscal problem in Latin America. As world trade growth sharply declines, so do tariff revenues, the only source of income of the governments of the new countries. Peru defaults in April 1826; Gran Colombia (Colombia, Ecuador, and Venezuela) defaults in September 1826; Chile and Mexico default in 1827; Argentina, Brazil, and the Federation of Central America default in 1828. It takes three decades before the debts are renegotiated and capital flows to Latin America resume.

The world economy and international trade grow rapidly in the early 1840s. With the European economy growing, the need for primary products and raw materials increases, benefiting Latin American economies. The growing international trade brings a fiscal bonanza to all Latin American countries (as tariff revenues increase accordingly) and with it, the possibility of settlement of the foreign debts.² Brazil is the first to re-enter the market in 1839 and is followed by Peru in 1853. Still, the new loan boom to Latin America only flourishes in the 1860s. This new capital flow bonanza is far larger than that of the early 1820s, with capital flows during this period financing governments but also the construction of railroads and the

² Chile is the first to renegotiate its debt in 1842 and Colombia follows in 1845. Peru reaches an agreement in 1849. Most Latin American countries renegotiate their debts in the 1850s.

creation of commercial banks across Latin America. This boom in international capital flows ends in 1873. The end of the Franco-Prussian War in 1870 plays a critical part in the unfolding of this crisis. Following the defeat of Napoleon III, the new French government has to pay an enormous indemnity of 200 million British pounds to Germany. These transfers lead to a massive flow of capital into the economies of central Europe, fueling speculation in various financial markets. A stock market crash in Vienna in May 1873 ends with the stock market boom in Austria and spreads rapidly to Germany. Stock markets in Amsterdam and Zurich also crash. The crisis crosses the Atlantic in September, the New York Stock market collapses, and is followed with a U.S. banking panic. As during the crisis of 1825, there is a collapse in world trade growth and in the prices of commodities, and loans are called off. Tax revenues in Latin America drop and trigger a new wave of defaults across Latin America. The crisis is also felt in the Middle East. In total, by 1876, fifteen non-European nations have suspended payments on almost 300 million British pounds. In Latin America, Bolivia, Colombia, Costa Rica, Guatemala, Honduras, Paraguay, Peru, and Uruguay default on their foreign debt.

By the early 1880s a process of recovery has begun. The upswing in world economic activity fuels foreign trade and new capital flows to Latin America. This time around, capital flows finance a new variety of private activities and the adoption of the cutting edge technologies of those times, such as railways, tramways, gas works, as well as banks, production of raw materials, mining, and land companies. Argentina and Uruguay receive the largest inflows. The boom of the 1880s ends in 1890 with the crisis set off by the near-failure of Baring Brothers, the underwriter of Argentine government loans. The Bank of England prevents a panic via a recapitalization of Baring Brothers with the help of other major London financial institutions and loans from the Banque de France and the Russian central bank. Still, the crisis spreads back to Latin America with the cessation of British lending to Argentina, Uruguay, and Brazil. Between 1890 and 1894 Argentina, Ecuador, Guatemala, Nicaragua, Paraguay, Uruguay, and Venezuela default.

The next international capital flow cycle starts in the early 1900s and ends with the start of the First World War. While Great Britain continues to be the main creditor, French, German, and United States investors set up new companies in banking as well as in railways, tramways, mines, sugar refineries, flour mills, gas works, and even some early electric and telephone companies. This episode is considered until now the heyday of financial globalization. The

outbreak of the First World War contributes to the end of this boom in international capital flows. In July, as the war becomes imminent, a liquidity crunch spreads around the world as investors start to liquidate foreign assets, fueling panics in all financial markets. While the panic is promptly stopped by the central banks in Great Britain, the United States, and continental Europe, the outbreak of the war in Europe causes an abrupt suspension of capital flows. Brazil, Ecuador, Mexico, and Uruguay default.

Capital flows resume with the end of the war in Europe, with New York becoming the main international financial center. Again, as in the earlier capital flow bonanzas, international capital finances governments as well as investment to implement the major inventions of the early twentieth century, including electricity, automobiles, and communications. Economic activity booms around the world, with Latin American countries benefiting from the rise in international prices of raw materials and primary products. In 1927-1928 the Federal Reserve tightens monetary policy; a recession begins in July 1929. Prices of commodities collapse, stock markets around the globe crash, and capital flows sharply decline, precipitating currency and banking crises in Latin America and Europe. In September 1931 Great Britain abandons the gold standard and so does the United States in January 1934. Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Nicaragua, Panama, Paraguay, Peru, and Uruguay default in the midst of the Great Depression. The default spells are long, with some countries settling their debts by the late 1950s.

In our chronology, we emphasize the common cycles of booms and busts in international capital flows fueled by developments in the financial centers and the global economy. It is following these international capital flow bonanzas that we observe clusters of defaults across most Latin American countries, as shown in Figure 1. Table 1 summarizes the characteristics of these systemic default episodes, which we define as five-year episodes with defaults of at least 20 percent of countries in Latin America. This table shows the origins, the background, the mechanisms of transmission, and the countries that default during these episodes. About seventy percent of all defaults in Latin American occur during these systemic crises.³

³ See Bordo and Murshid (2000) for an excellent chronology of crises in the financial centers as well as financial contagion during the first episode of financial globalization. See also Marichal (1989) for a detailed chronology of events, sovereign borrowing, and defaults in Latin American from independence to 1930. See Neal (1998) for an analysis of the London Panic in 1825.

Defaults also occur in times of booms in the global economy, with fragilities just emerging in the periphery. It is in those episodes that we observe idiosyncratic crises in various countries in Latin America. Table 2 shows those defaults with idiosyncratic patterns, such as Chile's default in 1879 in the midst of the War of the Pacific and Colombia's default in 1900 in the midst of the Thousand Days' War.

III. The Anatomy of Defaults

In this section, we examine the sovereign crises and the ensuing renegotiations on the terms of the debt and calculate investors' losses after the defaults in the seven largest economies in Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. To evaluate the various defaults we need information on the characteristics of the bonds in default, the terms of agreement following default as well as the characteristics of new bonds issued after the renegotiation. Most of the information is obtained from bond prospectuses at the time of issuance complemented with information on sovereign debt in the *Compendium of the English and Foreign Funds and the Principal Joint Stock Companies* by Charles Fenn, in *Kimber's Records on Government Debts and Other Foreign Securities*, in *Moody's Municipal and Government Manual*, and information on the negotiations in the *Annual Reports of the Council of the Confederation of Foreign Bondholders* and *Annual Reports of the Foreign Bondholders Protective Council, Inc.* This information is complemented with a large number of country studies on sovereign debt cited in the references. We focus only on defaults of the central government since it is mostly impossible to obtain the terms of the defaulted bonds issued by provinces, states, and municipalities.

Argentina defaults twice: 1828 and 1891. Brazil defaults four times: 1828, 1898, 1914, and 1931. Chile defaults three times: 1827, 1879, and 1931. Colombia defaults seven times: 1821, 1826, 1848, 1873, 1879, 1900, and 1932. Mexico defaults four times: 1827, 1854, 1914, and 1928. Peru defaults three times, 1826, 1876, and 1931. Uruguay defaults four times, 1875, 1891, 1915, and 1931. As shown in Figure 2, default spells are quite varied, ranging from a minimum of 1 year in the case of the 1891 Uruguay's default to 33 years in the case of Mexico's default in 1854. The defaults of the 1820s and 1930s are the most protracted.

Table 3 provides a higher resolution picture of the defaults and renegotiations of these seven countries. Before we examine the negotiations following the defaults, we need to discuss the characteristics of bonds during the 19th and early 20th centuries. During this episode, bonds have maturities between 20 and 50 years and have sinking fund provisions. Sinking funds are reserves set aside annually or half-yearly by bond issuers to amortize the debt. Lotteries are conducted to select those bonds to be repaid. Most bonds are paid at par value, but provisions in some prospectuses allow governments to use the sinking fund to purchase bonds at market prices. Most bonds have a constant annual service payment used to pay coupons and repayment of principal similar to current mortgage loans. Defaults during this first episode of financial globalization take the form of suspension of sinking funds or suspension of coupon payments or outright defaults with suspension of the complete service of the debt.

The first column in Table 3 shows the date of the default. For each default, columns 2 and 3 show the bonds in default as well as the outstanding debt in British pounds. Column 4 first provides information on the characteristics of the default, that is, whether there is a suspension of the sinking fund and/or coupon payments. Column 4 also provides information on the details of the agreement. If new bonds are issued, Column 4 shows the characteristics of the sinking fund and coupon rates of the new instruments as well as whether the old bonds are exchanged at par, discount, or premium.

Argentina defaults twice. The first default occurs in 1828, in the aftermath of the global crisis with London at its epicenter. At that time Argentina foreign sovereign debt consists of just one bond, the 6% 1,000,000 British pound bond floated in 1824. At the time of the default, the amount outstanding is approximately 975,000 British pounds. Argentina suspends the sinking fund as well as coupon payments. No negotiations occur until the 1850s. An agreement is reached in 1857 and a new 1-3% bond is issued for 1,641,000 British pounds equal to the unpaid interest (not capitalized). There is no exchange of the old bond for a new bond. The agreement does not allow for reductions in the value of the principal and Argentina has to resume the sinking fund and new coupon payments of the 1824 6% bond in 1860.

Argentina re-enters international capital markets in the mid-1860s. The first new government bond is issued in 1866. Private foreign issues start even earlier in 1861. From 1861 until 1891, private and sovereign international borrowing sharply increases, amounting to 166

million British pounds.⁴ Following the borrowing boom of the 1880s the government of Argentina defaults again in March 1891. While the government maintains the sinking fund and pays the coupons of the 1886-1887 5% 8,290,000 British pound loan, it suspends both the sinking fund and the coupon payments of ten bonds, with an outstanding balance of 31 million British pounds. Most of the defaulted debt consists of the new borrowing since 1866. The outstanding amount of the 1824 bond is only 244,000 British pounds. In contrast to the default of 1828, which is renegotiated in 1857 after 30 years, this default is settled within a month. This first restructuring is quite unfavorable to Argentina. According to the agreement of 1891, the government has to issue a 6% Funding Loan to service the defaulted bonds (sinking fund and coupon payments) between 1891 and January 1st, 1894. The principal of the bonds is maintained at its par value and the sinking fund and coupon payments have to be resumed (with payments in cash) in 1894. From 1891 to 1893, the government has to issue approximately a 7.6 million British pound 6% bond to cover the debt service of the defaulted bonds, increasing the government debt by about 25 percent. With no new borrowing in the midst of the collapse in international capital flows in the 1890s and with an increasing debt burden, Argentina repudiates the 1891 agreement in 1893. A new agreement is reached that same year, the so-called Romero Agreement. Other government bonds, such as the 5% loan of 1886-1887 for 8,290,000 British pounds, are included and the total amount in default is 44 million British pounds. The new agreement includes reductions in interest rates oscillating between 100 to 360 basis points for five years. The sinking fund on all bonds is suspended until 1901. This is the last default of the central government of Argentina in the first episode of financial globalization from 1820 to 1931.

Brazil defaults four times during the first episode of financial globalization. Brazil first taps international capital markets in 1824. Two bonds are issued in 1824-1825 for a total of 3,686,200 British pounds. Also, as a price for independence from Portugal, in 1825 Brazil accepts as part of its international liabilities the 1,400,000 British pound 5% Bond issued by Portugal in 1823. The London panic in 1825 makes it difficult to service the debt. Brazil unilaterally suspends the sinking fund of the Portuguese Bond in 1828. It resumes the sinking

⁴ The data on international capital flows to Latin America from 1820 to 1931 are part of a new database on international issuance in London, Paris, Berlin, Frankfurt, and New York constructed by Graciela Kaminsky. See, "Two Centuries of International Borrowing Cycles: A View from Latin America," in home.gwu.edu/~graciela/ for an analysis of the database.

fund payment in 1836 only to suspend it again in 1840. Again it restarts the sinking fund payment in 1843 to suspend it in 1844. Finally, it resumes the sinking fund of this bond in 1850. Brazil also unilaterally suspends the sinking fund of the 1824-1825 bonds in 1831 only to resume it in 1851. Still, Brazil continues to pay interest on the debt over the period 1828-1950.⁵ Thus, our analysis indicates that Brazil is in default from 1828 to 1850.⁶ As just described, the Brazilian default is in sharp contrast to the default of Argentina in 1828. Argentina defaults outright and does not make any payments until 1857 when the debt is renegotiated. Naturally, access to international capital markets following their defaults is quite different. Argentina cannot tap international capital markets until 1866. In contrast, Brazil issues a 5% bond for 769,200 British pounds in 1829 to pay coupons. Also in 1839 Brazil issues a 5% bond for 411,200 British pounds and in 1843 it issues a 5% bond for 732,600 British pounds, all issued before Brazil resumes the complete service of the debt in 1851.

Brazil participates heavily in international capital markets from the 1860s until the 1890s. Government debt increases to approximately 42 million British pounds by 1898. It defaults again in 1898 following the collapse of the price of coffee (its main export crop), political instability in the early years of the Republic, and the decline in international lending in the aftermath of the Baring Crisis in 1890. Brazil issues in 1898 a Funding Loan (Rothschild is the underwriter) for 8.6 million British pounds to pay coupons from 1899 to 1901. Interest payments are made regularly since the second half of 1901. The sinking fund of all the bonds is suspended for thirteen years (1898-1911). Again as during the earlier default in 1828, Brazil re-enters international capital markets even before it resumes full service of the debt in 1912. Brazil issues six 5% bonds in 1903, 1905, 1907, and 1908 (for 5,500,000; 3,000,000; 3,000,000; and 7,200,000 (in three bonds) British pounds, respectively). Moreover, Brazil issues a 4% conversion bond in 1908, reducing coupons on previous 5% bonds. This time around, many commodity-rich states, such as Sao Paulo, start tapping international capital markets following the constitutional reform in 1891 that gives state governments the sole right to tax exports.

⁵ The information on the service of the debt from the early 1820s to 1951 is collected from Bouças (1950), de Castro Carreira (1980), and *Estatísticas Históricas do Brasil: Series Econômicas, Demográficas e Sociais de 1550 a 1988* published by the Fundação Instituto Brasileiro de Geografia e Estatística (1990).

⁶ Previous research on this episode is contradictory. For example, Marichal (1989) and Paiva Abreu (2006) conclude that Brazil does not default in the 1820s or anytime during the 1828-1851 period. In contrast, Standard & Poor's and Bein and Calomiris (2001) identify the 1826-1829 period as a default event.

Following the collapse of rubber exports in 1912 and the sharp decline of coffee prices when the coffee support-plan implemented by Brazil is deemed illegal in the United States, Brazil defaults in 1914 in the midst of highly illiquid capital markets at the onset of First World War. As in 1898, Brazil issues a Funding Loan (Rothschild is the underwriter) for 14.5 million British pounds to pay coupons from 1914 to 1917 while interest payment are made regularly in cash starting in 1918. Brazil suspends the sinking fund for thirteen years. This time around, some states and municipalities also default. The total central government external debt at the time of the default is approximately 99 million British pounds. Even in the midst of default, Brazil is able to tap again international capital markets. Public borrowing (central government, states, and municipalities) from 1916 to 1931 reaches 167 million British pounds. Brazil (central government, states, and municipalities) defaults again in 1931. The central government debt in default in 1931 reaches 140 million British pounds. Renegotiations after this default are quite different to those following the earlier defaults. While initially Brazil only suspends sinking fund payments and issues a Funding Loan to pay coupons, this plan is quickly abandoned. Brazil resumes coupon payments in cash in 1934 but at a reduced rate. In 1937 coupon payments are suspended again. In contrast to previous defaults in which Funding Loans are considered senior loans and not defaulted, the Funding Loans of 1898, 1914, and 1931 enter in default in 1937. When the service on these bonds is resumed in 1940, coupon and sinking fund rates are reduced by 50% and 40%, respectively. Moreover, Brazil starts buying bonds in the market at prices that mostly oscillate between 7 and 36 percent of the par value for the non-funding loans. A final agreement is reached in 1944 for bonds issued in London and New York and in 1946 for bonds issued in Paris. This agreement includes both reductions in coupon rates and in the principal.

Chile defaults in 1827, 1879 and 1931. Chile first taps international capital markets in 1822, issuing a 6% bond for 1,000,000 British pounds. As Argentina, during the default of the 1820s, Chile does not service the debt (coupons and sinking fund). In 1842, an agreement is reached and a new 3% bond is issued for approximately 758,300 British pounds equal to the unpaid interest (not capitalized). There is no exchange of the old bond for a new bond. The agreement does not allow for reductions in the value of the principal and Chile has to resume sinking fund and new coupon payments of the 1822 6% bond in 1847.

As Argentina and Brazil, Chile participates heavily in international capital markets during the 19th century. Following the resolution of the default of the 1820s, Chile first issues a new

4.5% bond in 1858 for 1,554,800 British pounds for the construction of railways. By 1879, Chile's public external debt reaches approximately 6 million British pounds. It is in that year that the war with Bolivia and Peru starts. Chile unilaterally suspends the sinking fund for three years but it continues to pay coupons. Chile re-enters the international capital market in 1887. From 1887 to 1931, public borrowing (central, provinces, and municipalities) totals 130 million British pounds. Chile's last default is in 1932. The default begins in August with the failure to pay the interest and sinking fund of the 1927 6% bond. Other issues follow in turn. In the midst of the default, Chile as Brazil does, purchases debt in the market at prices that range from 13% to 37% of their par value. This last default is finally renegotiated in 1948-1949. The old bonds are exchanged at par for new bonds with reduced coupon rates and extended maturities. A new 3% bond is issued to pay 50% of the (not capitalized) unpaid coupons.

The characteristics of Colombia's default stand in sharp contrast with those of Argentina, Brazil, and Chile. Until 1830, Colombia is part of a Federation (Gran Colombia) including Ecuador and Venezuela. Gran Colombia first participates in international capital markets in 1820, floating a 10% debenture for 547,783 British pounds. This bond is defaulted in 1821. In May 1822, the government of Gran Colombia issues a 6% loan for 2,000,000 British pounds in part to pay the principal (at par) of the 1821 debenture as well as the arrears in interest (not capitalized). In 1824, in the midst of the boom of the 1820s, Gran Colombia floats another bond for 4,750,000 British pounds. These two bonds are defaulted in 1826.⁷ This default starts a string of serial defaults that span eighty years. In total, starting in 1826 until the end of the 19th century, Colombia defaults five times: 1826, 1848, 1873, 1879, and 1900. Most default spells are long. When agreements are reached, the old bonds are converted into new "active" bonds and "deferred" bonds are issued to pay bondholders the (not capitalized) interest in arrears. All these restructurings include reductions in coupon rates and in principal. In some of the agreements, the principal and the interest in arrears are heavily discounted. Other agreements allow Colombia to redeem its bonds through market purchases at prices well below their par value. From the default of 1826 to the default of 1900, bonds and shares issued by Colombia in

⁷ In 1834, the external debt of Gran Colombia is divided among the three countries in the following proportions: Colombia: 50 percent, Venezuela: 28.5 percent, and Ecuador: 21.5 percent. The outstanding external debt of Colombia in 1834 is 3,312,975 British pounds. In Table 3, the debts outstanding at the time of the defaults in 1821 and 1826 are scaled down to 50 percent of the outstanding debt of the Gran Colombia as is agreed in the Agreement of 1834 among Colombia, Ecuador, and Venezuela.

international capital markets amount to just 15 million British pounds (of which 12 million British pounds are bonds exchanged in the renegotiations for the old bonds plus bonds issued to pay unpaid interest). Basically, Colombia is out of international capital markets with most of the issuance to repay defaulted bonds and deferred coupons. By the end of all these defaults and renegotiations, the recovery rates are close to zero.

With the stabilization in the early years of the 20th century and the exit from default in 1905, Colombia starts tapping international capital markets, with new public and private borrowing reaching 60 million British pounds by 1931. States and municipalities default in 1931 and the central government defaults in 1932. During the default, Colombia purchases bonds in the market at prices oscillating between 15% and 36% of their par value. The central government settles the default in 1941-1942. Old bonds are to be exchanged at par for new 3% bonds due in 1970. Coupons in arrears (not capitalized) are paid at 50% with the issue of a 3% bond.

Until the last twenty years of the 19th century, Mexico's defaults and participation in international capital markets are mostly similar to those of Colombia, with long default spells and inability to tap international capital markets. From the default in 1827 until the settlement in 1886 of the default of 1854, Mexico is in default 58 years. Mexico issues two 3,200,000 British pound bonds in London, one in 1824 and the other in 1825. This is basically the debt defaulted in 1827. There are several attempts to renegotiate the debt in 1831, 1837, and 1846. In all these attempts, Mexico promises to issue bonds to pay for coupon arrears and exchange the defaulted bonds for new bonds (sometimes at par, sometimes with a heavy discount). In the midst of civil wars and the 1846 war with the United States in which Mexico loses half of its territory, all these renegotiations fail. Only in 1851, an agreement is reached. At that time, Mexico issues a 3% bond for 10,241,650 British pounds in exchange for old bonds and to pay in part the arrears in coupons. This bond is guaranteed with government revenues, mainly tariffs. Mexico also promises future annual transfers of 250,000 pesos starting in 1857 to amortize the debt. Bondholders also receive 2,500,000 U.S. dollars for part of the unpaid coupons.

Mexico suspends payments again in 1854. As with the default of 1827, renegotiations are quite protracted amid civil wars and the Franco-Mexican war of 1862-1867. The settlement of the debt occurs in 1886, once the country has been stabilized under Porfirio Díaz. Previous debt (including the bonds issued by the Maximilian Government in 1864) and unpaid coupons

(not capitalized) are converted into a new 3% bond. While the 1851 conversion bond principal is converted at par, other old bonds are converted into the new bond at heavy discounts, between 40 and 80 percent. Arrears in coupons of the 1851 bond are cancelled at 85 percent discount. According to the agreement in 1886, the Mexican government can redeem its bonds with purchases in the market or by drawings at a rate of 40 to 50 percent of their par value.

With the debt settled and the economy stabilized, Mexico is able to participate in international capital markets again. It is not just sovereign borrowing but also private investment financing the construction of railways, mining production, banks creation, and various manufacturing activities (particularly in the tobacco and paper sectors), and production of commodities, such as sugar, rubber, and coffee.

Mexico defaults again in the midst of the Revolutionary war in 1914, initiating a new episode of serial defaults, inability to access international capital markets, and debt recovery rates close to zero. Government debt by then has escalated to approximately 66 million British pounds. The debt is settled in 1922 (Convenio Lamont-De la Huerta. June 16, 1922). By this agreement, Mexico acknowledges all the debts prior to the revolution. Coupon arrears are agreed to be paid at par over a period of forty years beginning in January 1928. These arrears do not accumulate any interest. By this agreement, all service of the debt, including the sinking funds, is agreed to be fully resumed in cash. The debt service is partially guaranteed from 1923 to 1927 by oil export tax revenues, a tax on railways, and railway revenues. Payments are suspended on June 30, 1924 and a new agreement is signed in October 1925 that includes the capitalization of unpaid coupons from 1924 to 1925 and the privatization of the national railway system.

In 1928, under large fiscal pressure, Mexico suspends payments on the debt. The debt is renegotiated in 1942. Investors' losses are enormous because of large discounts on principal and interest arrears: The debt denominated in dollars with a market exchange rate of 4.85 Mexican pesos per dollar is paid in Mexican pesos at a conversion rate of 1 Mexican peso per dollar. Similar losses affect British pound-denominated bonds. Also, coupon arrears (not capitalized) are agreed to be paid at 1% to 2.5% of their face value.

Peru also first taps international capital markets in the early 1820s. It issues two 6% bonds for 1,816,000 British pounds. The crisis in London in 1825 and the collapse in international liquidity together with the unstable political and economic conditions in Peru

trigger a default in 1826. In the 1840s, Peru's economic conditions improve with the discovery of deposits of guano and with the increase in demand for this fertilizer from European countries. In 1842 the Peruvian government declares the deposits of guano a state monopoly, securing a new source of income. Within a short time, the ruinous fiscal conditions improve and the fiscal accounts are balanced, making it possible for the government to reach an agreement with its creditors. The 1849 agreement includes a 25 percent debt-relief on the unpaid coupons and the issue of a bond for the rest of the arrears. As with other debt defaults, coupon arrears are not capitalized. Also the old bonds are exchanged at par for a new bond. Interest rates on both bonds are reduced in the first few years after the agreement. These favorable economic conditions also allow Peru to tap the international capital market repeatedly. In 1853 it issues four new bonds for a total of 3,600,000 British pounds. In 1862 it issues a new bond for 5,500,000 British pounds and in 1865 it issues a 7,000,000 British pound bond. Part of the raised funding is used to convert previous external debt to better terms and to consolidate the internal debt. The capital flow bonanza continues into the early 1870s with the issues of two bonds, one for 11,920,000 British pounds and the second for 36,800,000 British pounds.⁸ While part of those issues is used to convert previous debt, a large part is devoted to the constructions of railways and public works. But economic conditions in Peru turn for the worse with the exhaustion of the guano deposits and the introduction of artificial fertilizers that leads to a collapse in demand of guano. With fiscal conditions deteriorating rapidly and with international liquidity strained following the 1873 crisis, Peru defaults again in 1876. By that year, Peru's external debt is approximately 36 million British pounds and the debt to exports ratio reaches 5.1. With no ability to make any commitments of repayment, an agreement, known as the Grace contract, is reached by which the claims of investors on the loans of 1869, 1870, and 1872, including the accumulated arrears in interest, are cancelled. In total, the foreign debt at the time of this agreement is about 51 million British pounds. In return for the cancellation of the debt, Peru cedes the national railway system for a period of 66 years. The government also compromises to pay an annuity of 28,000 British pounds for thirty years and gives bondholders 2 million tons of guano. This is Peru's last default in the 19th century.

⁸ Only 23,310,000 million British pounds are issued to the public. The first placement of this bond in 1872 is a complete failure. It takes three years for the government to place this bond in international capital markets.

After this agreement Peru does not regain access to international capital markets. From 1890 until the onset of WWI, private and public international issuance is below 13 million British pounds. Starting in 1920, Peru starts tapping international capital markets again, mostly issuing bonds in New York. Total issuance (private and public) from 1920 until 1930 reaches 34 million British pounds. Peru defaults on its debt in 1931. The central government debt is approximately 21 million British pounds. The negotiation of the default is quite protracted, only settling in 1951 for bonds issued in New York and in 1953 for bonds issued in London. The agreement includes the exchange of bonds paying 6% to 7.5% coupons to for a new 3% bond. Only 10 % of the interest arrears (not capitalized) are paid. The payment is effected with non-interest bearing script certificates, which are redeemed in annual installments for 15 years starting in 1953.

Uruguay's participation in international capital markets and defaults has characteristics similar to those of Argentina. From 1864 until 1900, Uruguay floated approximately 61 million British pounds (of which 30 million British pounds are refunding loans to exchange old bonds and the rest is new funding). Renegotiations are not protracted as those of Colombia. The first default occurs in 1875 in the aftermath of the first world recession of 1873. At that time Uruguay foreign debt consists of just one bond, the 6% 3,500,000 British pound bond floated in 1871. A debt-settlement agreement is reached in 1878. A 1.25% bond is issued to pay arrears in interest payments. A new bond is exchanged for the old bond at par but with interest rates reduced and the sinking fund suspended for five years. It is agreed that the redemption of the bond can be made by market purchases.

In the early 1880s Uruguay regains access to international capital markets, with total gross issuance from 1880 to 1890 reaching 26 million British pounds.⁹ In the midst of the 1890 Baring's crisis, Uruguay defaults again. This time around, government debt has increased to approximately 17 million British pounds. As is the case of Argentina in the 1890s, a debt settlement agreement is reached within a year. A new 3.5% bond for 19.3 million British pounds is issued in 1892 to pay for interest in arrears (not capitalized) and in exchange for the old bonds at a premium. The next default occurs at the onset of the First World War in 1915. Uruguay continues to pay coupons, only the sinking fund is suspended. While there is an initial attempt to

⁹ This amount includes a bond to convert domestic debt into foreign debt and the conversion of the 6% foreign debt into a 5% new bond.

renegotiate the debt in 1915, the debt settlement is only reached in 1921. The suspended sinking fund is resumed in 1921 and 1922. Uruguay regains access to international capital markets, with new issuance reaching 16 million British pounds by 1930. Uruguay defaults in 1932. Uruguay is the first of the Latin American countries to settle the default of the early 1930s. An agreement with U.S. bondholders is reached in 1937 and with British and French bondholders in 1939. Bonds mostly paying 5% to 6% coupon rates are exchanged for 3.5% - 4.5% bonds and maturities are extended.

The information reported in Table 3 as well as more detailed information from various sources described in Appendix 1 are used to estimate the debt reduction rates for each restructuring. They are shown in Table 4. As in the literature on sovereign defaults, we estimate these rates by comparing the present discounted value of the remaining contractual payments of the old instruments, including missing sinking fund payments or coupon arrears, and the present discounted value of the future payments of the new instruments at the moment of the agreement. The NPV of the old bond at the time of the agreement is estimated as follows:

$$NPV_{ta}^{old} = \sum_{t=td}^{ta-1} S_t^{old} (1 + r_{td})^{(ta-t)} + \sum_{t=ta}^{tm} S_t^{old} (1 + r_{ta})^{-(t-ta)} \quad (1)$$

Where td is the year of the default, ta is the year of the agreement, and tm is the year of the maturity of the bond. S captures the service of the bond (sinking fund and interest) during the life of the bond. The first component measures the capitalization of the missing payments (sinking fund and coupons) from the time when the payments are due to the time of the agreement. The second component measures the value of the post-agreement remaining payments of the old instrument discounted to the time of the agreement.

The NPV of the new bond at the time of the agreement is estimated as follows:

$$NPV_{ta}^{new} = \sum_{t=ta}^{tm} S_t^{new} (1 + r_{ta})^{-(t-ta)} \quad (2)$$

With the debt reduction rates estimated as follows:

$$Debt\ Reduction\ Rate_{ta} = 1 - \frac{NPV^{new}(r_{ta})}{NPV^{old}(r_{td}, r_{ta})} \quad (3)$$

Naturally, the debt reduction rates estimated using NPV estimates will be sensitive to the choice of the discount rate. The rate of discount of creditors and debtors may differ. For example, the rate of discount of the sovereign is linked to its cost of obtaining a new loan in the market. After the restructuring, if the new debt is sustainable, the sovereign will expect to access the international capital market at “non-crisis” interest rates. In a world with asymmetric information, investors may ask for a higher yield to compensate for the likelihood of a new default. Thus, at the time of exit from default, investors’ rates and sovereigns’ rates may differ substantially because the reputation of the sovereign has deteriorated and investor’s asking yield will reflect this loss of confidence. From the point of view of the investor, the discount rate may reflect more closely a “crisis” rate. Sturzenegger and Zettelmeyer (2005) and Cruces and Trebesch, (2011) net present value estimates are based on exit yields, a “crisis” rate, while Sturzenegger and Zettelmeyer (2007) are based on yields in normal (“non-crisis”) times.¹⁰

We estimate the debt reduction rates at the time of the agreement. The first estimate in Table 4 uses a measure of opportunity cost for the debtor. We use normal-time (“non-crisis”) discount rates at the time of the agreement to capture the so-called *Debt Relief* to the sovereign committed to the repayment of the debt. To capture the normal-time discount rates, we estimate the spread between the yield of the sovereign and the risk-free interest rate during normal times. For the risk-free interest rate, we use the yield to maturity on a U.K. long-term government bond. Then, we estimate the normal-time yield at the time of the agreement as the sum of the risk-free yield at the moment of the agreement plus the sovereign spread during normal times. The second estimate uses exit yields (the average of the yield during the year of the agreement) to capture “crisis-time” discount rates and thus captures the so-called *Investors’ Haircuts*.

Since agreements are not reached immediately after default, we need to capitalize the missing payments of the old bond from the time of default to the time of the agreement. For capitalization we use a unique rate: a non-crisis time rate at the time of default. It captures the opportunity cost of not defaulting to the debtor. It also captures the opportunity cost to the

¹⁰ Jorgensen and Sachs (1988) estimate the net present value of the flows using a risk-free interest rate. See also Kozack (2005) for a discussion on debt reduction rates.

investor if the investor would have chosen to invest the proceeds of the now defaulted bond on a similar long-term investment in a developing country.

Defaults and restructurings mostly involve an extension of residual maturities. Since lower discount rates raise the net present value of the longer-maturity new instrument more than that of the shorter-maturity old instrument, NPV estimates using lower discount rates will provide a lower bound for savings for the sovereign and a higher bound for losses of investors following the restructuring.

The last column of Table 4 shows the average debt reduction rates. Debt reduction rates vary substantially across the various agreements, from a minimum of 1 percent to a maximum of 94 percent. While these rates vary widely, there are still two clear patterns in the estimates. First, there is a country variety: Debt reduction rates are far larger for Colombia, Mexico, and Peru. The average debt reduction rate for these countries is about 65 percent. In contrast, Argentina, Brazil, Chile, and Uruguay have on average lower debt reduction rates, oscillating around 31 percent. Second, debt reduction rates vary across episodes. Clearly, the defaults of the 1820s and 1930s have mostly quite large debt reduction rates across the board, with an average of 62 percent. All other episodes (excluding the defaults of the 1820s and 1930s) end, on average, with debt reduction rates of 37 percent. We will examine what triggers these varied debt reduction rates in Section VI.

IV. The Indicators

As we described in the introduction, all models of sovereign defaults have at their core adverse shocks to domestic economic activity. In contrast, we argue in the introduction that since most of the sovereign crises are systemic and occur at times of crises in the financial center, global vulnerabilities should be also at the heart of defaults in the periphery. Thus, we construct a variety of indicators to capture both idiosyncratic and global shocks.

For country-specific fragilities, we examine two indicators: exports and the terms of trade. Since defaults in Latin America start in the early 19th century and the data on GDP start later in the 20th century or even after the Second World War, we capture economic activity using exports. Even data on exports are not readily available for the earlier part of the sample. In

many cases, we construct the data on exports using the data on imports from the most important trade-partner countries.¹¹

For the terms of trade, we collect data on the prices of the most important exports of each of the countries in our sample and construct an export price index with weights capturing the time-varying share of each commodity exports in total exports. We use the wholesale price index of the United Kingdom to capture prices of imports. The construction of the exports and terms of trade series is also explained in Appendix 1.

While exports are recognized as a good indicator of economic activity, the theoretical and empirical literature on the links between terms of trade and growth is not conclusive. As discussed more extensively in Blattman, Hwang, and Williamson (2007) and Deaton (2005), one view emphasizes the positive effect of terms of trade growth on economic activity, concluding that an improvement in the terms of trade allows developing countries to purchase productivity-enhancing equipment, increasing productivity, investment, and growth. The opposite view also known as the “resource curse” theory suggests that resource abundance hurts long term growth prospects. Explanations range from the Dutch Disease to the rent-seeking activities by the resource-owing elites suppressing growth. Empirical results are mixed. For example, Basu and McLeod (1992) find a positive effect of terms of trade growth on economic activity but Hadass and Williamson (2003) find the opposite result.

While the evidence on the links between terms of trade fluctuations and economic activity are conflicting, there is ample evidence that terms of trade fluctuations have a dramatic impact on the revenues of governments in resource abundant countries now¹² and even more

¹¹ We use import data of France, the United Kingdom, and the United States for the earlier part of the sample when most of the trade (exports and imports) of Latin American countries is concentrated in these three countries. France, the United Kingdom, and the United States identify all imports from each of the countries with whom they trade with the exception of imports of gold and silver. Gold and silver imports are considered specie rather than commodities and are not reported in the import data by country of origin. In our sample, Colombia, Mexico, and Peru are important producers of gold or silver. We construct series of exports of gold and silver using a variety of sources (detailed in Appendix 1) and add them to the data on exports to France, the United Kingdom, and the United States.

¹² Empirical evidence for episodes of booms and busts in commodity prices since the 1970s emphasize the liquidity aspect of terms of trade booms and busts for commodity-producer countries. For example, the Inter-American Development Bank *2007 Annual Report*, entitled *All that Glitters May Not Be Gold*, discusses the increase in fiscal revenues of Latin American countries during the boom years in the early- and mid-2000s and worries that the fiscal surpluses during these years are far from reassuring since they are based on inflated and unsustainable fiscal revenues due to transitory increases in the price of commodities, that is *All that Glitters May Not Be Gold*. See also, Kaminsky (2010)

during the first episode of financial globalization when most fiscal revenues are related to taxes on international trade.¹³ The idea is that booms in commodity prices increase fiscal revenues and relax government liquidity constraints but trigger liquidity crashes when commodity prices collapse. It is in times of adverse shocks to the terms of trade, that sovereigns may not be able to service their debt. For example, the collapse of the price of coffee in 1898 and the sharp decline in the price of rubber in the early 1910s, Brazil's main exports at that time, contribute to fiscal vulnerabilities and liquidity squeezes of the central and state governments in Brazil,¹⁴ explaining in part the defaults of 1898 and 1914. Still, some countries' revenues are related to tariffs on imports. Even in this case, a collapse in the terms of trade will reduce the capacity of the country to import, fueling a decline in government revenues, liquidity squeezes, and possibly defaults. Thus, in the absence of continuous series on government revenues during the 19th and early 20th centuries, we will use terms of trade data to capture idiosyncratic transitory liquidity shocks.

While domestic fragilities, as captured by adverse shocks to economic activity and the terms of trade may explain defaults in Latin America, the evidence that most of the sovereign crises during this period are systemic crises with a large number of countries defaulting all at once, suggests that global shocks may be at the core of these crises. As we describe in Table 1, most of the sovereign crises in Latin America cluster around the London panic in 1825, the stock market crash in Vienna in 1873, the Baring Brothers crisis in London in 1890, the panic in the financial centers at the onset of the First World War in 1914, and the London and Wall Street panics in 1929. These crises, as we will examine shortly, rapidly lead to crashes in international liquidity, the so-called "Sudden Stops," and can trigger systemic defaults in the periphery since defaults may help countries to continue to finance their spending when international capital markets crash. To capture fluctuations in international liquidity, we look at the evolution of interest rates in the financial centers. Another important yardstick to measure global liquidity is the evolution of international capital flows. We could look at the evolution of international capital flows to Latin American countries around the time of defaults. Still, the inability of those countries to tap international capital markets may just reflect the defaults. If countries are in

¹³ For example, Mexico's exports of silver during the 19th century are about 85 percent of total exports. Exports of silver during that period are taxed at rates between 2 and 6 percent. See, for example, Miguel Lerdo de Quejada (1853)

¹⁴ Following the constitutional reform in Brazil in 1891, the state governments start to have the sole right to tax exports.

default, they will lose access to international capital markets even in times of highly liquid international capital markets. The collapse in lending to Latin American countries may even occur before the countries suspend payments as investors stop lending to the country when they evaluate that the probabilities of default are increasing. To have a yardstick of international liquidity not contaminated by the defaults in Latin America, we examine the fluctuations in international capital flows to the non-Latin American periphery. In particular, we look at international primary issuance of four (very active participants –excluding the financial centers– in international capital markets) European countries: Denmark, Italy, Russia, and Spain, and three of the members of the Commonwealth: Australia, Canada, and New Zealand.¹⁵

Figure 3 shows the behavior of exports from 1820 to 1960. Since we want to assess sustainability of the foreign debt denominated in British pounds, we examine the evolution of exports also in British pounds. The two panels in Figure 3 show the evolution of exports and the long term trends (estimated using the Hodrick-Prescott filter). Although we will examine in more detail the sustainability of the debt in the next sections, we want to point some important patterns of growth in the seven countries during two periods: from 1820 to 1900 and from 1900 to 1960. In our analysis, we examine the growth rates of the permanent component. During the 19th century, countries can be divided into two groups: high growth and low growth countries. Argentina, Chile, and Uruguay are in the first group, with average growth rates of 4 percent or higher. These are also countries with low volatilities in the growth rates of the permanent component, with the standard deviation around 2.20 percent. Brazil, Colombia, Mexico, and Peru are in the second group, with average growth rates around 2.6 percent. Importantly, Brazil's and Mexico's growth rates are not highly volatile, with the standard deviation also around 2.2 percent. In contrast, Colombia and Peru are highly volatile countries, with some short episodes of high growth and episodes with collapses in the growth rate of exports: the standard deviation is around 4.8 percent. During the earlier part of the 20th century (1900-1960), average export growth rates of the seven Latin American countries are high, with rates 4 percent or higher. This is a volatile period across all countries, with growth rates soaring in the early

¹⁵ As described in the Appendix, the data on international capital flows for the period 1865-1914 are from Stone (1999). The data for 1820-1864 and 1915-1960 are from a new database being constructed by Kaminsky (2012). The data are based on international primary issuance in London and New York but excludes issuance of refinancing bonds. For example, following the 1931 Great Depression, international capital markets disappear and the few bonds internationally- issued during this period are to refinance old bonds.

1900s until the end of the First World War, in the mid-1920s until the Great Depression, and during the Second World War, but collapsing at the end of the First World War and in the midst of the Great Depression. The standard deviation of the growth rate of the permanent component is about 7 percent on average.

Figure 4 shows the evolution of the terms of trade of the seven countries. Overall, countries specialize in a small number of commodities. Argentina exports tallow, hides, and wool in the earlier part of the sample, while during the latter part of the sample its main exports are cereals and beef. Brazil's main exports are cotton, sugar, and coffee in the earlier part of the sample. Rubber becomes important towards the end of the 19th century. With competition from South East Asia (Indonesia and Malaysia) in the production of rubber, Brazilian rubber exports decline dramatically after the First World War, with coffee becoming again the main Brazilian export until the end of our sample. Chile's main exports are copper and nitrates with copper being the most important commodity export during the earlier times and nitrates becoming more important since 1880. Colombia's main exports in the earlier part of the 19th century are coffee, tobacco, and gold. The share of gold in total exports declines over time, with tobacco becoming the main export in the mid-19th century and coffee the main export during the early years of the 20th century. It is during the early 20th century that Colombia starts exporting petroleum. Mexico's main exports are silver and petroleum, with silver predominating during the 19th century and petroleum becoming the main export during the early 20th century. Peru's main exports are silver, copper, and wool during the early 19th century. Guano dominates from the 1840s to the 1880s; copper, cotton, sugar, and petroleum are the main exports during the late 19th and early 20th centuries. Uruguay's main exports are skins and wool earlier on and also beef in the later part of the 19th and early 20th centuries.

Brazil and Colombia are the ones with the most volatile terms of trade, with the average volatility of the growth rate being twice the size of those for the rest of the countries. Sharp movements in the terms of trade can affect dramatically government revenues. Since in large part those shocks are transitory, governments can offset adverse shocks to revenues by borrowing in international capital markets. However, if adverse shocks to the terms of trade occur in times of low international liquidity, they will not be able to tap international capital markets. In these circumstances, governments may be tempted to default. Interestingly, Brazil's defaults in 1898 and 1914 are preceded by drastic declines in its terms of trade due to collapses

in coffee prices in 1898 and rubber prices in 1914. Importantly, as we will show below, international liquidity is quite low in both episodes

Figure 5 shows the indicators of international liquidity. The top panel shows the U.K. real bank rate and the bottom panel shows international primary issuance. Note that international primary issuance is shown as a percent of exports of the United Kingdom (to correct for the size of the world economy in the more than the one hundred years of our sample).¹⁶ In both panels, the vertical lines identify the five episodes of systemic sovereign crises in Latin America with a financial center at its epicenter. This figure shows clearly that the bunching of sovereign crises in Latin America is in part triggered by increases in interest rates in Great Britain in 1825, 1873, and 1890 in response to an external gold drain caused by capital outflows. In 1927-1929, the Bank of England is joined by the Federal Reserve in raising interest rates, again, following an outflow of capital to the rest of the world.¹⁷

The bottom panel shows international primary issuance by non-Latin American countries in the periphery (Denmark, Italy, Russia, and Spain in Europe and Australia, Canada, and New Zealand in the Commonwealth). It is important to note that the more drastic crashes in international liquidity are those following the 1825 and 1931 crises. International capital markets recover within six years following the crisis in 1825, with lending mostly to European countries.¹⁸ The crisis in 1931 is more persistent as barriers to trade and capital flows are erected around the world, with capital markets recovering again only in the late 1970s and 1980s. Again, as with the evidence on interest rates, the cluster of systemic sovereign crises in Latin America in the mid-1870s, early 1890s, and at the onset of the First World War, also occur in the midst of a sharp decline in international issuance around the world.

¹⁶ We use trend exports of the United Kingdom to normalize international issuance.

¹⁷ As described in Bordo and Mushid (2000), there are other financial crises with the London and/or New York at their epicenter: The London crisis related to capital outflows to the United States comes in two phases, first in 1836-37 and then in 1841. The London 1847 crisis follows a railway mania in the early 1840s. The crisis in 1857 begins in the United States following a capital inflow episode triggered by the gold discoveries in California in 1849 and the railroad stock boom. The London panic of 1866 is triggered by the collapse of Overend Gurney & Co, a major London discount house. The crisis in 1907 has its origin in the United States and is transmitted to London. The crisis in 1920-1922 is triggered by the monetary authorities in the U.S. and the U.K. as they try to roll back the wartime inflation.

¹⁸ Although not included in our measure of international liquidity, international lending to the United States booms in the 1830s, with U.S. States borrowing for the construction of canals and railroads, creation of banks, and other public works. This capital flow bonanza ends with the default of eight U.S. States in the 1840s.

V. What Triggers Sovereign Defaults?

To shed light on whether sovereign crises may have common roots, we examine the evolution of the fundamentals around the time of crises. The variables used in the analysis are chosen in light of theoretical considerations. The models of sovereign defaults (for example, Eaton and Gersovitz, 1981; Arellano, 2008; and Aguiar and Gopinath, 2006) indicate that defaults occur following adverse shocks to the domestic economy. However, not all adverse shocks trigger defaults. The calibration exercise in Aguiar and Gopinath (2006) indicates that only adverse shocks to the permanent component of output can explain the frequency of defaults observed in the data. Thus, our analysis will look at both transitory and permanent changes.

The four panels in Figure 6 capture domestic vulnerabilities around the time of default. These indicators reflect the evolution of permanent and transitory components of exports and the terms of trade.¹⁹ Each panel portrays a different variable. In each panel, the horizontal axis records the number of years before and after the time of default. We look at the behavior of each indicator for an interval of 10 years around the year of the crisis (t). For the growth rate of the permanent component of exports and the terms of trade, the vertical axis records the percentage-point difference between the crisis years and the average during tranquil times. For the transitory components of exports and the terms of trade, the vertical axis records the transitory component as a percent of the trend. In all the figures the solid line represents the average behavior of that indicator during the years around the defaults while the dotted lines denote plus/minus one-standard-error bands around the average.

The top two panels show the behavior of exports while the bottom two panels show the behavior of the terms of trade. As shown in top left panel, crises occur in the midst of a drastic and persistent decline in the growth rate of the permanent component of exports. The growth rates of exports oscillate between 2 and 4 percentage points below the growth rates observed during tranquil times, suggesting that crises reflect in large part unsustainability of the debt. The right top panel examines the behavior of transitory shocks to exports (as a percent of the trend). Interestingly, large adverse transitory shocks to exports are not at the heart of sovereign crises. The defaults are preceded by positive shocks to exports, but with a reversal at the onset of the crises. Transitory shocks, before and after the default, are not statistically different from zero.

¹⁹ We identify permanent components using the Hodrick-Prescott filter.

This evidence supports the calibration results in Aguiar and Gopinath (2006) that indicate that large adverse transitory shocks to economic activity are not at the heart of defaults.

The bottom two panels examine the effects of permanent and transitory shocks to the terms of trade. Interestingly, while there is a decline in the growth rate of the trend of the terms of trade (relative to tranquil times) around default episodes, this decline is far smaller and less protracted than the decline in export growth. In contrast, sovereign crises occur in the midst of adverse transitory shocks to the terms of trade (from 4 percent to minus 3 percent at the onset of the crises). This result supports the findings of the current empirical literature on commodity price cycles (see, for example, the *Inter-American Development Bank 2007 Annual Report*) that concludes that these booms and busts in commodity prices fuel booms and busts in fiscal revenues, reducing and increasing government liquidity constraints.

We now examine what triggers systemic and idiosyncratic crises. Systemic crises suggest the presence of global factors. Thus, Figure 7 also shows the behavior of international liquidity as captured by international issuance of the non-Latin America periphery (as a percent of U.K. trend exports) and the real interest rate in the United Kingdom.

The first two panels show the behavior of the growth rate of the trend of exports around the time of default. Both systemic and idiosyncratic crises occur in times of adverse permanent shocks to exports. Interestingly, systemic defaults occur even in the presence of milder adverse shocks to growth, suggesting that other factors are at the heart of these defaults. As shown in the second panels, adverse transitory shocks to exports are not at the core of either systemic or idiosyncratic crises. Both systemic and idiosyncratic defaults occur in the midst of adverse shocks to the permanent component of the terms of trade. Finally, while transitory shocks to the terms of trade occur at the onset of all sovereign crises, systemic crises are preceded by milder shocks than those before idiosyncratic crises, again suggesting the presence of other adverse global shocks.

The next four panels show the evolution of international liquidity around the time of sovereign crises. The first two panels show international issuance (as a percent of U.K. trend exports) during the ten years around the time of default relative to the sample average issuance (as a share of U.K. trend exports). These panels show that a crash in international issuance is at the core of systemic crises. Before the defaults occur, international issuance is booming on average across countries (with issuance peaking at almost 13 percent of U.K. trend exports above

the average ratio over the sample) but it collapses to minus 2 percent at the onset of the crises and continues to fall to minus 5 percent after the crises start (again relative to the sample average ratio). In contrast, international issuance even increases at the onset of the idiosyncratic sovereign crises.

The last two panels show the evolution of the real interest rate in the United Kingdom during both systemic and idiosyncratic crises. Note that most of the systemic sovereign crises occur in the midst of a sharp increase in real interest rates. The only exception is the 1914 crisis.²⁰ In contrast, idiosyncratic crises mostly occur during episodes of declining real interest rates.

Table 5 presents a higher resolution picture of the characteristics of the Latin American sovereign crises. This table takes a snapshot of the 27 sovereign crises in our sample in the year of the default. The first column shows the country and year of the crisis. The next two columns show the indicators of insolvency: the growth rate of the trend of exports at the time of default (relative to tranquil times) and the debt/export ratio.²¹ Columns 4-6 show the indicators of liquidity: the first two indicators provide a metric on international liquidity as captured by international issuance (in percent of U.K. trend exports and relative to the average over the 1820-1960 period) and U.K. real interest rates. The third indicator captures idiosyncratic liquidity and it shows the transitory component of the terms of trade (relative to trend) for each country. We then construct three indices to evaluate the sources of fragility at the time of default. As it is traditional in the literature of crises when creating the indices of vulnerability,²² we combine the indicators weighed by the inverse of their standard deviation as follows:

$$Insolvency\ Index = \frac{Debt / Export}{\sigma_{Debt / Export}} - \frac{Export\ Growth}{\sigma_{Export\ Growth}} \quad (4)$$

²⁰ This crisis starts in the summer of 1914 with investors selling overseas stocks. Declining prices trigger margin calls and banks start to call in loans, there is a struggle for liquidity leading to panics in all asset markets. Central Banks intervene immediately providing liquidity. This liquidity is not drained, leading to inflation and sharply negative real interest rates.

²¹ Assessments on insolvency require an assessment of the long run ability of the country to service its debt. Thus, the debt/export ratio uses the trend value of exports.

²² See, for example, Kaminsky and Reinhart (1999) for the construction of the index of severity of currency crises.

$$\text{International Illiquidity Index} = \frac{U.K. \text{ Interest Rate}}{\sigma_{U.K. \text{ Interest Rate}}} - \frac{\text{International Issuance}/U.K. \text{ Exports}}{\sigma_{\text{International Issuance}/U.K. \text{ Exports}}} \quad (5)$$

$$\text{Idiosyncratic Illiquidity Index} = - \frac{\text{Transitory Terms of Trade Component}}{\text{Terms of Trade Trend}} \quad (6)$$

As defined, a higher value of each index shows higher fragility due to insolvency, international illiquidity or idiosyncratic illiquidity.

Figure 8 shows the values of these indices. The vertical line in each graph shows the separation of the crises using the median value of the indicator. The top panel shows the *Insolvency Index*. Importantly, 63 percent of all idiosyncratic crises are above the median while only 47 percent of the systemic crises are above the median, supporting the findings in Figure 7 that unsustainability considerations are not the only triggers of systemic defaults. Still, the crises of the 1930s in the midst of the great depression rank high in the insolvency index in the year of the default.

The middle panel examines what defaults occur in the midst of severe international liquidity problems. In this case, 60 percent of all the systemic crises are above the median while only 40 percent of the idiosyncratic crises are above the median. The crises of the 1820s and the crises of the 1930s rank high with this metric. Note that the adverse shock to liquidity at the time of the defaults of the 1820s is far more severe than that in the year of the defaults of 1930s. However, as it is clear from the evidence in Figure 5, the liquidity crash is far more protracted in the 1930s.

The next panel shows the idiosyncratic illiquidity index, as captured by adverse transitory shocks to the terms of trade (as a percent of the trend). Note that Brazil with highly volatile terms of trade ranks the highest in terms of idiosyncratic illiquidity risks. This is the case of Brazil in 1898 and 1931. Note, as shown in the top panel, that Brazil crisis in 1898 ranks very low in terms of insolvency. Importantly, debt reduction rates in the 1898 crisis, with important illiquidity shocks but not insolvency problems, are very small. However, the dramatic adverse terms of trade shocks in 1931 do contribute to the creation of a perfect storm. This is also the most severe Brazil crisis in terms of debt reduction rates, oscillating around 50 percent.

VI. Default Spells and Debt Reduction Rates

This section studies why some defaults are resolved quickly, within 1 to 2 years, whereas others last more than 20 years. It also examines why some agreements lead to high investors' losses while others do not.

There is a flourishing theoretical literature on default spells and debt reduction rates. As examined in Bi (2008) delays in debt restructuring may be seen as inefficient. However, waiting to restructure the sovereign debt is only inefficient under certain strict assumptions. In a world with no uncertainty, the sovereign and the creditors know exactly all future shocks and hence they can reach an agreement immediately after the default. Since most defaults occur under adverse conditions and countries in default are excluded from international capital markets when they need them the most, waiting will be inefficient. Note that creditors lose too since while the default persists, they do not share any resources of the sovereign. Similarly, waiting will be inefficient in a world with uncertainty if sovereigns and investors can write state-contingent repayment contracts. Still, there could be benefits from delaying a restructuring if the future stream of output of the sovereign is uncertain and markets are not complete. In this case, delays are beneficial as concluded in Bi (2008). In that paper, following a default, investors and borrowers can enter renegotiations and restructure the debt. If the default is preceded by a collapse in economic activity, few resources are available for repayment. It may be beneficial for borrowers and lenders to wait and examine the evolution of economic activity. If the recovery starts, borrowers will be able to allocate more resources to service the debt and investors will be able to recover a larger part of their assets.

Benjamin and Wright (2009) also examine why delays in renegotiations occur. In this paper, delays arise from the same commitment problems that lead to default. As in Bi (2008), a debt re-structuring generates a surplus for both creditors and debtors at the time of the agreement and in the future. But Benjamin and Wright (2009) point out that the ability of the creditor to share the surplus in the future is limited by the risk that the sovereign will not comply with the terms of the agreement. Thus, they show that sovereigns and creditors will delay renegotiations until the future risk of default on the agreement is low, that is, when economic activity recovers.

Yue (2010) also incorporates sovereign defaults and renegotiations into a dynamic equilibrium model. The focus of this paper is on the links between the Debt/GDP ratio at the

time of default, interest rates at which sovereigns can borrow, and debt recovery rates. The paper also examines the effects of changing bargaining power of creditors and debtors. She finds that debt recovery rates are smaller the higher is the debt/GDP at the time of default. She also demonstrates that the changes in bargaining power have a great impact on debt recovery rates. As expected, lower creditors' bargaining power results in smaller debt recovery rates. Still, this paper does not model what fundamentals trigger the various degrees of bargaining power.

As with models of sovereign defaults, theoretical models on renegotiations and haircuts are focused on adverse domestic shocks in debtor countries. In these models, international investors are always ready to lend to all sovereigns, at risk free rates if they evaluate that the sovereigns are committed not to default and at higher rates to those sovereigns that may default to compensate for possible debt reductions. That is, in those models, it is assumed that there is liquidity in international capital markets. In fact, the incentive for the sovereign to restructure its debt is its ability to re-access credit markets. What if international liquidity collapses and even non-defaulters cannot borrow? In this case, countries will have more incentive to default and delays in restructuring should persist. The bargaining power of investors will decline since they cannot offer new credit. If an agreement is reached, this loss of bargaining power of investors will impact adversely the debt recovery rates.

In this section, we will examine empirically the role of insolvency and economic recoveries as well as liquidity crashes on the duration of the default spell and the debt recovery rates. First, we deal with insolvency. We use value at risk methodologies to estimate the likelihood that recoveries can stabilize the debt (as a proportion of exports). It is at that time, that both debtors and creditors will find beneficial to restructure the debt. Second, we deal with both insolvency and liquidity crashes. We use duration analysis to examine the role of these two factors in delaying an agreement and regression analysis to estimate their effects on debt reduction rates at the time of the agreement.

VI.1 Default Spells and Recoveries

We use value at risk methodologies as in Garcia and Rigobon (2004) to explain delays in debt renegotiations. To estimate the timing of the restructuring, we now examine the stochastic

properties of the debt dynamics at the time of the default and during the duration of the default for the seven countries in our sample.

As in all the literature on debt sustainability, our analysis focuses on the debt accumulation equation, with a twist. We just examine the evolution of the debt to exports ratio during default episodes when countries do not access international capital markets.

The debt dynamics is

$$(1 + g_{t+1})d_{t+1} = (1 + r)d_t - f_t \quad (7)$$

Where d is the debt to exports ratio, r is the interest rate on the debt, g is the growth rate of exports, and f captures the service to exports ratio (if any) of the debt during the default. In equation (7) there is no new borrowing, sovereigns can just rollover the principal and accumulate coupon arrears. Note that during the default, borrowers and lenders know exactly the interest rate on the debt. This is the rate on the loans contracted before the default. However the debt/exports ratio is uncertain since the growth rate of future exports is stochastic.

In this exercise, we first examine the information governments and investors have at the time of default. Both investors and the government know the debt/exports ratio at the time of the default. However, the decision of default is not just based on the current debt/exports ratio. It also depends on the expected evolution of the economy in the future. Thus, to assess sustainability, we do not look just at the debt/exports ratio at the time of the default, but we also estimate the evolution of the debt/export ratio over a period of n years (conditional on information up to the time of the default).

To compute the various paths of the debt/exports ratio, we estimate an AR process for the growth rate of the export trend. We focus on the trend because sustainability is mostly affected by shocks to the permanent component of export and not by transitory shocks. In particular, we estimate:

$$\begin{aligned} g_t &= \tilde{g} + B(L)g_t + \varepsilon_t \\ \varepsilon_t &\sim N(0, \sigma^2) \end{aligned} \quad (8)$$

Using the estimated AR process and Monte Carlo simulations using the distribution of ε , we can estimate the various paths of the debt/exports ratio and the probability that the debt/export ratio will stabilize in say n years. This probability will not only provide a yardstick to compare debt sustainability at the time of default for all the defaults in the sample, but also to test whether default spells end when the economy is expected to recover as in Bi (2008) and Benjamin and Wright (2009).

We estimate the AR process with data up to the year of the default to obtain the probability that the debt/exports ratio will stabilize in n equal to five years. We then repeat this analysis (re-estimate the AR process with the new data) for each year during the default episode. The idea is to compute the debt/export ratio as data on exports become available each year and compute the various paths of the debt/export ratio in the following five years. We would like to examine whether the decision to renegotiate the debt is delayed until the future default risk is low, that is, when the probabilities that growth resumes and the debt/export ratio stabilizes increase.

The question is what is the threshold that makes the debt sustainable? The answer to this question remains elusive. Thus, we do not estimate the probability that the debt/export ratio reaches a certain threshold. Instead, our criterion will be that of the stability of the debt/export ratio. We compute at the time of default and during the episode of default the probability that the debt/export ratio in each year stabilizes within five years.²³ In other words, our debt/exports ratio target is time-varying. In each period during the default spell, we estimate the probability that the debt/exports ratio at the beginning of that period will be “stabilized” in the next five years. In particular, we use two criteria of stability. For the first one, the target debt/exports ratio is the debt/export ratio at the beginning of each year. The second criterion is more stringent. Stability in this case is achieved if the sovereign manages to reduce the initial debt/exports ratio (as a result of high growth or by servicing the debt) at the beginning of each year by 10 percent within five years.

The results on the likelihood of renegotiating the debt (“stabilizing” the debt/exports ratio) are reported in Table 6. This table shows the probability that the debt/exports ratio can be reduced by 10 percent within 5 years. To examine the robustness of this result for a different

²³ We also compute the service of the debt as the one announced at the moment of the default or announced during the default spell. For example, when Chile defaults in 1879, it suspends the sinking fund but it announces that coupons will be paid.

“target” level of the debt/exports ratio, we also estimate the probabilities that the debt/export ratio remains constant (is completely stabilized) within five years. Figure 9 shows the probabilities of “stabilizing” the debt/exports ratio for the two criteria.

In Table 6, the first probability is the probability at the time of the default of reducing the debt/export ratio by 10 percent within five years. The next row shows the same probabilities but using information up to the first year of the default episode. More in general, the probability in year t is the estimated probability that the debt/export ratio will be reduced by 10 percent in year $t+5$ using information up to period t . The last probability for each default episode is the probability in the year of the restructuring of the sovereign debt (the end of the default spell).²⁴ We can summarize the results as follows. First, at the time of the default, most countries cannot stabilize the debt/export ratio according to our metric. Less than 20 percent of the defaults occur when the likelihood of “stabilizing the debt/export ratio” is high. Even in these cases, the probabilities mostly are high not because of recoveries but because the sovereigns do not suspend coupon payments.

Importantly, not all default spells end with recoveries. Overall, only 45 percent of all the default spells end when the economy starts to recover and the probabilities of stabilizing the debt/export ratio are increasing, suggesting that other factors may lead sovereigns and creditors to reach an agreement. There are various patterns across countries and across time episodes. As for patterns across countries, note that the default spells of Argentina, Brazil, Chile, and Peru end in general when their economies start to recover. On average, 65 percent of the default spells in these countries end when recoveries start. In contrast, less than 30 percent of the default spells of Colombia and Mexico end when recoveries start. These are mostly the serial defaults in the presence of debt overhang we discuss in the previous section, with investors and debtors trying to reach an agreement that may allow countries to access capital markets again. In the end, these serial defaults end with large debt reduction rates and no re-access to new credit. Uruguay is a special case, with most agreements reached when the debt/export ratio is not stabilized. Still, debt reduction rates in the case of Uruguay are not large.

²⁴ For the first defaults in the 1820s we do not report the probability of restructuring for Brazil for the first few years of the default episode because we do not have information on exports going back enough to make a forecast. The data for Argentina and Chile start in 1810 while that for Colombia, Mexico, and Peru start in 1800. The data for Brazil start in 1821.

As for patterns in various time episodes, we find that the default spells following the crises of the 1820s are (in part) so long because of a protracted growth slowdown in the aftermath of the defaults. None of the probabilities of stabilizing the debt/export ratio are positive until about 15 years after the default. Brazil's probabilities become positive after 15 years of default, Peru's after 14 years, and Argentina after 25 years. Importantly, at the heart of Argentina and Peru's ability to stabilize their debt/exports ratio during this episode is the high growth of exports starting in the mid-1840s. Brazil's stabilization of its debt/exports ratio is owed to Brazil's ability (or willingness) to continue to pay the interest on its debt. In contrast, the probabilities of stabilizing the debt/export ratio of Chile, Colombia, and Mexico are basically always zero during this episode. These are also some of the defaults of the 1820s with the largest haircuts (89 percent for Colombia and 80 percent for Mexico).²⁵

The sovereign crises of the 1930s are also quite protracted, lasting on average 15 years. The first country to restructure is Uruguay after 8 years of default, followed by Colombia after 11 years, Brazil after 14 years, Chile after 19 years, and Peru after 23 years. Interestingly, while the crisis in 1931 devastates the economies of these countries in the early 1930s, growth resumes sharply with the onset of the Second World War. As shown in Table 6, the probabilities of restructuring the debt (reducing by 10 percent the debt/exports ratio) increase sharply. By 1940, the probabilities of restructuring the debt for all the countries are above 50 percent. Only Uruguay restructures its debt in 1937.²⁶ All other countries continue to be in default even after 10 years of sharp increases of their exports. A possible explanation about the reluctance of the debtor countries to settle their debt is the missing "carrot." Without international liquidity, there are no benefits from paying back foreign debts. Renegotiations take longer and haircuts may

²⁵ Results change somewhat when the criterion of stabilization implies keeping the debt/exports ratio constant within five years. As shown in Figure 9, the probabilities of Argentina and Brazil start increasing earlier during the default episodes following the London crisis of 1825. Still, the effects of the two criteria about "debt/export ratio stabilization" do not affect our results on duration of the default spells or on debt recovery rates as discussed in the following pages.

²⁶ International trade with the United Kingdom seems to be an important determinant of the short default spell of Uruguay and Argentina's decision not to default in the 1930s. Both Argentina and Uruguay most important trading partner during the first episode of financial globalization is the United Kingdom. However, access to the British market becomes more difficult with the adoption of the imperial preference at the 1932 the Ottawa Conference. According to Díaz-Alejandro (1983) Argentina, in the midst of recession in the early 1930s, resists pressures to default as a concession to the United Kingdom in an attempt to avoid the collapse of exports to that country. In return, by the Roca-Runciman Treaty signed in 1933, the United Kingdom compromises not to impose any restrictions of Argentine chilled beef into the United Kingdom below the quantity imported in 1932. See, also Bulmer-Thomas (1998).

become larger. Another possible explanation is that although the debt/exports ratio is declining, its level may still be too large. For example, the level of indebtedness of Brazil in 1931 is much higher than the one at the time of the previous defaults, perhaps making its level unsustainable. We examine the role of debt overhang in the next section.

VI.2 Default Spells and Debt Reduction Rates: Shocks to Sustainability and Liquidity

The previous section examines whether the timing of the restructuring of the debt is preceded by an economic recovery and the stabilization of the debt/export ratio. This section will study the effects of both shocks to sustainability and liquidity on the duration of defaults as well as on the debt reduction rates.

As we discussed earlier, the theoretical literature of sovereign debt renegotiations focuses on the ability of the country to grow. In those papers, the authors develop a stochastic bargaining game in which the incentive for the sovereign to settle its debt is given by new access to international capital markets. In these models, creditors are risk neutral and liquidity is always available. However, while not frequent, international liquidity may disappear as panics in the financial center trigger capital market disruption. This is the case in the third quarter of 2008 in the midst of the subprime crisis. In general, crises with the financial center at its epicenter trigger interruptions in the free flow of capital. For example, in the aftermath of the London 1825 crisis, international issuance in London collapsed from 50 percent of British exports in 1822 to 14 percent in 1825 and zero percent in the second half of the 1820s. Naturally, all the renegotiations of sovereign contracts will collapse in the midst of a liquidity crunch.

Thus, the expected duration of the default should be shorter in states with high international liquidity or with high growth. Naturally, the debt/export ratio in the year of the default may also matter. Conditional on the other factors, a higher initial debt/export ratio can delay the debt settlement since the possible payoffs to creditors will be low. We also examine whether idiosyncratic liquidity can delay the renegotiation process. As before, we capture idiosyncratic liquidity with transitory shocks to the terms of trade. As positive shocks to the terms of trade lead to higher government revenues, they may offset the need to access international capital markets to finance spending, and thus may delay the renegotiation. Since liquidity and growth change over time, our duration model has time-varying determinants.

Table 7 reports the effects of all domestic and global fundamentals on default spells. As in all duration model estimations, we only look at the years of default and the year when the country exits default. The dependent variable in our estimates is a dummy variable equal to zero in the years the country is in default and equal to one in the year when the country exits default. The estimations include the data of the 27 default spells of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. The explanatory variables include time-varying covariates: international issuance (percent of U.K. trend exports), the U.K. real interest rate, the transitory shocks to the terms of trade (percent of trend terms of trade), and the probabilities of stabilizing the debt/export ratio of each country as well as a time-invariant covariate: the debt/export ratio at the time of the default. Table 7 shows the coefficients of a Cox proportional hazard model in column 1 and the corresponding p-value in column 2. A positive coefficient indicates that a higher value of that variable is associated with a shorter duration of the default spell. To interpret the coefficients, they have to be transformed as follows:

$$\frac{\Delta \text{Increase in probability of renegotiation}}{\Delta \text{covariate}_i} = (e^{\text{coeff}_i} - 1) * 100 \quad (9)$$

These responses are shown in column 3. As examples, the coefficient for the international issuance covariate indicates that a one-percentage point increase in international issuance (as a share of U.K. exports) is associated with a 6.55 percent increase of the probability of a renegotiation of the default while a one-percentage point increase in the probability of stabilizing the country debt/export ratio leads to a 1.43 percent increase in the probability of ending the default spell. The coefficients on these two covariates are significantly different from zero with p-values below 0.04. None of the other indicators have a statistically significant effect on duration. To have a sense of the economic importance of economic recoveries and international liquidity on default spells, this table also shows the responses to a one-standard-deviation shock in the covariates.

Our estimates in Table 7 indicate that the disappearing international capital markets following the international crisis in 1931 are at the core of the long default spells following the defaults in the early 1930s and outweigh the effect of economic recoveries. Note that while adverse shocks to economic activity in Latin America are colossal in the early 1930s, so are the

economic recoveries across the region starting with the Second World War. The probabilities of stabilizing the debt/exports ratio increase on average 63 percentage points from the average in the 1930s to the average at the end of the defaults, leading to an increase in the probability of ending the default spell of about 90 percent. However, there is also a dramatic and persistent decrease in international liquidity following the crises in London and New York. International issuance (as a share of U.K. exports) that averages about 15 percent during the 1920-1930 period, declines to 1 percent on average from 1931 to 1950. This 14 percentage-point decline in international issuance leads to a decrease in the probability of restructuring the debt of 92 percent, offsetting the effect of the economic recoveries.

In contrast, the long default spells following the defaults of the 1820s are mostly explained by the protracted slowdown in economic activity. While international liquidity crashes following the London crisis in 1825, international issuance restarts in the early 1830s to collapse in the early 1840s, and surge again in the late 1840s and 1850s. The increase in international liquidity in the 1830s does not lead to any restructurings. Only by the mid-1840s, economic activity starts recovering in Argentina, Brazil, and Peru. The probabilities of stabilizing the debt/export ratio for these countries increase on average by 40 percentage points, leading (according to the estimates in Table 7) to an increase in the likelihood of an agreement of almost 60 percent. At that time, the increase in international liquidity also contributes to the increase in the likelihood of restructuring the debt. The average international issuance (as a share of U.K. exports) increases by 5 percentage points during the late 1840s and 1850s. According to our estimates in Table 7, this increase in international liquidity leads to an increase in the probability of restructuring the debt of almost 35 percent.

Table 8 shows the effects of liquidity and sustainability shocks on debt reduction rates in our sample of 27 defaults. The dependent variable is the average debt reduction rates shown in Table 4. The explanatory variables capture sustainability and liquidity effects. To capture the effects of sustainability of the debt, we use the debt/export ratio at the time of the default and the average probabilities of stabilizing the debt/export ratio during the default spell. For international liquidity, we use the U.K. real interest rate and international issuance (percent of U.K. trend exports). For idiosyncratic liquidity, we use the transitory shocks to the terms of trade (as a percent of the trend). For the three liquidity indicators, we use the average during the

five years before the agreement if the default spell is at least five years or the average since the default if the default spell is less than five years.

Column 1 shows our benchmark estimation. Our findings indicate that debt sustainability matters. An increase in the probability of stabilizing the debt/export ratio leads to declines in debt reduction rates while high debt/exports ratios at the time of default lead to higher investors' losses. These effects are not only statistically significant but also they are economically significant. A one-standard deviation increase in the probability of stabilizing the debt/export ratio leads to an 10 percentage point reduction of investors' losses while a one-standard deviation increase in the debt/export ratio at the time of default leads to an 18 percentage point increase in investors' losses.

Importantly, although not examined in the theoretical literature on sovereign defaults, international liquidity (or lack of) also matters. The coefficient of international issuance (share of U.K. Exports) is not only statistically but also economically significant. A one-standard deviation increase in international liquidity reduces investors' losses by 13 percentage points. In particular, the average decline of international issuance from the 1920s to the episode starting with the Great Depression and lasting for more than 30 years of about 14 percentage points leads to an increase in the haircuts of about 22 percentage points. On the other hand, idiosyncratic liquidity is statistically significant but with a p value equal to 0.11. Still, the positive coefficient suggests that transitory booms in the terms of trade, by relaxing fiscal constraints, increase the bargaining power of the sovereign and leads to an increase in investors' losses. In particular, a one-standard deviation increase in idiosyncratic liquidity leads to a 9 percentage point increase in investors' losses.

Column 2 explores whether recoveries (as captured by the probability of stabilizing the debt/exports ratio) has different effects in times of high and low international liquidity. We construct two international liquidity dummies. The high (low) international liquidity dummy is equal to 1 when international liquidity is higher (lower) than the median value in our sample of defaults and zero otherwise. The international liquidity dummies are interacted with the probabilities of stabilizing the debt/export ratio shown in Table 6. We find that higher growth only leads to lower haircuts in times of high international liquidity. In contrast, when there is an international liquidity crash, a higher likelihood of recoveries has no effect on debt reduction rates perhaps because it is in these times that international investors lose bargaining power.

Finally, regression 2 indicates the effect of changes in idiosyncratic liquidity (as captured by transitory shocks to the terms of trade) is both statistically and economically significant. A one-standard deviation increase in the terms of trade leads to increases in debt reduction rates of 12 percentage points, again showing that when the sovereign does not have tight fiscal constraints, does not need to tap international capital markets, its bargaining power increases, and thus can negotiate higher debt reduction rates.²⁷ Finally, we should mention that while the real interest rate in the financial centers (in this case in the United Kingdom) can capture liquidity crashes at the time of panics in the financial center, they cannot capture the lingering effects of these panics on the interruption of international capital flows, and thus they do not influence default spells or debt recovery rates.

Appendix 2 shows robustness tests. In Table 7 and 8, we capture the ability of a country to stabilize its debt/export ratio with the probability of reducing the debt/export ratio by 10 percent within 5 years (shown in Table 6). In Figure 9, we also show the probabilities of keeping the debt/export ratio constant within 5 years. Appendix 2 examines whether the results in Tables 7 and 8 are invariant to our definition of the probability of stabilizing the debt/export ratio. These tables show that the two criteria of stabilizing the debt do not affect our results.

VI. Final Remarks

We have examined the empirical regularities and the sources of the problems leading to 27 sovereign defaults in Latin American during the first episode of financial globalization. For these defaults, we have also examined what triggers long and short default spells as well as large and small debt reduction rates at the time of the restructuring of the debt. We find that while defaults occur following adverse shocks to the sovereign's economy, these shocks cannot explain why sovereign crises cluster together. Panics in the financial centers that lead to disruptions in international capital flows are at the epicenter of these systemic crises. In contrast, idiosyncratic crises reflect only insolvency problems. We also find that insolvency and persistent international liquidity crashes contribute to long default spells. Long-lasting international liquidity crashes prolong the default spells as there is no incentive for debtor countries to settle their debts. If under these circumstances an agreement is reached, debt

²⁷ We thank Jeffrey Frankel for suggesting us to study this effect.

recovery rates are far smaller. We also find that positive shocks to the terms of trade, by relaxing fiscal constraints, increase the bargaining power of the sovereign, leading to lower debt recovery rates. In contrast to systemic crises, we find that most idiosyncratic crises are triggered by debt overhang problems. Low international liquidity is not at the core of these crises. Moreover, the default spells of these crises do not end with episodes of booms in international liquidity. These countries can only tap international capital markets after the debt-overhang problem is eliminated following major debt reductions in various agreements that span several decades.

The results presented in this paper constitute a first step in examining the links between panics in the financial center and sovereign crises in the periphery. Still, sovereign defaults do not occur in isolation. Around the time of the defaults, many countries abandon the gold standard and issue paper money. The question is how these two crises interact. Does the abandonment of the gold standard contribute to longer default spells and larger losses to investors? What are the effects of these twin crises on the ability of countries to regain access to international capital markets? Is there a vicious cycle with defaults triggering the abandonment of the gold standard and making even harder for countries to restructure their debts and re-access international capital markets? It is important to examine the lingering effects of financial panics on the breakdowns of currency systems.

Finally, our focus has been on sovereign crises in Latin America. These countries are particularly interesting because they participate in international capital markets right from the beginning of the first episode of financial globalization at the end of the Napoleonic wars. However, there are other periphery countries tapping international capital markets from early on. Moreover, as financial globalization matures, other regions start participating in international capital markets too, making it important to examine the scope of international capital market disruption triggered by panics in the financial center. Are there patterns of spillovers of financial distress at the center? What is the role of the various financial centers in spreading financial distress? As Bordo and Murshid (2000) chronology of crises with the financial center at its epicenter shows, the reach of the various panics in the financial center varies, with some panics having a global reach but others having only regional spillovers. Is it because of various policies implemented in the financial center in the midst of the crisis? Or is it because of the degrees of indebtedness of the periphery following the cycles of booms in international capital markets

changes? A more global perspective of the effects of distress in the financial center could provide a better understanding of the aftermath of the current financial crisis.

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Appendix 1 Data Sources

Since the sovereign crises at the onset of the great depression are only resolved in the 1950s, we construct indicators of domestic and global fragility from the early 1800s to the 1960s.

I. Exports

We construct annual series of exports for the period 1800 to 1960. We collect data on exports from a variety of sources both domestic and international. We convert the data to British pounds to compare with government international indebtedness (also in British pounds) and assess the ability of those countries to service their debt. Some countries, like Argentina, Brazil, and Chile have publications with export data starting in the early 19th century. The data from Colombia, Peru, Mexico, and Uruguay has to be complemented with data from the main trading partners for the 19th century. We use data of France, United Kingdom, and United States imports from these countries. For Colombia, Mexico, and Peru, we complement the data on exports to partner countries with data on production of gold and silver since partner countries only identify imports of commodities excluding gold and silver. Not only do we use the country trading-partner data to extend the domestic series, but also to check the data published in domestic statistical abstracts.

The sources for the data are as follows:

Argentina:

1810-1960 : *Dos Siglos de Economía Argentina 1810-2004*. *Historia Argentina en Cifras*, Orlando Ferreres, Table 8.1.1

Brazil:

1821-1960 *Estatísticas Históricas do Brazil: Séries Econômicas, Demográficas e Sociais de 1550 a 1988*, Fundação Instituto Brasileiro de Geografia e Estatística. Sector Externo: Gustavo Henrique Barroso Franco (Departamento de Economia, Pontificia Universidade Católica PUC-RJ). Table 11.1

Chile:

1810-1960: *Economía Chilena 1810-1995 Estadísticas Históricas*; Matias Braun, Ignacio Briones, and Jose Diaz, in www.economia.puc.cl. Table V.I.1

Colombia:

1800-1822: We construct data on Colombia's exports of gold based on production data from *Memoria sobre la Monedación de Oro I Plata* by Jose Manuel Restrepo. Serie "Amonedación Oro en la Casa de Moneda Santa Fe (Bogota), Cuadro Número I (page 25).

1822-1834: We combine the data from France, the United Kingdom, and the United States on (non-gold) imports from Colombia with our estimates of Gold Exports. Our estimates of Colombia's gold exports are based on production data from *Memoria sobre la Monedación de Oro I Plata* by Jose Manuel Restrepo. Serie "Amonedación Oro en la Casa de Moneda Santa Fe (Bogota), Cuadro Número I (page 25).

1834-1910: *Compendio de Estadísticas Históricas de Colombia*, Miguel Urrutia and Mario Arrubla, Universidad Nacional de Colombia, Bogota, 1970. Page 108. This Table reports both exports of goods and gold.

1910-1960: Official exports of goods and gold. *Compendio de Estadísticas Históricas de Colombia*, Miguel Urrutia and Mario Arrubla, Universidad Nacional de Colombia, Bogota, 1970. Table IX. Page 209.

Mexico:

1800-1820: *Estadísticas Históricas de México Tomo II*, Instituto Nacional de Estadística, Geografía e Informática, INEGI. Table 18.1

1821-1824: *El Comercio Exterior de México 1821-1873*, Inés Herrera Canales, 1977.

1825-1875: The data for exports of goods are estimated using imports from Mexico to France, the United Kingdom, and the United States. The data do not include imports of silver from Mexico. We estimate Mexico's exports of silver using data on Acuñaciones de Moneda de Plata from *Estadísticas Históricas de México Tomo II*, Instituto Nacional de Estadística, Geografía e Informática, INEGI, Table 20.3; *El Comercio Exterior de México 1821-1873*, Inés Herrera Canales, 1977, and *Comercio Exterior de México desde la Reconquista hasta Hoy*, Miguel Lerdo de Tejada. Mexico, 1853

1876-1877: Our Estimates.

1878-1913: *Estadísticas Históricas de México Tomo II*, Instituto Nacional de Estadística, Geografía e Informática, INEGI. Table 18.1

1914-1916: University of Oxford, *Oxford Latin American Economic History Database*

1917-1960: *Estadísticas Históricas de México Tomo II*, Instituto Nacional de Estadística, Geografía e Informática, INEGI. Table 18.1

Peru:

1800-1821: We construct a series of exports of silver based on production of silver from *Compendio de Historia Económica del Perú*, Carlos Contrera (Editor), Banco Central de la Reserva del Perú, 2010. We also check the data with on Peru's annual production of Silver during Colonial times from the Archivo General de Indias (1751 to 1820 and collected by J.J Tepaske and in Richard Garner's webpage (<http://www.insidemydesk.com/hdd.html>).

1822-1830: We add the data from France, the United Kingdom, and the United States on (non-silver) imports from Peru to our estimates of silver exports. Our estimates of Peru's silver exports are based on production of silver from *Compendio de Historia Económica del Perú*, Carlos Contrera (Editor), Banco Central de la Reserva del Perú, 2010.

1830-1896: The data for exports of goods are estimated using imports from Perú to France, the United Kingdom, and the United States. The data do not include imports of silver from Perú. We add Perú's silver exports from *Price and Quantum Estimates of Peruvian Exports 1830-1962*, Shane J. Hunt, Princeton University.

1897-1899: *Historia de la República del Perú 1822-1933*, Jorge Basadre, Editorial Universitaria, 1965.

1900-1945: *Anuario Estadístico del Perú, 1944-1945*, Ministerio de Hacienda y Comercio. Dirección Nacional de Estadística.

1945-1948: Moody, John, *Moody's Analyses of Investments and Security Rating Books; Government and Municipal Investments*, New York, various issues.

1948-1960: International Financial Statistics, International Monetary Fund, CDROM

Uruguay:

1860-1899: *Anales Históricos del Uruguay*, Eduardo Acevedo, Casa A. Barreiro y Ramos, S.A., Montevideo, 1933

1900-1939: *Estadísticas Históricas del Uruguay 1900-1950*, Benjamín Nahum, Universidad de la República, 2007.

1940-1948: Moody, John, *Moody's Analyses of Investments and Security Rating Books; Government and Municipal Investments*, New York, various issues.

1948-1960: International Financial Statistics, International Monetary Fund, CDROM

Main Trading Partners:

The data on exports to major trading partners are obtained from the following sources:

France:

Tableau Général du Commerce de la France avec ses Colonies et les Puissances Étrangères, Administration de Douanes, various issues

United States:

Commerce and Navigation of the United States, Bureau of Statistics, Treasury Department, various issues.

United Kingdom:

The House of Commons, Parliamentary Papers, 1801-1900

The Annual Statement of Trade and Navigation of the United Kingdom with Foreign Countries and British Possessions, Customs Establishment Statistical Office. Various issues.

II. Terms of Trade

We construct annual series of terms of trade for the 1820-1960 period. The Export Price Index of each country is a time-varying weighted average of the prices of the most important exports.

Export Price Index:

The data on prices of commodities are obtained from the following sources:

Bezanson, R. D. Gray and M. Hussey (1937), *Wholesale Prices in Philadelphia 1784-1861: Series of Relative Monthly Prices*. Philadelphia: University of Pennsylvania Press.

Gayer, A.D., W.W. Rostow, and A.J. Schwartz (1953), *Microfilmed Supplement to Volumes I and II of The Growth and Fluctuation of the British Economy 1790-1850*. Oxford: Clarendon Press.

International Financial Statistics, International Monetary Fund, CDROM.

Jastram, Roy, 1981, *Silver The Restless Metal*, Wiley.

Sauerbeck, Augustus "Prices of Commodities and Precious Metals," *Journal of the Statistical Society of London*, various issues.

U.S. Department of Commerce, *Historical Statistics of the United States from Colonial Times to 1970*, Bureau of the Census.

Manthy, Robert and Joan R. Tron, *Natural Resources Commodities- A Century of Statistics: Prices, Output, Consumption, Foreign Trade, and Employment in the United States, 1870-1973*. Published for Resources for the Future by the Johns Hopkins University Press, 1978.

Import Price Index:

The price of imports is captured with the Wholesale Price Index of the United Kingdom. It is obtained from:

1820-1948: Mitchell, B. R., *International Historical Statistics Europe, 1750-1988*.

1948-1960: *International Financial Statistics*, International Monetary Fund, CDROM

Exports Shares:

The data on weights of the most important exports are from:

Mitchell, B. R., *International Historical Statistics America, 1750-1988*.

III. International Primary Issuance in London and New York

We construct data on international issuance for the period 1820-1960 from the following sources:

1820-1864 and 1915-1960:

Kaminsky, Graciela: New Database on International Issuance in London and New York for the first episode of financial globalization, 1820-1931.

For this project we also estimated international primary issuance for Australia, Canada, Denmark, Italy, New Zealand, Russia, and Spain from 1932 to 1960 using Prospectuses as well as data on government international issuance from:

Moody, John, *Moody's Analyses of Investments and Security Rating Books; Government and Municipal Investments*, New York, various issues.

1865-1914:

Stone, Irving, *The Global Export of Capital from Great Britain, 1865-191: A Statistical Survey*, MacMillan Press Ltd., 1999.

IV. Interest Rates

The data on interest rates in the United Kingdom are from:

Homer, Sidney and Richard Sylla, 2005, *A History of Interest Rates*, Fourth Edition, John Wiley and Sons, INC. New Jersey. USA.

V. Defaults, Renegotiations, and Agreements

All data on the characteristics of the defaulted and new bonds issued following the agreements are obtained from:

General Sources:

Annual Reports of the Council of the Confederation of Foreign Bondholder, London, various issues

Annual Reports of the Foreign Bondholders Protective Council, Inc. New York, various issues.

Compendium of the English and Foreign Funds and the Principal Joint Stock Companies by Charles Fenn, various issues

Kimber's Records on Government Debts and Other Foreign Securities, various issues

Moody, John, *Moody's Analyses of Investments and Security Rating Books; Government and Municipal Investments*, New York, various issues.

Suter, Christian, 1992, *Debt Cycles in the World Economy: Foreign Loans, Financial Crises, and Debt Settlements, 1820-1990*, Westview Press, Inc.

Prospectuses of Bonds issued in the various financial centers.

Country Studies:

Bazant, Jan, 1968, *Historia de la Deuda Exterior de México, 1823-1946*, El Colegio de Mexico, Guanajuato, Mexico.

Bouças, Valentim, 1950, *História Da Dívida Externa*, Edições Financeiras S.A., Rio de Janeiro Second Edition.

Casasus, Joaquin Demetrio, 1885, *Historia de la Deuda Contraída en Londres*, Mexico Imprenta del Gobierno en Palacio.

Costeloe, Michael, 2007, *Deuda Externa de México: Bonos y Tenedores de Bonos, 1824-1888*, Fondo de Cultura Económica, Mexico.

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De Castro Carreira, Liberato, 1980, *História Financeira e Orçamentária do Império no Brasil*, Fundação Casa de Rui Barbosa, Ministério da Educação e Cultura, Rio de Janeiro, Brasil

Fundação Instituto Brasileiro de Geografia e Estadística, 1990, *Estatísticas Históricas do Brasil: Séries Econômicas, Demográficas e Sociais de 1550 a 1988*, Rio de Janeiro, Brazil, IBGE.

Ferrada Urzúa, Alfonso, 1948, *Historia Comentada de la Deuda Externa de Chile, 1810-1945*, Escuela de Derecho, Universidad de Chile, Santiago de Chile.

Nahum, Benjamín, 1994, *Deuda Externa Uruguay, 1864-1930*, Ediciones de la Banda Oriental, Montevideo, Uruguay.

Nahum, Benjamín, 1995, *La Evolución de la Deuda Externa del Uruguay, 1875-1939*, Ediciones de la Banda Oriental, Montevideo, Uruguay.

Palacios Moreyra, Carlos, 1983, *La Deuda Anglo Peruana; 1822-1890*, Librería Studium, Lima, Perú.

Camacho, Vicente, 1914, *Resumen Histórico sobre la Deuda Exterior de Colombia del 3 por 100*, Imprenta Eléctrica, Bogota, Colombia.

Payno, Manuel, 1862, *México and Her Financial Questions with England, Spain, and France: Report by Order of the Supreme Constitutional Government of the Mexican Republic*, Printed by Ignacio Cumplido, Mexico

Peña, José, 1907, *Deuda Argentina: Copilación de Leyes, Decretos, Resoluciones, Notas y Contratos sobre al Deuda Publica Nacional*, Imprenta de Juan A. Alsina, Buenos Aires, Argentina.

Turlington, Edgar, 1930, *Mexico and Her Foreign Creditors*, Columbia University Press, New York.

Wynne, William, 1951, *State Insolvency and Foreign Bondholders, Selected Case Histories of Governmental Foreign bond Defaults and Debt Readjustments*, Volume II, Yale University Press.

Table 1

Systemic Sovereign Defaults

Episode	Origin of the Shock	The Background	Mechanism of Transmission	Latin America's Sovereign Defaults
1825-1829	1825 London Panic	The crisis is preceded by a boom in international capital flows. The increase in global liquidity is in part triggered by the end of the Napoleonic Wars and the reduction in government spending in Great Britain, which leads to a sharp decline in interest rates.	In the summer of 1825, the Bank of England raises the discount rate to avoid the loss of foreign exchange reserves. A stock market crash in London leads to a banking panic in England. The crisis spreads to Continental Europe, with many banking houses failing. There is a reversal in international capital flows, with countries in the periphery losing access to international capital markets	Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru, Venezuela
1873-1877	1873 Stock Market Collapse in Vienna	This crisis is preceded by surge in capital flows from England and continental Europe to finance the construction of railroads in Latin America and the periphery as well as by a speculative land boom in Germany and Austria fueled by the French gold indemnity paid to Prussia after the Franco-Prussian war.	The Austrian-German boom collapses in a dramatic stock market crash in Vienna in May 1873. Stock markets in Amsterdam and Zurich also crash. In the United States, a banking panic in September follows the collapse of the stock market in New York. Reversal of capital flows. Economic activity worldwide collapses, fueling also a downturn in commodity prices.	Bolivia, Colombia, Costa Rica, Guatemala, Honduras, Paraguay, Peru, Uruguay
1890-1894	1890 Baring Crisis	The crisis culminates a major lending boom from England and the continent in the 1880s to finance railroads and other infrastructure worldwide. Capital flows also trigger a boom in land prices.	The international crisis is fueled by the collapse of Baring Brothers on November 8, 1890. The Bank of England prevents a panic by arranging an operation to recapitalize Baring Brothers with the aid of other major London financial institutions and a temporary rescue loan from the Banque de France and the Russian central bank. Capital flows to Latin America and the periphery contract sharply.	Argentina, Ecuador, Guatemala, Nicaragua, Paraguay, Uruguay, Venezuela
1914-1918	First World War	A new surge in international liquidity finances railroads, construction of cities, gas, electricity, and telephone companies.	The outbreak of the First World War precipitates a massive international financial crisis across the world as investors start to liquidate foreign assets. In late July, there is massive selling in the London Stock Exchange, with this collapse triggering margin calls, sales of assets, driving stock prices further down. Panics in all asset markets.	Brazil, Ecuador, Mexico, Uruguay
1929-1933	1929 Stock Market Collapse in New York and London	The 1920s experienced a major stock market boom associated with massive investment in new technologies. These included: electricity, automobiles, communications, and petrochemicals.	The stock market crashes in London and New York in 1929 trigger a massive collapse in liquidity and lead to the worldwide depression. Banking crises in continental Europe contribute to the sharp recession. England abandons the gold standard in September 1931 and so does the United States in January 1934. Contractionary monetary and fiscal policies in the United States intensify the contraction. Commodity prices collapse.	Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Nicaragua, Panama, Paraguay, Peru, Uruguay

Notes: Systemic default episodes are defined as five-year episodes with defaults of at least 20 percent of countries in Latin America.

Table 2

Idiosyncratic Sovereign Defaults

Year	Country
1821	Colombia, Venezuela
1848	Colombia
1848	Venezuela
1854	Mexico
1865	Venezuela
1868	Ecuador
1872	Dominican Republic
1879	Chile and Colombia
1895	Costa Rica
1898	Brazil, El Salvador, Venezuela
1900	Colombia
1901	Costa Rica
1906	Ecuador
1911	Nicaragua
1920	Paraguay
1921	El Salvador
1928	Mexico

Table 3
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
ARGENTINA			
1828	6% Buenos Ayres Loan 1824 (L)	974,602	Default 1828: Suspension of coupon and sinking fund payments. Agreement 1857: Issue of a new 1%-3% bond of 1,641,000 pounds for the unpaid coupons (not capitalized). Principal amount of the bond remains unchanged. Reduced debt service through 1859.
1891	6% Buenos Ayres Loan 1824 (L) 6% Railway Loan 1881 (L) 5% Loan 1884 (L) 5% Northern Central Railway Extension Loan 1887-8-9 (L) 5% Treasury Conversion Loan 1887 (L) 5% National Bank Loan 1887 (G) 4.5% Internal Gold Loan 1888 (L) 4.5% Conversion Loan 1889 (L) 3.5% External Loan 1889 (L) 5% Northern Central Railway Loan 1890, 2nd emission (L) The following bonds are added to the 1893 agreement: 5% Loan 1886-7 (L) 5% Waterworks Loan of 1892 (L) 6% Funding Loan 1891 (L) 5% Buenos Aires Port Loan 1892 (L)	30,770,930	Default March 1891: Suspension of coupon and sinking funds payments of the first ten bonds. Agreement April 1891: Issue of the 6% funding loan of 1891 to service (sinking fund and coupons) the ten bonds in default between 1891 and January 1st, 1894. It is agreed that there will be a full resumption of the debt service at par after 1894. A new agreement is reached in July 1893. July 1893 (Romero's Agreement): With the new bonds added, the amount outstanding in 1893 is 44,152,975 pounds. Interest rates of the 10 (first defaulted) bonds are reduced by 60% for 5 years. Interest rates of the bonds added in 1893 are reduced by 100 basic points for 5 years. Suspension of sinking fund payment of all bonds until 1901.
BRAZIL			
1828	5% Loan 1824/25 (L) 5% (Portuguese) Loan 1825 (L)	4,868,468	Default 1828: Brazil unilaterally suspends the sinking fund payment of the Portuguese Bond in 1828. It resumes the sinking fund payment in 1836 only to suspend it again in 1840. Again it resumes the sinking fund payment in 1843 to suspend it in 1844. Finally, it resumes the sinking fund payment of this bond in 1850. Brazil also unilaterally suspends the sinking fund payment of the 1824-1825 bond in 1830 only to resume it in 1851. Still, Brazil continues to pay coupons on the debt over the period 1828-1950. Agreement 1851: Full resumption of the suspended sinking funds payment in 1851.
1898	4.5% Loan 1883 (L) 4.5% Loan 1888 (L) 4% Loan 1889 (L) 5% Western of Minas Railroad Company Loan 1893 (L) 5% Loan 1895 (L) 4.5% Internal Gold Loan 1879 (L)	41,911,231	Default July 1898: Suspension of coupon payments for three years (1898-1901). Suspension of the sinking fund payment for 13 years through June 1911. Announcement July 1898: Issue of a 5% funding loan to pay for missing coupon payments from 1898 to 1901. Coupon payments in cash are resumed in July 1901. Sinking fund payment is resumed in July 1911.
1914	4.5% Loan 1883 (L) 4.5% Loan 1888 (L) 4% Loan 1889 (L) 5% Loan 1895 (L) 5% Loan 1903 (L) 5% Loan 1908 (L) 5% Railway Loan 1908-9 (Colon, Itapura, Corumba) (P) 4% Railway Guarantees Rescission Bonds (L) 5% Companhia Lloyd Brasileiro Bonds (L) 5% Loan 1909 (Recife Port Loan) (P) 4% Loan 1910 (Goyaz Railway Loan) (P) The Lloyd Brasileiro 4% Loan (L) 4% Loan 1910 (L) 4% Loan 1911 (L) 4% Loan 1911 (Ceara Railway Loan) (L) 4% Gold Loan 1911 (Viacao Bahiana Loan) (P) 5% Loan 1913 (L)	98,569,982	Default August 1914: Suspension of coupon payments for three years (1914-1917). Suspension of the sinking fund payment for 13 years through July 1927. Announcement August 1914: Issue of a 5% funding loan to pay for missing coupon payments from 1914 to 1917. Coupon payments in cash are resumed in August 1917. Sinking fund payment is resumed in August 1927.
1931	4.5% Loan 1883 (L) 4.5% Loan 1888 (L) 4% Loan 1889 (L) 5% Loan 1895 (L) 4% Rescission Loan 1901 (L) 5% Loan 1903 (L) 5% Loan 1908-09 (P) 5% Pernambuco Loan 1909 (P) 4% Lloyd Loan 1910 (L) 4% Goyaz Loan 1910 (P) 5% Loan 1910 (P) 4% Loan 1910 (L) 4% Bahia Loan 1911 (P) 4% Ceara Loan 1911 (L) 4% Rio Loan 1911 (L) 5% Loan 1913 (L) 5% Loan 1916 (P) 8% Loan 1921 (NY) 5% Victoria-Minas Railway Loan 1922 (P) 7% Loan 1922 (NY) 6.5% Loan 1926 (NY) 6.5% Loan 1927 (L) 6.5% Loan 1927 (NY) The following bonds are also in default in 1937 5% Funding 1898 (L) 5% Funding 1914 (L) 5% Funding 1931 (L & NY)	140,273,414	Default 1931: Suspension of coupon and sinking fund payments. Issue of a 5% funding loan with maturities of 20 and 40 years to pay missing coupons payments from October 15th, 1931 to October 15th, 1934. 1934: Sinking fund payments continue to be suspended. Payment of coupons in cash is resumed but coupon rates are reduced. November 1937: Sinking fund payments continue to be suspended and coupon payments are suspended again. The Funding Loans of 1898, 1914, and 1931 are added to the list of defaulted bonds with both partial suspension of coupon and sinking fund payments. 1940: Sinking fund payments continue to be suspended. Coupon payments in cash are resumed at the reduced rates announced in 1934. Further reductions in coupon rates. Coupon rates and sinking fund provisions of the three funding loans are reduced by 50% and 40%, respectively. 1940-1944: The Brazilian government cancels part of the outstanding debt through bond purchases at market values. Prices of the Funding Loans oscillated between 37% and 80% of their par value while the prices of the rest of the bonds oscillated between 7% and 39% of their par value. Agreement 1944-1946: Two options are given to the bondholders: Option A: Interest of the original bonds ranging from 4 to 7 percent are reduced to rates ranging from 1.5 to 3.5 percent. The sinking fund provision is also reduced for most of the bonds. New sinking fund provisions oscillate between 0.06 to 10.56 percent depending on the category of the bond. Principal amount of bonds remains unchanged. Option B: Issue of a new 3.75 % bond in exchange for the reduced principal of the old bonds. The reduction of the principal of the old bonds ranges between 20% and 50%, depending on the category of the bond. Part of the principal amount reduction is partially compensated by a cash payment. The new 3.75% bond has a higher sinking fund provision to shorten the maturity of the debt. The agreements for bonds issued in London, New York, and Paris become effective in January 1944, June 1944, and March 1946, respectively. As of July 24, 1945, bondholders of 60 percent of outstanding bonds have already accepted either Option A or B.

Table 3 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
CHILE			
1827	6% Loan 1822 (L)	936,157	Default 1827: Suspension of coupons and sinking fund payments. Agreement 1842: Issue of a new bond for the repayment of the principal at par value. This bond has similar characteristics to the one issued in 1822. Issue of a 3% 758,287 pound bond for the unpaid coupons (not capitalized). Coupon and sinking fund payments are resumed in September 1847.
1879	4.5% Loan 1858 (L) 6% Loan 1867 (L) 5% Loan 1870 (L) 5% Loan 1873 (L) 5% Loan 1875 (L)	6,163,106	Default 1879: Suspension of sinking fund payments in the second semester of 1879 due to the war against Bolivia and Peru. Announcement 1884: Resumption of sinking fund payments in the second semester of 1884 after the victory of Chile in the war against Peru and Bolivia.
1931	4.5% Loan 1885 (L) 4.5% Loan 1886 (L) 4.5% Loan 1887 (L) 4.5% Loan 1889 (L) 5% Loan 1892 (L) 4.5% Loan 1893 (L) 4.5% Loan 1895 (L) 5% Loan 1896 (L) 4.5% Loan 1899 (L) 5% Loan 1905 (L) 5% Loan 1909 (L) 5% Loan 1910 (L) 4.5% Loan 1911 (L) 5% Loan 1911 (1st Series) (L) 5% Loan 1911 (2nd Series) (L) 5% Annuities A,B,C (L) 5% Railway 1915 (L) 7% Loan (South Longitudinal Railway) 1922 (L) 7.5% Loan 1922 (L) 8% Transandine Loan 1922 (L) 7% Loan 1922 (NY) 6% Loan 1926 (L) 6% Loan 1926 (NY) 6% Loan 1927 (NY) 5% Loan (South Longitudinal Railway) 1928 (L) 6% Loan (South Longitudinal Railway) 1928 (L) 6% Loan 1928 (L) 6% Loan 1928 (NY) 6% Railway Loan 1928 (NY) 6% Loan 1929(L) 6% Loan 1929 (NY) 6% Loan 1929 (S) 6% Loan 1930 (NY) 6% Loan 1930 (S) Guaranteed Obligations 5% Mortgage Bank Chile Loan 1911 (P) 5% Mortgage Bank Chile Loan 1912 (P) 7.5% Transandine Railway Chile Loan 1924 (L) 6.5% Mortgage Bank Chile Loan 1925 (NY) 6.75% Mortgage Bank Chile Loan 1926 (NY) 6% Mortgage Bank Chile Loan 1926 (NY) 6% Mortgage Bank Chile Loan 1928 (NY) 6% Mortgage Bank Chile Loan 1929 (NY)	88,220,417	Default 1931: Partial suspension of the debt service in July 1931 and complete suspension of coupon and sinking fund payments in August 1931. Debt Service Adjustment 1935: Partial resumption of coupon and sinking fund payments. Reduced coupon rates, with new rates ranging from 0.4% to 2%. Starting in 1935, while in default, the Chilean government cancels part of the outstanding debt through bond purchases at prices oscillating between 13% and 37% of their par value. Agreement 1948-1949: Issue of a new bond paying interest rates increasing from 1.5% in 1948 to 3% in 1954, and remaining constant thereafter in exchange for bonds in default at par. The new bond has a 1% sinking fund yielding a maturity of 46 years. Similar offers are extended to bondholders of New York-, London-, and Switzerland-issued bonds. Offers for New York- issued bonds are extended in July 1948, the offers for London-issued bonds are extended on December 21, 1948, and those for Switzerland-issued bonds are extended in August 1949.

Table 3 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
COLOMBIA			
1821	10% Loan 1820 (L)	273,891	Default 1821: Suspension of coupon payments. Agreement 1822: Issue of a 10% bond to pay missing coupon payments in cash.
1826	6% Loan 1822 (L) 6% Loan 1824 (L)	3,312,975	Default 1826: Suspension of coupon and sinking funds payments. Agreement 1845: Issue of a new Active bond to pay the outstanding debt principal at par. The interest rate on this new bond is set at 1% for 4 years, with increments of 0.25% per annum until the maximum 6% is reached. Issue of a Deferred bond for the unpaid coupons (not capitalized). The Deferred Bond does not pay coupons for the first 16 years. The coupon rate is set at 1% for the 17th year with an annual increment of 0.125% per annum until 3% is reached. The service of the Deferred bonds is guaranteed by the tobacco monopoly and customs receipts.
1848	1% - 6% Active Bond 1845 (L) 1% - 3% Deferred Bond 1845 (L)	6,460,550	Default 1848: Sinking fund payments are suspended in 1848. The last coupon of 1848 and the coupons of 1849 are paid with Treasury Bills. Starting in 1850 all coupon payments are also suspended. Agreement 1861: Interest on the Active and Deferred bonds issued in 1845 remain as scheduled under the 1845 agreement. A new 2%-3% Active Debt bond is issued for the unpaid coupons (not capitalized) of the Active bond of 1845. In addition, 30 hectares of land are offered to bondholders for each 100 pound of holdings of the Active bond of 1845 and 16 hectares of land for each 100 pound holdings of the Deferred bond of 1845. The redemption of the three bonds is agreed to be made through market purchases. (At the time of the agreement, the prices of these bonds are well below par, with the Active bond of 1845 at 16%, the Deferred bond of 1845 at 8%, and New Active bonds of 1861 at 35% .)
1873	3% New Active Bond 1845 (L) 3% Deferred Bond 1845 (L) 2%-3% New Active Bond 1861 (L)	6,630,000	Default 1873: A new arrangement for the unification of the external debt is reached in 1873. Agreement 1873: Issue of a new bond for 2,000,000 pounds with coupon rates of 4.5% until 1878. From then on rates are raised to 4.75% and remain at that level until custom revenues are above a certain minimum level when they increase to 5%. This bond is exchanged for the old bonds as follows: 1) Each 100 pounds of the 1845 Active Bond is exchanged for 34 pounds of the new bond; 2) Each 100 pounds of the 1845 Deferred Bond is exchanged for 17 pounds of the new bond. 3) Each 100 pounds of the 3%1861 New Active Bond is exchanged for 66 pounds of the new bond. 4) 2,000,000 hectares of land are given in compensation for the loss of interest payments agreed in the conversion of 1873.
1879	4.5%-5% New Conversion Bond 1873 (L)	1,947,871	Default 1879: The coupon due in July 1879 is partially paid. Starting in October 1879 coupon payments are suspended. Sinking fund payments are also suspended. Intermediate Renegotiations: Bondholders submit a proposal in 1889 that is modified by the Government in 1890 and is rejected by bondholders in 1891. Agreement 1896 (Roldan-Passmore Agreement): A New 2,700,000 pound bond is issued to pay the outstanding principal and unpaid coupons (not capitalized) of the 1873 bond. Coupon rates of this new bond are set at 1.5% on January 1st 1897, increasing by 0.5 % every 3 years until the rates reach 3%. The principal outstanding of the 1873 bond is converted at par while the unpaid coupons are converted at 43% of their nominal value. Sinking fund payments are agreed to start on January 1st, 1900. The sinking fund rate is set at 0.5% in 1900, increasing by 0.5% every 3 years until reaching 1.5%. The sinking fund is applied to purchases in the market while the price is below par. When the price is at or above par, the sinking fund is applied to drawings at 60% when the coupon rate is below 3% and at 70% when the coupon rate is at 3%.
1900	1.5%-3% Consolidated External Bond 1896 (L)	2,700,000	Default 1900: Sinking fund and coupons payments are suspended in the midst of the Thousand Days' War (1899-1902). Agreement 1905 (Hoiguin-Avebury Agreement): Coupon payments are agreed to be resumed starting on July 1st, 1905. Interest rates are the same as those agreed in 1896. Issue of certificates at par for the unpaid coupons (not capitalized). Payment of 50% of this amount by June 30th, 1907. The sinking fund payments are suspended until 1910 when they are resumed at the same rate as stated in the Agreement of 1896.
1932	5% Loan 1906 (L) 6% Loan 1911 (L) 6% Loan 1913 (L) 5% Loan 1916 (L) 6% Loan 1920 (L) 6% Loan 1927 (NY) 6% Loan 1928 (NY) Guaranteed Obligations Agricultural Mortgage Bank 7% Loan 1926 (NY) Agricultural Mortgage Bank 7% Loan 1927 (NY) Agricultural Mortgage Bank 7% Loan 1927 (NY) Agricultural Mortgage Bank 7% Loan 1928 (NY) Agricultural Mortgage Bank 7% Loan 1929 (L)	16,229,552	Default 1932: Sinking fund payments are suspended in February 1932. Coupons from July 1933 to January 1934 are paid one third in cash and the balance in non-interest bearing scripts. Issue of 4% funding certificates to pay for the coupons between January 1934 to January 1935. All the payments are suspended from January 1935 to December 1939. Coupon payments are resumed on the two bonds issued in New York at 3% in 1940. London-issued bonds remain in default until April 1942. During the default, Colombia also purchases bonds in the market, at prices oscillating between 15% and 36% of their par value. Agreement 1941 - Bonds issued in New York: Exchange of the 6% bonds for a new 3% bond at par with extended maturity. Issue of new 3% bond to pay for 50% of the unpaid coupons (not capitalized) from 1935 to 1939. Agreement July 1942 - Bonds issued in London: Conversion of the 6% and 5% bonds for a new 3% bond at par with extended maturity. Issue of a new 3% bond to pay for the 50% of the unpaid coupons (not capitalized) from June 1935 to December 1939 and for 60% of the unpaid coupons (not capitalized) between 1940 and March 1942.

Notes: Gran Colombia is formed in 1821 with the union of New Granada (Colombia), Ecuador, and Venezuela. The Gran Colombia is dissolved in 1829-1830. In 1834, the external debt of Gran Colombia is divided among Colombia, Ecuador, and Venezuela in the following proportions: Colombia: 50 percent, Venezuela: 28.5 percent, and Ecuador: 21.5 percent. The outstanding external debt of Colombia in 1834 is 3,312,975 British pounds. In this table, the debts outstanding at the time of the defaults in 1821 and 1826 are scaled down to 50 percent of the outstanding debt of the Gran Colombia as is agreed in 1834.

Table 3 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
MEXICO			
1827	5% Loan 1824 (L) 6% Loan 1825 (L)	6,584,362	Default 1827: Coupon and sinking fund payments are suspended. Intermediate Renegotiations: There are several renegotiations in 1831, 1837, and 1846 with exchanges of bonds and issues of Deferred bonds to pay for coupons in arrears. All the arrangements fall through within months. In 1846 the total debt is consolidated into a 5% new bond of 10,241,650 pounds. Agreement 1851: Coupons in arrears from July 1847 until the agreement total 1,871,276 pounds. These arrears are cancelled with a payment of 2,500,000 US dollars (about 500,000 British pounds). Conversion at par of the outstanding 5% loan of 1846 into a 3% loan. 250,000 pesos are agreed to be sent annually to London to start paying the principal of this new 3% loan starting in 1857.
1854	3% Loan 1851 (L) The following bond is added in 1866. 3% Loan 1864 (L)	10,241,650	Default 1854: Sinking fund and coupon payments are suspended. Intermediate Renegotiation 1864: Issue of a 3% loan for 4,864,800 pounds to pay 9.5 years of unpaid coupons of the 3% Loan 1851 with a 67% premium. Agreement 1866: Issue of a new 3% Loan for the conversion at par of the 3% Loan of 1851, for 50% of the 3% loan of 1864, for 15% of the interest in arrears of the 3% loan of 1851 from July 1866 to July 1886, and for 20% of other smaller unpaid debts. The principal of the 1866 bond is 14,626,279 pounds. The government has the right to amortize the 1866 bond with purchases in the market or to redeem them by drawings at the rate of 40% of their par value up to December 31, 1890. After that, the redemptions can be effected by purchases in the market or by drawings at the rate of 50% of their par value.
1914	3% Loan 1886 (G) (L) (P) 5% Loan 1894 (G) (L) 5% Loan 1899 (L) 4% Loan 1904 (NY) 4.5% Loan 1908 (Irrigation Bond) (NY) 4% Loan 1910 (P) 6% Loan 1913 (L) Guaranteed Obligations 5% Mexico City Loan 1889 (L) 4% National Railway Bond 1908 (NY) 4.5% Veracruz-Pacific Railway Bond 1904 (NY) 5% Tehuantepec Railway Bond 1902-1904-1905 (L) 4.5% Tehuantepec Railway Bond 1905 (L)	66,349,636	Default 1914: Sinking fund and coupon payments are suspended in July 1914. Agreement 1922: Unpaid coupons from 1913 to 1923 (not capitalized) are agreed to be paid at par over a period of 40 years starting in 1928. Coupons from 1923 to 1927 are agreed to be paid part in cash and part with 20-year scrips carrying 3% interest since 1928. The sinking fund and coupons are agreed to be resumed in cash in a date no later than January 1928. Debt service is guaranteed partially by taxes on oil exports and the revenue of the railway system. The National Railway System is privatized in 1925.
1928	3% Loan 1886 (G) (L) (P) 5% Loan 1894 (G) (L) 5% Loan 1899 (L) 4% Loan 1904 (NY) 4.5% Loan 1908 (Irrigation Bond) (NY) 4% Loan 1910 (P) 6% Loan 1913 (L) Guaranteed Obligations 5% Mexico City Loan 1889 (L) 6% Mexican National Packing Co. First Mortgage 1911 (NY) 6% Mexican National Packing Co. Second Mortgage 1911 (NY) 5% Tehuantepec Railway Bond 1902-1904-1905 (L) 4.5% Tehuantepec Railway Bond 1905 (L)	57,219,334	Default 1928: Debt service agreed to be resumed in January 1928 is suspended. There are various failed attempts to settle the debt in 1930 and 1931. Agreement November 1942: Reduction of the outstanding principal to about 25% by converting all the debt at the rate of 1 US dollar = 1 Mexican peso and 1 British pound = 4.85 Mexican pesos (the market exchange rates at the time of the agreement are 1 US dollar = 4.85 Mexican pesos and 1 British pound = 19.4 Mexican pesos). All past due interest from 1923 to 1942 is agreed to be canceled at 1% of its face value in cash and the unpaid coupons maturing before 1923 are agreed to be canceled at 2.5% of their face value in cash.
PERU			
1826	6% Loan 1822 (L) 6% Loan 1825 (L)	1,816,000	Default 1826: Sinking fund and coupon payments are suspended in April 1826. Agreement 1849: Conversion of the two bonds for a new active bond with interest rates at 4%-6%. Twenty-five percent of the unpaid coupons is written off. Issue of a new passive bond in 1849 to pay the balance of unpaid coupons (not capitalized) with interest rates at 1%-3%. Coupons of this bond start to be paid in 1852.
1876	5% Loan 1869 (L) 6% Loan 1870 (L) 5% Consolidated Loan 1872 (L)	36,400,000	Default 1876: Suspension of sinking fund payments. Mandatory conversion of the 6% loan 1870 into 5% consolidated bonds of 1872 deposited in the Bank of England. Coupons from 1876 to 1878 are converted in new bonds carrying interest. Agreement 1889 (Grace's Contract): Cancellation of all the foreign bonds (principal and coupons) in exchange for 2 million tons of guano, with a value of approximately 11 million pounds in 1899. Also, the concession of the whole national railway system for 66 years, an annuity of 80,000 British pounds for 30 years, and the concession of the steamboat in Lake Titicaca. There are also compensations in land and the exploitation of the telegraph and telephone system.
1931	7% Tobacco Loan 1927 (NY) 6% Loan 1927, first series (NY) 6% Loan 1928, second series (NY) 6% Loan 1928 (L) 7.5% Guano Loan 1922 (L)	20,924,277	Default 1931: Sinking fund and coupon payments are suspended in May 1931. Still, the government amortizes part of the debt with purchases in the market from 1931 to 1953. Prices of the bonds oscillate between 6 and 26 percent of the par value. Agreement 1938: The 1922 Guano Loan is restructured. The interest rate is reduced to 4% and its sinking fund is increased from 1.5% to 2%. Accepting bondholders waive the right on any unpaid coupons before December 1937. The government also offers a partial payment of the unpaid coupons in 1931 and 1932 for the other bonds. 1947: Peru makes a unilateral offer to renegotiate the debt. This offer includes: 1) To exchange at par the 7% Loan 1927, the 6% Loan 1927, the 6% Loan 1928 (NY), and the 6% Loan 1928 (L) for new bonds with lower interest rate (increasing from 1% to 2.5%) and sinking fund of 0.5%, maturing in January 1997. 2) All coupons arrears from 1932 to December 1936 are cancelled. At the end of 1949 about 50% of the outstanding amount has been exchanged under the new terms offered. Agreement November 13th, 1951 - Bonds issued in New York: (Amended offer to Agreement 1947, effective January 1953) Conversion of the old bonds into new 3% bonds. In addition, bondholders receive non-interest bearing scrip certificates in payment for 10% of unpaid coupons from January 1932 to December 1946. These scrip certificates are to be redeemed in annual installments during 15 years starting in January 1953. Upon conversion, bondholders have to waive any rights on previously unpaid coupons. By end of 1955, about 95% of the bondholders have accepted this offer. Agreement January 1953 - Bond issued in London: Conversion of the outstanding debt at the rate of 1.74 pounds of the new bond for every pound of the original bond. The interest rate of the new bond is 3% with maturity in 2007. In addition, bondholders receive non-interest bearing scrip certificates in payment for 10% of the unpaid coupons between 1932-1947. The scrip certificates are to be redeemed in annual installments during 15 years starting in April 1954 and a one time payment in January 1954 of about 11% of the unpaid coupons between 1947-1953.

Table 3 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
URUGUAY			
1875	6% Consolidated Loan 1871 (L)	3,110,960	Default 1875: Default is announced on March 27th, 1875. Funds deposited in London are used to meet the debt service until early 1876. Suspension of sinking fund and coupon payments afterwards. Agreement 1878: Issue of a new bond of 373,315 pounds at 1.25% to pay for the unpaid coupons (not capitalized). The principal is exchanged at par for new 6% bonds. Interest of 2.5% for 5 years while the principal amortization is on hold. Full resumption of the debt service in February 1883. The bond can be amortized through purchases in the market.
1891	5% Unified Loan of 1883 (L) 6% Loan 1888 (L) 6% Baring Loan 1890 (L)	16,724,300	Default 1891: Suspension of sinking fund and coupon payments. Agreement 1892: Issue of a new 3.5% bond to pay for coupons in arrears (not capitalized) and in exchange of the outstanding principal of three bonds including conversion premiums of 5%, 15% and 13%. Total issue of the new 3.5% bond reaches 19,300,000 pounds. The new bond has a 1% sinking fund. The government has the right to increase the amount devoted for redemption.
1915	3.5% Consolidated loan 1892 (L) 5% Loan 1896 (L) 5% Loan 1905 (L) 5% Loan 1909 (L)	23,807,799	Default 1915: The sinking fund is suspended until one year after the end of the First World War. Coupons are paid regularly. Agreement 1921-22: The sinking fund payments of the loans of 1905 and 1909 are resumed in July 1921 while the sinking fund payments of the consolidated loan of 1891 and of the loan of 1896 are resumed in August 1921 and January 1922, respectively. Coupons are payed as scheduled originally.
1931	3.5% Uruguay Loan 1891-96 (L) 5% Loan 1896 (L) 5% Loan 1905 (L and P) 5% Loan 1909-45 (P) 5% Loan 1914-51 (L) 5% Loan 1915 (NY) 5% Loan 1919 (L) 8% Loan 1921 (NY) 6% Loan 1926 (NY) 6% Loan 1930 (NY)	30,069,471	Default 1931: Default announcement in May 1931. The sinking fund payments start to be suspended in December 1931. Interest rate of all the bonds are unilaterally reduced to 3.5% from October 1933 to October 1937. Agreement September 1937 - Bonds issued in New York: Balance of the partially paid coupons from 1933 to 1937 is waived. Interest rates on all bonds are reduced. New interest ranging from 3.5% to 4.5%. Maturities are extended. Agreement November 1938 - Bonds issued in London and Paris: Balance of the partially paid coupons from 1933 to 1937 is waived. Interest rates of all bonds are reduced to 3.5%. Assented bondholders receive a cash compensation of 1% of the outstanding principal during the first 5 years. Maturities for most of the bonds are extended. By the end of 1939 about 95% of the bondholders have accepted these offers.

Notes: (G) (L), (NY), (P), (S) identify the financial center where the bond is issued. G stands for Germany, L stands for London, NY stands for New York City, P stands for Paris, and S stands for Switzerland.

Table 4
Debt Reduction Rates

Countries	Year of Default	Debt Relief	Investors' Haircuts	Average
Argentina	1828	0.71	0.74	0.73
	1891	0.03	0.15	0.09
Brazil	1828	0.04	0.08	0.06
	1898	0.04	0.03	0.04
	1914	0.06	0.08	0.07
	1931	0.50	0.52	0.51
Chile	1827	0.40	0.52	0.46
	1879	0.02	0.02	0.02
	1931	0.73	0.76	0.75
Colombia	1821	0.01	0.01	0.01
	1826	0.81	0.96	0.89
	1848	0.78	0.84	0.81
	1873	0.22	0.27	0.25
	1879	0.77	0.89	0.83
	1900	0.19	0.28	0.24
	1932	0.37	0.41	0.39
Mexico	1827	0.72	0.88	0.80
	1854	0.85	0.91	0.88
	1914	0.58	0.62	0.60
	1928	0.90	0.97	0.94
Peru	1826	0.71	0.83	0.77
	1876	0.79	0.82	0.80
	1931	0.83	0.85	0.84
Uruguay	1875	0.46	0.64	0.55
	1891	0.27	0.32	0.29
	1915	0.06	0.07	0.07
	1931	0.32	0.35	0.34

Notes: This Table shows the debt reduction rates at the time of a debt restructuring. They are estimated by comparing the present discounted value of the remaining contractual payments of the old instruments, including missing sinking fund payments or coupon arrears, and the present discounted value of the future payments of the new instruments at the moment of the exchange. The debt reduction rates using NPV estimates are sensitive to the choice of the discount rate. The rate of discount of creditors and debtors may differ. The rate of discount of the sovereign is linked to its cost of obtaining a new loan in the market. After the restructuring, if the new debt is sustainable, the sovereign will expect to access the international capital market at "non-crisis" interest rates. In a world with asymmetric information investors may ask for a higher yield to compensate for the likelihood of a new default, a "crisis" rate. The rate of discount used to estimate the "Debt Relief" is the yield in "non-crisis" times while the one used to estimate "Investors' Haircuts" is the exit yield (a "crisis" time rate as evaluated by investors).

Table 5
What Triggers Defaults?

Crises	Indicators of Insolvency		Indicators of International Liquidity		Indicator of Idiosyncratic Liquidity
	Export Growth	Debt/Export Ratio	International Issuance	U.K. Real Interest Rate	TOT Cycle/Trend
Argentina 1828	-0.9	151.3	-6.5	4.0	23.9
Argentina 1891	-1.1	163.3	2.1	8.7	-4.2
Brazil 1828	-1.9	117.2	-6.5	4.0	-7.8
Brazil 1898	0.1	122.0	-1.2	4.5	-21.5
Brazil 1914	-1.0	154.5	8.2	-18.2	-1.8
Brazil 1931	-14.5	262.1	-3.0	6.7	-20.7
Chile 1827	0.2	126.0	-6.5	7.5	2.5
Chile 1879	0.1	85.2	0.8	-1.2	5.8
Chile 1931	-12.8	297.6	-3.0	6.7	5.2
Colombia 1821	-2.7	62.5	31.5	17.0	3.1
Colombia 1826	-3.0	618.4	-6.5	6.0	-2.3
Colombia 1848	-2.6	872.6	-6.5	13.5	-1.1
Colombia 1873	-4.5	154.9	-0.3	7.9	-5.9
Colombia 1879	-8.3	46.7	0.8	-1.2	-2.7
Colombia 1900	-9.2	88.1	-1.8	7.4	-3.3
Colombia 1932	-10.7	85.3	-5.6	3.0	29.1
Mexico 1827	3.2	323.1	-6.5	7.5	-1.0
Mexico 1854	-3.4	236.8	-6.5	6.0	-10.7
Mexico 1914	5.1	176.2	8.2	-18.2	-2.0
Mexico 1928	-11.4	105.0	16.5	7.4	-2.8
Peru 1826	2.4	317.3	-6.5	6.0	-2.3
Peru 1876	-6.6	505.4	-1.4	0.1	-3.3
Peru 1931	-10.4	120.9	-3.0	6.7	-5.5
Uruguay 1875	-1.2	93.6	0.0	5.7	1.3
Uruguay 1891	-2.0	281.0	2.1	8.7	-10.6
Uruguay 1915	5.0	137.6	6.0	-24.5	-1.3
Uruguay 1931	-12.0	223.0	-3.0	6.7	-12.9

Notes: Export Growth is the growth rate of the trend of exports relative to tranquil times (in percent). Debt/Export ratio is the central government debt as a ratio of the trend of exports (in percent). International issuance is all primary issuance of seven non-Latin America Periphery Countries: Denmark, Italy, Spain, Russia, Australia, Canada, and New Zealand. International issuance is scaled with the trend of exports of the United Kingdom (in percent). The ratio is reported relative to the sample average. The U.K. Real Interest Rate is the Bank rate minus the rate of inflation of the U.K. wholesale price index (Annual Rate in percent). TOT Cycle/Trend is the ratio of the transitory component of the Terms of Trade as a ratio of the Terms of Trade trend (in percent). All variables are for the year of the default.

Table 6
Probabilities of Debt Restructuring

Year in Default	Argentina		Brazil				Chile			Colombia					Mexico				Peru			Uruguay					
	1828	1891	1828	1898	1914	1931	1827	1879	1931	1821	1826	1848	1873	1879	1900	1932	1827	1854	1914	1928	1826	1876	1931	1875	1891	1915	1931
1	0	0	n.a.	36	17	0	0	54	0	0	0	41	0	0	0	0	21	0	62	0	9	0	0	0	0	80	0
2	0	0	n.a.	56	27	0	0	61	0	0	0	76	0	0	0	0	12	0	70	0	6	0	0	0	0	80	0
3	0	20	n.a.	65	37	0	0	64	0	0	0	81	0	0	0	0	8	0	77	0	1	0	0	0	0	79	0
4	0		n.a.	74	45	0	0	61	0	0	0	86	0	0	0	0	2	0	74	0	0	0	0	0	0	59	0
5	0		n.a.	78	47	0	0	55	0	0	0	89	0	0	0	0	1	1	62	0	0	0	0	0	0	21	0
6	0		n.a.	79	44	0	0	42	0	0	0	89	0	0	0	0	1	1	45	0	0	0	0	0	0	1	0
7	0		n.a.	79	34	49	0	2	0	0	0	88	0	0	3	0	0	2	7	0	0	0	0	0	0	0	2
8	0		n.a.	79	24	95	0	16	0	0	0	87	0	0	36	0	0	3	0	0	0	0	0	0	0	0	29
9	0		n.a.	78	18	100	0	39	0	0	0	86	0	0	76	0	0	1	0	9	0	0	1	0	0	0	0
10	0		1	72	11	100	0	55	0	0	0	86	0	0	87	0	0	0	43	0	0	0	10	0	0	0	0
11	0		0	64	1	100	0	69	0	0	0	82	0	0	99	0	0	0	71	0	0	0	39	0	0	0	0
12	0		0	59	0	100	0	75	0	0	0	80	0	0	0	0	0	0	81	0	0	0	67	0	0	0	0
13	0		0	50	0	100	0	77	0	0	0	80	0	0	0	0	0	0	86	0	0	0	81	0	0	0	0
14	0		0	38	0	100	0	78	0	0	0	80	0	0	0	0	0	0	89	0	0	0	84	0	0	0	0
15	0		0				0	79	0	0	0	0	0	0	0	0	0	0	90	1			86				
16	0		2				0	79	0	0	0	0	0	0	0	0	0	0		1			86				
17	0		12					78	0	0	0	0	0	0	0	0	0	0		2			85				
18	0		35					74	0	0	0	0	0	0	0	0	0	0		6			83				
19	0		56					63	0	0	0	0	0	0	0	0	0	0		21			81				
20	0		68									0					0	0		44			73				
21	0		77														0	0		60			57				
22	0		79														0	0		66			37				
23	0		80														0	0		69			27				
24	0		80														0	0		69							
25	0																0	0									
26	1																	0									
27	4																	0									
28	15																	1									
29	28																	3									
30	32																	8									
31																		9									
32																		6									
33																		3									
Average Export Growth (%)	5.1	3.9	2.6	5.1	1.5	9.4	3.6	4.3	6.5	4.0	1.6	9.6	2.0	-1.3	-0.5	4.6	3.3	1.9	7.9	5.0	6.4	-6.2	7.1	4.2	2.4	3.6	-0.6
Debt/X at Default (%)	151	163	117	122	154	262	126	85	298	63	618	873	155	47	88	85	323	237	176	105	317	505	121	94	281	138	223

Notes: The probability of restructuring in each period has been estimated as the probability that the country is able to reduce the debt/export ratio in each period by 10 percent in five years.

Table 7
Insolvency, Liquidity Crashes, and Default Spells
Duration Analysis

Indicator	Coefficient	p-Value	Response of the Probability of Renegotiation to a One-percentage point Increase in Variable:	Response of the Probability of Renegotiation to a One-Standard Deviation Increase in Variable:
Probability of Stabilizing the Debt/Export Ratio	0.0142	0.04	1.43	59
International Issuance (Percent of U.K. Trend Exports)	0.0634	0.02	6.55	47
U.K. Real Interest Rates	0.0289	0.23	2.93	32
Transitory Shocks to the Terms of Trade (Percent of Trend)	0.0155	0.46	1.56	16
Debt at the time of default (Percent of Trend Exports)	-0.0008	0.50	-0.08	-14
Number of Defaults: 27				
Number of Observations: 367				

Notes: This table shows the coefficients of a Cox proportional hazard model. As in all duration model estimations, we only look at the years of the default and the year when the country exits default. The dependent variable is a dummy variable equal to zero in the years the country is in default and equal to one in the year when the country exits default. The Probabilities of Stabilizing the Debt/Export Ratio are from Table 6. The explanatory variables are all in percent. A positive coefficient indicates that a higher value of that variable is associated with a shorter duration of the default spell. To interpret the coefficients, they have to be exponentiated. As an example, the coefficient for the international issuance covariate indicates that a one-percentage point increase in International Issuance (Percent of U.K. Trend Exports) is associated with a 6.55 percent increase of the probability of restructuring the debt (ending the default spell).

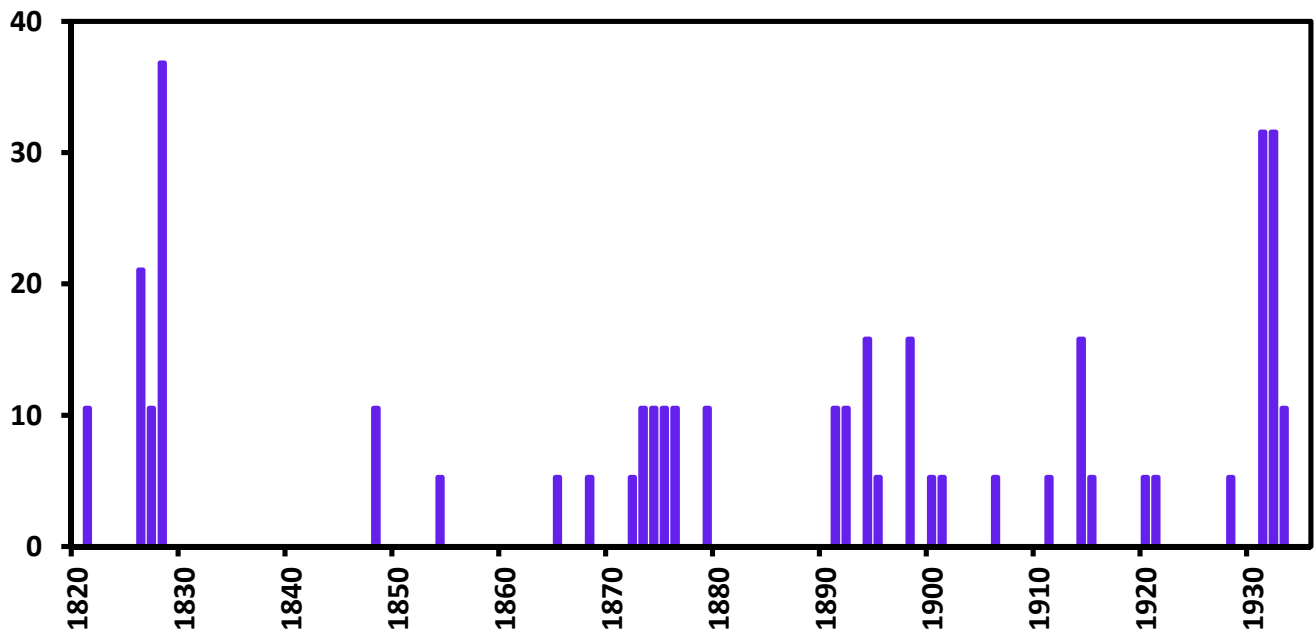
Table 8
Insolvency, Liquidity Crashes, and Debt Reduction Rates

Indicators	Coefficient Estimates (p-Values)	
Constant	50.09 (0.00)	39.98 (0.00)
International Issuance (Percent of U.K. Trend Exports)	-1.56 (0.02)	-1.43 (0.04)
Transitory Shocks to the Terms of Trade (Percent of the Trend)	1.32 (0.11)	1.70 (0.05)
U.K. Real Interest Rate	-1.40 (0.18)	-0.28 (0.82)
Debt/Export Ratio at the time of default	0.10 (0.00)	0.11 (0.00)
Probability of Stabilizing the Debt/Export Ratio	-0.40 (0.08)	
Probability of Stabilizing the Debt/Export Ratio (in Times of Low International Liquidity)		0.17 (0.71)
Probability of Stabilizing the Debt/Export Ratio (in Times of High International Liquidity)		-0.44 (0.05)
R-squared	0.55	0.59
Adjusted R-squared	0.45	0.47
Number of observations	27	27

Notes: All indicators are in percent. The average Debt Reduction Rate in Table 4 is the dependent variable. International Issuance (Percent of U.K. Trend Exports), Transitory Shocks to the Terms of Trade (Percent of Trend), and U.K. Real Interest Rate are the average of the five years before the agreement. The Probability of Stabilizing Debt/Export Ratio (from Table 6) is the average during the default spell. We use trend exports to normalize Debt. In column 2, we allow for non-linear effects of the Probability of Stabilizing the Debt/Export Ratio. We divide the observations of International Issuance (Percent of U.K. Trend Exports) according to whether the observations are below or above the median. We create two dummies: (1) The Low International Liquidity dummy is equal to one during episodes of low liquidity, zero otherwise. (2) The High International Liquidity dummy is equal to one during episodes of high liquidity, zero otherwise. We use these dummy variables to estimate the effects of high growth (higher probability of stabilizing the Debt/Export ratio) on debt reduction rates during international liquidity booms and crashes.

Figure 1

Sovereign Defaults in Latin America
(in Percent of Countries)

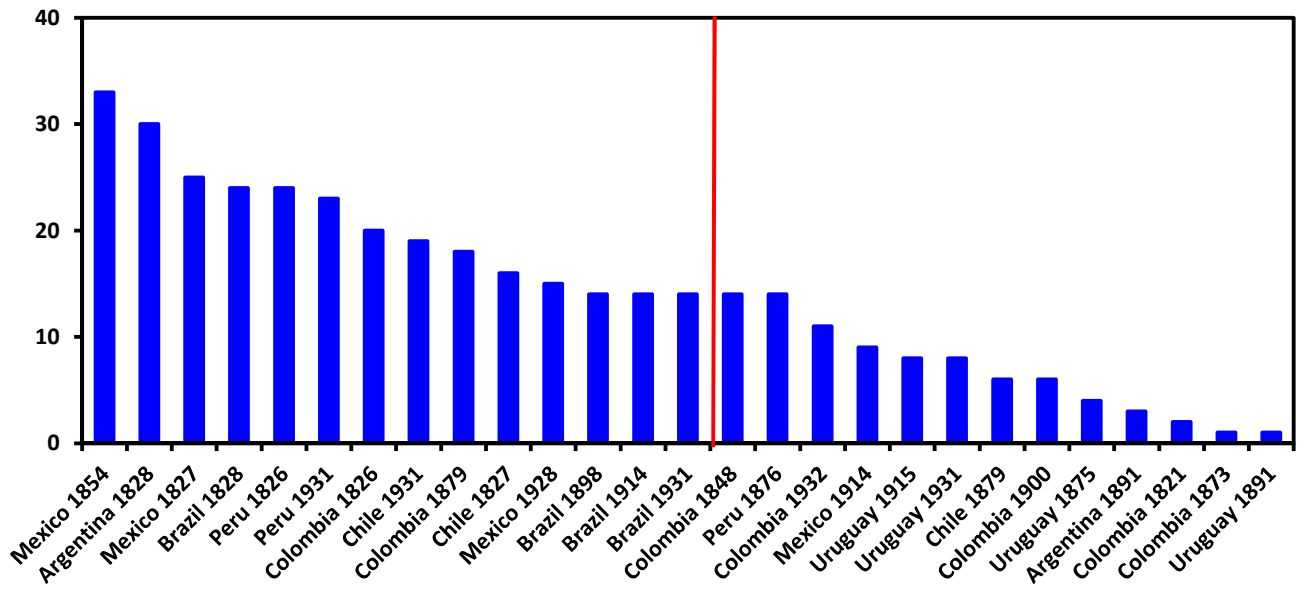


Note: The bars indicate how many countries default each year (in percent of all countries). It only identifies the beginning of the default episodes.

Sovereign Defaults	
Type	Number
All	67
Systemic	46
Idiosyncratic	21

Figure 2

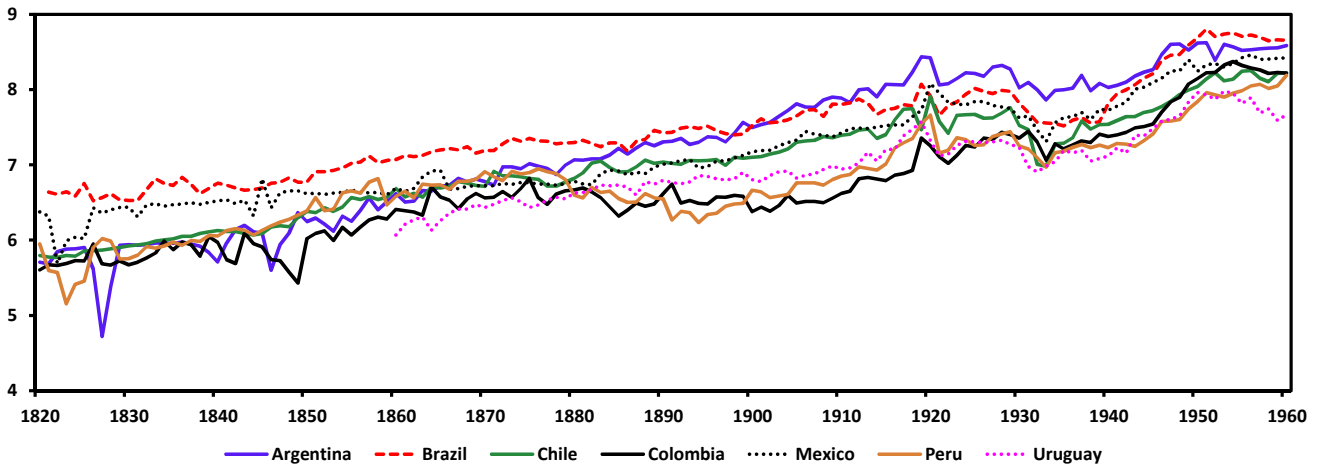
Duration of Sovereign Default Spells
(in Years)



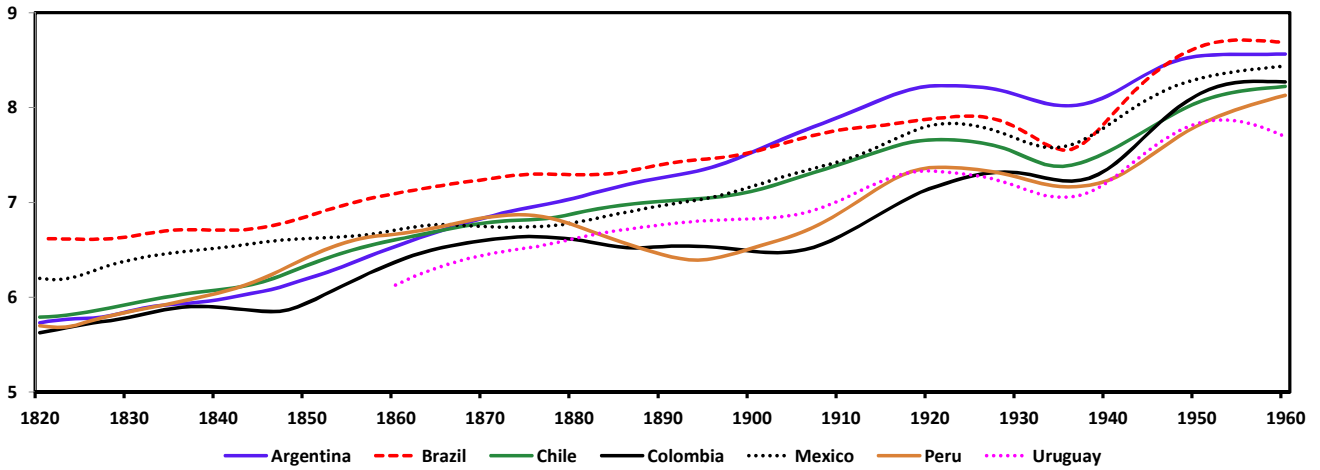
Notes: The vertical line divides the crises between those with default spells above and below the median.

Figure 3

Exports: 1820-1960
(in Logs)



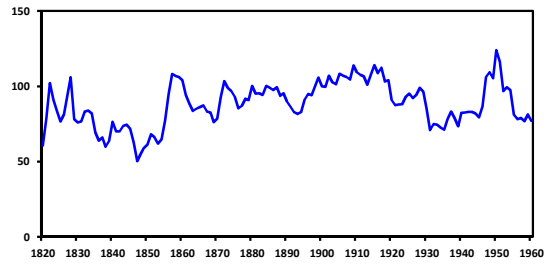
Estimated Exports Trend with Hodrick-Prescott Filter: 1820-1960
(in Logs)



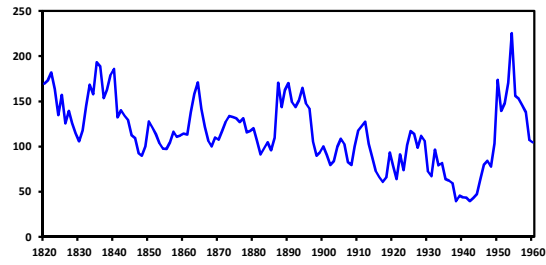
Notes: The original Export series in this Figure are in British pounds. The Hodrick-Prescott trend is estimated with a lambda equal to 100.

Figure 4
Terms of Trade
1900=100

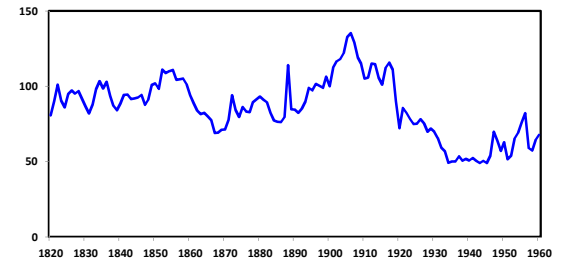
Argentina



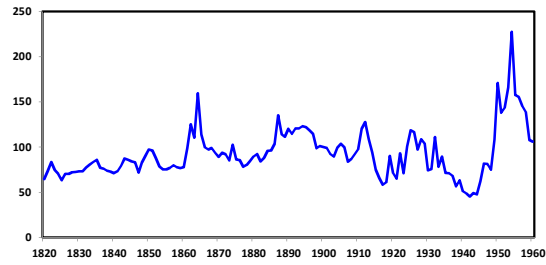
Brazil



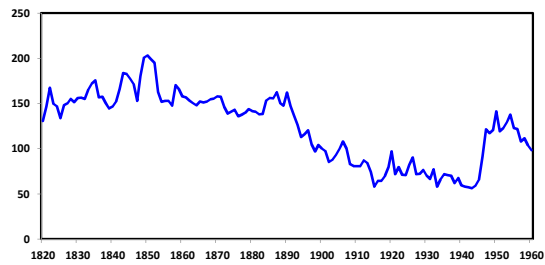
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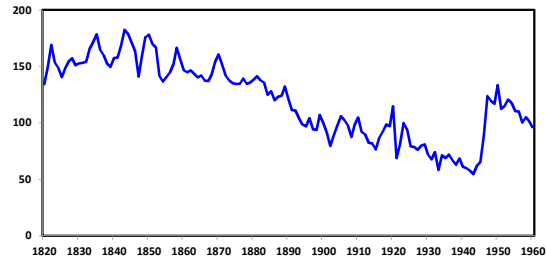
Colombia



Mexico



Peru



Uruguay

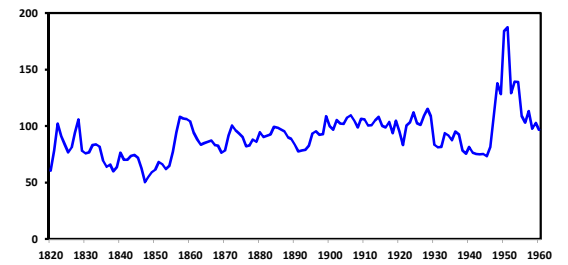
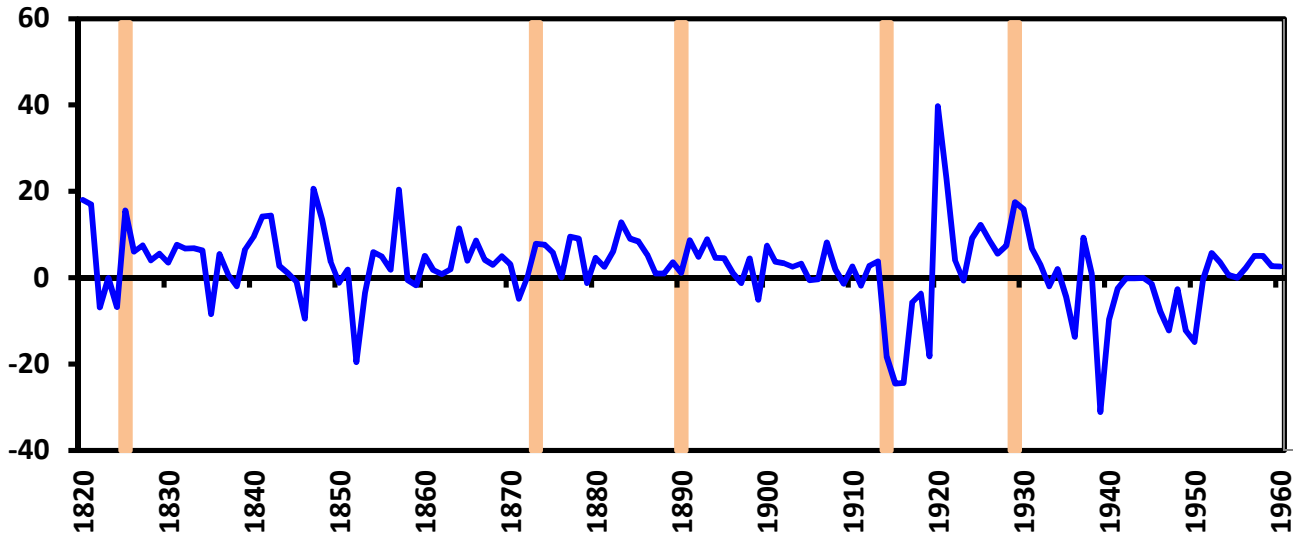


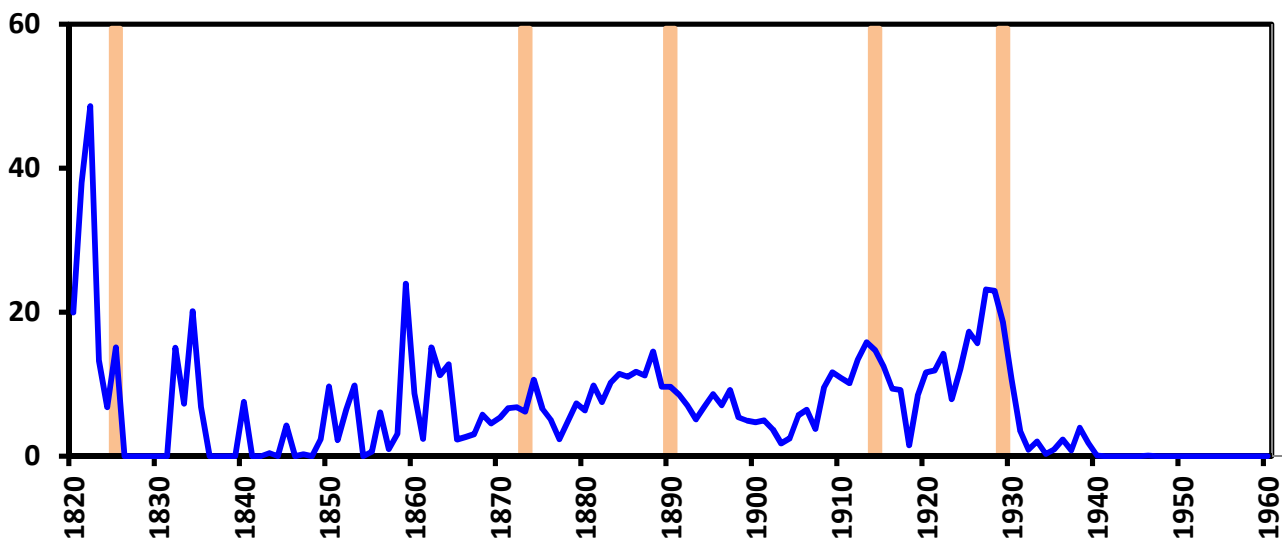
Figure 5
International Liquidity

U.K. Short Term Real Interest Rate
(Per Cent Per Annum)



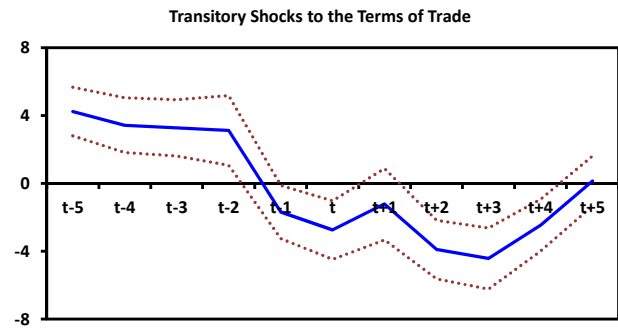
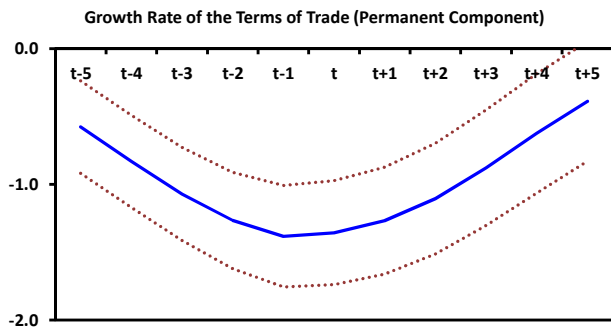
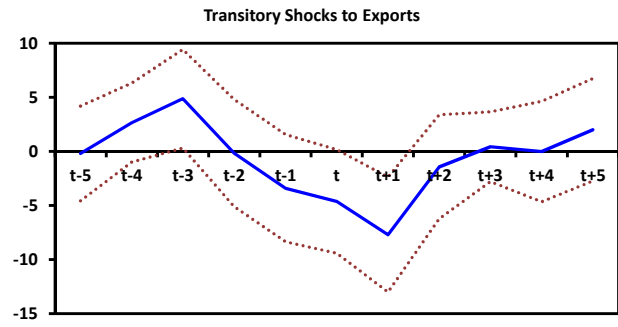
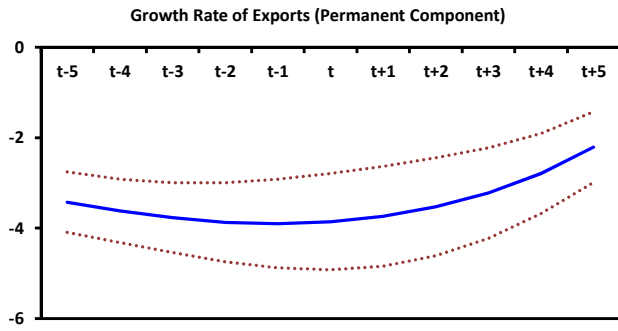
Notes: The U.K. short-term interest rate is the Bank rate. The inflation rate is the rate of increase of the U.K. Wholesale Price Index. The vertical lines identify the years of crisis in the financial center.

International Primary Issuance of Non-Latin American Periphery Countries
(Percent of U.K. Trend Exports)



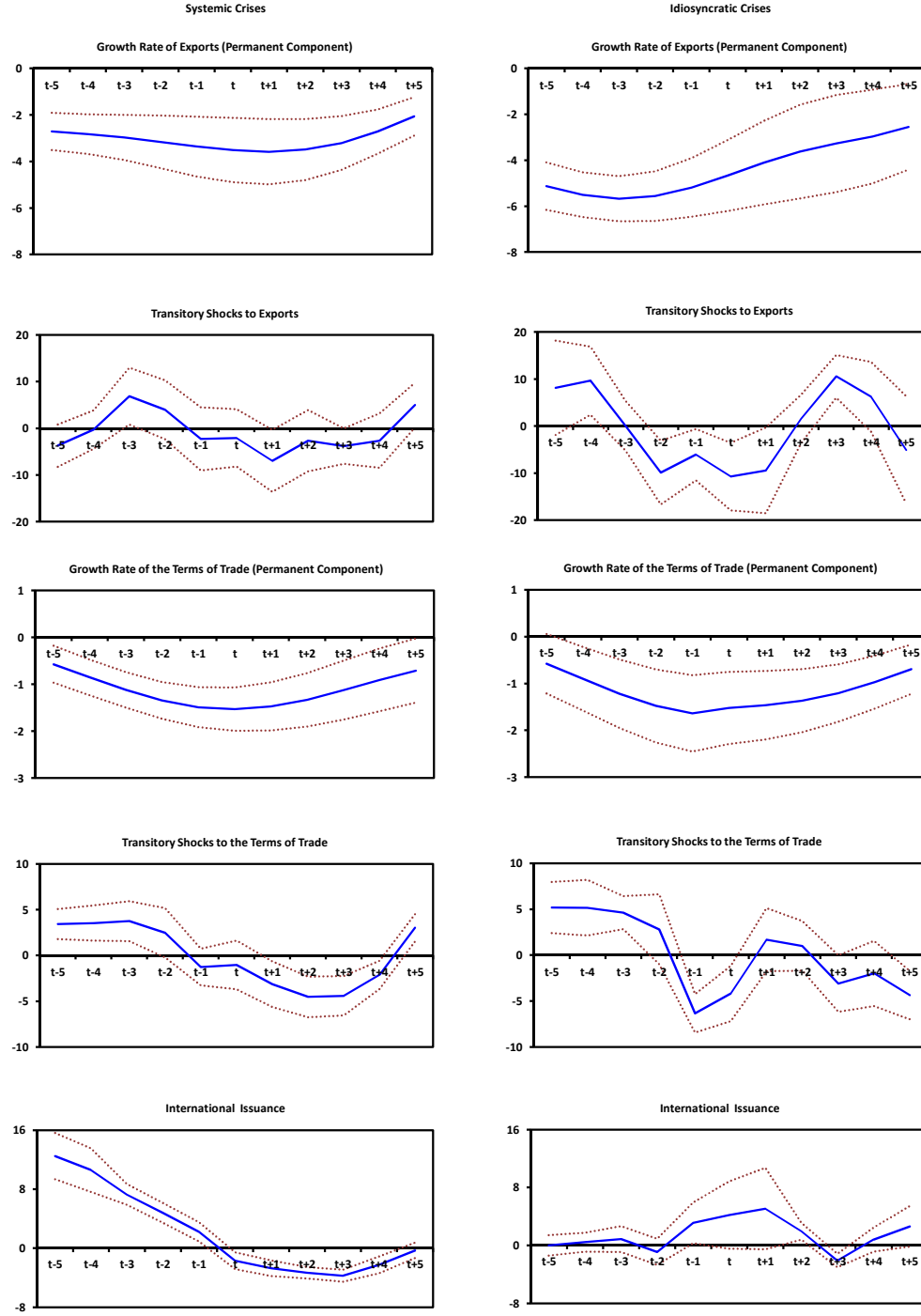
Notes: International Primary Issuance of Non-Latin American Periphery Countries is the issuance of four European countries (Denmark, Italy, Russia, and Spain) and three Commonwealth Countries (Australia, Canada, and New Zealand). The vertical lines identify the years of crisis in the financial center.

Figure 6
What Triggers Sovereign Crises?



Note: The growth rate of exports and the growth rate of terms of trade are shown relative to their values in non-crisis times. The transitory shocks to exports and the transitory shocks to the terms of trade are shown as a percent of their trend.

Figure 7
What Triggers Systemic and Idiosyncratic Crises?

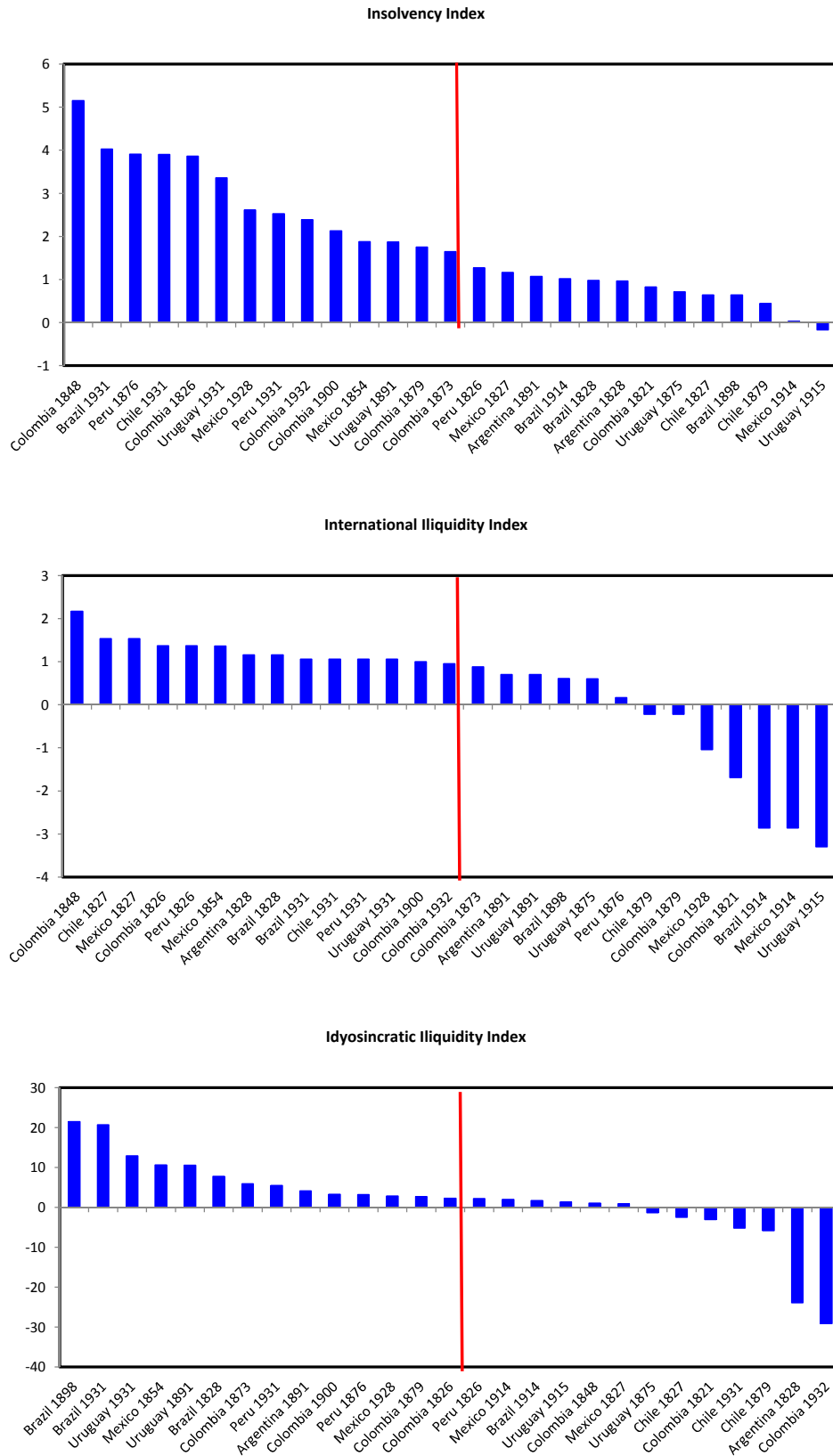


Year	Real Interest Rates in the U.K. During Crisis in the Financial Center					Liquidity Crash Index
	t-2	t-1	t	t+1	t+2	
1825	-0.1	-6.8	15.6	6.0	7.5	13.1
1873	-4.9	0.1	7.9	7.7	5.7	9.5
1890	1.0	3.6	1.2	8.7	4.8	2.6
1914	2.8	3.8	-18.2	-24.5	-24.4	-25.6
1929	5.6	7.4	17.5	15.9	6.7	6.9

Crises	Real Interest Rates in the U.K. During Idiosyncratic Crises in Latin America					Liquidity Crash Index
	t-2	t-1	t	t+1	t+2	
Brazil 1898	1.2	-1.3	4.5	-5.1	7.4	2.3
Chile 1879	9.5	9.1	-1.2	4.6	2.6	-7.3
Colombia 1821	15.2	18.0	17.0	-6.9	-0.1	-13.3
Colombia 1848	-9.5	20.6	13.5	3.6	-1.2	-0.3
Colombia 1879	9.5	9.1	-1.2	4.6	2.6	-7.3
Colombia 1900	4.5	-5.1	7.4	3.7	3.3	5.1
Mexico 1854	-19.6	-3.4	6.0	4.9	1.9	15.7
Mexico 1928	8.7	5.6	7.4	17.5	15.9	6.4

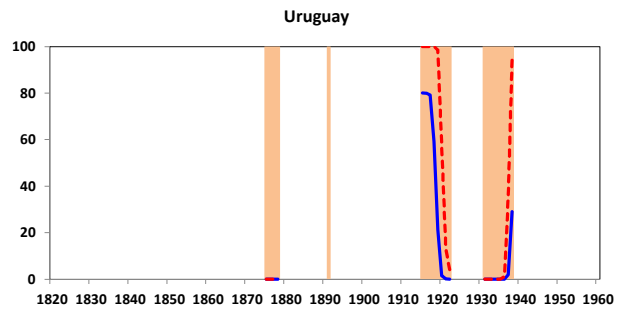
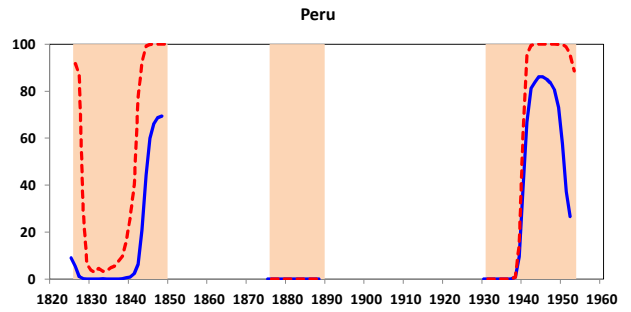
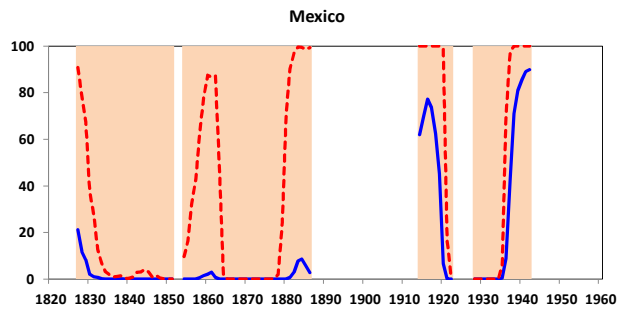
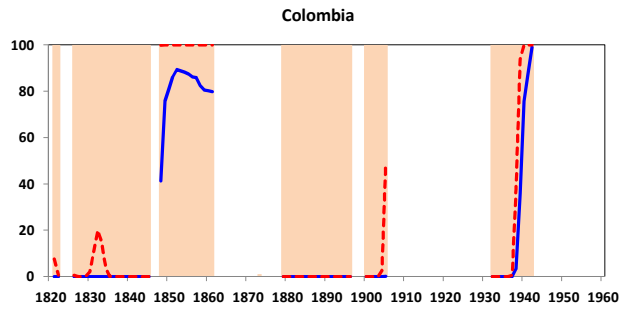
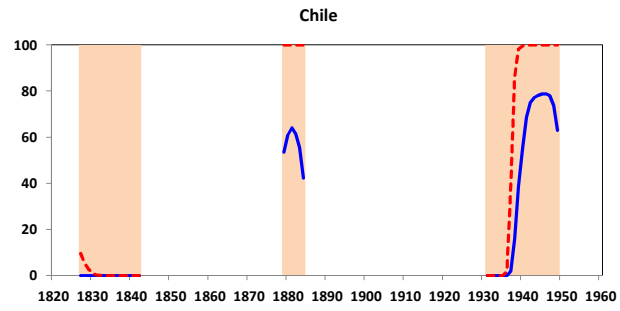
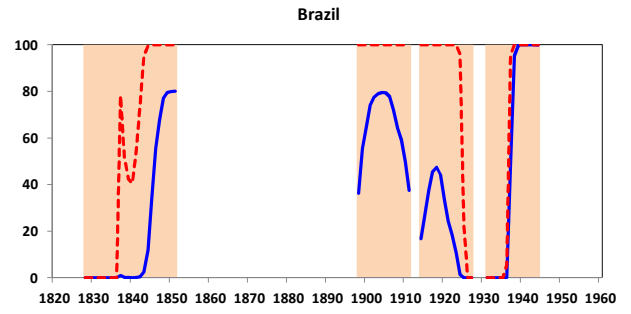
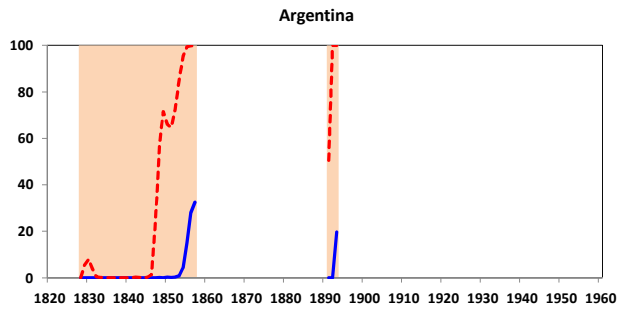
Notes: The growth rates of exports and of terms of trade are shown relative to their values in non-crisis times. The transitory shocks to exports and the terms of trade are shown as a percent of their trend. International Issuance is shown as a percent of U.K. Exports Trend (relative to the average of the sample). The Liquidity Crash Index in the bottom panels captures the average increase in real interest rates when the crisis erupts and its immediate aftermath. In particular, it is the average real interest rate from period t to t+2 relative to the average from period t-2 to t-1. Period t is the year of the crisis.

Figure 8
Varieties of Sovereign Crises



Notes: Higher values of the indices indicate more vulnerabilities. The vertical line divides the crises as those with indices above the median and those with indices below the median value of the index.

Figure 9
 Probabilities of Stabilizing the Debt/Export Ratio



Notes:

- █ Probability of reducing the D/X ratio by 10 percent within five years
- - - Probability of keeping the D/X constant within five years
- Episodes of Default

Appendix 2: Table 7
Insolvency, Liquidity Crashes, and Default Spells
(Duration Analysis)

Robustness Test: Changing the Indicator for Probability of Stabilizing the Debt/Export Ratio

Indicator	Coefficient	p-Value	Response of the Probability of Renegotiation to a One-percentage point Increase in Variable:	Response of the Probability of Renegotiation to a One-Standard Deviation Increase in Variable:
Probability of Stabilizing the Debt/Export Ratio	0.0082	0.09	0.83	46
International Issuance (Percent of U.K. Trend Exports)	0.0613	0.03	6.32	45
U.K. Real Interest Rates	0.0229	0.32	2.31	25
Transitory Shocks to the Terms of Trade (Percent of Trend)	0.0113	0.58	1.14	11
Debt at the time of default (Percent of Trend Exports)	-0.6000	0.64	-0.60	-10
Number of Defaults: 27				
Number of Observations: 367				

Notes: This table shows the coefficients of a Cox proportional hazard model. As in all duration model estimations, we only look at the years of the default and the year when the country exits default. The dependent variable is a dummy variable equal to zero in the years the country is in default and equal to one in the year when the country exits default. The Probability of Stabilizing the Debt/Export Ratio is the Probability of keeping the Debt/Export Ratio constant within 5 years shown in Figure 9. The explanatory variables are all in percent. A positive coefficient indicates that a higher value of that variable is associated with a shorter duration of the default spell. To interpret the coefficients, they have to be exponentiated. As an example, the coefficient for the international issuance covariate indicates that a one-percentage point increase in International Issuance (Percent of U.K. Trend Exports) is associated with a 6.32 percent increase of the probability of restructuring the debt (ending the default spell).

Appendix 2: Table 8
Insolvency, Liquidity Crashes, and Debt Reduction Rates

Robustness Test: Changing the Indicator for Probability of Stabilizing the Debt/Export Ratio

Indicators	Coefficient Estimates (p-Values)	
Constant	56.16 (0.00)	49.54 (0.00)
International Issuance (Percent of U.K. Trend Exports)	-1.63 (0.01)	-1.45 (0.03)
Transitory Shocks to the Terms of Trade (Percent of the Trend)	1.41 (0.07)	1.51 (0.05)
U.K. Real Interest Rate	-1.00 (0.26)	-0.51 (0.61)
Debt/Export Ratio at the time of default	0.09 (0.00)	0.10 (0.00)
Probability of Stabilizing the Debt/Export Ratio	-0.31 (0.02)	
Probability of Stabilizing the Debt/Export Ratio (in Times of Low International Liquidity)		-0.10 (0.69)
Probability of Stabilizing the Debt/Export Ratio (in Times of High International Liquidity)		-0.33 (0.02)
R-squared	0.60	0.62
Adjusted R-squared	0.51	0.51
Number of observations	27	27

Notes: All indicators are in percent. The average Debt Reduction Rate in Table 4 is the dependent variable. International Issuance (Percent of U.K. Trend Exports), Transitory Shocks to the Terms of Trade (Percent of Trend), and U.K. Real Interest Rate are the average of the five years before the agreement. The Probability of Stabilizing Debt/Export Ratio is the probability of keeping the Debt/Export ratio constant within 5 years shown in Figure 9. As in Table 8, we use the average probability during the default spell. We use trend exports to normalize Debt. In column 2, we allow for non-linear effects of the Probability of Stabilizing the Debt/Export Ratio. We divide the observations of International Issuance (Percent of U.K. Trend Exports) according to whether the observations are below or above the median. We create two dummies: (1) The Low International Liquidity dummy is equal to one during episodes of low liquidity, zero otherwise. (2) The High International Liquidity dummy is equal to one during episodes of high liquidity, zero otherwise. We use these dummy variables to estimate the effects of high growth (higher probability of stabilizing the Debt/Export ratio) on debt reduction rates during international liquidity booms and crashes.