Varieties of Sovereign Crises: Latin America, 1820-1931

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Abstract

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 were sixty seven defaults, with countries as rich as Argentina and as poor as Bolivia all defaulting at least once. What can we learn from this first period of financial globalization? This paper creates an anatomy of debt defaults, renegotiations, investors' losses, and the re-entering in international capital markets and links this anatomy to the economic and financial evolution of the global economy, the financial centers, and the periphery.

Keywords: Sovereign crises, renegotiations, defaults, haircuts, debt sustainability, liquidity crises

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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 and the world is preparing for the aftershocks. 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?

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 and episodes of isolated defaults. What can we learn from this first period of financial globalization?

This paper creates an anatomy of debt defaults, renegotiations, losses, and the re-entering in international capital markets 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 allows 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 characteristics of the domestic economies that trigger long renegotiation episodes. These one hundred years of defaults can allow us to make a distinction between defaults following crises in the periphery, such as the coffee crisis in Brazil in 1898 or Chile's default 1879 in the midst of the Pacific War, and the defaults following crises in the financial center, such as the ones in 1825, 1873, 1890, and 1931. Finally, we study the ability of defaulting countries to re-enter capital markets following crises with origin in the periphery and those with origin in the financial center. The experiences of this long episode will help us to understand better the aftermath of the current crisis with the financial center at its epicenter.

The rest of this paper is organized as follows. Section II provides 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 negotiations, and re-entering in international capital markets. Importantly, this section also computes investors' losses and countries debt reliefs following each default. Section IV examines the fundamentals of each country as well as the state of the global economy and links these fundamentals to the success or failure of each renegotiation. We classify sovereign defaults into sustainability crises and liquidity crises. Section V concludes.

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) and Chile default in September 1826; Brazil defaults in 1827, Mexico defaults in October 1827; Argentina defaults in January 1828; and the Federation of Central America defaults in February 1828. It takes three decades before the debts are renegotiated and capital flows to Latin American resume.

The world economy and 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.[1] 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 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 a huge indemnity of 5,000 million francs (£200 million) to Germany. These transfers lead to a massive flow of capital into the economies of central Europe, fueling speculation in various financial markets. A spectacular 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 the year 1876 fifteen non-European nations have suspended payments on almost 300 million British pounds. In Latin America, Bolivia, Colombia, Costa Rica, Guatemala, Honduras, 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

[1] Chile is the first to renegotiate its debt in 1842, Peru follows in 1849. Most Latin American countries renegotiate their debts in the 1850s.

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, with Argentina and Uruguay the most important recipients of this inflow. 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 mid-1890s and ends with the start of WWI. While Britain continues to be the main creditor, France, German and American 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 World War I 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 asset markets. While the panic is promptly stopped by the central banks in the United Kingdom, the United States, and continental Europe, the outbreak of the war in Europe causes an abrupt suspension of capital flows. Only 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, Europe, and Australia. 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, Guatemala, Nicaragua, Panama, Paraguay, Peru, and Uruguay default in the midst of the great depression.

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 defaulted during these episodes. Sixty-five percent of all defaults in Latin American occur during these systemic crises.

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 isolated crises in various countries in Latin America. Table 2 shows those defaults with idiosyncratic patterns, such as the Brazilian default in 1898 following the coffee price collapse or Chile's default in 1879 in the midst of the War of the Pacific.

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 and 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: 1827, 1898, 1914, and 1931. Chile defaults three times: 1827, 1879, and 1931. Colombia defaults seven times: 1821, 1826, 1849, 1873, 1879, 1900, and 1932. Mexico defaults four times: 1828, 1854, 1914, and 1928. Peru defaults three times, 1826, 1876, and 1931. Uruguay defaults four times, 1875, 1891, 1915, and 1933. As shown in Table 3, the average duration of default spells is 14 years, with default spells ranging from a minimum of 1 year in the case of the 1891 Uruguay's default to 31 years in the case of Mexico's default in 1854. Interestingly, most of the defaults of Colombia, Mexico, and Peru are quite protracted while the duration of the negotiations in the case of Argentina, Chile, and Uruguay (excluding the defaults in the 1820s) are far shorter. Brazil's default-spells are as protracted as those of Colombia, Mexico, and Peru; Brazilian defaults, but as we will examine below, they are somewhat different from those three-country defaults. Colombia, Mexico, and Peru default outright with no service payment during the duration of the default. In contrast, Brazil continues to pay coupons, suspending only the sinking fund.

Table 4 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 took 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 4 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 provides the details of the agreement with particular attention to the suspension of the sinking

fund and payment of coupons, reduction in interest rates and if new bonds are exchanged for the old bonds, it shows 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 970,000 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 3% bond is issued for 1,641,000 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 158 million British pounds.[2] Following the borrowing boom of the 1880s, the government of Argentina defaults again in April 1891: While the government maintains the sinking fund and pays the coupons of the 1886-1887 5% 8,290,000 pound loan, it suspends both the sinking fund and the coupon payments of ten bonds, with an outstanding balance of 23 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 pounds. In contrast to the default of 1824, which is only renegotiated in 1857 after 29 years, this default is renegotiated within a couple of months. This first renegotiation 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 7,600,000 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

[2] The data on international capital flows to Argentina 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," (http://home/gwu.edu/~home) for an analysis of the database.

international capital flows in the 1890s and with an increasing debt burden, Argentina repudiates the 1891 agreement in 1892. A new agreement is reached in 1893, 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 period 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 1827. It resumes the sinking fund payment in 1836 only to suspend it again in 1840. Again it resumes the sinking fund 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 1827-1950.[3] Thus, our analysis indicates that Brazil is in default from 1827 to 1850.[4] 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 1860 until the 1890s. Government debt increases to approximately 38 million British pounds by 1898. It defaults

[3] The information on the service of the debt during from the early 1820s to 1951 is collected from Bouças (1950), Carreira (1980), and *Estatísticas Históricas do Brasil* published by the Fundaçao Instituto Brasileiro de Geografia e Estatística.

[4] 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 1825-1951 period. In contrast, Standard & Poors and Bein and Calomiris (2001) identify the 1826-1829 period as a default event.

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 following the Baring Crisis in 1890. Brazil issues in 1898 a Funding Loan (Rothschild is the underwriter) for 8,613,717 British pounds to pay coupons from 1899 to 1901. Interest payments are made regularly since 1902. The sinking fund of all the bonds is suspended for thirteen years (1898-1911). Again as during the earlier default in 1827, Brazil re-enters international capital markets even before it resumes full service of the debt in 1912. It issues six 5% bonds in 1903, 1905, 1907, and in 1908 (for 5,500,000; 3,000,000; 3,000,000; and 21,000,000 (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 giving state governments the sole right to tax exports. 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 WWI. As in 1898, Brazil issues a Funding Loan (Rothschild is the underwriter) for 14,502,396 British pounds to pay coupons from 1914 to 1917 while interest payment are made regularly starting in 1918. Brazil suspends the sinking for thirteen years (1915-1927). This time around, some states and municipalities also default. The total central government external debt at the time of the default is approximately 91 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 pounds. Brazil reaches a final agreement on the debt in 1943.

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 765,500 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 the 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 1,854,800 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 totals 130 million British pounds. Chile's last default is in 1931. 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. This last default is finally renegotiated in 1948. A new bond with 46-year maturity is issued in that year to consolidate all dollar bond issues by exchange at par. The interest rate of that bond is initially set at 1.5% in 1948 and rising to 3% by 1954.

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 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. 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. Colombia renegotiates its debt in 1845. New bonds are issued to pay the principal and the unpaid (not capitalized) coupons. The new bonds carry very low interest rates starting at 1 percent (in the case of the bonds issued to pay the unpaid principal) or even zero interest rate in the case of the bonds issued to pay interest arrears. In both cases, interest rates increase slowly until they reach 6 percent for the bonds paying the principal and 3 percent for the bonds paying the interest arrears. These same bonds are defaulted in 1849, then again in 1873, in 1879, and in 1900. Renegotiations take time. For example, the default in 1849 is renegotiated in 1861 and the one in 1879 is renegotiated in 1896. Only the default of 1873 is renegotiated within a couple of months. In all the agreements, bonds are

issued to pay for (non-capitalized) arrears in coupons. These bonds pay very low interest for several years. The agreement of 1861 adds a new feature: investors are compensated with land (about 1,500,000 hectares). The principal is maintained at par value with no exchanges for new bonds. The debt is renegotiated in 1873. Again investors receive land in partial payment (2,000,000 hectares). This time around, bonds are heavily discounted, with discounts oscillating between 67 percent (for outstanding principal) and 83 percent (for unpaid coupons). The agreement of 1896 also includes discounts. In this case, there are discounts on interest arrears that are reduced by 57 percent. From 1850 to 1900 bonds and shares issued by Colombia in international capital markets amount to just 15 million British pounds (of which 12 million 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 repaid defaulted bonds and deferred coupons. With the stabilization in the early years of the 20th century, Colombia starts tapping international capital markets, with public borrowing reaching 60 million British pounds by 1931. States and municipalities default in 1931 and the central government defaults in 1933. The central government settles the default in 1941. Old bonds are to be exchanged at par for new 3% bonds due in 1970

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. Mexico issues two bonds in London in the 1820s. Both bonds are for 3,200,000 pounds, the first one in 1824 and the second one in 1825. This is basically the debt defaulted in 1827. There are several attempts to renegotiate the debt in 1831, 1837, 1842, 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 losses 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) is converted into a new 3% bond. Old bonds are converted into new bonds at heavy discounts, between 50 and 80 percent. Arrears in coupons are also capitalized in this 3% bond at 85 percent discount.

With the debt successfully settled, 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. Government debt by then has escalated to approximately 103 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. There are coupon arrears for a total of approximately 40,000,000 British pounds. These 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 only renegotiated in 1942.

Peru also first taps international capital markets in the early 1820s. It issues two 6% bonds for 1,816,000 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 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 creditor. 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. Also the old bonds are exchanged at par for 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 5,000,000 pounds. In 1862 it issues a new bond for 5,500,000 pounds and in 1865 it issues a 10,000,000 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 pounds and the second for 36,800,000 pounds.[5] 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 worst 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 40,000,000 pounds and the debt to exports ratio reaches 4.5. With no ability to make any commitments of repayments, an agreement, known as the Grace contract, is reached by which the claims of investors on the loans of 1869, 1870, 1872 including the accumulated arrears in interest are cancelled. In total, the foreign debt at the time of this agreement is about 55 million 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 pounds for thirty years and gives bondholders 2 million tons of guano. This is Peru's last default in the 19th century. 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 16 million pounds. Starting in 1920, Peru starts tapping international capital markets again, mostly issuing bonds in New York. Total issuance until 1930 reaches 34 million pounds. Peru defaults on its debt in 1931. Central government debt is approximately 29 million pounds. The negotiation of the default is quite protracted, only settling in 1951.

Uruguay's participation in international capital markets and defaults has similar characteristics to those of Argentina. From 1864 until 1900, Uruguay floated approximately 61

[5] Only 23,310,000 million 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.

million pounds (of which 30 million 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 sovereign debt consists of just one bond, the 6% 3,500,000 pound bond floated in 1871. A debt-settlement agreement is reached in 1878. A 1.25% funding loan 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.

In the early 1880s Uruguay regains access to international capital markets, with total gross issuance from 1880 to 1890 reaching 23 million British pounds. In the midst of the 1890 Baring's crisis, Uruguay defaults again. This time around, government debt has increased to approximately 18 million 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 pounds is issued in 1892 and exchanged for the old bonds at a premium. Also a new funding loan is issued in 1891 to pay for interest in arrears. The last default before 1931 occurs at the onset of the war in 1915. While there is an initial attempt to renegotiate the debt in 1915, the debt settlement is only reached in 1921. The suspended sinking fund is resumed in 1921 and 1922 and Uruguay regains access to international capital markets, with new issuance reaching 16 million pounds by 1930. Uruguay defaults in 1932. An agreement with U.S. bondholders is reached in 1937 and with British and French bondholders in 1939.

Table 5 shows the costs of debt restructuring. As in the literature on sovereign defaults, we estimate these costs 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 NPV of the old bond at the time of the agreement is estimated as follows:

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

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 Reliefs/Investors Losses estimated as follows:

$$DR / IL_t = 1 - \frac{NPV^{new}(r_{ta})}{NPV^{old}(r_t, r_{ta})} \quad (3)$$

Naturally, the cost of the debt restructuring 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 sovereign's 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, (2012) net present value estimates are based on exit yields while Sturzenegger and Zettelmeyer (2007) are based on yields in normal times. Jorgensen and Sachs (1988) estimate the net present value of the flows using the risk-free interest rate. As discussed in Kozack (2005) reaching a consensus on the appropriate rate of discount is elusive. For example, exit yields can be quite volatile and cannot reflect the costs of servicing future liabilities. Assessing normal-time rates involves not only assessing the rates at which the sovereign may borrow when committed not to default but also depend of the state of international financial markets in general. Thus, we estimate a range of haircuts/debt reliefs for various rates of discount. For indicative purposes, we follow Kozack (2005) and report the internal rate of return –the discount rate that equalizes the NPV of the streams of payments of the old and new instruments. The

internal rate of return provides a benchmark for assessing whether debtors and creditors would face savings or losses following a debt restructuring.[6]

We estimate the haircuts/debt reliefs at the time of the agreement. Since the episodes of default are in many cases quite protracted, not only we need to discount the future payments of the old and the new bond but also need to capitalize the missing payments of the old bond to the time of the agreement. For the discounting, we use the chosen rate at the time of the agreement. For capitalization, we use the average rate during the episode of default. The first estimate in Table 6 (H1) uses the risk-free interest rate both for capitalization and discounting. The assumption is that the investor if repaid (or if the debtor country does not service its debt), would invest those funds into a liquid risk-free bond. We use the yield on British long term bonds to capture the risk free rate. The second estimate (H2) uses a measure of opportunity cost for the debtor. We use normal-time rates to capture the debt relief to the sovereign committed to the repayment of the debt or the opportunity cost of capital after the agreement. To capture the normal-time rates, we estimate the spread between the yield of the sovereign and the risk-free interest rate during normal times. Then, we estimate the normal-time yield as the sum of the risk-free yield at the moment of the restructuring plus the sovereign spread during normal times. The third estimate (H3) uses exit yields (the average of the yield during the year of the agreement) to capture "crisis-time rates" and thus capture the so-called investor's haircuts. For the rate of capitalization, we use the yield of the bond at the time of issue. H4 and H5 are variations of H2 and H3. The only difference is that the rate of capitalization is the risk-free interest rate. The last column in this table reports the average of all the different estimates of costs of restructuring.

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 (losses for investors) following the restructuring. Overall, Colombia, Mexico, and Peru estimates for all the defaults during this episode suggest far larger losses for investors (debt reliefs for the sovereigns). The average losses for these countries are about 60 percent. In contrast, Argentina, Brazil, Chile, and Uruguay have on average lower costs/gains from the restructurings, oscillating around 25

[6] We will estimate the internal rate of return in the next version of this paper.

percent. Importantly, the cost of the defaults of the 1820s and 1930s are mostly across the board quite large and the default episodes quite protracted. Averages in these cases oscillate around 50 percent.

IV. Domestic and Global Fragilities and Varieties of Sovereign Crises

Why do sovereign defaults across these seven countries differ so much? Argentina, Brazil, Chile, and Uruguay default mostly in the midst of crises with the financial center at its epicenter. Idiosyncratic shocks sometimes also trigger defaults in these countries: For example, Chile defaults in 1879 in the midst of the War of the Pacific (against Bolivia and Peru) while Brazil defaults in 1898 following the collapse of the price of coffee. In contrast, Colombia and Mexico default even at times of booms in international capital markets. Debt Relief/Investors losses following default differ greatly across countries and time. The defaults of the 1820s and 1930s end with large losses to investors. In contrast, defaults in Argentina in 1891, Brazil in 1898 and 1914, Chile in 1879, and Uruguay in 1891 and 1914 end up with small investors' losses. Still investors' losses even reach more than 70 percent following sovereign crises in Colombia, Mexico, and Peru. Default spells are also quite different. Defaults in Argentina and Uruguay are resolved on average relatively rapidly. In the other extreme, defaults in Colombia and Mexico are quite protracted. Moreover, as we examined previously, 65 percent of the defaults in Latin America are clustered together. What triggers these systemic defaults?

We tackle this issue in two different ways. We first look at the year of the sovereign crisis and ask what type of country-specific and global fragilities trigger the defaults. Second, we examine the evolution of these fragilities during the default spell using value at risk methodologies and duration analysis to understand why some renegotiations are so protracted while other defaults are solved almost instantaneously.

IV.1 The Indicators

For country-specific fragilities we examine the behavior of exports and the terms of trade. For global fragilities, we look at indicators of international liquidity as captured by international issuance and real interest rates in the financial center.

Models of sovereign crises (for example, Eaton and Gersovitz (1981), Arellano (2005) and Aguiar and Gopinath (2006) indicate that defaults occur following adverse shocks to the economy. In particular, the calibration exercise in Aguiar and Gopintah (2006) indicates 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. Our analysis then will look at both transitory and permanent changes in economic activity in crisis times. 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 WWII, we capture economic activity using both exports and the terms of trade. Even data on exports and terms of trade are not readily available for the earlier part of the sample. In the case of exports, in many cases we construct the data on exports using the data on imports from the most important trade-partner countries.[7] 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 in the United Kingdom to capture prices of imports. The construction of the exports and terms of trade series is explained in the Data Appendix.

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 (2005) 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" 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 results.

[7] Imports from trading partners are a good approximation for total exports of countries not exporting gold or silver. Gold and silver imports are considered specie rather than commodities. While France, U.K. and U.S. do report import of both gold and silver, they do not identify 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 as detailed in the Data Appendix.

While the evidence on the links between terms of trade fluctuations and economic activity are mixed, there is ample evidence that terms of trade fluctuations have a dramatic impact on the revenues of governments in resource abundant countries now and even more during the first episode of financial globalization when most of fiscal revenues originated in taxes on external trade.[8] Naturally, adverse shocks to the terms of trade will worsen the ability of countries to service its debt when taxes take the form of taxes on exports. For example, following the constitutional reform in Brazil in 1891, the state governments start to have the sole right to tax exports. Naturally, the collapse of coffee prices in 1898 and the sharp decline in the price of rubber in the early 1910s, Brazil's most important exports at that time, contribute to fiscal vulnerabilities and liquidity squeezes in Brazil explaining in part the defaults of 1898 and 1914. Still, most 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. Again, we look at permanent and transitory shocks in the terms of trade.

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. Liquidity crises may be one of the common factors explaining some of these systemic defaults 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 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

[8] 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)

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 the four (most 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.[9]

Figure 2 shows the behavior of exports from 1820 to 1931. Since we would like to assess sustainability of the foreign debt denominated in British pounds, we examine the evolution of exports also in pounds. The top two panels in Figure 2 show the evolution of exports and the long term trends (estimated using the Hodrick-Prescott filter). The middle panel shows the volatility of the growth rate of exports and the transitory components of exports (as a percent of the long term trend). The bottom panel shows the growth rates of the trend for various episodes. As shown in the middle panel, volatility is quite high in the transitory component but it is even higher in the growth rate of exports.

We now describe in more detail the evolution of exports in the seven countries in our sample. We should first note the diverse size of these economies in the early years of the 19th century. Brazil and Mexico are the largest economies in the 1820s. At the onset of the 1825 crisis, Brazil's exports are about seven times the exports of Argentina, six times those of Chile, seven times those of Colombia, and ten times those of Peru.[10] Of course, Uruguay's economy at that time is even far smaller and not even independent. Mexico is the second economy in size, with Brazilian exports being twice those of Mexico. These statistics put already in perspective the ability of those countries to service the bonds floated in 1822-25, which amount to 1 million British pounds for Argentina, 3.6 million British pounds for Brazil (5 million British pounds if we include the 1,400,000 bond inherited from Portugal as a price for independence), 1 million British pounds for Chile, 3.4 million British pounds for Colombia,[11] 6 million British pounds for

[9] As described in the Appendix, the data on international capital flows for the period 1865-1914 are from Stone (1999). The data for 1810-1864 and 1915-1950 are from a still unfinished database being constructed by Kaminsky (2012).

[10] This comparison is based on the long term trends, not on the total value of exports.

[11] In the 1820s, Colombia is not a separate country. At that time, it forms part of the Gran Colombia comprising Colombia, Ecuador, and Venezuela. Gran Colombia issues three bonds in the 1820s. The first one is issued in 1820 for 547,783.5 British pounds. The second one is issued in 1822 for 2,000,000 British pounds and the third one is issued in 1824 for 4,750,000 British pounds . These last two bonds are in part used to repay the bond of 1820. That is, the Gran Colombia's debt outstanding in 1825 when it defaults is 6,750,000 British pounds. When the Gran Colombia separates in 1831, the Gran Colombia's debt is allocated to the three new countries. Colombia's share is 50 percent of the Gran Colombia's debt.

Mexico, and 1.8 million British pounds for Peru. The debt export ratios for the first episode of international borrowing oscillate between approximately a minimum of 1 for Brazil and a maximum of 3, 4, and 6 for Mexico, Peru, and Colombia, respectively. The debt-export ratio for Argentina is 1.7 and for Chile is 1.5. Uruguay does not participate in the international capital market until the 1860s.

The second important feature to note is the speed at which these countries' exports increase during the first episode of financial globalization, 1820-1931. We first look at the 19th century patterns. Argentina's exports surpass those of Brazil in 1898. Argentina is the fastest growing country in the 19th century, with an average growth rate of almost 5.5 percent. The second fastest growing countries are Chile and Uruguay, with average growth rates of approximately 4 percent. Brazil, Mexico and Peru follow next, with average growth rates of approximately 3 percent. The slowest growing country is Colombia with an approximately average rate of 2 percent.

To further understand these countries' sovereign defaults and renegotiations in the 19th century, we need to examine the different pattern of export growth (of the permanent trend) in the earlier and later part of the 19th century. In particular, we look at the average annual growth rates during the 1820-1860 and the 1860-1900 episodes. As shown in the table, there are pronounced idiosyncratic patterns. One group consists of the high growth countries, with annual growth rates consistently above 4 percent. Argentina and Chile are in this group. On the other, there is Brazil that consistently is growing at an average of 2.8 percent per year. The other countries growth rate is period dependent. Colombia and Peru grow fast during the 1820-1860 period but stagnate during the second half of the 19th century. While both Colombia and Peru grow fast in the earlier period, it is Peru the one with the highest growth rate, in most part because of guano exports from 1840 to 1880. With a growth rate of about 7 percent per year on average, the burden of the foreign debt falls and allows Peru to renegotiate its debt and to tap international capital markets again. This is not the case of Colombia, while exports grow at a higher pace in the earlier period, the debt burden remains high and Colombia does not regain access to international capital markets. Finally, while Mexico grows close to 3 percent per year on average during 1820-1860 and 1860-1900, the annual growth rate during the second period hides a period of stagnation from 1860 to the late 1870s and an episode of high growth starting with the rise to power of Porfirio Díaz in 1876. After many years of renegotiating the debt

contracted in the 1820s, it is during the "Porfiriato" that Mexico settles its defaulted foreign debt and begins to participate in international capital markets. We could not find data on Uruguay's exports for the first episode. Our data start in 1860. From that time until 1900, Uruguay is a fast growing country, with growth rates averaging 4 percent.

As shown in the top figure, during the early 20th century all countries grow fast until the onset of WWI but rates of growth decline afterwards. On average, Argentina, Chile, and Uruguay continue to be fast-growing economies but their growth rates are on average lower than those of the 19th century. In contrast, Colombia, Mexico, and Peru show a better performance in the early 20th century, with Colombia and Peru growing at about 6 percent on average and Mexico at 4 percent. Brazil is the slowest growing country, with annual growth rates averaging 1.8 percent.

Figure 3 shows the evolution of the terms of trade of the seven countries and provides some descriptive statistics. 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 WWI, 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 dominating 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 dominate 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.

As shown in the top and the middle panels in Figure 3, Brazil and Colombia are the ones with the most volatile terms of trade, with the average volatility of the growth rate and the transitory shocks in both countries 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.

The table at the bottom of Figure 3 shows the evolution of terms of trade at the onset of crisis episodes with the financial center at its epicenter. It is during those episodes that international liquidity (as we will show in Figure 5) sharply contracts. During the first episode of financial globalization there are five crises with the financial center at its epicenter. The 1825, 1914, and 1890 crises start in London, the 1873 crisis starts in Vienna, and the 1931 crisis starts in New York. While all these crises trigger sovereign defaults across Latin America, the ones with farther reach are the 1825 and 1931 crises, with thirteen Latin American countries defaulting in 1825 and in 1931. Notably, these are the crises that are preceded by the collapse of terms of trade in all Latin American countries. Terms of trade decline by 22 percent on average during the four years before the crisis of 1825 and by 24 percent during the four years before the crisis of 1931. In contrast, the terms of trade on average across all our seven countries in Latin America either mostly remain constant or increase in the four years prior to the 1873, 1890, and 1914 crises. All the countries in our sample (participating in international capital markets) default in the 1820s and six countries default in the 1930s. In contrast, only three countries default in the crises of 1873 and 1914 and just two countries default in the crisis of 1890. Interestingly, (with the exception of Colombia) only the terms of trade for Argentina and Uruguay sharply decline prior to the 1890 crisis that ends with the default of both countries. Also, only the terms of trade of Brazil and Colombia collapse prior to the 1914 crisis. Brazil defaults in 1914 but Colombia does not.

Figure 4 shows the indicators of international liquidity. The top panel shows the UK 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 in our sample). In both panels, the vertical lines identify the four 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.[12] increase in real interest rates last panel, it is easy to visualize the collapse in international liquidity following the 1825, 1873, 1914, and 1931 financial crises with the financial centers at their epicenter.

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.[13] 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. Again, as with the evidence on interest rates, the cluster of systemic sovereign crises in 1873, 1891, and 1914 occur in the midst of a sharp decline in international issuance around the world.

IV.2 What Triggers a Default?

To examine whether the four varieties of sovereign crises we have identified have different roots, we now examine the evolution of six economic and financial indicators around the time of the defaults. The first four indicators capture domestic vulnerabilities around the

[12] There are other financial crises with the London at its epicenter: The crisis related to capital outflows to the United States comes in two phases, first in 1836-37 and then in 1841. The 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 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.

[13] Although not included in our measure of international liquidity, international lending to the United States booms in the 1930s, with US 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 US States in the 1840s.

time of default. These indicators reflect the evolution of permanent and transitory components of exports and the terms of trade. The last two indicators reflect global conditions. These global indicators capture liquidity in international capital markets as captured by international issuance of the non-Latin America periphery (as a percent of UK and US exports) and the real interest rate in Great Britain.

Figure 5 examines crises with large and small haircuts. As suggested by the international finance literature, our focus in this figure is on domestic vulnerabilities. Each panel in these figures 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 crises. For the growth rate of the permanent component of exports and the terms of trade, the vertical axis records the percentage-point difference between crisis and 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 panels on the left in Figure 5 show all the indicators around the time of sovereign defaults with large haircuts. The panels on the right show the same indicators for crises with small haircuts. We define crises with small haircuts as all the crises with average haircuts in the 50^{th} percentile. The top two panels show the behavior of the growth rate of the trend of exports around the time of the crises relative to average growth rate of the trend of exports in tranquil times. As shown in these panels, crises that lead to large haircuts occur in the midst of a drastic and persistent decline in the growth rate of the permanent component of exports that oscillates between 2 and 4 percentage points below the growth rates observed during tranquil times, suggesting that large haircuts reflect in large part unsustainability of the debt. In contrast, growth rates around sovereign crises with small haircuts are not significantly different from the average growth rate of exports during tranquil times, suggesting that there are other factors influencing the decision of default. The fact that the growth rate of exports at the time of default is as high as it is in good times suggests that this may be the reason why the debt-restructuring agreement leads only to small investors' losses.

The next two panels examine 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 either

type of default. In the case of large haircuts, the defaults are preceded by positive shocks to exports. While there is a reversal of the boom after the defaults, transitory shocks following the default are not statistically different from zero. In the case of defaults with small haircuts, transitory shocks before and after the default are not statistically different from zero. This evidence supports the calibration results in Aguiar and Gopinath (2006) that indicate that large adverse transitory shocks are not at the heart of defaults.

The last four panels examine the effects of permanent and transitory shocks to the terms of trade. Interestingly, declines in the growth rate of the trend of the terms of trade (relative to tranquil times) around default episodes are not at the heart of large haircuts. Growth rates of the terms of trade around these crises are not different from growth rates in tranquil times. Moreover, negative transitory shocks do not seem to be a regularity during crises with large haircuts either. In fact, negative transitory shocks to the terms of trade are mostly not significantly different from zero. Adverse shocks to the growth rate and transitory shocks to the terms of trade are more important in sovereign crises that are resolved with smaller haircuts perhaps suggesting just adverse shocks to liquidity.

Figure 6 examines the behavior of domestic and global economic fundamentals during systemic and idiosyncratic crises. The first two panels show the behavior of the growth rate of the trend of exports around the time of default. Interestingly, while the growth rate of exports around the time of the defaults is lower than the one during tranquil times for all defaults, the adverse shock to growth is far more persistent and increasing during systemic crises. Systemic crises occur following crises in the financial centers. These are crises preceded by large increases in leverage and vulnerabilities in financial institutions. The deleverage takes time and in turns triggers slowdowns in the center, a decline in world trade, and can have large and persistent effects on economic activity in the periphery as the one we capture in these panels.

The next two panels show the behavior of transitory shocks to exports. Again, as we examine before for crises with large and small haircuts, we do not capture adverse transitory shocks to exports for either type of sovereign crisis.

The next four panels show the behavior of the terms of trade. Adverse shocks to the growth rates of the terms of trade for both systemic and idiosyncratic crises are small compared to those of the growth rate of exports, still they are significantly different from those during tranquil times. Adverse transitory shocks are more pronounced. Reversals in the terms of trade

oscillate between 10 to 20 percent of the trend, but only those reversals during systemic crises are significantly different from zero.

The next four panels show the evolution of international liquidity around the time of the sovereign crises. The first two panels show the evolution of international issuance of the non-Latin American periphery countries as a percent of U.K. exports (relative to the average ratio over the sample). Importantly, on average idiosyncratic crises are not accompanied by international liquidity crashes. In fact, at the onset of the idiosyncratic sovereign crises there is an increase in international liquidity. In contrast, systemic sovereign crises are preceded by a dramatic international capital flow bonanza followed by striking and persistent liquidity crash. Before the defaults occur, international issuance is booming on average across countries (with issuance peaking at 14 percent of UK exports above the average ratio over the sample) but it collapses to -2 percent at the onset of the crises and continues to fall to -4 percent after the crises (again relative to the sample ratio).

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.[14] In contrast, idiosyncratic crises do mostly occur during episodes of high international liquidity.

While Figures 5 and 6 show the average domestic and global fragilities by type of sovereign crises, Table 6 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[15]. 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 UK exports) and relative to the average over the 1820-1960 period, and UK real interest rates. The third indicator captures idiosyncratic liquidity

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

[15] Since insolvency requires a long-run assessment of the ability of the country to service its debt, the debt/export ratio uses the trend value of exports.

and it shows the transitory component of the terms of trade of each country (relative to trend). We then construct three indices to evaluate the fragility at the time of default. As is traditional in the literature of crises when creating the indices of vulnerability,[16] we combine the indicators weighed by the inverse of their standard deviation as follows:

$$Insolvency\ Index = \frac{Debt / Export}{\sigma_{Debt / Export}} - \frac{Export\ Growth}{\sigma_{Export\ \ Growth}} \tag{4}$$

$$International\ Illiquidity\ Index = \frac{UK\ Interest\ Rate}{\sigma_{UK\ Interest\ Rate}} - \frac{International\ Issuance/UK\ Exports}{\sigma_{International\ Issuance\,/\,UK\ Exports}} \tag{5}$$

$$Idiosyncratic\ Illiquidity\ Index = -\frac{Transitory\ Terms\ of\ \ Trade\ Component}{Terms\ of\ \ Trade\ Trend} \tag{6}$$

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

Figure 7 shows the values of these indices. The red line in each graph shows the separation of the crises using the median value of the indicator. The top panel shows the *Insolvency Index.* Note that all the crises that erupt during the 1931 crisis are all clustered together with high levels (with the exception of Colombia) of debt/exports ratio and a collapse in the growth rate of the exports trend. The other major systemic crisis is that of the 1820s when six Latin American countries (Uruguay only starts to borrowing in international capital markets in the second half of the 19th century) default. Interestingly, not all the countries defaulting in the 1820s are at a high risk of insolvency. Only the silver or gold producing countries have very high debt/export ratios. In fact, the sovereign crises of Colombia, Mexico, and Peru rank in the top 80 percentile using this metric. Insolvency problems are aggravated by low long-run growth rates.[17] In contrast, Argentina, Brazil, and Chile crises are ranked in the low 30 percentile. Importantly, mostly all the sovereign crises of Colombia have insolvency index values above the median. So are all the crises of Peru.

[16] See, for example, Kaminsky and Reinhart (1999) for the construction of the index of severity of currency crises.
[17] At the time of the default only Mexico is growing above the growth rates in tranquil times although in the years prior to the default economic activity (as captured with exports) declines sharply.

The middle panel examines what defaults occur in the midst of severe international liquidity problems. Again, the crises of the 1820s and the crises of the 1930s rank high with this metric too. This time, in the year of the default, the adverse shock to liquidity in the 1820s is far more severe than that of 1931. However, as we will examine when we look at default spells, the liquidity crash is far more protracted in the 1930s. The bottom panel shows idiosyncratic liquidity shocks, those trigger by transitory adverse shocks to the terms of trade. Interestingly, the crises just triggered by these shocks are short-lived. This is the case of Brazil in 1898. Importantly, investors' losses in this crisis are on average zero. In other cases, these terms of trade shocks contribute to the creation of a perfect storm, as in the case of Brazil's default in 1931. This is also the most severe Brazil crisis in terms of investors' losses, with haircuts oscillating around 50 percent.

IV.3 Default Spells

In the previous section, we examine the evolution of domestic and global factors at the time of sovereign defaults. We do not examine why some defaults are resolved quickly within 1 to 2 years whereas others last more than 20 years. Delays in debt restructuring are widely seen as inefficient since most defaults occur under adverse conditions and countries in default are excluded from international capital markets. Creditors lose too since while the default persists, they do not share any resources of the sovereign. Still, there could be benefits from delaying a restructuring as concluded in Bi (2008). In that paper, once the country has defaulted, 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. Moreover, as examined in Benjamin and Wright (2009) and Bi, (2008), economic recoveries accelerate the end of the default episodes. In all the theoretical models on delays, it is assumed that there is liquidity in international capital markets. In fact, the carrot for the sovereign to restructure its debt is its ability to re-access credit markets. What about if international liquidity collapses and even non-defaulters cannot borrow? In this case, delays should persist. In this section, we will examine

empirically the role insolvency and economic recoveries and liquidity crashes on the duration of the default spell. 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), with both debtors and creditors agreeing in a restructure of the debt. Second, we deal with both insolvency and international liquidity crashes. We use duration analysis to examine the role of these two factors in delaying an agreement.

IV.3.1 Value at Risk Estimations: Probabilities of Stabilizing the Debt/Exports Ratio

We first 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 in this case is

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

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 (if any) of the debt during the default. 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

$$g_t = \bar{g} + B(L)g_{t-1} + \varepsilon_t$$
$$\varepsilon_t \sim N(0, \sigma^2) \tag{8}$$

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 provide a yardstick to compare debt sustainability at the time of default for all the defaults in the sample.

We estimate the AR process with data up to the year of the default to obtain the probability that the debt/export 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 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. Our criterion will be that of the stability of the debt/exports ratio. We will compute at the time of default and during the episode of default the probability that the debt/exports ratio stabilizes in five years, taking into account service of the debt (if any) during the default episode. The results on the likelihood of renegotiating the debt are reported in Table 7. This table shows the probability that the debt/exports ratio is stabilized within 5 years, The first probability is the probability of stabilization of the debt/export ratio within five years at the time of the default. 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 *n* is the estimated probability that the debt/export ratio stabilizes in year *n+5* using information up to period *n*.[18] The longest episode of default is that of the 1854 Mexican default. We highlight the probability

[18] For the first defaults in the 1820s we do not report the probability of restructuring for the first few years of the default episode because we do not have information on exports going back enough to make a forecast.

estimated during the year of the restructuring of the debt. 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. There are only four sovereign crises in which the probabilities of stabilizing the debt/export ratio are above 40 percent right from the time of default. The stabilization in two of these cases is mostly because the countries do not suspend coupon payments (Brazil 1898 and Chile 1879), the stabilization in a third case is due to high growth (Colombia 1848), and the fourth case is because of high growth and the commitment of the country to pay coupons (Uruguay 1915).

We find that the default spells following the crises of the 1820s are so long because of a protracted growth slowdown. None of the probabilities of stabilizing the debt/export ratio is positive before the first decade of default. Brazil's probabilities become positive after 13 years of default, Chile's after 15 years, Peru's after 17 years, and Argentina after 18 years. In contrast, the probabilities of stabilizing the debt/export ratio of Colombia and Mexico are always zero during this episode. These are also the defaults of the 1820s with the largest haircuts (69 percent for Colombia and 73 percent for Mexico).

The sovereign crises of the 1930s are also quite protracted, lasting on average 10 years. The first country to restructure is Uruguay after 7 years of default, followed by Chile after 9 years, Colombia after 10 years, Brazil after 12 years, and Peru after 14 years. It is important to point out that even though Brazil's expansion during these years is high and the probabilities of stabilizing its debt/export ratio are quite large starting 5 years after the default it only restructures its debt after 12 years of default, suggesting that the persistent international liquidity crash following the 1931 crisis may have influenced the renegotiations.

IV.3.2 Default Spells: 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. It does not examine whether the level of the debt/export ratio is itself sustainable. Moreover, the previous analysis does not study whether shocks to international liquidity affect the default spells. This section will study the effects of both shocks to sustainability and liquidity on the duration of defaults.

As examined in the theoretical literature of sovereign debt renegotiations delays in restructuring the debt may be inefficient. Since most defaults occur in bad times, debtors suffer because of lack of access to international capital markets. Creditors suffer too because they cannot share the income resources of the sovereign. As examined both in Benjamin and Wright (2009) and Bi (2008) delays can be beneficial. Since a default occurs in the midst of adverse shocks, very few resources are available for repayment immediately following a default. If a debt settlement is reached immediately after default, the resources to share are very small. By delaying the debt settlement, debtors and creditors may finally renegotiate once the economy recovers and receive higher payoffs. In both 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. This was 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 is shorter in states with high international liquidity or with low growth. Naturally, the debt/export ratio in the year of the default will also matter. Conditional on the other factors, a higher initial debt/export ratio will delay the debt settlement since the possible payoffs to all creditors will be low. Since liquidity and growth change over time, our duration model has time-varying determinants.

We now use duration analysis techniques to assess the effects of liquidity and sustainability to the duration of the default spell. The dependent variable in our estimates is the number of years between the default and the successful renegotiation. The estimations include the data of the 27 default spells of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. The explanatory variables include both time-varying covariates: international liquidity (as a share of British exports) and the probabilities of stabilizing the debt/export ratio of each country shown in Table 7 as well as a time-invariant covariate: the debt/exports ratio at the time of the default. The results of this estimation are shown in Table 8. This table shows

coefficients of a Cox proportional hazard model using the default spell as the dependent variable. 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:

$$\frac{\Delta \, Increase \, in \; probability \, of \; renegotiation}{\Delta \, covariate_i} = (e^{coeff_i} - 1) * 100 \qquad (9)$$

These responses are shown in column 3. As an example, the coefficient for the international liquidity covariate indicates that a one-percentage point increase in the liquidity/export ratio is associated with a 4.6 percentage point higher probability of a renegotiation of the default while a one-percentage point increase in the initial debt/exports ratio reduces the probability of renegotiation by 5.3 percentage points.

Finally, Figure 8 shows the Kaplan-Meier survival functions conditional on various values of the debt/exports ratio at the time of the default. This figure shows that the initial conditions matter. The probability of staying in default after 11 years is about 50 percent for countries with initial debt/exports ratio smaller than 2, with the probability increasing to 75 percent if the initial debt/exports ratio is larger than 2.

V. Conclusions

Our results point clearly to a variety of sovereign crises: First, in many cases, renegotiations result in large haircuts. Forty percent of all the crises have average haircuts ranging from 50 to 100 percent. Importantly, these are the crises that are preceded by large and persistent declines in the growth rate of the economies, suggesting insolvency problems. These are also the crises with the longer default spells.

Second, there are clusters of sovereign crises. These crises occur when the financial center is at the epicenter of the crisis. Defaults occur in the midst of international liquidity crashes, such as those in the 1820s and the 1930s. These liquidity crises if persistent, can prolong the default spells. This is the case of Brazil's default in the 1930s. Even when Brazil starts growing fast in the mid-1930s, it only renegotiates its debt in 1944 and with large losses for investors. Importantly, these are crises in which the financial center economies sharply slow down, affecting growth in the periphery and compounding the liquidity problems. Importantly,

these crises also trigger a sharp deterioration of the terms of trade, and with it a deterioration of fiscal revenues and liquidity problems of the sovereign. This evidence from the first episode of financial globalization provides a bleak augury for the current European crisis.

Third, three of the seven countries studied seem to suffer from an "original sin" problem. This time, the original sin is not related to the inability to issue external debt in domestic currency (none of the Latin American countries issue external debt in domestic currency). It seems to be related to gold and silver riches. Colombia, Mexico, and Peru are the countries that have more access to international borrowing in the 1820s, presumably because of the expectations about the gold and silver export growth following independence. However, exports decline sharply following the wars of independence and the debt/export ratios in 1825 are 3, 4, and 6 for Mexico, Peru, and Colombia, respectively. Importantly, their exports of gold and silver do not recover and their debts become unsustainable. Colombia and Mexico are unable to service their original bonds and renegotiate several times the defaults on the bonds issued in the 1820s. Only Peru manages to service the original bonds due to the guano boom, accessing international capital markets again in the 1860s. These are the countries with the largest haircuts.

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Data Appendix

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.

Exports

We construct annual series of exports for the period 1810 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 on France, U.K., and U.S. 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:

1821-1960 : *Dos Siglos de Economía Argentina 1810-2004***.** Orlando Ferreres, Table 8.1.1

Brazil:

1821-1960 *Estadisticas Historicas do Brazil: Series Economicas, Demograficas e Sociais de 1550 a 1988,* Fundacao Instituto Brazileiro de Geografia e Estadistica. Sector Externo: Gustavo Henrique Barroso Franco (Departamento de Economia, Pontificia Universidade Catolica PUC-RJ. Table ??

Chile:

1810-1960: *Economica Chilena 1810-1995 Estadisticas Historicas*; Matias Braun, Ignacio Briones, and Jose Diaz, www.economia.puc.cl. Table V.I.1

Colombia:

1825-1834: We combine the data from the USA and the United Kingdom on (non-gold) imports from Colombia with our estimates of Gold Exports. Our estimates of Colombia's gold exports are based in three sources. The earliest data available are Colombia's annual production of Gold during Colonial times from the Archivo General de Indias (1621 to 1819) and collected by J.J Tepaske and in Richard Garner's webpage (http://www.insidemydesk.com/hdd.html). The second source is from Restrepo, 1888, *Estudio sobre las Minas de Oro y Plata de Colombia*, Second Edition. Restrepo estimates Colombia's production of Gold from … to … (averages per

decades). The third source is exports of gold for the 1835-1910 period from *Compendio de Estadísticas Históricas de Colombia*, Miguel Urrutia and Mario Arrubla, Universidad Nacional de Colombia, Bogota, 1970.
1835-1910: *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.
1911-1960: 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:

1810-1820: *Estadísticas Históricas de México Tomo II*, Instituto Nacional de Estadistica, Geografia e Informatica, INEGI. Table ??
1821-1824: *El Comercio Exterior de México*, Ines Herrera Canales.
1825-1875: The data for exports of goods are estimated using imports from Mexico to the United States, United Kingdom, and France. 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 *Estadisticas Históricas de México Tomo II*, Instituto Nacional de Estadística, Geografía e Informática, INEGI; *El Comercio Exterior de México*, Ines Herrera Canales, and *Comercio Esterior 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 Estadistica, Geografia e Informatica, INEGI. Table ??
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 ??

Peru:

1825-1829: We combine the data from the USA and the United Kingdom on (non-silver) imports from Peru with our estimates of Silver Exports. Our estimates of Peru's silver exports are based in two sources. The earliest data available are 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). Our second source is Own estimations using data on imports of the USA and the United Kingdom from Perú. Own estimations of silver exports using an AR(1) process to back up exports of silver for these years using data on exports of silver for 1830-1962 period from *Price and Quantum Estimates of Peruvian Exports 1830-1962*, Shane J. Hunt, Princeton University.
1830-1896: The data for exports of goods are estimated using imports from Perú to the United States, United Kingdom, and France. 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.

1900-1941??: *Anuario Estadístico del Perú, 1944-1945*, Ministerio de Hacienda y Comercio. Dirección Nacional de Estadística.

Uruguay:

1860-1899: *Anales Históricos del Uruguay*, Eduardo Acevedo, Casa A. Barreiro y Ramos, S.A., Montevideo, 1933
1900-1950: *Estadisticas Históricas del Uruguay 1900-1950*, Benjamín Nahum, Universidad de la República, 2007.
1951-1960:

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

France:

Tableau Genéral du Commerce de la France avec ses Colonies et les Puissances Étrangeres, 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.

Terms of Trade

We construct annual series of terms of trade for the 1810-1950 period The Export Price Index of each country is a time-varying weighted average of the prices of the most important exports.

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

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

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.

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

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

B. R. Mitchell, *International Historical Statististics Europe, 1750-1988.*

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

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

They are complemented with data from country studies too.

International Primary Issuance in London and New York:

We construct data on international issuance for the period 1800-1960 from the following sources:

1800-1864 and 1915-1960:

Fenn, Charles, *A Compendium of the English and Foreign Funds and the Principal Joint Stock Companies,* London. Various Issues.

Council of the Corporation of Foreign Bondholders Report, London. Various Issues.

Loan & Company Prospectuses, 1800-1946.

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1865-1914:

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Interest Rates:

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

Homer, Sydney and Richar Sylla, *A History of Interest Rates, Fourth Edition (Wiley Finance).*

Table 1

Systemic Sovereign Defaults

Episode	Origin of the Shock	The Background	Mechanism of Transmission	Latin America's Sovereign Defaults
1826-1830	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 Britaint. 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	Stock Market Collapse in Viena	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 spectacular stock market crash in Vienna in May 1973. Stock markets in Amsterdam and Zurich also crash. In the U.S. a banking panic in September follows the collapse of the stock market in New York. Reversal of capital flows. Economic activity worldwide collapses, fueling a sharp downturn in commodity prices.	Bolivia, Colombia, Costa Rica, Guatemala, Honduras, Peru, Uruguay
1890-1894	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 Argentina's default, which leads to the collapse of Baring Brothers in November 8, 1890. The Bank of England prevents a panic by arranging an operation to re-capitalize Barings 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	World War I	A new surge in international liquidity finances railroads, construction of cities, gas, electricity, and telephone companies	The outbreak of World War I precipitated a massive international financial crisis across the world as the belligerents scramble to liquidate foreign assets. In late July, there is massive selling in the London Stock Exchange with this collapse triggering marging calls, sales of assets, driving stock prices further down. Panics in all asset markets and a scramble for money.	Brazil, Ecuador, Mexico, Uruguay
1931-1935	The Great Depression	The 1920s experienced a major stock market boom associated with massive investment that brought the major inventions of the late nineteenth century to fruition. These included: electricity, automobiles, communications, and petrochemicals.	The stock market crash on Wall Street in October of 1929 ushers in the great worldwide depression. Banking crises in continental Europe contribute to the sharp recession. England abandons the gold standard in September 1931 and the United States in 1933. Contractionary monetay and fiscal policies in the United States furthers the contraction. Commodity prices collapse.	Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Guatemala, Nicaragua, Panama, Paraguay, Peru, Uruguay,

Table 2

Idiosyncratic Sovereign Defaults

Year	Country	Causes of the Crisis
1821	Colombia	War of Independence.
1834	Colombia	
1844	Mexico	US-Mexico War
1848	Venezuela	Revolution and civil unrest
1850	Colombia	
1854	Mexico	War and fiscal problems
1868	Ecuador	
1872	Dominican Republic	Civil unrest and war; repudiations
1880	Chile and Colombia	Chile: War of the Pacific. Colombia: Trade depression, then civil war
1895	Costa Rica	
1898	Brazil, El Salvador, Venezuela	Brazil: Coffee price collapse, El Salvador:…, Venezuela: Revolutions and European blockades
1900	Colombia	War of the 1,000 Days 1899-1902
1901	Costa Rica	
1906	Ecuador	Civil unrest and then depression
1907	Colombia	
1911	Nicaragua	
1920	Paraguay	
1921	El Salvador	
1928	Mexico	

Table 3

Duration of Sovereign Default Spells
(in Years)

Episodes	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Uruguay	Average
				Systemic Sovereign Defaults				
1826-1830	27	25	16	19	22	24		22
1873-1877						15	4	10
1890-1894	3						1	2
1914-1918		13			8		7	9
1931-1935		12	17	13		21	6	14
				Idiosyncratic Sovereign Defaults				
1821				4				4
1848				14				14
1854					31			31
1862								
1879			5	18				12
1898		13						13
1900				6				6
1928					14			14
Average all crises	15	16	13	12	19	20	5	14

Table 4
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	970,000	**Agreement 1857**. Issue of a new bond amounting 1,641,000 for the arrears of interests. Principal remains at par. Reduced debt service until 1859
1891	6% Buenos Ayres loan 1824 6% Railway loan 1881 5% Loan 1884 5% Northern Central Railway Extension 1887-8-9 5% Treasury Conversion 1887 5% National Bank (German loan) 1887 4.5% Internal Gold loan 1888 4.5% Conversion 1889 3.5% External 1889 5% Northern Central Railway 1890 (2nd emision)	30,770,930	**Agreement 1891:** Issue of a 6% Funding Loan of 1891 in exchange for the debt service of the ten bonds in default between 1891 and January 1st, 1894. After 1894 full resumption of the debt service at par.
1893	In addition to the ten previous bonds: 5% Loan of 1886-7 5% Waterworks loan of 1892 6% Funding loan of 1891 5% Buenos Aires Port loan 1892	44,152,975	**Agreement 1893 (Romero's agreement):** Reduction of 60% on the interest rate of 11 bonds representing 28,098,500 pounds of nominal value for 5 years. Reduction of 100 basic points in the interest rate of 3 bonds representing 21,250,400 pounds for 5 years. Suspension of the sinking fund until 1901. On March 27th, 1897 the Government announces its intention to resume the full payment of interest one year before stated in Romero's agreement. Sinking fund is resumed in 1901 as stated in Romero's Agreement
BRAZIL			
1827	5% Loan 1824/25 5% (Portuguese) Loan1825	4,868,468	Full resumption of the suspended sinking funds in 1851.
1898	4.5% Loan of 1883 4.5% Loan of 1888 4% Loan of 1889 5% Loan of 1895 5% Western of Minas Railroad Company Loan 1893 4.5% Internal Gold Loan of 1879.	37,731,820	**Announcement:** Issue of a 5% funding loan to pay coupons of these bonds during 3 years (1898-1901). Coupon payment are resumed in 1902. Suspension of the amortization of all the bonds until 1911.
1914	4.5% Loan 1883 4.5% Loan 1888 4% Loan 1889 5% Loan 1895 5% Loan 1908 4% Loan 1910 4% Loan 1911 5% Loan 1913 4% Railway Guarantees Rescission Bonds 5% Companhia Lloyd Brasileiro Bonds The Lloyd Brasileiro 4% Bonds 4% Bonds of 1911 (Ceara Railway Loan) 5% French Loan 1908-9 (Colon, Itapura, Corumba Railwa 4% French Loan 1910 (Goyaz Railway Loan) 4% French Gold Loan 1911 (Viacan Bahiana Loan) 5% French Loan 1909 (Recife Port Loan) 5% Loan 1903	98,569,982	**Announcement 1914:** Issue of a 5% funding loan to pay coupons of these bonds (except the 5% Loan 1903) during three years (1914-1917). Coupon payments are resumed in 1918. The sinking fund of all the bonds to be resumed in 1927.
1931	5% Funding 1898 (L) 5% Funding 1914 (L) 5% 1903 (L) 6.5% 1927 (L) 8% 1921 (NY) 7% 1922 (NY) 6.5% 1926 (NY) 6.5% 1927 (NY) 4.5% 1883 (L) 4.5% 1888 (L) 4% 1889 (L) 5% 1895 (L) 4% Rescission 1901 (L) 5% Railway Waterworks Rio (L) 5% Pernambuco 1909 (P) 4% Lloyd 1910 (L) 4% 1910 Goyaz (P) 5% 1910 (P) 4% 1911 Bahia (P) 4% 1911 Ceara (L) 4% 1911 Rio (L) 5% 1908-09 (P) 4% 1910 (L) 5% 1913 (L) 5% 1916 (P) 5% Victoria-Minas Railway 1922 (P)	140,313,060	**Announcement 1931:** Sinking fund is suspended. A 5% Funding Loan with maturities of 20 and 40 years is issued to pay the coupons between October 15th 1931 and October 15th, 1934. **Adjustment Plan 1934:** reduction in the interest rate of most of the bonds. Sinking fund is suspended. In November 1937 the payments according to this plan are suspended. **Debt Service Plan 1940:** From April 1940 to April 1944. Additional reductions in interest rates are approved. Sinking fund is suspended until April 1944. In 1940, the Brazilian government announces that it is planning to purchase bonds in the market in the amount of 400,000 pounds and US$2.5 million annually between 1940-1944. **Debt Readjustment 1944:** Two options are given to the bondholders: ***Plan A:*** Reduction in interest rates ranging from 1.5%-3.5%. The sinking fund is also reduced, with reductions ranging between 0.06% to 10.56% depending on the category of the bond. Principal unchanged. ***Plan B:*** Reduction of the principal between 20%-50% depending on the category of the bond. Payment in cash as partial compensation for that reduction of principal. Issue of a new bond paying 3.75% and increase in the sinking fund to shorten the maturity for all the bonds. The agreement for British bonds is effective in January 1944. For US bonds in June 1944. The agreemenent for French bonds is similar to that of British bonds and it is effective on March 6th, 1946.

Table 4 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
CHILE			
1827	6% Loan 1822	942,871	**Agreement 1842:** Issue of a new bond for the outstanding debt (i.e. 934,000 pounds) with the same characteristics as the original. Issue of a 3% bond to pay for the unpaid coupons. Service of this last bond commenced in September 1847.
1879	4.5% Loan 1858 6% Loan 1867 5% Loan 1870 5% Loan 1873 5% Loan 1875	6,163,106	**Announcement:** Resumption of the sinking fund in the second semester of 1884 after the victory of Chile in the war against Peru and Bolivia.
1931	4.5% Loan 1885 4.5% Loan 1886 4.5% Loan 1887 4.5% Loan 1885 4.5% Loan 1886 4.5% Loan 1887 4.5% Loan 1889-1941 5% Loan 1892 4.5% Loan 1893 4.5% Loan 1895 5% Loan 1896 4.5% Loan 1899 5% Loan 1905 5% Loan 1905 5% Loan 1909 5% Loan 1910 4.5% Loan 1911 5% Loan 1911 (1st Series) 5% Loan 1911 (2nd Series) 7.5% Loan 1922 7% Loan 1922-42 6% Loan 1928 (Railway Refunding) 6% Loan 1929-61 (Swiss Issue) 6% Loan 1930-62 (Swiss Issue) 6% Loan 1930-63 6% Loan 1926 6% Loan 1926-60 6% Loan 1927-61 6% Loan 1928-61 6% Loan 1928-61 6% Loan 1929-62 6% Loan 1929-62	60,770,725	Suspension of interest and sinking fund in August 1931. **Debt Service Adjustment 1935:** Partial resumption of the interest and sinking fund payments. Reduced interest rate (ranging from 0.4% to 2%) and amortization by purchases in the market. Different sources of revenue from nitrates and copper equally distributed to pay interest and amortize the debt. **Offer July 1948 (US$ bonds):** Issue of a new bond paying increasing interest rates from 1.5% to 3%. Minimun 1% sinking fund. Maturity 46 years. Sinking fund effective since 1954. The previous offer is extended to the sterling bondholders on December 21, 1948 and to Swiss franc bondholders in August 1949.
COLOMBIA			
1821	10% Loan 1820	273,891	**Agreement 1822**: Issue of a 6% loan for 1,000,000 pounds on May 13th, 1822 to pay for the 1821 Debentures, the arrears of interest at August 21st, 1821 (i.e. 140,000 pounds), and other expenditures. Amount of unpaid interest was 91,612 pounds which were quoted at 65.5 (i.e. total issue 140,000).
1826	6% Loan 1822 6% Loan 1824	3,312,975	**Agreement 1845**: Issue of New Active bonds for the principal of the debt carrying 1% interest for 4 years and then increments of 0.25% per annum until the maximum 6% was reached. Issue of Deferred Bonds for the arrears of interest for the total debt. No interest for 16 years. Interest 1% with increments of 0.125% per annum until 3% was reached. Maturity in 16 years. Deferred interest bonds were guaranteed by the Tobacco monopoly and Customs receipts.
1849	1% -6% New Active bonds 1845 1% to 3% Deferred bonds 1845	6,460,550	**Agreement 1861**: Issue of new Active Debt with lower interest rates to convert unpaid interest of the Active bonds of 1845. In addition 30 hectares of land to be assigned to each 100 pounds of Active debt and 16 hectares of land to each 100 pounds of Deferred Debt of 1845.
1873	2%-3% New Active Debt 1861	6,630,000	**Agreement 1873:** Issue of 2,000,000 of New Bonds at 4.5% until 1878 and 4.75 afterwards, to be given in exchange for the bonds of the Old debt in the following terms: i) Each 100 pounds active (1845) Conversion to receive 34 pounds of the New bonds; ii) Each 100 pounds of the Deferred Bond (1845 Conversion) to receive 17 pounds of the New bonds. iii) Each 100 pounds of the 3% Bond (1861 Paris Convention) to receive 66 pounds of the New bonds. iv) 2,000,000 hectares of land were given in compensation for the loss of interest under the conversion.
1879	4.5%-4.75% New Conversion Bonds 1873	1,947,871	**Agreement 1896:** New bonds to be issued for 2,700,000 pounds at 1.5 from January 1st 1897 increasing by 0.5 % every 3 years until reaching 3%. The principal of the 1873 bonds outstanding to be converted at par and the arrears of interest at 43% of their nominal value. Sinking fund to commencing from January 1st, 1900 (0.5% increasing by 0.5% every 3 years until reaching 1.5%) to be applied by tenders or purchases while the price were below par and by drawings at 60% when interest rate was below 3% and at 70% when interest were at 3% in the event of the price rising to or above par.
1900	1.5%-3% Consolidated External Debt 1896	2,700,000	**Agreement 1905**: The payment of interest to be resumed from July 1st, 1905 as stated in the Agreement of 1896. Issue of certificates at par for unpaid coupons. Payment of 50% by June 30th, 1907.
1931	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)	12,565,260	Sinking fund is suspended in February 1932. Coupons from July 1933 to January 1934 are paid one third in cash and the balance with 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. Interest payments are resumed on the two US$ bonds at 3% in 1940. **Offer 1941** (US$ bonds): Exchange of the 6% bonds for 3% bonds at par with extended maturity. Issue of new 3% bonds to pay for the 50% of the unpaid coupons betweeen 1935-1939. **Offer July 1942 (sterling bonds):** a similar offer to that of 1941 is extended to the holders of the sterling bonds.

Table 4 Continuation
Defaults and Renegotiations

Default Year	Bonds in Default	Debt Outstanding at the time of default (in pounds)	Agreements
MEXICO			
1828	5% Loan 1824 6% Loan 1825	6,584,362	**Agreement 1851:** After several failed renegotiation in 1831, 1837 and 1846, a new agreement is reached in 1851 consisting of: payment of US$2,500,000 to the bondholders as partial compensation for unpaid coupons; conversion of the 5% loan of 1846 into a 3% loan with discount. After 1857, 250,000 pesos would be sent annually to London to start paying the principal. 1,200,000 pounds for unpaid interest were forgiven.
1854	3% Loan 1851	12,288,781	**Agreement 1886**: Issue of a 3% loan in exchange for the 50% of the 3% loan of 1864, amounting 4,864,800 pounds, for the 15% of the interest in arrears of the 3% loan 1851 from July 1866 to July 1886, amounting 6,14,990 pounds and for the 20% of the existing Deferred bonds of 1837, unpaid certificates of the conversion of 1851 and certificates issued by Baring for the unpaid third part of the coupon matured on July 1st, 1866.
1914	3% Loan 1886 5% Loan 1889 5% Loan 1894 5% Loan 1899 5% Loan 1903-1907 4% Loan 1904 4.5% Loan 1908 4% Loan 1910 6% Loan 1913 4% to 6% Raylways bonds 1893-1914	103,711,615	**Agreement 1922:** Mexico acknowledges all the debts previous to the revolution. Unpaid interest from 1913 to 1923 will be paid at par over a period of 40 years starting in 1928 but without interest on those arrears. Interest from 1923 to 1927 will be paid part in cash and part with 20-year scripts carrying 3% interest since 1928. The debt service would be resumed in cash in a date no later than January 1928. The government commits to fix the rail stock and return the railways to private management in a prompt date. Debt service is guaranteed partially by taxes on oil exports and railways and the revenue of the railway system. **Agreement 1925**: Same modifications to the 1922 Agreement are introduced: railways return to private management in January 1926.In addition to the previous guarantees, a share of oil production tax would be included. The unpaid minimum amounts the government had to pay for 1924 and 1925 would be converted into a 3% 8-year bond beginning in January 1928.
1928	5% Loan 1899-1945 4% Loan 1904 4% Loan 1908 4% Loan 1910 6% Loan 1913 (Series A, B, C)	40,821,189	Failed Agreements in 1930 and 1931. **Agreement November 5, 1942** (effective March 2nd, 1943): Reduction of the principal to 25% of the outstanding amount. All past due interest from 1923 to 1942 to be canceled for 1% cash of the total amount.
PERU			
1826	6% Loan of 1822 6% Loan of 1825	1,816,000	**Agreement 1849:** Conversion of the two bonds for a new active bond 4%-6%. 25% of the interest was written off. Issue of a new passive bond to pay the balance of unpaid interest at 1%-3% from 1852.
1876	5% Loan 1869 5% Consolidated Loan 1872	36,400,000	**Agreement 1889 (Grace Contract):** Cancelation of all the foreign debts -principal and interest in exchange of guano, concession of the whole national railway system for 66 years, annuity for 30 years, concession of the steamboat in Lake Titicaca and land.
1931	7% Tobacco Loan 1927-59 (US Dollars) 6% Loan 1927-60, first series 6% Loan 1928-61, second series 6% Loan 1928-61 Loan 7.5% 1922-48 (Guano Loan)	28,851,459	**Offer 1938:** The government offers to resume the 1922 Guano Loan at 4% and increase the sinking fund from 1.5% to 2% starting in June 1938. Accepting bondholders waive the right on any unpaid coupons before December 1937. For the US$ loans a partial payment for the balance of the unpaid coupons from 1931 and 1932 is offered as a final settlement. **Offer 1947:** Peru unilaterally offers to exchange at par the 7% Loan 1927, the 6% National 1st and 2nd series (US$) and the 6% National 1928 2nd series (sterling) for new bonds with lower interest rate (increasing from 1%-2.5%) and sinking fund of 0.5%, maturing in January 1997. The Council of Foreign Bondholders does not recommend to accept this offer. About 9% of the outstanding amount is exchanged under the new terms offered. **Offer November 13th, 1951** (Amended offer to Agreement 1947) effective January 1953: Upon conversion, bondholders have to waive any rights on previously unpaid coupons. Interest rate of the new bonds to be increased to 3% and bondholders will receive non-interest bearing scrip certificates in payment for the 10% of 15 years of unpaid coupons (from January 1932 to December 1946). These scrip certificates will be redeemed in annual installments during 15 years starting in January 1953. The Council of Foreign Bondholders recommended the acceptance of the offer. About 95% of the bondholders accept this offer. The 6% sterling bond of 1928 is included in this agreement in July 1954.
URUGUAY			
1875	6% Consolidated loan of 1871	3,110,960	**Agreement 1878**. Issue of a new bond of 371,520 pounds at 1.25% to pay for the unpaid coupons. Reduction on the interest rate to 2.5% for 5 years and principal on hold. In February 1883, full resumption of the debt service. New bonds for old bonds were exchanged at par.
1891	5% Unified loan of 1883 6% Sterling loan of 1888 6% Sterling loan of 1890 (Baring Loan)	16,724,300	**Agreement 1892:** Issue of a new bond to pay for interest in arrears for 625,572 pounds. Issue of a new bond of 3.5% to pay for the interest and the outstanding principal of three bonds including a conversion premium. Total issue of 19,300,000. Sinking Fund 1% although the government had the right to increase the amount devoted for redemption. Bonds exchange at premium.
1915	3.5% Consolidated debt loan 1892 5% Loan 1896 5% Loan 1905 5% Loan 1909	23,807,799	**Agreement 1915:** The sinking fund is suspended until one year after the close of the WWI. Interest rates are paid regularly. **Agreement 1921-22:** The suspended sinking fund was resumed as follows: On the loans of 1905 and 1909 in July 1921; on the consolidated loan of 1892 on August 1921; and on the loan of 1896 in January 1922. Interest rates are paid as scheduled originally.
1931	3.5% Uruguay 1891-96 5% Loan 1896 5% Loan 1905 (London and Paris) 5% Loan 1909-45 (Paris) 5% Loan 1914-51 5% Loan 1915 (New York) 5% Loan 1919 5% Loan 1919 8% Loan 1921-46 (New York) 6% Loan 1926-60 (New York) 6% Loan 1930-64 (New York)	30,063,447	Sinking fund suspended in February 1932. Interest rate reduced to 3.5% from October 1933 to October 1937. **US Dollar bonds** - offer of September 1937 (effective 1938): Balance of the partially paid coupons from 1933 to 1937 is waived. Interest rates on all the US bonds are reduced . New interest ranging from 3.5% to 4.5%. Maturities are extended. **French Franc and Sterling bonds**: offer of January 1939: Balance of the partially paid coupons from 1933 to 1937 is waived. Interest rates of all bonds are reduced to 3.5%. Maturities are extended. By the end of 1942, over 95% of the bondholders have accepted these offers.

Table 5
Haircuts and Debt Relief

Countries	Year of Defaults	H1	H2	H3	H4	H5	Average Haircut
Argentina	1828	32	73	83	58	66	62
	1891	-9	-4	8	-4	8	0
	1893	-1	11	20	9	20	12
Brazil	1828	-15	19	40	5	16	13
	1898	-12	2	3	-2	-3	-2
	1914	-4	5	6	1	4	2
	1931	37	49	53	44	47	46
Chile	1827	7	48	69	36	48	42
	1879	-8	4	2	2	0	0
	1931						
Colombia	1821	9	17	19	17	19	16
	1826	26	79	89	68	81	69
	1848	68	77	79	75	79	76
	1873	11	21	26	21	26	21
	1879	48	75	91	67	84	73
	1900	-4	17	33	15	26	18
	1932	29	53	55	49	52	48
Mexico	1827	42	81	91	65	85	73
	1854	73	94	99	85	87	87
	1914	34	54	56	43	48	47
	1928						
Peru	1825	22	69	82	55	67	59
	1876	100	100	100	100	100	100
	1931	54	77	85	68	77	72
Uruguay	1876	37	44	65	44	64	51
	1891	9	25	12	25	11	17
	1915	2	6	6	5	6	5
	1932	21	30	31	30	31	28

Notes: The columns show the haircuts/debt reliefs for different discount rates.
H1; the rate of discount/capitalization is the risk free rate
H2: The rate of discount/capitalization is the yield for sovereign bond in normal times
H3: The rate of discount is the exit yield and the rate of capitalization is the rate at which
H4: The rate of discount is the yield for sovereign bond in normal times, the rate of capitalization is the risk free rate.
H5: The rate of discount is the exit yield, the rate of capitalization is the risk free rate.

Table 6
Fragilities in Times of Sovereign Defaults

Crises	Indicators of Insolvency		Indicator of International Liquidity		Indicator of Idiosyncratic Liquidity
	Export Growth	Debt/Export Ratio	International Issuance (Ratio of U.K. Exports)	U.K. Real Interest Rate	TOT Cycle/Trend
Argentina 1828	-0.87	1.51	-6.77	4.00	23.93
Argentina 1891	-1.07	1.63	1.29	8.71	-4.17
Brazil 1828	-1.53	1.17	-6.77	4.00	-7.75
Brazil 1898	0.48	1.22	-1.00	4.50	-21.49
Brazil 1914	-0.65	1.54	10.98	-18.19	-1.76
Brazil 1931	-14.13	2.62	-1.28	6.73	-20.88
Chile 1827	0.20	1.26	-6.77	7.53	2.45
Chile 1879	0.06	0.85	1.67	-1.25	5.83
Chile 1931	-12.78	2.05	-1.28	6.73	5.34
Colombia 1821	…	…	34.49	17.00	6.95
Colombia 1826	-6.57	5.44	-6.77	6.00	-10.01
Colombia 1848	-2.68	8.72	-6.77	13.47	-6.96
Colombia 1873	-4.68	1.55	-1.43	7.89	-3.17
Colombia 1879	-8.49	0.47	1.67	-1.25	-7.53
Colombia 1900	-9.35	0.88	-2.43	7.43	-3.45
Colombia 1932	-10.88	0.66	-5.23	3.01	27.12
Mexico 1827	2.83	3.23	-6.77	7.53	-0.97
Mexico 1854	-3.70	2.84	-6.77	5.95	-10.66
Mexico 1914	4.74	2.75	10.98	-18.19	-2.04
Mexico 1928	-11.71	0.75	13.73	7.41	-3.05
Peru 1826	-5.87	3.92	-6.77	6.00	-2.08
Peru 1876	-6.31	5.03	-1.20	0.06	-3.24
Peru 1931	-10.11	1.73	-1.28	6.73	-5.72
Uruguay 1876	-0.62	0.90	-1.20	0.06	-8.12
Uruguay 1891	-1.89	2.81	1.29	8.71	-10.55
Uruguay 1915	5.05	1.37	11.20	-24.55	-1.33
Uruguay 1932	-11.47	2.40	-5.23	3.01	-11.11

Notes: Export Growth is the growth rate of the trend of exports relative to tranquil times. Debt/Export ratio is the central government debt as a ratio of the trend of exports. 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 United Kingdom exports. 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. 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 7
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	1876	1891	1915	1932
0	n.a.	0	n.a.	60	17	0	n.a.	40	0	n.a.	n.a.	80	0	0	0	0	n.a.	0	20		n.a.	0	0	0	0	76	0
1	n.a.	0	n.a.	60	2	0	n.a.	40	0	n.a.	n.a.	83		0	5	0	n.a.	0	14		n.a.	0	0	0	0	65	0
2	n.a.	37	n.a.	71	1	0	n.a.	40	0	n.a.	n.a.	83		0	50	0	n.a.	0	3		n.a.	0	0	0		50	0
3	n.a.	54	n.a.	76	0	0	n.a.	36	0	n.a.	n.a.	83		0	67	0	n.a.	0	0		n.a.	0	0			31	0
4	n.a.		n.a.	79	0	0	n.a.	30	0	n.a.	n.a.	83		0	72	0	n.a.	0	0		n.a.	0	0			0	0
5	n.a.		n.a.	76	0	18	n.a.	22	0		n.a.	83		0	83	0	n.a.	0	0		n.a.	0	0			0	0
6	n.a.		n.a.	73	0	53	n.a.		0		n.a.	83		0		0	n.a.	0	0		n.a.	0	0			0	0
7	0		n.a.	73	0	75	n.a.		0		n.a.	80		0		0	n.a.	0	0		n.a.	0	0			0	0
8	0		0	60	0	80	0		2		n.a.	80		0		0	0	0	0		n.a.	0	0				
9	0		0	60	0	69	0		1		n.a.	71		0		0	0	0			n.a.	0	0				
10	0		0	60	0	75	0		2		n.a.	59		0		0	0	0			n.a.	0	0				
11	0		0	60	0	66	0		0		n.a.	60		0			0	0			n.a.	0	0				
12	0		0	50	0	63	0		0		n.a.	55		0			0	0			n.a.	0	0				
13	0		4	44	0		0		0		n.a.	46		0			0	0			n.a.	0	0				
14	0		16				0		0		0			0			0	0			0		0				
15	0		50				20		0		0			0			0	0			0						
16	0		60						0		0			0			0	0			0						
17	0		64						0		0			0			0	0			5						
18	12		76								0						0	0			18						
19	28		80								0						0	0			30						
20	36		80														0	0			38						
21	37		80														0	0			45						
22	31		80															0			43						
23	34		80															0			35						
24	36																	0									
25	40																	0									
26	40																	0									
27	40																	0									
28	37																	0									
29	22																	1									
30																		3									
31																		0									
Average Export Growth (%)	5.0	5.1	2.4	4.9	2.3	4.2	3.8	3.2	2.0		0.9	9.2	1.5	-1.6	1.0	2.9	3.5	1.7	5.3		7.7	-5.4	0.5	4.2	1.9	3.2	0.0
Average Haircuts (%)	62	12	13	-2	2	53	42	0		16	69	76	21	73	18	48	73	87	47		59	100	72	51	17	5	28
D/X at Default	1.5	1.7	1.1	1.2	1.5	2.4	1.3	0.8	1.9		5.4	7.8	1.6	0.5	0.9	0.6	3.1	2.8	2.5		4.1	5.4	1.6	0.9	2.9	1.4	2.1
D/X at Agreement	2.0	2.0	0.6	0.6	1.4	2.4	1.7	0.7	2.9		13.6	4.5	1.6	1.3	1.0	0.7	5.6	4.1	2.6		2.9	24.6	3.4	0.9	3.0	1.2	3.0

Table 8
Insolvency, Liquidity Crashes, and Default Spells

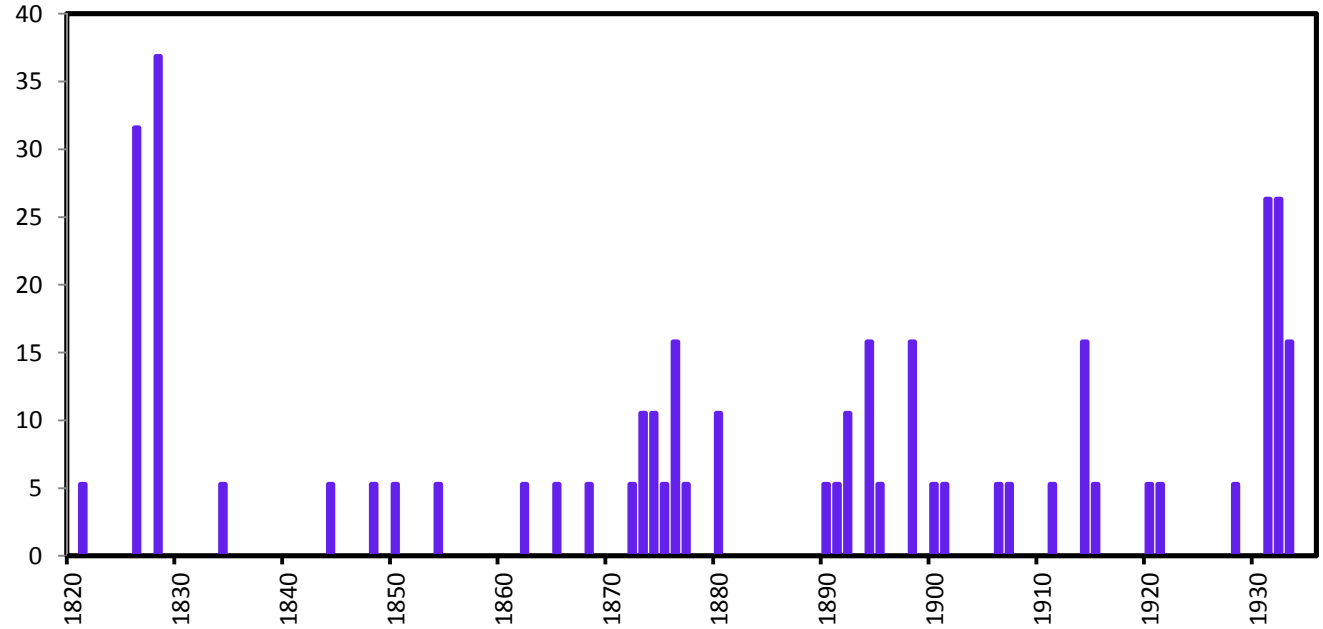
Indicator	Coefficient	Standard Error	Response of the Probability of Renegotiation to a 1 percentage point increase in variable:
probability of stabilizing the Debt	0.0031	0.0047	0.306
International Liquidity	0.0451	0.0380	4.614
Debt/Export Ratio at the time of the Default	-0.5484	0.13041	-5.336

This table shows coefficients of a Cox proportional hazard model using the default spell as the dependent variable. 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 liquidity covariate indicates that an increase in a one-percentage point increase in the liquidity/export ratio is associated with a 4.6 percentage point higher probability of a renegotiation of the default

Figure 1

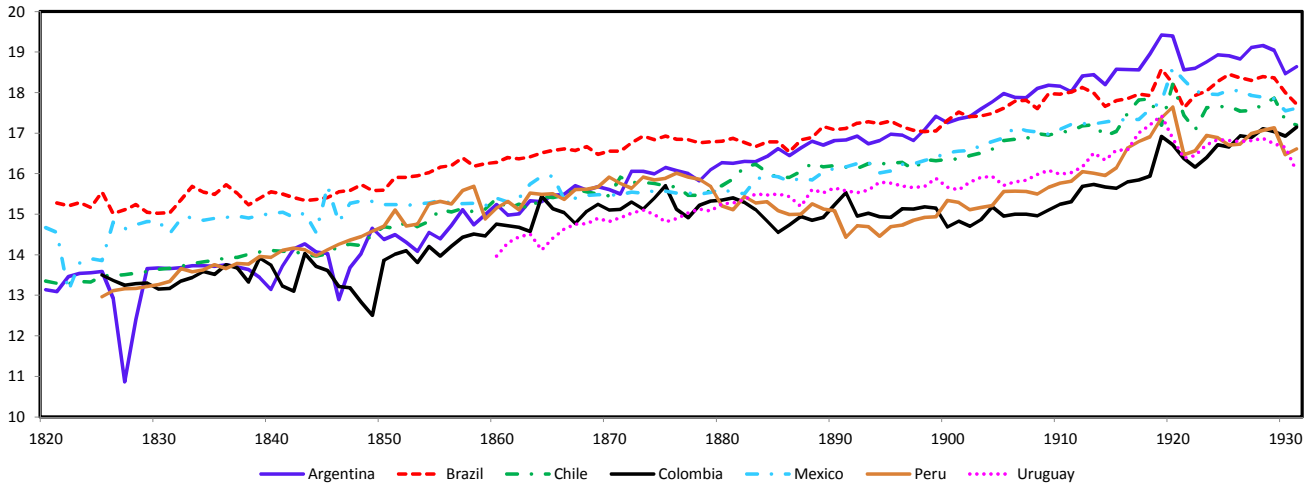
Sovereign Defaults in Latin America

(in Percent of Countries)

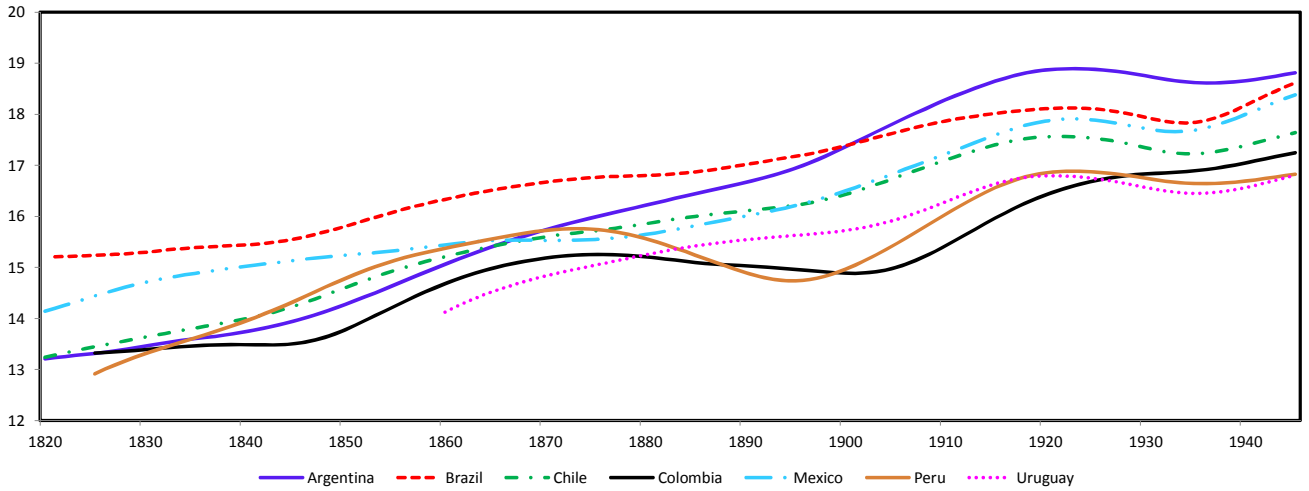


Note: The bars indicate how many countries defaulted in each year (in percent of all countries).

Figure 2
Exports: 1820-1931
Exports (in Logs)



Estimated Trend with Hodrick-Prescott Filter



Volatility of Filtered Exports and Growth Rates

Components	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Uruguay	Average
Growth Rates	50.13	18.92	24.15	43.47	33.54	23.08	18.93	30.32
Filtered Terms of Trade	24.52	17.36	17.25	25.57	23.17	23.49	19.54	21.56

Notes: Growth is the growth rate of the Exports. The transitory factor is the deviation of exports from its trend. Volatility is captured by the Standard Deviation. (in percent)

Growth Rates of the Trend of Exports in Various Episodes

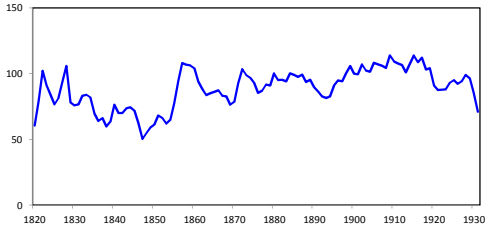
	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Uruguay
Mean 1820-1931	5.14	2.50	3.76	3.47	3.29	3.81	3.50
Mean 1820-1900	5.34	2.80	4.08	2.18	3.01	2.91	4.10
Mean 1820-1860	4.77	2.94	5.06	4.03	3.32	7.29	...
Mean 1860-1900	5.97	2.71	3.14	0.75	2.69	-0.80	4.10
Mean 1900-1931	4.76	1.82	3.03	6.34	4.10	6.03	2.72

Notes: Growth rates are in percent.

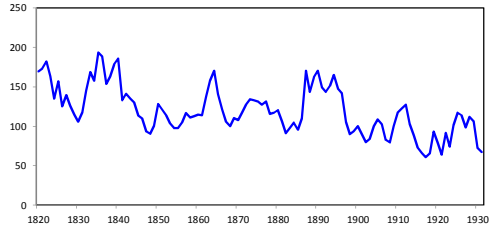
Figure 3

Terms of Trade
1900=100

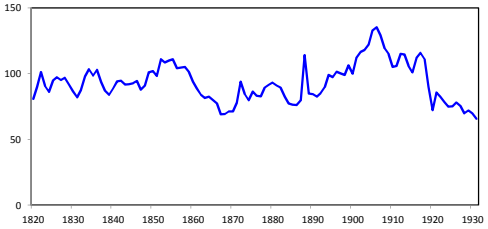
Argentina



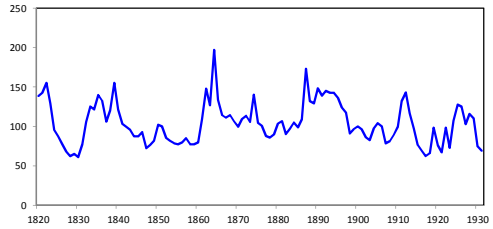
Brazil



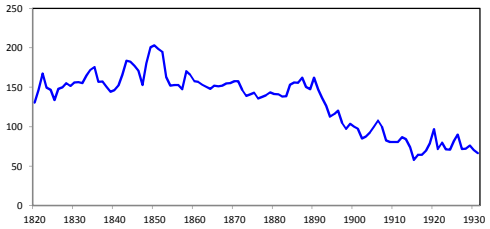
Chile



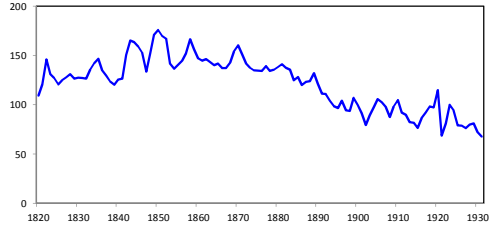
Colombia



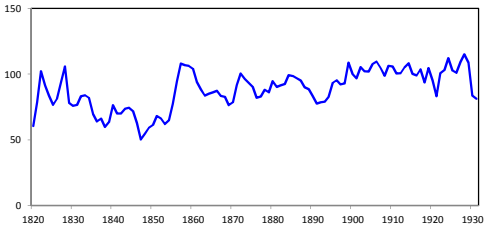
Mexico



Peru



Uruguay



Volatility of Filtered Terms of Trade and Growth Rates

Components	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Uruguay	Average
Growth Rates	8.84	14.85	8.28	18.22	8.20	8.59	9.46	10.92
Filtered Terms of Trade	9.85	16.51	7.82	19.82	8.35	7.89	10.20	11.49

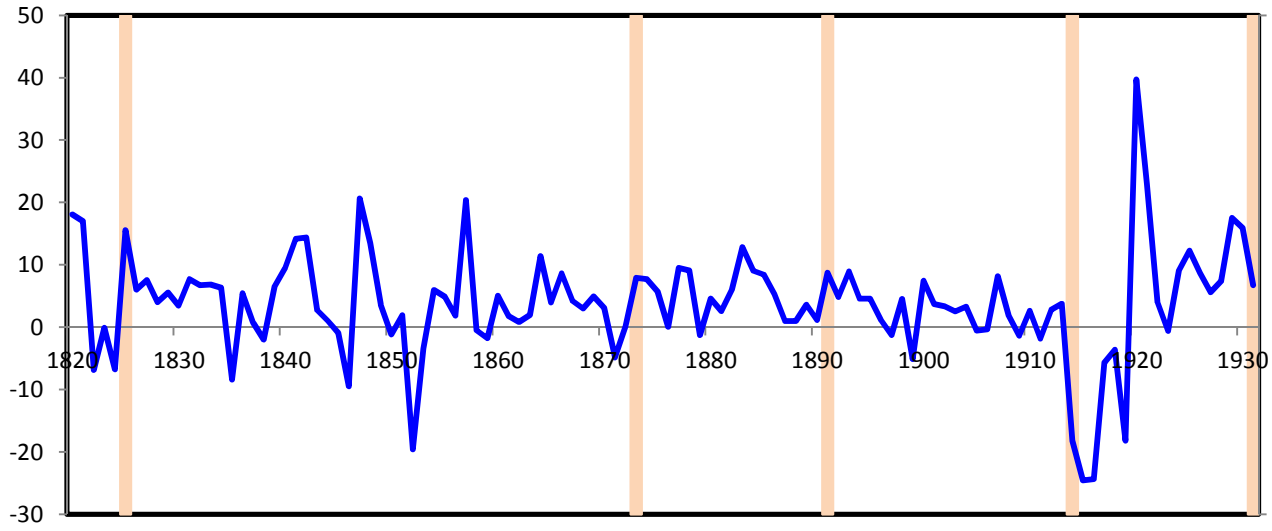
Notes: Growth is the growth rate of the Terms of Trade. The transitory factor is the deviation of the Terms of Trade from its trend. Volatility is captured by the Standard Deviation. (in percent)

Fluctuations in the Terms of Trade During Crises in the Financial Center
(in Percent)

Episodes	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Uruguay	All
1822-1825	-25	-14	-6	-44	-20	-17	-25	-22
1870-1873	26	24	18	6	-12	-14	23	10
1887-1890	-10	0	6	-14	0	-2	-12	-5
1911-1914	0	-28	0	-27	-8	-11	8	-9
1928-1931	-28	-40	-6	-40	-8	-15	-29	-24

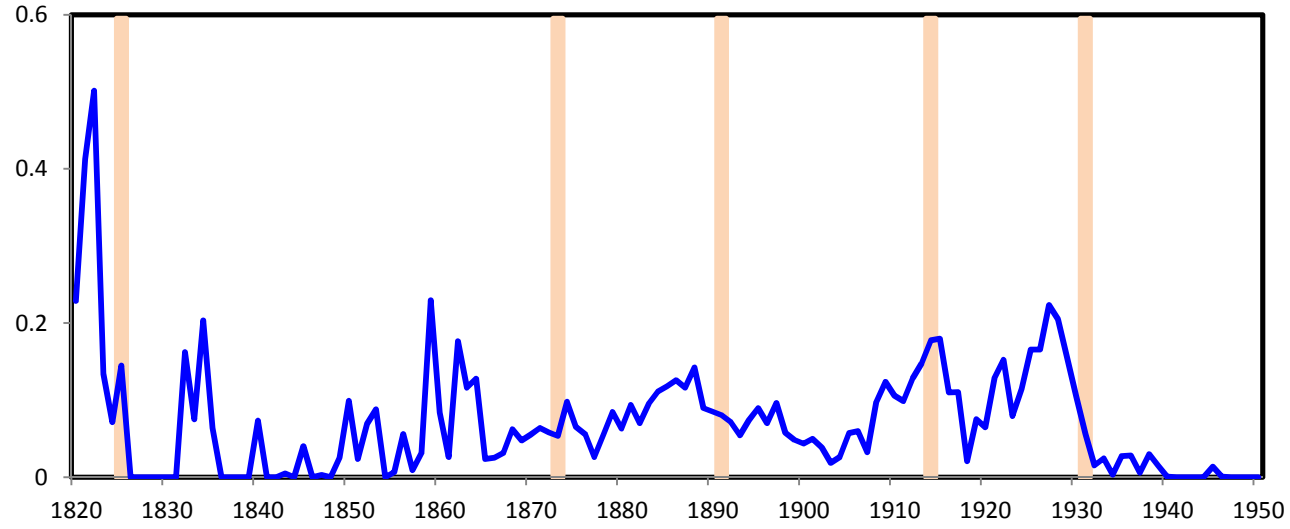
Figure 4
International Liquidity

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



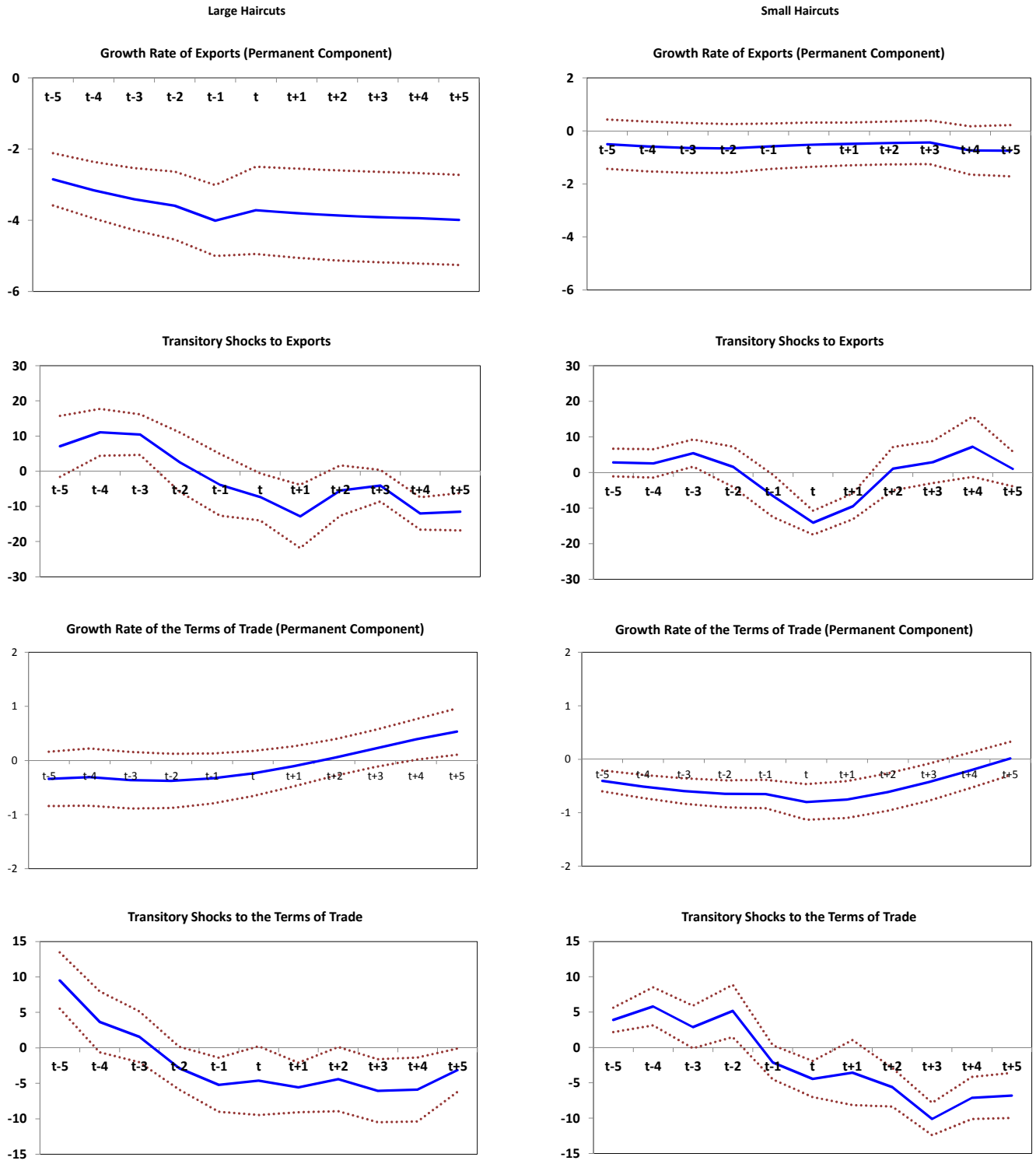
Notes: The U.K. short-term interest rate is the Bank rate. The inflation rate is the rate of increase of the U.K. Wholesale Price Index

International Primary Issuance of Non-Latin American Periphery Countries
(as a ratio of U.K. 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).

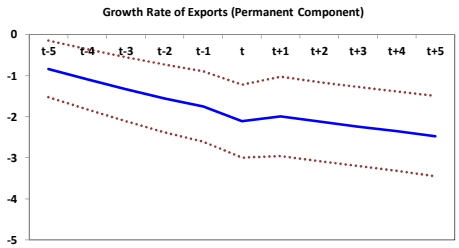
Figure 5
Crises with Large and Small Haircuts: Domestic Fragilities

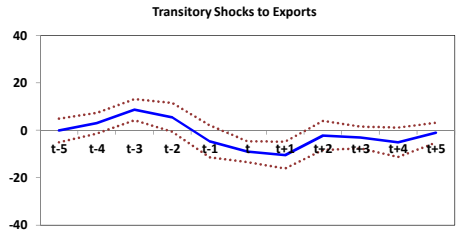


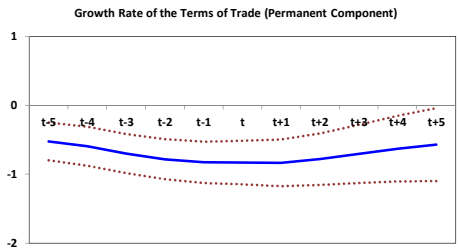
Notes: The growth rate of exports and of terms of trade are shown relative to their values in non-crisis times. The transitory shocks to exports and terms of trade are shown as a percent of their trend.

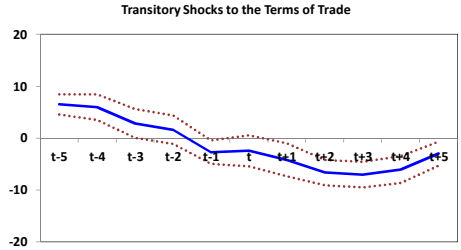
Figure 6
Systemic Crises and Idiosyncratic Crises

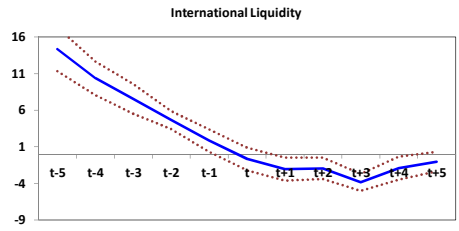
Systemic Crises



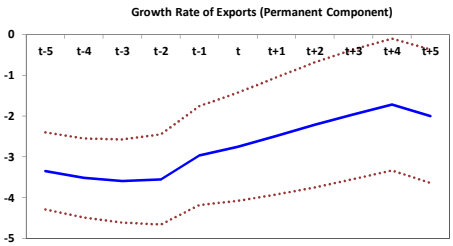


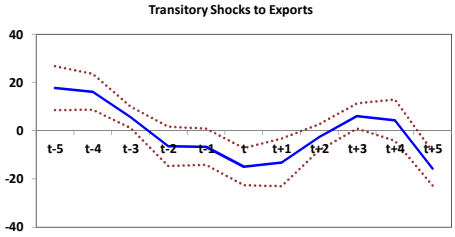


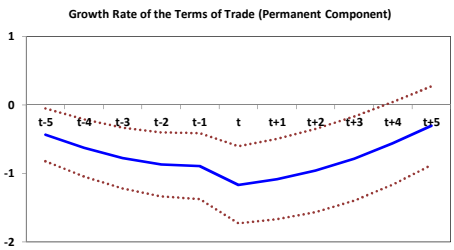


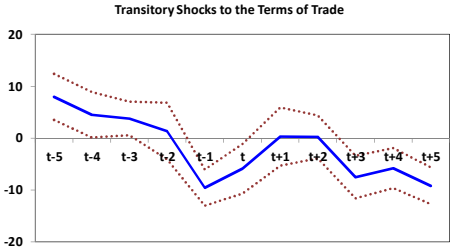


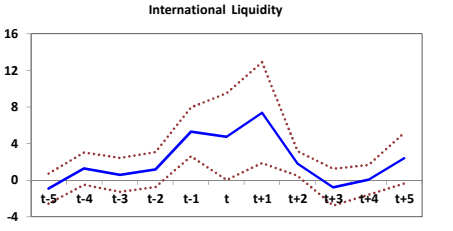
Idiosyncratic Crises











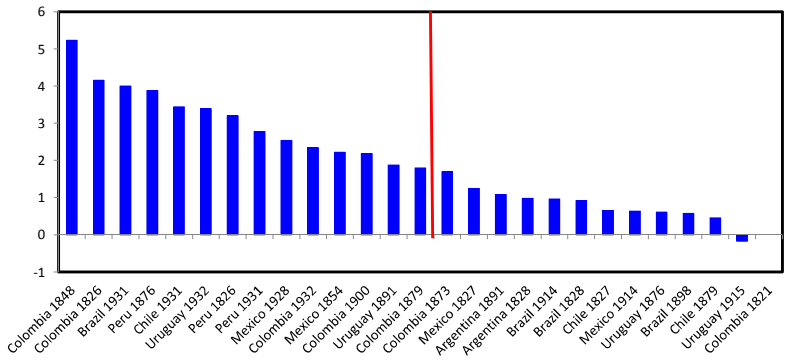
Year	Real Interest Rates in the UK During Crisis in the Financial Center					Liquidity Crash Index
	t-2	t-1	t	t+1	t+2	
1825	-0.1	-6.8	15.6	6.0	7.5	13.1
1873	-4.9	0.1	7.9	7.7	5.7	9.5
1890	3.6	1.1	8.7	4.8	8.9	5.1
1914	2.8	3.8	-18.2	-24.5	-24.4	-25.6
1929	8.4	5.5	8.4	15.4	16.6	6.6

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 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

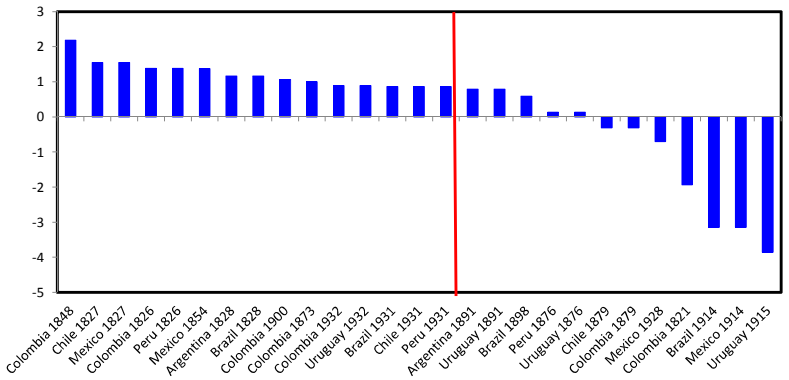
Note: The growth rate of exports and of terms of trade are shown relative to their values in non-crisis times. The transitory shocks to exports and terms of trade are shown as a percent of their trend. International Issuance is shown as a percent of U.K. Exports (relative to the average of the sample) 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 is the average real interest rate from period t to t+2 relative to the average from period t-2 to t-1.

Figure 7
Varieties of Sovereign Crises

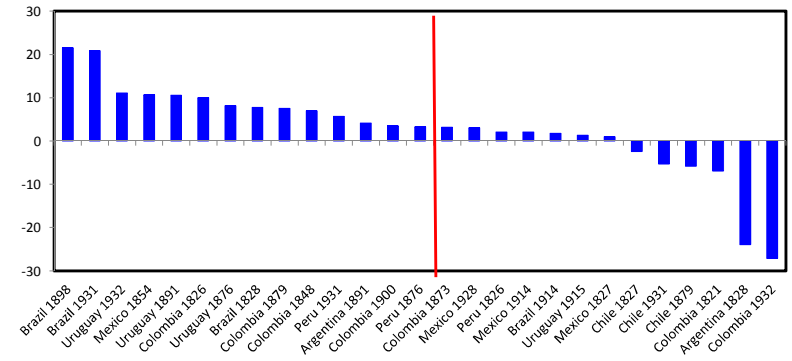
Insolvency Index



International Illiquidity Index



Idyosincratic Iliquidity Index



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

Fragilities and Haircuts	
Indicator	**Correlation with Haircuts**
Debt/Export	0.51
Growth Rate of the Trend of Exports	-0.27
International Issuance/UK Exports	-0.37
UK Real Interest Rate	
Transitory Shocks to the Terms of Trade	-0.04
Index of Insolvency	0.56
Index of International Iliquidity	0.38
Index of Idiosyncratic Iliquidity	0.04

Figure 8
Kaplan-Meier Survival Functions for Duration Default Spells

