

**The Center and the Periphery:
Two Hundred Years of International Borrowing Cycles***

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Abstract

Using a newly created database of capital flows, I examine the characteristics of bonanzas and busts during two episodes of financial globalization: 1820-1931 and since 1973, both during crises and tranquil times in the financial center. I find that bonanzas and sudden stops are far more pronounced during the Gold Standard Period. In contrast to the claim that cyclical monetary policy in the financial center since the 1970s fuels more volatile capital flows to the emerging periphery, I find that monetary policy has drastically smoothed capital flow cycles to the periphery, but only amid crises in the financial center.

Keywords: International borrowing cycles, systemic and idiosyncratic capital flow cycles, Financial Center Crises.

JEL Codes: F30, F34, F65

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I. Introduction

The booms and busts in international capital flows since the restart of capital mobility in the 1970s have attracted a lot of attention in both academic and policy circles.¹ Many suggest that capital flow bonanzas are excessive, end in crises, and lead to sudden stops. While the factors behind the boom-bust cycles are many, the most frequently mentioned are the cycles of monetary easing and tightening in the United States (the world's financial center). It is further argued that these monetary cycles trigger highly synchronized international capital flows unrelated to countries' specific macroeconomic conditions, the so-called global financial cycle.²

Since the restart of financial globalization in the 1970s, there have been three main waves of capital flow cycles to the periphery: the one starting in the late 1970s, the one starting in the early 1990s, and the one starting in the 2000s. Thus, the empirical research on the role of monetary policy in the financial center on international capital flow cycles to the periphery focuses at most on the easing-tightening cycles during these three episodes.³ With just three waves of capital flow cycles, it is hard to pinpoint the role of monetary policy in the financial center on the rest of the world. This is especially so because these capital flow cycles coincide with other worldwide shocks, such as the oil shocks of the 1970s, the creation of the European Monetary Union in the 1990s, and the savings glut in East Asia in the 2000s.

Another aspect of booms and busts in capital flows that has attracted attention more recently is the role of crises in the financial center. Many have pointed to the global retrenchment in capital flows in the aftermath of the 2007-2009 Subprime Crisis in the United States.⁴ This slowdown in international borrowing has been accompanied by a protracted collapse in the global economy quite different from the one following previous capital flow bonanzas and busts. While the boom-bust borrowing cycle in Latin America, Asia, Russia, and Turkey in the 1990s also ended with crises, those crises were short-lived with the periphery rapidly rebounding. Importantly, those crises erupted amid highly liquid international capital markets with a healthy financial center and a growing world economy, with vulnerabilities only present in the crisis countries. In contrast, the crisis starting in 2007 had the financial center at its epicenter, with

¹ See, for example the IMF World Economic Outlook (2016), Avdjiev, Hardy, Kalemli-Özcan, and Serven (2018), Broner, Didier, Erce, and Schmukler (2013), Calvo, Leiderman, and Reinhart (1993), Cerutti, Hale, and Minoiu (2015), Fernandez-Arias (1996), Forbes and Warnock (2012), Fostel and Kaminsky (2008), Ghosh, Qureshi, Kim, and Zaldueño (2014), and Reinhart and Reinhart (2009), to name just a few.

² See, for example, Rey (2015).

³ Because the IMF Balance of Payments database only starts to cover many countries in the mid-1990s or even in the 2000s, most of the studies on capital flows only focus on two boom-bust cycles. See, for example, Cerutti, Claessens, and Rose (2017), and Kalemli-Özcan (2019).

⁴ See for example, Bussière, Schmidt, and Valla (2016) and Milesi-Ferretti and Tille (2010).

international capital markets collapsing and the world economy coming to a standstill. Importantly, it is hard to draw general conclusions about crises with the financial center at its epicenter on international capital flows from just examining the crisis of 2007-2009.

In this paper, I study international capital flow cycles during a far longer episode. I look at the first episode of financial globalization (starting with the end of the Napoleonic Wars in the early 19th century and ending with the Great Depression in 1931 when barriers to international capital flows and trade were erected around the globe) as well as the second episode of financial globalization (beginning with the collapse of the Bretton Woods System in 1973). Studying the dynamics of capital flows during these two episodes has two major advantages. First, during the first episode of financial globalization, monetary policy in the financial center was constrained by the adherence to the Gold Standard, providing a benchmark for capital flow cycles in the absence of an active role of the central bank in the financial center. Second, panics in the financial center are *rare disasters*. Thus, to understand the empirical regularities of this type of global crisis, we need to look at a longer historical episode. The first episode of financial globalization spanning more than 100 years was witness to major crises in the financial center, such as the London Panic in 1825, the World Crisis in 1873 fueled by the collapse of financial markets in the Austrian-Hungarian Empire and Germany, the 1890 Baring Crisis in London, and the London Stock Exchange and Wall Street Crashes in 1929.

To study capital flow booms and busts since the start of financial globalization in the early 19th century, I constructed a new database of international capital flows spanning two hundred years. The data for the first episode of financial globalization was collected in London, Paris, Berlin, Frankfurt, Hamburg, and New York, the financial centers of the 19th and early 20th centuries. I used information in archives, prospectuses, annual reports of the Stock Exchanges, and financial newspapers of those times. The database includes international issuance by the public sector (central governments, provinces/states, and municipalities) as well as international issuance by private financial and non-financial firms. The database is granular. It includes data on every bond and share floated in international capital markets. For bonds, it includes the amount issued, the coupon rate, the issue price, the amortization characteristics, the underwriting banks, as well as information on the markets where those bonds were floated. For shares, the database includes the amount issued, the price of issue, whether shares are ordinary or preferred, as well as the markets where those shares were issued.⁵ I constructed a similar database for the second

⁵ This database is the first comprehensive database on international capital flows for the first episode of financial globalization. This is an important contribution of this paper since while there is partial historical data on central government external debt there is no information on private external borrowing and debt. Stone (1999) constructed international capital flows using issuance of bonds and equity in London from 1865 to 1914 for twenty-one countries.

episode of financial globalization beginning in the 1970s. The database was collected from the archives of the World Bank, the International Monetary Fund, the Institute of International Finance, Central Banks, as well as from various digital databases. The database constructed for the second episode of financial globalization is also granular and includes all bonds, syndicated loans, and shares floated in international capital markets. The database on international issuance is complemented with a database on economic fundamentals, including economic activity, commodity prices, terms of trade, world interest rates, inflation, and monetary statistics in the financial centers, all going back to 1820.

This paper focuses on capital flows to Latin American countries, the quintessential emerging countries. It concentrates on the seven most active participants in international capital markets: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. These countries started to participate in international capital markets right after their independence from Spain and Portugal in the first twenty years of the 19th century. I study the characteristics of booms and busts in international gross capital inflows (captured with international gross primary issuance) for each Latin American country, with a focus on their amplitude. For each cycle, I calculate the amplitude of booms and busts by estimating the accumulated net issuance over booms (busts), with net issuance defined as international gross primary issuance minus the amortization of bonds and loans. I classify capital flow cycles into two varieties: *Systemic Capital Flow Cycles* and *Idiosyncratic Capital Flow Cycles*. *Systemic Capital Flow Cycles* are those issuance cycles in the periphery that coincide with a crisis in the financial center. It is around panics in the financial center that cycles in the periphery are more synchronized, with booms and busts mostly affected by conditions in the financial center. I identify six major crises in the financial centers in this two-hundred-year period: four during the first episode of financial globalization (the already mentioned London 1825 panic, the 1873 panic centering in Austria and Germany, the 1890 Baring crisis in London, and the 1929 panic in London and New York) and two during the second episode of financial globalization (the Banking Crisis in the United States starting in 1981 (centered on major commercial banks with large exposures to developing countries via the syndicated loan market)⁶ and the U.S. Subprime Crisis beginning in 2007). *Idiosyncratic Capital Flow Cycles* are

Unfortunately, this database lacks information on the individual issues and does not have information on the characteristics of amortization of the bonds, making it impossible to estimate the external debt of those countries. Importantly, Stone (1999) only covers issuance in London. During the mid-19th and early 20th centuries Paris, Frankfurt Berlin, and New York also became financial capitals of the world. Many countries in the periphery (for example in Continental Europe) floated most of their bonds and shares in Paris, Berlin, Frankfurt, and Hamburg. Thus, just capturing issuance in London provides a biased indicator of access to international capital markets for many countries.

⁶ See, Kyle and Sachs (1984), Sachs (1986) and Sachs and Huizinga (1987) for an in-depth analysis of the origins of the 1981-1983 U.S. Banking Crisis, the deterioration of the balance sheet of large U.S. banks, and the effects on U.S. monetary policy and regulations.

identified as those cycles during tranquil times in the financial center. These cycles tend to be less synchronized, with their booms and busts mostly affected by country-specific shocks. I then study these cycles across the two episodes of financial globalization and examine what factors explain the characteristics of capital flows then and now. The focus of this analysis is on the trait of monetary policy in the financial centers around panics in the financial center and during tranquil times.

The main results of the paper indicate that:

First, although many have argued that cyclical monetary policy in the financial center since the 1970s has been at the core of volatile and excessive booms and busts in capital flows to the emerging periphery, capital flow bonanzas and busts were far more pronounced during the first episode of financial globalization when monetary policy in the financial center was constrained by adherence to the Gold Standard.

Second, the differences in the magnitude of booms and busts of capital flows to the emerging periphery in the first and second episodes of financial globalization are driven by capital flow cycles around crises in the financial center. During the first episode of financial globalization, capital flow bonanzas preceding panics in the financial center were about 60 percent larger than capital flow bonanzas in tranquil times while capital flows during busts following crises in the financial center were approximately 50 percent smaller than capital flows during busts in tranquil times. In contrast during the second episode of financial globalization, international capital flows to the periphery around crises in the financial center are characterized by smaller bonanzas and substantially more issuance during the bust. Since the 1970s, *Systemic Capital Flow Bonanzas* cannot be distinguished from *Idiosyncratic Capital Flow Bonanzas*. What is more, capital flows during busts following crises in the financial center are larger than capital flows during busts in tranquil times in the financial center.

Third, the changes in monetary regimes in the financial center (from adherence to the Gold Standard to autonomous monetary policy since the collapse of the Bretton Woods System) are at the core of the time-varying characteristics of international capital flow cycles to the emerging periphery around episodes of crises in the financial center. Monetary policy cycles in the financial center during the second episode of financial globalization are far more pronounced around a crisis in the financial center, with severe monetary contractions targeting the boom in credit preceding the crises and a protracted expansionary monetary policy injecting liquidity to rein in the crises in their aftermath. Naturally, these policies also substantially moderate capital flow bonanzas in the periphery and guarantee periphery countries better access to liquidity in international capital markets during busts following a panic in the financial center.

The rest of the paper is organized as follows. Section II describes the new database as well as its sources. Section III studies the anatomy of booms and busts in capital flows for each Latin American country, it identifies *Systemic* and *Idiosyncratic Capital Flow Cycles*, and compares the borrowing cycles in both episodes of financial globalization. This section also reports tests of the varying characteristics of capital flow cycles. Section IV examines what fuels the changing characteristics of international capital flows. Using event studies, I examine the role of pull and push factors on the characteristics of *Systemic* and *Idiosyncratic Cycles*. These event studies suggest that the time-varying characteristics of monetary policy in the financial center are at the core of the changing amplitude of bonanzas and busts in the periphery. Section V explores this connection further using cross-section regressions as well as the Local Projection Approach introduced in Jordà (2005). Section VI concludes.

II. International Issuance: The Database

The historical data on international capital flows of Latin American countries constructed for this paper⁷ is what is known as international gross primary issuance. This measure of capital flows captures gross capital inflows and is defined as purchases of domestic assets by foreign residents. Until recently, research on capital flows focused on the behavior of net capital flows (current account imbalances).⁸ At the core of this interest is the hypothesis that financial fragility and currency crises are triggered by sharp declines in savings (net of investment) and excessive external borrowing, which is captured by deficits in the current account.⁹ The Global Crisis in 2007-2009 changed that. This financial panic was not preceded by a surge in net capital flows. Instead, there was a dramatic increase in gross financial flows while net capital flows remained mostly subdued. The new literature on capital flows thus identifies financial fragility with gross capital flows and external positions.¹⁰ The database I constructed will extend the analysis of boom-bust cycles of gross exposures for two hundred years.

⁷ The database used in this paper is only a small part of a newly created database. The complete historical database is still being processed and includes issuance data from 1820 to 1931 for all countries that participated in international capital markets, from countries like Paraguay, which only floated a few bonds during the first episode of financial globalization, to Canada, which issued thousands of bonds and shares in international capital markets during the same period. The inclusion of all countries that tapped international capital markets at least once can also allow us to examine not only those countries that are at the center of international capital flows but also study the ability of low-income countries to access international capital markets during the first episode of financial globalization.

⁸ In some studies, net capital flows include not only current account imbalances but also changes in foreign exchange reserves.

⁹ See, for example, Calvo, Leiderman, and Reinhart (1993); Fernandez-Arias (1996); and Reinhart and Reinhart (2009).

¹⁰ One of the earlier papers assessing the role of gross flows on financial fragility in the years predating the global crisis is Obstfeld (2012). In this paper, Obstfeld describes how gross exposures in the presence of financial distortions

This historical database is unique in its coverage.¹¹

First, it spans the whole first episode of financial globalization, from 1820 when London emerged as the financial capital of the world, to 1931 when barriers to international capital mobility were erected around the world.

Second, this database not only includes governments' (central, provinces/states, and municipalities) international issuance but also international issuance of the private sector. Since the private sector has always participated intensively in international capital markets, omission of private sector issuance severely underestimates capital flows.

Third, the database includes international issuance of bonds, loans, and shares, the major drivers of international capital flows.

Fourth, this database includes all bonds and shares issued in London, Paris, Berlin, Frankfurt, Hamburg, and New York, the financial centers of that era. Coverage of flotations in all financial centers is essential since the importance of each financial center in the international capital market evolved over time. While London was the financial capital of the world in the earlier period, Paris, Berlin, Frankfurt, and Hamburg became major financial centers in the 1870s, with New York capturing international capital markets in the aftermath of WWI. Importantly, not all financial centers provided equal financing to all the countries in the periphery. For example, while the Commonwealth countries (Australia, Canada, India, New Zealand, and South Africa) basically only tapped the London market, European countries (such as, Austria, Denmark, Finland, Hungary, Italy, Norway, the Ottoman Empire, Portugal, Russia, Spain, and Sweden) basically issued bonds and shares massively in Paris as well as Frankfurt, Berlin, and Hamburg. Latin American countries, the focus of attention in this study, issued only 58 percent of bonds and shares

can carry risks of financial instability regardless of whether the country has a current-account deficit or surplus. See also, Acharya and Schnabl (2010) and Borio and Disyatat (2011) for two exhaustive studies of the type of capital flows preceding the global crisis in 2007-2009.

¹¹ The historical database I constructed is not the first database on international capital flows during the first episode of financial globalization. Stone (1999) constructed a database of international capital flows using issuance of bonds and equity in London from 1865 to 1914 for twenty-one countries. This database lacks information on the individual issues and does not have information on the characteristics of amortization of the bonds, making it impossible to estimate the external debt of those countries. Importantly, Stone (1999) only covers issuance in London, capturing just a fraction of international capital flows. More recently, Reinhart, Reinhart, and Trebesch (2017) also constructed another database spanning the 1815-2016 period. Unfortunately, their database is heterogenous in nature making it impossible to compare cycles across time. For the period 1815-1866, the authors construct a database that only includes international sovereign bond issuance for 38 countries in London. For the episode spanning 1867-1914, they use Stone (1999) international issuance in London for 25 countries, which includes both sovereign and private issuance. Finally, for the episode 1919-2016, they construct a database on capital flows using the Current Account and changes in Foreign Exchange Reserves for 60 countries, that is, this database combines gross capital flows from 1815 to 1914 with net capital flows since 1919.

in London, with 14 percent issued in Paris, 8 percent issued in Berlin, Frankfurt, and Hamburg, and 20 percent issued in New York.¹²

Fifth, the database is granular. It contains information on each single issue. For bonds, the data includes the date of the issue, the name of the borrower, the purpose of the issue, the type of business of the borrower, the amount issued, the price of the issue (whether it was issued at par/premium/discount), the coupon rate and the characteristics of the amortization of the bonds set up when issued, the banks underwriting the issue, the financial centers where the bonds were issued, and the currency of issue. For shares, the data includes the date of the floating, the name of the company issuing the shares, the price of the shares, whether the shares were ordinary or preferred, the currency of issue, and the financial centers where the shares were issued. This detailed information on the characteristics of loans and bonds allows the estimation of both private and sovereign debt starting in 1820.

Sixth, most bonds in this earlier episode were callable, allowing the borrower to repay the bonds earlier. During the first episode of financial globalization, there were waves of refinancing in low-interest rate years, with old high-coupon bonds converted into newly issued low-coupon bonds. To estimate the amplitude of booms and busts as well as debt series, I also identify the characteristics of these conversions. The original repayments of bonds also change when countries default. To construct series of external debt as well as to estimate the amplitude of booms and busts, it is also necessary to study in detail the characteristics of the post-default restructurings.

Lastly, the historical database (1820-1931) as well as the database for the modern era (starting with the collapse of the Bretton Woods System in 1973) are identically constructed, including all bonds/loans and shares issued in the financial centers. This is a pre-requisite to compare the boom-bust cycles in the two episodes of financial globalization.

I collected the historical data for this project from many sources. They include financial newspapers and magazines of the 19th and early 20th centuries (such as *The Statist*, *l'Economiste Européen*, *l'Économiste Français*, and *Dt. Oekonomist*), annual reports of the Stock Exchanges in London and Paris, the annual listings of bonds and stocks in the Berlin, Frankfurt, and Hamburg Stock Exchanges, the archives of the London Stock Exchange, the Paris Bourse, and the New York Stock Exchange, as well as the archives of merchant banks (such as the House of Rothschild and Baring Brothers in London) and deposit banks (such as Crédit Lyonnais in Paris). The historical database also includes information on issuance collected from *Investors Monthly Manual* (1865-1914) as well as prospectuses of bonds and shares issued in London,

¹² See, Appendix Table 1 for a detailed decomposition of issuance in the different financial centers by country.

Paris, and New York.¹³ I have also used information on issuance from the *Fenn's Compendium*, the *British Annual Report of the Confederation of Foreign Bondholders*, the *United States Annual Report of the Foreign Bondholders Protective Council*, *L'Association Nationale des Porteurs Français de Valeurs Mobilières* as well as *Moody's*, *Kimber*, and *Fitch* manuals on government borrowing in both domestic and international capital markets. I have also obtained data from publications from government agencies in the United States, such as the Department of Commerce and the Federal Reserve. Part of the database has also been collected from important studies on sovereign defaults by scholars around the world, such as Jorgensen and Sachs (1989) and Kaminsky and Vega-García (2016).

To introduce the historical data, I present two prospectuses in Figure 1.¹⁴ The first prospectus shows the characteristics of a 1,034,700 British-pound bond issued by the Province of Buenos Aires (Argentina) in 1870. This was a 6% loan issued at a discount (88 percent of face value) redeemable in 33 years, with coupons paid twice a year in London. This bond was, like most bonds issued in the 19th and early 20th centuries, a sinking fund bond equivalent to a mortgage loan today. The Buenos Aires 6% bond had an accumulative sinking fund of 1%. The total annual service of this loan was 7% (1% for the sinking fund and 6% for the coupon payments) of the total amount issued. For the 1,034,700 British pound bond, the annual service was equal to 72,429 British pounds. As with mortgages, the service mostly pays the coupons in the first years of the life of the bond, with the part dedicated to the amortization increasing over time. In the case of the Buenos Aires 6% bond, the service was partly used to amortize the bond by annual drawings of the bond at par. Note that, the issuer (Province of Buenos Aires) had the right to increase the sinking fund and refinance this bond in low-interest rate years. The second prospectus shows the characteristics of the 1889 conversion of the Argentine 6% Bonds of 1871 and 1882 and the Buenos Aires 6% Bonds of 1870 and 1873 into a £5,263,560 4.5% Argentine Government Sterling Bond to be redeemed in 39 years.

The historical database is complemented with a similar database for the second episode of financial globalization starting in 1973. As with the database for the first episode of financial globalization, the database for this period includes bonds and shares floated in international capital markets. It also includes international syndicated loans. The database for the second episode of financial globalization is also granular. It also contains information on each single issue. For bonds and syndicated loans, the data includes the date of the issue, the name of the borrower, the purpose of the issue, the type of business of

¹³ The database for all countries includes about 100,000 prospectuses also including domestically issued bonds and shares.

¹⁴ These photos only include the top part of the prospectuses.

the borrower, the amount issued, the interest rate, the maturity, and the currency of the issue.¹⁵ For shares, the data includes the date of the floating, the name of the company issuing the shares, the price of the shares, whether the shares are ordinary or preferred, and the currency of issue. I collected data from the World Bank Archives for the 1970s and from *Dealogic*, *Refinitiv's Securities Data Company (SDC) Platinum*, and *Thomson Reuters' Loan Pricing Corporation Dealscan*, starting in 1980. I also collected data on the restructurings/exchanges following the defaults from Bloomberg terminals, the database of the International Finance Institute, International Monetary Fund publications, and a variety of studies examining restructurings of debt, such as Sturzenegger and Zettelmeyer (2006).

Figure 2 shows the newly collected data on capital flows spanning two hundred years. This figure shows Latin America's international gross primary issuance as captured by the issuance of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. These seven countries were the most active participants in international capital markets in the region.¹⁶ The top panels show total international gross primary issuance as well as its decomposition into public (including central government, states/provinces, municipalities, and government-owned firms) and private (including non-government owned financial and non-financial corporations) issuance. Information on total issuance is insufficient to assess the extent of financial integration. We need to scale total issuance with an indicator of the size of the economy. The most common indicator used to capture the extent of financial integration is the ratio of total issuance (or gross capital inflows) to GDP. Official estimates of GDP for the 19th and the early 20th century are not available. Instead, I use exports as the scale variable for both the historical and the modern period.¹⁷ The bottom panels in Figure 2 show total international gross primary issuance as a share of exports starting in 1820. The panels on the left show the behavior of international issuance starting in 1820 and ending in 1931, when barriers to capital mobility were erected around the world. During the next forty years, international capital flows vanished only to recover following the collapse of the Bretton Woods System

¹⁵ For syndicated loans, the database includes information on the name and nationality of the members of the syndicate. For bonds, the database reports the price of the issue (whether it is issued at par/premium/discount).

¹⁶ The data on international gross primary issuance that I construct captures access to international capital markets, that is, it only includes issuance for cash. As estimated, gross primary issuance does not include the value of the bonds issued in exchange for previously issued bonds via a conversion or an exchange of defaulted bonds for new bonds when the default ends. It also does not include bonds issued to pay accumulated coupon arrears when the debt is restructured to end a default. Finally, all bond issuance is measured at face value

¹⁷ Exports are quite volatile. For the issuance/export ratio to capture the volatility of capital flows only, I use trend exports as the scale variable. Trend exports are estimated by applying the Hodrick-Prescott filter to the series of exports in British pounds for the first episode of financial globalization and in US dollars for the second episode of financial globalization.

in the early 1970s when capital controls were drastically reduced.¹⁸ The panels on the right show the behavior of international issuance starting during the second episode of financial globalization.

The top panels in Figure 2 show boom-bust episodes throughout the 19th and early 20th centuries as well as those during the second episode of financial globalization. Importantly, during both episodes, private international issuance was very important. During the first episode, the private share oscillated around 46 percent while during the second episode the private share average was 60 percent. In the 1820s, private issuance was just 10 percent of total issuance. In the 1860s and early 1870s, private issuance increased to about 30 percent of total issuance while in the 1880s private issuance reached 55 percent of total issuance. Private issuance at the turn of the century until the WWI was approximately 65 percent of total issuance and then declined to 20 percent during the last capital flow bonanza before the crisis of 1931. During this episode, the correlation between public and private international issuance was about 0.50, with private borrowing reinforcing sovereign borrowing cycles. Similar patterns of private and public international issuance are observed since the restart of financial globalization in the early 1970s. During the first years, international issuance was mostly government borrowing, with the private share at about 19 percent of total issuance. In contrast, the bonanzas of the 1990s and the 2000s were driven by private issuance with private issuance increasing to 68 percent of total issuance.

Finally, the bottom panels in Figure 2 show the evolution of financial integration captured with the issuance/export ratio. Average issuance was 15 percent of exports during the first episode of financial globalization, with the average issuance increasing to 24 percent of exports during the second episode of financial globalization. Interestingly, episodes of bonanzas were more pronounced in the earlier period with a peak at 121 percent of exports in 1824 but only reaching 69 percent of exports in 1997.

III. The Anatomy of International Borrowing Cycles

To construct the anatomy of capital flow bonanzas and busts, I adopt the Harding and Pagan (2002) algorithm¹⁹ that has been widely used to estimate real business cycles as well as financial cycles. I also define a criterion to classify international borrowing cycles into *systemic* and *idiosyncratic*. I end by testing whether bonanzas and busts differ across the first and second episode of financial globalization. The estimations indicate that the characteristics of systemic bonanzas and busts have evolved over the

¹⁸ As early as July 1973, United States eliminated capital flows restrictions. Germany and Great Britain followed, partially eliminating capital controls in 1973 while Japan joined in 1979. In the mid-1970s, Latin American countries deregulated the domestic banking sector and eliminated restrictions on international capital flows.

¹⁹ A similar technique was first proposed by Bry and Boschan (1971). For an application of this methodology to stock market cycles, see Kaminsky and Schmukler (2008).

two episodes of financial globalization pointing to the need to study what triggers this time-varying pattern.

A. Identification of Capital Flow Cycles

Figure 3 shows the international capital inflows for the two episodes of financial globalization for each of the countries in the sample. The blue bars in this figure show international issuance (as a share of exports). Data on issuance is quite volatile, in part because government bonds are issued in large tranches. To have a better visualization of booms and busts, the red line in Figure 3 also shows international primary issuance as a three-year moving average (share of exports). During the first episode of financial globalization, booms and busts across the seven countries were highly correlated, with most countries participating in each cycle.²⁰ There are two exceptions: Colombia and Mexico. Following the boom of the 1820s, all Latin American countries defaulted. These defaults lasted around 20 years. Following the debt restructurings, mostly in the 1850s, Argentina, Brazil, Chile, and Peru started tapping international capital markets again in the early 1860s. In contrast, Colombia and Mexico, amid serial defaults,²¹ were out of the international capital markets until the beginning of the 20th century and the 1880s, respectively.²² The figures for the second episode of financial globalization also show that cycles were highly correlated across the countries. Except for Argentina (following the default of 2001), all countries participated in the capital flow bonanzas of the 1970s, 1990s, and 2000s.

I now examine more systematically the boom-bust capital flow cycles by looking at their duration and amplitude. To identify the boom-bust cycles in gross international issuance, I apply the Harding and Pagan (2002) algorithm. This algorithm isolates local maxima in a time series subject to a minimum constraint on the length of upturns and downturns. To identify *bona fide* bonanzas and not just blips in issuance, I also impose a constraint of a minimum level of issuance (as a share of exports) at the peak of the cycle. In particular, I impose the restriction that the cycle cannot have duration of less than 5 years. That is, y_t (international issuance as a share of exports) is a maximum if:

$$y_{t-2} < y_{t-1} < y_t > y_{t+1} > y_{t+2} \quad (1)$$

and y_t is at least 0.15. The trough is identified as the minimum value between two local peaks.

²⁰ Uruguay started tapping international capital markets for the first time in 1864.

²¹ During the period 1826 to 1905 Colombia defaulted 5 times, with Colombia being in default in total for 70 years. Mexico defaulted twice, in 1827 and in 1854. The first default lasted 25 years and the second lasted 33 years.

²² Even in default, Mexico tapped international capital markets in the 1860s during the French intervention from 1861 to 1867. During the intervention, the French government imposed Maximilian I as emperor. During this period, the government of Maximilian I issued bonds in Paris. After the French intervention was defeated, Benito Juárez was re-elected president and the loans contracted by the government of Maximilian I were repudiated.

I apply this filter to the (3-year moving average) total issuance/exports ratio for each of the seven countries in the sample. The algorithm identifies 34 cycles for the first episode of financial globalization and 22 for the second episode of financial globalization. The average duration of the capital flow bonanzas is 8 years in the two episodes.²³ For the first episode of financial globalization, the minimum boom duration is 2 years, and the maximum boom duration is 18 years. For the second episode of financial globalization, the minimum boom duration is 3 years, and the maximum boom duration is 13 years. The length of busts is more varied during the first episode of financial globalization. Although the minimum duration of busts is 2 years, capital flow busts can last much longer. For example, after the capital flow bonanza of the 1820s, Colombia defaulted and could not tap international capital markets for 79 years. However, long-lasting bust spells may be due to global patterns. For example, following the Great Depression in 1931, barriers to capital flows were erected around the world, with international capital markets disappearing for about 40 years. Overall, the average duration of busts during the first episode of financial globalization is 22 years. Latin American countries only start tapping international capital markets again in the 1970s. The duration of busts during the second episode of financial globalization is less variable than during the earlier episode, with the most protracted bust lasting 18 years (for Argentina following the default of 2001) and the shortest lasting 2 years.

To examine the amplitude of the capital flow bonanzas and busts I need to estimate the accumulated net issuance during a boom and during a bust.²⁴ I estimate the amplitude of the bonanza (bust) for each cycle i as follows:

$$amplitude_i = \sum_{t_i=1}^{T_i} \left(\frac{net\ issuance_{t_i}}{Exports_{T_i}} \right) \quad (2)$$

Where 1 is the year when the capital flow bonanza (bust) starts. For bonanzas, T is the year of the peak of the capital flow cycle and the numerator is total accumulated net issuance over the boom normalized by the level of exports in the peak year. For busts, T is the year of the trough of the capital flow cycle and the numerator is total accumulated net issuance over the bust normalized by the level of exports in the trough year.

²³ Appendix Table 2 shows the duration of booms and busts for each of the identified cycles.

²⁴ Net primary issuance is estimated by subtracting amortizations from gross primary issuance. As I described in the previous section, I estimate amortizations including conversions and debt restructurings after defaults.

B. Bonanzas and Busts: Then and Now

Figure 4 shows the amplitude of booms and busts in international borrowing, estimated as shown in (2). For the first episode of financial globalization, 1820-1931, the average capital flow bonanza was quite large, with total accumulated net issuance across all countries averaging 194 percent of exports. Still, the amplitude of the cycles was quite varied, with some bonanzas being extremely large and reaching almost seven hundred percent of exports and others much milder with accumulated total net issuance being just a fraction of exports during the cycle. Interestingly, some of the most extreme capital flow bonanzas occurred in the 1820s, with Colombia and Mexico's bonanzas reaching seven hundred and four hundred percent of their exports, respectively. Not surprisingly, Colombia's and Mexico's default spells following these booms were the longest, with repeated restructurings until their debt burdens reached sustainable levels.²⁵

For the first episode of financial globalization, accumulated net issuance during the busts averaged 25 percent of exports. Importantly, 30 percent of busts were more extreme. During these extreme busts, countries were unable to tap international capital markets, with zero or even negative accumulated net issuance during the downturn in the cycle. The sharpest decline in issuance occurred in Peru following the 1873 world crisis. At that time, Peru's accumulated net issuance became negative, with deleveraging reaching 58 percent of exports.

The estimates in Figure 4 for the second episode of financial globalization paint a different picture of capital flow booms and busts. The average capital flow bonanza for this episode is 113 percent of exports (only 60 percent of the average capital flow bonanza in the earlier episode). In contrast, the average accumulated net issuance during busts in the modern episode is larger than in the earlier period of financial globalization, with accumulated issuance during the bust averaging 38 percent of exports. Interestingly, extreme busts have been less prevalent since the 1970s (only accounting for 5 percent of all cycles), suggesting better access of Latin American countries to international capital markets in bad times.

The table at the bottom of this figure tests whether the amplitude of capital flow bonanzas and busts differ across the first and second episodes of financial globalization. As shown in this table, the null hypothesis of equal bonanzas in the first and second episodes of financial globalization can be rejected with a p-value of 0.01. On average, bonanzas in the first episode of financial globalization were 72 percent larger than those during the second episode of financial globalization (194 percent of exports in the first

²⁵ See Kaminsky and Vega-García (2016) for a detailed analysis of the sovereign debt crises in Latin America during the first episode of financial globalization.

episode versus 113 percent of exports in the second episode). In contrast, the average accumulated net issuance during busts in the second episode of financial globalization was about 50 percent larger than during the first episode of financial globalization (25 percent of exports during the first episode versus 38 percent during the second episode). The null hypothesis of equality of busts across the two episodes can be rejected at a p-value of 0.09. These results indicate that bonanzas and bust are less pronounced in modern times.

C. Identifying Rare Disasters

The 2007-2009 U.S. Subprime Crisis, now labeled “The Global Financial Crisis” has brought to the attention the role of fragilities in the financial center on economic and financial stability around the world. It also brought to the attention the unusual financial conditions predating this crisis.²⁶ Still, it is hard to draw conclusions from just one crisis in the financial center. As I discussed in the introduction, since crises in the financial center are *rare disasters*, we can only examine the role these crises on capital flows around the world using a far longer sample. This is the advantage of examining not just the second episode of financial globalization starting in the early 1970s but also the first episode of financial globalization starting in 1820. Importantly, not all crises in the financial center are the same. Some crises are preceded by extreme bonanzas and when these crises finally erupt, they disrupt the operation of the financial system and affect dramatically the health of the economy. Other crises are minor ones and they do not severely affect the functioning of the financial sector and the economy. It is only the most extreme crises in the financial center the ones that spread around the world: while the 2007-2009 U.S. Subprime Crisis became to be known as the *Global Financial Crisis*, affecting countries around the world, the 1988 U.S. Bank Crisis, just became to be known as the *Savings and Loan Crisis* and was identified by Laeven and Valencia (2018) as a borderline case. To identify disruptive crises in the financial center, such as the 2007-2009 Subprime U.S. crisis, from non-disruptive ones, I will use as a yardstick the extent of adverse spillovers to the rest of the world as captured with the number of banking, currency, and sovereign debt crises in the periphery in the aftermath of each crisis in the financial center.

The most well-known historical chronologies of crises identify the following crises in financial centers during the first episode of financial globalization:²⁷ London 1825, London 1836-1838, London 1847, London 1857, London 1866, Austria and Germany 1873, London 1890, and the New York and London Stock Market Crashes 1929. For the second episode of financial globalization, the focus is on the United States,

²⁶ See for example, Acharya and Schnabl (2010), Adrian, Colla, and Shin (2013), and Borio and Disyatat (2011) for an in-depth analysis of the remarkable financial capital flow bonanza predating this crisis.

²⁷ See, for example, Bordo and Murshid (1999), Kindleberger (1978), and Marichal (1989).

the now undisputed financial capital of the world. There are three financial crises in the United States in the most recent episode of financial globalization: The 1981-1983 U.S. Large Commercial Banks Crisis,²⁸ the 1988 U.S. Banking Crisis, and the 2007-2009 U.S. Subprime Crisis. To identify which of these crises in the financial center can be classified as *Rare Disasters*, I use the Reinhart, Reinhart, Rogoff, and Trebesch (2016) database on crises. This database identifies years of banking, currency, and sovereign debt crises for 70 countries from 1800 to 2016. I also checked this database with the crises identified in Baron, Verner, and Xiong (2020), Bernanke and James (1991), Bordo and Eichengreen (1999), Bordo and Murshid (1999), Caprio and Klingebiel (2003), and Laeven and Valencia (2018). Using these databases, I construct an index of World Financial Fragility as the average of banking crises (b), currency crises (c), and sovereign debt crises (sd) across all countries.²⁹ Since the number of countries has changed since 1800 because of partitions, I normalize the index by the number of countries in each year. As estimated, the maximum value for the index is 3: when all the existing countries in a particular year have banking, currency, and sovereign debt crises.

$$\text{World Financial Fragility Index}_t = \frac{\sum_{i=1}^{N_t} [b_t^i + c_t^i + sd_t^i]}{N_t}. \quad (3)$$

Figure 5 shows the evolution of the World Financial Fragility Index. I identify crises in the financial center as rare disasters if the index of world financial fragility more than doubles in the aftermath of the panic in the financial center. The index clearly identifies 6 global crises, those erupting in the following years: 1825, 1873, 1890, 1929, 1981-1983, and 2007-2009. The crisis in London in 1825 fuels an increase in fragility from 0.1 in 1824 to 0.7 in 1828. The crisis in 1873 initially erupting in Austria and Germany fuels an increase in fragility from 0.2 in 1872 to 0.5 in 1877. The Baring Crisis in London in 1890 fuels an increase in the fragility index from 0.2 in 1889 to 0.5 in 1891, and the London and New York crisis in 1929 fuels an increase in fragility from 0.1 in 1927 to 1.0 in 1931. Similar increases in fragility are clear for the 1981-1983 U.S. Large Commercial Bank Crisis and the U.S. Subprime Crisis in 2007-2009 with the index of world financial fragility increasing from 0.3 in 1980 to 1.0 in 1989 and from 0.1 in 2006 to 0.7 in 2008.³⁰

²⁸ See, Kyle and Sachs (1984), Sachs (1986) and Sachs and Huizinga (1987) for a detailed analysis of the US financial crisis in the early 1980s, with the largest commercial banks at the core of the financial fragilities.

²⁹ Where b_t^i , c_t^i , or sd_t^i is equal to 1 when country i in period t has a banking, currency, or sovereign debt crisis and zero otherwise.

³⁰ Importantly, there are two other episodes with the index more than doubling. Both episodes are related to World War I. The 1914 crisis did not spread from the core to the periphery but occurred simultaneously as investors in the belligerent countries liquidated foreign assets. The increase in crises in 1920-1921 just reflected devaluations in the periphery to offset the effect of inflation during WWI. Importantly, these two episodes occurred amid capital controls around the world and overall restrictions on foreign commercial transactions.

As described in Table 1, all these crises were preceded by bonanzas in financial markets and followed by crashes in their aftermath. This table also describes in detail the background and the mechanism of the transmission of these crises.

D. Systemic and Idiosyncratic Bonanzas and Busts: Then and Now

Figure 6 studies jointly all capital flow cycles (during both the first and second episodes of financial globalization) and examines whether the characteristics of *Systemic* and *Idiosyncratic Cycles* change over time. The first episode of financial globalization witnessed four major crises in the financial center: 1825, 1873, 1890, and 1929. These crises were preceded by extreme capital flow bonanzas. The average bonanza in Latin America preceding panics in the financial centers was 226 percent of exports while the average bonanza unrelated to these global panics was only 142 percent of exports. As shown in Figure 6, the null hypothesis of equality of *Systemic* and *Idiosyncratic bonanzas* during the first episode of financial globalization can be rejected with a p-value of 0.06. The estimates for the cycles in the second episode of financial globalization paint a completely different picture of capital flow bonanzas. The average capital flow bonanza in Latin America preceding the financial crises in the United States in the early 1980s and in 2007-2008 only reached 111 percent of exports. This is very close to the bonanzas in tranquil times, which average 115 percent of exports. In fact, the null hypothesis of equality of *Systemic* and *Idiosyncratic Bonanzas* during the second episode of financial globalization cannot be rejected at any conventional significance level (p-value of 0.44).

Figure 6 also examines the characteristics of issuance during busts. During the first episode of financial globalization, countries had less access to international capital markets in the aftermath of a panic in the financial center when compared to idiosyncratic busts. Following panics in the financial center, Latin American countries could not access international capital markets, with average issuance during the bust only reaching 19 percent of exports. In contrast, international liquidity in the aftermath of idiosyncratic crises was 85 percent higher than that of systemic crises, with average issuance during idiosyncratic busts reaching 35 percent of exports. The null hypothesis of equality of *Systemic* and *Idiosyncratic Busts* during the first episode of financial globalization can be rejected at a 0.10 confidence level. In sharp contrast to the evidence during the first episode of financial globalization, during the second episode of financial globalization, access to international liquidity in the Latin American periphery following crises in the financial center was almost four times the issuance during idiosyncratic busts. Issuance during busts amid crises in the financial center averaged 59 percent of exports while it was only 15 percent of exports in

tranquil times. The hypothesis of equality of issuance during *Systemic* and *Idiosyncratic Busts* can be rejected at conventional significance levels (p-value of 0.00).

There may be many drivers of changes in participation of Latin American countries in international capital markets. However, many have argued that monetary policy cycles in the financial center since the restart of financial globalization in the 1970s have been at the core of dramatic booms and busts in capital flows to emerging markets. In contrast, the evidence presented in Figures 4 and 6 for the two episodes of financial globalization indicates that capital flow cycles, particularly systemic cycles, have become far less pronounced since the restart of financial globalization in the 1970s. This evidence suggests that we need to re-evaluate the role of monetary policy in the financial center.

IV. What Fuels Capital Flow Cycles?

The previous section showed that capital flow cycles changed over time. Systemic capital flow bonanzas in Latin America became much less pronounced and less distinguishable from idiosyncratic booms. Busts also changed, with Latin American countries being able to tap international capital markets more often in the aftermath of crises in the financial center. What is driving these differences? Is it country-specific economic conditions? Or global factors? This section examines the drivers of these differences. First, it examines the evolution of pull and push factors using event studies around the time of the peak of capital flow cycles in Latin American countries. Second, it studies and tests the time-varying characteristics of monetary policy in the financial center during the first and second episodes of financial globalization.

A. Event Studies

To shed light on whether capital flow cycles may have different origins in the first and second episodes of financial globalization or during episodes with or without crises in the financial center, I examine these episodes separately. To capture country-specific shocks, the “pull factors,” I use two indicators: exports and terms of trade. Since Latin American countries started tapping international capital markets in the early 19th century and the official data on GDP only starts later in the 20th century, I capture economic activity using exports. To capture the “push factors,” I use indicators of global liquidity and world economic activity. As is traditional in this literature, I capture cycles of global liquidity with interest rates in the financial center. I use the bank rate in the United Kingdom for the first episode of financial globalization and the U.S. federal funds rate for the second episode of financial globalization. To capture global shocks to growth, I construct a series of world imports, which I capture with total imports of the financial centers of each episode. For the first episode, I use the imports of France, the United Kingdom,

and the United States. For the second episode, I use the imports of Germany, the United Kingdom, and the United States.³¹

Figure 7 shows four columns with three panels each. The first two columns to the left show the behavior of all the indicators during the first episode of financial globalization, while the next two columns to the right show the behavior of all the indicators during the second episode of financial globalization. For each episode of globalization, this figure shows the evolution of all the indicators separately for idiosyncratic and systemic capital flow cycles. Each column in Figure 7 shows three panels capturing both capital flow cycles as well as the evolution of country-specific factors (the “pull factors”) as captured by the growth rates of (real) exports and the growth rate of the terms of trade.³² I look at the behavior of each indicator for an interval of 10 years around the year of the peak in capital flows in each country (t). In each panel, the solid line represents the average behavior of each indicator across all cycles while the dotted lines denote plus/minus one-standard-error bands around the average. For all variables, the vertical axis in each figure records the percentage-point difference between the value of each indicator each year relative to its sample mean.

For the first episode of financial globalization, the top two panels in Figure 7 show, as discussed before, that capital flow cycles are far more pronounced in the episodes around a crisis in the financial center. During systemic episodes, the average capital flow cycle peaks at 93 percent of exports while it only reaches about 38 percent of exports during idiosyncratic episodes. The middle two panels show the behavior of the growth rate of exports. Although both idiosyncratic and systemic capital flow bonanzas are accompanied by export growth, the export boom is substantially larger during idiosyncratic bonanzas. Importantly, the economies in Latin America collapse after crises in the financial center, with the growth rate of exports declining to about 5 percentage points below its sample mean. In contrast, there is no collapse in the growth rate of exports in the aftermath of idiosyncratic capital flow bonanzas, with the growth rate of exports during the capital flows busts being mostly the same as that of the growth rate over the entire episode. The bottom two panels show the terms-of-trade growth rate. Although both idiosyncratic and systemic bonanzas are accompanied by an improvement in the terms-of-trade of the borrowing countries, the terms-of-trade boom is more pronounced during systemic cycles, with the growth

³¹ The evolution of the pull and push factors during the first and second episode of financial globalization are shown in Appendix Figures 2 and 3. The data-sources of these indicators are also shown in the Appendix.

³² For the first episode of financial globalization, I estimate real exports by deflating exports in British pounds with the U.K. price index. For the second episode of financial globalization, I deflate exports in U.S. dollars with the U.S. price index. Since exports and terms of trade are quite volatile, I estimate the growth rates of trend real exports and the growth rates of trend terms of trade. The trend is estimated with the Hodrick-Prescott filter with lambda set to 6.25.

rate peaking at 2 percentage points above its sample mean. As with exports, the growth rate of the terms-of-trade collapses during the bust in capital flows during systemic episodes, with growth rates declining by 4 percentage points from peak to trough. In contrast, the fluctuations in the terms-of-trade growth rate around idiosyncratic capital flow cycles are far less pronounced, only declining by about 2 percentage points.

The right two columns in Figure 7 show the behavior of international issuance, exports, and the terms of trade during the second episode of financial globalization. During this episode, the issuance cycles around crises in the financial center are very similar to those of an idiosyncratic nature with peaks reaching about 30 percent of exports. Interestingly, while capital flows in systemic episodes are not as volatile as those in the first episode of financial globalization, booms and busts of economic fundamentals continue to be quite pronounced with protracted downturns in the aftermath of panics in the financial center. For example, as shown in the right middle panel, the growth rate of exports declines from about 5 percentage points at the onset of the capital flow bonanzas to -7 percentage points during the bust. Similarly, the terms-of-trade growth rate declines about 8 percentage points from the peak of the boom to the trough of the bust. In contrast, during idiosyncratic capital flow cycles, export and terms of trade growth rates, after a short decline, recover during the bust in capital flows. Importantly, the evidence in Figure 7 suggests that there is a disconnect between real cycles and financial cycles during systemic episodes in the second episode of financial globalization, with subdued capital flow cycles being accompanied by extremely pronounced real cycles.

Figure 8 shows the evolution of three global factors (“push factors”) around the time of the peak in capital flow cycles in Latin America. The first two panels show two indicators of global liquidity. The first measure examines the evolution of the interest rate in the financial center relative to its average over the sample.³³ The second measure captures the aggressiveness and persistence of changes in monetary policy by estimating the 3-year average percent change in interest rates over the capital flow cycle. The last panels show the state of the world economy as captured by the growth rate of real imports of the financial centers relative to its average change over the sample.³⁴

³³ Since any meaningful measures of expectations of inflation for the first episode of financial globalization are difficult to come by, I use nominal interest rates to capture changes in monetary policy during both episodes of financial globalization. The results are mostly unchanged when I use the real interest rate for the second episode of financial globalization.

³⁴ Again, as with exports, I estimate the growth rate of the trend of real imports. The trend is estimated with the Hodrick-Prescott filter with lambda set to 6.25.

The first two columns show the evidence for the first episode of financial globalization, with the evidence from the top four panels indicating that the interest rate in the U.K. around the peak of capital flow cycles is not very different from the average during the sample. Naturally, during the Gold Standard period, the Bank of England had less room to conduct cyclical monetary policy or to become the lender of last resort. The bottom panels capture economic activity in the financial centers. Again, as in Latin America, the fluctuations in economic activity in the financial centers are far more pronounced when the center itself is in crisis, with growth rates declining by almost 5 percentage points between booms and busts in these episodes. In contrast, idiosyncratic capital flow cycles in Latin America are accompanied by continuous growth in the world economy above the average world growth rate over the first episode of financial globalization.

The second episode of financial globalization (in the right two columns) presents a different picture of monetary policy in the financial center during systemic and idiosyncratic capital flow cycles. As shown in the top two panels, interest rate fluctuations in the United States in episodes with no crisis in the financial center are quite small and not statistically different from their average during the sample. In contrast, interest rate policy is more volatile at the onset of the U.S. Large Commercial Banks crisis in the 1980s and the Subprime crisis in the 2000s. The tightening in monetary policy in the late 1970s and early 1980s triggered an 11-percentage-points increase in the Federal Funds rate (from 5 percent in 1976 to 16 percent in 1981),³⁵ with the monetary policy contraction in the mid-2000s fueling an increase in the Federal Reserve interest rates from about 1 percent in 2003 to 5 percent in 2007. Importantly, following the onset of these two crises in the financial center, interest rates were sharply reduced, with interest rates during the U.S. Large Commercial Bank crisis in the 1980s declining from 16 percent in 1981 to 7 percent in 1986 and interest rates during the U.S. Subprime crisis declining from 5 percent in 2007 to a range of 0-0.25 percent (using the effective federal funds rate) and to -2.75 percent (using the Wu-Xia shadow federal funds rate).³⁶ The sharp increases in interest rates in the years preceding financial crises in the United

³⁵ Importantly, the U.S. sharp contraction in monetary policy in 1979 was not targeted to slow down the ongoing U.S. Large Commercial Banks boom in international lending but it was geared to reduce the pervasive high inflation in the United States. Still, this tightening in monetary policy also opened up the prospect of a major world financial crisis. With all international borrowing consisting of syndicated loans with floating interest rates, the hike in short term interest rates instantaneously increased the cost of foreign borrowing. Foreign debt became non-sustainable and developing countries began to default, starting with Mexico in October 1982. As Large Commercial Banks carried large amounts of LDC assets, amounting to more than 100% of total book value (see, Sachs, 1986), the LDC Debt Crisis in turn threatened the solvency of these banks.

³⁶ The estimations in Figure 8 report the evidence using the effective U.S. federal funds interest rate. I also estimated monetary policy changes using the combined federal funds interest rate: the effective federal funds interest rate for the 1970-2009 period and the shadow federal funds interest rate for 2010-2015. The results with the combined interest rate are similar to those just using the effective federal funds interest rate.

States seem to cut short the booms in international issuance while the extremely easy monetary policy in the years following the crisis in the financial center seems to be linked to a far milder collapse in international capital flows. In contrast, global economic activity volatility in the second episode of financial globalization continues to be as pronounced around panics in the financial center as it is during the first episode of financial globalization, with the growth rate of world imports declining about 5 percentage points from peak to trough during the second episode of financial globalization.

B. Monetary Policy in the Financial Centers: Then and Now

This section examines in further detail the time-varying characteristics of monetary policy in the financial center in the two episodes of financial globalization. Again, I capture monetary policy in the financial center with the U.K. bank interest rate during the first episode of financial globalization and the U.S. federal funds interest rate during the second episode of financial globalization.

Table 2 shows the interest rate fluctuations around times of panics in the financial center in the two episodes of financial globalization and compares them to the average fluctuations of each of the episodes. The top panel shows two measures of volatility of interest rates: the standard deviation and the coefficient of variation. The clear message of this panel is that interest-rate volatility during the first episode of financial globalization did not change during crises in the financial center. This is not the case since the 1970s. In this episode, interest-rate volatility during crises in the financial center increased about 25 percent, suggesting more drastic changes in monetary policy when the financial center is in distress.

The top panel in Table 2 only examines annual fluctuations in interest rates. However, around times of financial panics, annual changes in interest rates can become not only far more pronounced but also highly protracted. To evaluate the extent of the range and persistence of interest rate changes around panics in the financial center, the bottom panel compares average percent changes of interest rates over 5-year intervals, both for crisis times and for the whole sample. As shown in the first two columns, panics are predated by interest rate hikes to rein in the credit booms preceding the crises and are followed by interest rate cuts to inject liquidity after the panic in both episodes of financial globalization. But are these changes unusual? To examine whether the changes in monetary policy around a panic in the financial center are more drastic and protracted than in normal times, I estimate an annual series of 5-year changes in interest rates over the whole sample. I then divide these 5-year changes into two series: one with only positive 5-year changes and the other with just negative 5-year changes. The average of the positive and negative strings over the whole sample are reported in columns 3 and 4. Columns 5 and 6 show the p-values of testing the null hypothesis of equality of these positive (negative) 5-year average changes in crisis

times and those positive (negative) 5-year average changes over the whole sample with the alternative hypothesis that hikes (cuts) in interest rates predating (following) the panic are on average larger than the ones over the whole sample.³⁷ Interestingly, as shown by the p-values, during the first episode of financial globalization, hikes (cuts) of interest rates around the onset of a crisis in the financial center are not statistically different from the positive (negative) changes over the whole sample. In contrast, during the second episode of financial globalization, hikes preceding crises are on average 2.7 times larger than the average hike during the whole sample, with the null hypothesis rejected at all conventional significance levels. Again, during the second episode of financial globalization, cuts in interest rates in the aftermath of crises are on average 1.8 times larger than the average decline during the whole sample, with the null hypothesis rejected at all conventional significance levels.

V. Monetary Policy in the Financial Center and Capital Flows to the Periphery

The estimations in Section IV show that during the second episode of financial globalization, changes in monetary policy around times of panics in the financial center were far more pronounced and persistent than those during tranquil times. The question now is whether this policy can explain the stabilization of international capital flow cycles around panics in the financial center since the collapse of the Bretton Woods System.

I examine the role of monetary policy on bonanzas and busts to the periphery using two approaches. First, I use panel regressions to capture the effect of monetary policy in the financial center on the amplitude of bonanzas and busts. Second, I use Jordà (2005) Local Projections together with Ramey and Zubairy (2018) modifications allowing for state-dependent effects, to capture the role of shocks to monetary policy in the financial center on capital flows to Latin American countries in the short- and the long-run.

V.A Panel Estimations

To quantify the time-varying role of monetary policy in the financial center on the amplitude of capital-flow bonanzas and busts in the periphery, I estimate the following regression separately for bonanzas and busts.

$$B_i = \alpha^1(\Delta r_i \times I_i^{fe} \times I_i^{sc}) + \alpha^2(\Delta r_i \times I_i^{fe} \times I_i^{ic}) + \alpha^3(\Delta r_i \times I_i^{se} \times I_i^{sc}) + \alpha^4(\Delta r_i \times I_i^{se} \times I_i^{ic}) + \sum_{j=1}^k \beta^j X_i^j + \varepsilon^i \quad (4)$$

³⁷ Since by construction these series are serially correlated and as shown in Table 3 they are heteroscedastic, the t-statistic and p-value have to be made robust to serial correlation and heteroscedasticity using HAC standard errors.

Where B is alternatively the amplitude of bonanzas and busts (share of exports) shown in Figure 6. Since changes in interest rates are persistent amid panics in the financial center during the second episode of financial globalization (as seen in Figure 8), I examine the effect of three-year changes in the financial center interest rate (Δr_i) before (after) the peaks of issuance cycles in the periphery. I use dummy variables to capture the time-varying effects of monetary policy. I^{fe} (I^{se}) is equal to one during the *first episode (second episode) of financial globalization* and zero otherwise. I^{sc} (I^{ic}) is equal to one during *systemic capital flow cycles (idiosyncratic capital flow cycles)* and zero otherwise. The regression in (4) also controls for other factors (X^j) that include the growth rate of: real exports, terms of trade, and real-world imports.

The results are shown in Table 3. Since there are just 56 cycles, I use a more parsimonious model. Since during the first episode of financial globalization monetary policy effects do not vary across episodes of systemic and idiosyncratic cycles, I just report the effect of monetary policy jointly for systemic and idiosyncratic cycles. Also, the final regressions in this table only include the push-pull variables that are statistically significant. The estimates in Table 3 indicate that monetary policy in the financial center during the Gold Standard of the 19th and early 20th centuries could not mitigate bonanzas nor inject liquidity in times of busts. In contrast without the constraints imposed by the Gold Standard on monetary policy, far more drastic and protracted tightening (easing) in monetary policy in times of panics in the financial center smooths capital flow cycles to the periphery. The estimates indicate that the effects of monetary policy in those times are not only statistically significant but also economically significant: Monetary policy tightening and easing in times of crisis in the financial center during the second episode of financial globalization (captured by a one-standard deviation of the three-year change rate in the Federal Reserve interest rate) can explain on average about 43 percent of the decline in issuance during bonanzas and about 38 percent of the increase in issuance during busts.

V.B Local Projections

I use Jordà (2005) Local Projections methodology together with the Ramey and Zubairy (2018) modifications to examine the effects of shocks to monetary policy in the financial center on capital flows to Latin American countries allowing for state-dependent effects. Again, I examine whether the effects of monetary shocks in the financial center on capital flows to the periphery vary across episodes of *Systemic Capital Flow Cycles* (those cycles around crises in the financial center) and episodes of *Idiosyncratic Capital Flow Cycles* (those cycles during tranquil times in the financial center). I examine separately the first and second episode of financial globalization to allow for different monetary policies in the financial center

under the Gold Standard (during the first episode of financial globalization) and under floating exchange rates since the collapse of the Bretton Woods System. The results indicate that the countercyclical monetary policy in the financial center during the second episode of financial globalization mitigates the size of capital flows to the periphery but only in times around crises in the financial center.

I estimate the following panel model at different horizons: $h = 0, 1, 2, \dots, 5$ (years).

$$y_{t+h}^j = I_{t-1}^{sc} [\alpha_h^{sc} + \beta_h^{sc}(L)y_{t-1}^j + \gamma_h^{sc}r_t] + I_{t-1}^{ic} [\alpha_h^{ic} + \beta_h^{ic}(L)y_{t-1}^j + \gamma_h^{ic}r_t] + \theta_h(L)X_t + \varepsilon_{t+h}^j \quad (5)$$

where y^j is international gross primary issuance (as a share of exports) of country j , $\beta_h(L)$ and $\theta_h(L)$ are polynomials in the lag operator, X is a vector of control variables, and r_t is the shock in the financial center as captured by the interest rate in Great Britain during the first episode of financial globalization and the interest rate in the United States during the second episode of financial globalization). The coefficient γ_h gives the response of international gross primary issuance (as a share of exports) at time $t + h$ to a shock to the interest rate in the financial center at time t . I allow all the coefficients of the model to vary between systemic (sc) and idiosyncratic (ic) capital flow cycles. I^{sc} (I^{ic}) is a dummy variable that indicates the state of the economy when the monetary shock hits and it is equal to 1 during systemic (idiosyncratic) capital flow cycles and zero otherwise. The model in (5) is estimated separately for bonanzas (busts) during the first and second episode of financial globalization.

The results are shown in Figure 9. The four panels show the local projections during the first and second episodes of financial globalization. The left (right) panels show the responses to a tightening (easing) in monetary policy in the financial center during capital flow bonanzas (busts) in the periphery. The blue line shows the responses during *Systemic Capital Flow Cycles* (those around panics in the financial center) while the red line shows the responses during *Idiosyncratic Capital Flow Cycles* (those during tranquil times in the financial center).

The top two panels show the local projections during the first episode of financial globalization when monetary policy in the financial center is constrained by the adherence to the Gold Standard. These two panels indicate that during the Gold Standard, monetary policy in the financial center did not affect issuance during bonanzas nor did it during busts in either systemic or idiosyncratic capital flow cycles. The bottom two panels show the local projections during the second episode of financial globalization. In contrast to the Gold Standard period, monetary policy since the collapse of the Bretton Woods System becomes countercyclical and as shown in Table 2 far more pronounced in times of crises in the financial center. It is in these episodes, that tightenings and easings in the financial center reduce the magnitude of the systemic boom-bust cycles. The results are not only statistically significant at the 95% confidence level,

but they are also economically significant. For example, a one-standard-deviation tightening (easing) shock to interest rates leads to a persistent decline (increase) of capital flows (as a share of exports) peaking at 8 (10) percent of exports.³⁸

VI. Conclusions

Boom-bust cycles in international capital flows are hardy perennials. Financial globalization first erupted in the aftermath of the Napoleonic wars with London at its center. The next 120 years were witnesses to a massive expansion of financial flows to every corner of the globe not just from London but also from Paris, Frankfurt, Berlin, and New York, the new financial capitals of the world. Financial globalization collapsed in the aftermath of the Great Depression when countries around the world erected barriers to international capital flows. It took about 40 years for capital flows to restart. The collapse of the Bretton Woods System heralded the restart of financial globalization. With floating exchange rates, countries could regain monetary autonomy without resorting to capital account controls. Barriers to capital flows began to be dismantled first in the financial centers and then in the periphery. Financial globalization erupted again and so did boom-bust cycles in international capital flows.

The restart of financial globalization in the 1970s fueled a surge in research on capital flows. Some of the most studied topics examine the determinants of booms and busts as well as whether cycles are excessive and fuel financial crises. This paper contributes to this literature with an important twist. It examines capital flow cycles since the restart of financial globalization in the 1970s and compares these cycles with those of the first episode of financial globalization. The new database I constructed allows me to study two very prominent and debated topics in international finance: the role of monetary policy and financial panics in the financial center on capital flow cycles to the periphery. This paper also forms part of a new area of research on cycles of government indebtedness and banking credit booms spanning two centuries.³⁹

While the analysis of capital flows using a larger sample of countries is clearly necessary,⁴⁰ the evidence from Latin America for the two episodes of financial globalization strongly indicates that capital flow bonanzas to the emerging periphery have been far less pronounced since the 1970s than those observed during the first episode of financial globalization. Moreover, it is not just about booms. Sudden

³⁸

³⁹ See, for example, Reinhart and Rogoff (2011), and Schularick and Taylor (2013).

⁴⁰ I am finalizing the data on issuance and macro-economic indicators for about twenty other major international borrower countries for the first episode of financial globalization to compare the cycles of capital flows then and now.

stops were also more dramatic during the first episode of financial globalization, with countries around the world losing complete access to international capital markets for many years. At the core of these differences are the systemic boom-bust capital flow cycles to the emerging periphery as defined as those cycles that coincide with crises in the financial center. In contrast, idiosyncratic boom-bust cycles to the emerging periphery are similar across the two eras of financial globalization. The question is what drives these changes in the characteristics of systemic capital flow cycles. The evidence presented above indicates that the change in the monetary regime in the financial centers is at the core of these changes. Without the constraints of the adherence to the Gold Standard, monetary policy in the financial center became not only cyclical but also time-varying, with far more marked shifts implemented amid economic and financial distress in the financial center. For example, the change in the U.S. monetary policy in the late 1970s and early 1980s was not only preceded by high inflation but also by a boom in international lending with U.S. commercial banks at its core. In this environment, the sharp hikes in interest rates in the United States wreaked havoc in international capital markets as basically all international lending at that time was contracted at a floating interest rate. Many debtor countries were forced to reschedule their debts with the commercial bank creditors, substantially damaging banks' balance sheets. With banks' exposure to the developing countries significantly exceeding the banks' total capital, the odds of a major world financial crisis increased. To avoid a full-blown crisis, monetary and regulatory policies were implemented to keep debtor countries servicing their debts to the commercial banks in the financial centers. Interest rates were sharply reduced, commercial banks involuntary lending policies to debtor countries were introduced, and lax prudential standards were applied to banks heavily exposed to developing countries to allow them to carry those loans at book value even when they were heavily discounted in the secondary markets. Similar drastic policy measures were also implemented before and after the U.S. Subprime crisis: the federal funds rate was increased from 1 percent to 5 percent in the mid-2000s and was rapidly reduced to 0-0.25 percent following the onset of the crisis. This crisis also triggered an unprecedented expansion of the U.S. money base. These policies cut short international capital flow bonanzas and substantially increase international liquidity during the busts in international capital flows following the crisis in the financial center.

Importantly, even with the plethora of policies implemented to stabilize financial markets before and after a crisis in the financial center, recessions in the financial centers and the emerging periphery (as captured in Figures 7 and 8) are as pronounced now as they were during the first episode of financial globalization. Many suggest that at the core of dramatic economic slowdowns in the aftermath of a panic in the financial center during the Gold Standard episode was the inability of central banks to be a lender of

last resort and use monetary policy as a stabilizing tool. But is the movement to cyclical monetary policy and the persistent injection of liquidity in the aftermath of a crisis in the financial center since the 1970s too much of a good thing? Does this increase in leverage in the financial center contribute to its economic slowdown in the aftermath of financial distress? The debate is still ongoing, with both supporters and detractors of these policies. But what about the emerging periphery? During the first episode of financial globalization, the end of the systemic capital flow bonanzas to the emerging periphery was followed by waves of defaults. Many argue that these defaults, amid a collapse in international liquidity, were at the core of the sharp slowdown in economic activity of the debtor countries. Since the restart of globalization in the 1970s, the experiences in the emerging periphery are diverse. Still, a common thread is the increase of leverage in the aftermath of distress in the financial center. While the bonanzas of the 1970s and early 1980s were followed by early defaults in the periphery, continuous renegotiations and banks' involuntary lending avoided debt forgiveness for about a decade, with leverage in the periphery increasing substantially in the 1980s. Many argue these lingering renegotiations and injections of liquidity for the debtor countries to be current on interest payments were at the core of the lost decade in Latin America. The experience in the aftermath of the Subprime crisis was different. Developing countries did not default and continued tapping international capital markets in the aftermath of the panic in 2008, with leverage increasing in the emerging world this time around too. Was this at the core of the slowdown in the emerging periphery?⁴¹

Latin American countries are the quintessential prototype of emerging markets making the findings in this paper quite general. Still, a further analysis of a larger sample of countries including developed economies could help to untangle the route through which financial crises with the financial center at its epicenter are transmitted to the periphery during both episodes of financial globalization.

⁴¹ The seemingly lack of stabilizing characteristics of macro-policies suggested by the evidence in Figures 7 and 8 is closely related to the findings in Romer (1986a and 1986b). In those papers, Romer re-estimates the series of the U.S. industrial production and unemployment rates and finds that real cycles before and after WWII are statistically undistinguishable, putting into question the effectiveness of the post-WWII government stabilization policy on the real business cycle. I thank Maury Obstfeld for bringing to my attention the similarity of the findings.

References

- Acharya, Viral, and Philipp Schnabl, 2010, "Do Global Banks Spread Global Imbalances? Asset-Backed Commercial Paper During the Financial Crisis of 2007–09," *IMF Economic Review*, 58, 37–73.
- Adrian, Tobias, Paolo Colla, and Hyun Song Shin, 2013, "Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007 to 2009, in NBER Macroeconomics Annual, 27(1), 159-214.
- Avdjiev, Stefan, Bryan Hardy, Şebnem Kalemli-Özcan, Luis Servén, 2018, "Gross Capital Flows by Banks, Corporates, and Sovereigns, University of Maryland Working Paper.
- Baron, Matthew, Emil Verner, and Wei Xiong, 2020, "Banking Crises Without Panics," NBER Working Papers 26908, National Bureau of Economic Research, Inc.
- Bernanke, Ben and Harold James, 1991, "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison," in *Financial Markets and Financial Crises* Volume Glenn Hubbard (ed), University of Chicago Press, 33 – 68.
- Bordo, Michael, and Antu Murshid, 1999, "The International Transmission of Financial Crises before World War II: Was there Contagion?" Prepared for UNU/WIDER conference on Financial Contagion Helsinki, mimeo.
- Bordo, Michael and Barry Eichengreen, 1999, "Is Our Current International Economic Environment Unusually Crisis Prone?" in Luke Gower and David Gruen (eds), *Capital Flows and the International Financial System*, Sydney: Reserve Bank of Australia, 18-75.
- Borio, Claudio, and Piti Disyatat, "Global Imbalances and the Financial Crisis: Link or no Link?," BIS Working Papers 346, 2011.
- Broner, Fernando, Tatiana Didier, Aitor Erce, and Sergio Schmukler, 2013, "Gross Capital Flows: Dynamics and Crises," *Journal of Monetary Economics*, 60, 113-133.
- Bruno, Valentina, and Hyun Song Shin, 2015, "Capital Flows and the Risk-Taking Channel of Monetary Policy," *Journal of Monetary Economics*, 71, 119-132.
- Bry, Gerhard and Charlotte Boschan, 1971, *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs* (New York: Columbia University Press).
- Bussière, Matthieu, Julia Schmidt, and Natacha Valla, 2016, "International Financial Flows in the New Normal: Key Patterns (and Why We Should Care)," Policy Brief CEPII No. 10.
- Calvo, Guillermo, Leonardo Leiderman, and Carmen Reinhart, 1993, "Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors," *International Monetary Fund Staff Papers*, 40, 108-151.
- Caprio, Gerard and Daniela Klingebiel, 2003, Episodes of Systemic and Borderline Financial Crises. In: Klingebiel, Ed., *The World Bank*, Washington DC.
- Cerutti, Eugenio, Galina Hale, and Camelia Minoiu, 2015, "Financial Crises and the Composition of Cross-Border Lending," *Journal of International Money and Finance*, 52, 60-81.
- Cerutti, Eugenio, Stijn Claessens, and Andrew Rose, 2017, "How Important is the Global Financial Cycle: Evidence from Capital Flows," IMF Working Paper 17/193.
- Fernández-Arias, Eduardo, 1996, "The New Wave of Private Capital Inflows: Push or Pull?" *Journal of Development Economics*, 48, 389-418
- Forbes, Kristin and Francis Warnock, 2012, "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment," *Journal of International Economics*, 88, 235-251.
- Fostel, Ana and Graciela Kaminsky, 2008, "Latin America's Access to International Capital Markets: Good Behavior or Global Liquidity?" in Kevin Cowan, Sebastian Edwards, Rodrigo Valdés, Norman Loayza, and Klaus Schmidt-Hebbel (eds) *Current Account and External Financing*, Chapter 4, 117-158, Central Bank of Chile.

- Ghosh, Atish, Mahvash Qureshi, Jun Kim, and Juan Zalduendo, 2014, "Surges," *Journal of International Economics*, 92, 266-285.
- Jorgensen, Erika, and Jeffrey Sachs, 1989, "Default and Renegotiation of Latin American Foreign bonds in the Interwar Period, in Barry Eichengreen and Peter Lindert, eds, *A Long Run Perspective on the Debt Crisis* (Cambridge: MIT Press).
- Harding, Don, and Adrian Pagan, 2002, "Dissecting the Cycle: A Methodological Investigation," *Journal of Monetary Economics*, 49, 365-381.
- International Monetary Fund, 2016, *World Economic Outlook*, Chapter 2: Understanding the Slowdown in Capital Flows to Emerging Markets, 63-99.
- Jordà, Òscar, 2005, "Estimation and Inference of Impulse Responses by Local Projections," *American Economic Review*, 95, 161-182.
- Kalemli-Özcan, Şebnem, 2019, "U.S. Monetary Policy and International Risk Spillovers," Jackson Hole Economic Policy Symposium, Federal Reserve Bank of Kansas City, August 23-25.
- Kaminsky, Graciela, and Sergio Schmukler, 2008, "Short-Run Pain, Long-Run Gain: Financial Liberalization and Stock Market Cycles," *Review of Finance*, 12, 253-292.
- Kaminsky, Graciela and Pablo Vega-García, 2016, "Systemic and Idiosyncratic Sovereign Debt Crises" *Journal of the European Economic Association*, 14, 80-114.
- Kindleberger, Charles, 1978, *Manias, Panics, and Crashes: A History of Financial Crises*, New York, (Basic Books).
- Kyle, Steven and Jeffrey Sachs, 1984, "Developing Country Debt and the Market Value of Large Commercial Banks," NBER, Working Paper No. 1470.
- Laeven, Luc and Fabián Valencia, 2018, "Systemic Banking Crises Revisited," International Monetary Fund, Working Paper No. 18/206.
- Marichal, Carlos, 1989, *A Century of Debt Crises in Latin America* (New Jersey: Princeton University Press.
- Milesi-Ferretti, Gian Maria, and Cédric Tille, 2010, "The Great Retrenchment: International Capital Flows during the Global Financial Crisis," *Economic Policy*, 66, 285-330.
- Obstfeld, Maurice, "Does the Current Account Still Matter?," 2012, *American Economic Review: Papers & Proceedings*, 102, 1-23.
- Reinhart, Carmen and Vincent Reinhart, 2009, "Capital Flow Bonanzas: An Encompassing View of Past and Present," in Jeffrey Frankel and Christopher Pissarides, eds., *NBER Book Series NBER International Seminar on Macroeconomics* (Chicago: University of Chicago Press).
- Reinhart, Carmen, Vincent Reinhart, and Christoph Trebesch, 2017, "Capital Flow Cycles: A Long, Global View," mimeo.
- Reinhart, Carmen, Vincent Reinhart, Kenneth Rogoff, and Christoph Trebesch, 2016, Global Data Crises by Country, in: <https://www.hbs.edu/behavioral-finance-and-financial-stability/data/Pages/global.aspx>
- Reinhart, Carmen and Kenneth Rogoff, 2011, "From Financial Crash to Debt Crisis." *American Economic Review*, 101 (5), 1676-1706.
- Rey, Hélène, 2015, "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence, NBER Working Paper No. 21162.
- Romer, Christina, 1986a, "Is the Stabilization of the Postwar Economy a Figment of the Data," *American Economic Review*, 76), 314-334.
- Romer, Christina, 1986b, "Spurious Volatility in Historical Unemployment Data," *Journal of Political Economy*, 94, 1-37.
- Sachs, Jeffrey, 1986, "Managing the LDC Debt Crisis," *Brookings Papers on Economic Activity*, 2, 397-431.
- Sachs, Jeffrey, and Harry Huizinga, 1987, "U.S. Commercial Banks and the Developing-Country Debt Crisis, *Brookings Papers on Economic Activity*, 2, 555-606.
- Schularick, Moritz and Alan Taylor, 2013, "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008," *American Economic Review*, Vol. 102 (2), 1029-1061.

- Stone, Irving, 1999, *The Global Export of Capital from Great Britain, 1865-1914: A Statistical Survey*, (London: Palgrave-MacMillan Press Ltd).
- Sturzenegger, Federico, and Jeromin Zettelmeyer, 2006, *Debt Defaults and Lessons from a Decade of Crises*, (Cambridge, Massachusetts: MIT Press).
- Wu, Jing and Fan Xia, 2016, "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound," *Journal of Money, Credit, and Banking*, Vol. 48 (2-3), 253-291.

Table 1
Rare Disasters: Financial Center Crises

Crisis	The Background	The Crisis: Mechanism of Transmission
1825 London Panic	The end of the Napoleonic Wars fueled a boom in global liquidity with the center in London. Government spending in Great Britain sharply declined, British bonds were converted in 1822 and 1824 at lower coupon rates, and monetary policy became expansionary, fueling a speculative mania on the London Stock Exchange. Capital flows to Continental Europe and Latin America fastly increased, with issuance of sovereign bonds reaching 41 million British pounds.	The Bank of England raised the discount rate in the Summer of 1825 fueling a stock market crash in October and a banking panic in December, and triggering bankruptcies in the financial sector in early 1826. With liquidity collapsing, the crisis spread to continental Europe and Latin America. Banks in Paris suffered large losses and banks in Berlin, Leipzig, Vienna, Bologna, and Rome collapsed. Amid a collapse of commodity prices, all Latin American countries that borrowed from London in the early 1820s defaulted starting in 1826.
1873 Vienna Stock Market Collapse	This crisis was preceded by a boom of capital flows to Asia, Europe, Latin America, Middle East, North America, and Oceania, in large part due to a boom in railroad issuance. France's gold indemnity to Prussia at the end of the 1870-1871 France-Prussia War fueled a speculative land boom in Germany and Austria.	The boom in Austria and Germany ended with a spectacular collapse of the Stock Market in Vienna in May 1873. Stock markets in Amsterdam, Berlin, and Zurich also crashed. In the U.S., a banking panic in September followed the collapse of a stock market boom in New York. The crisis also spread to Italy and Belgium. Later on, this crisis spread to London, France, and Russia. It was also transmitted to Latin America and the Middle East. Economic activity worldwide collapsed and was followed by defaults in Europe, Latin America, and the Middle East.
1890 Baring Crisis	The crisis was preceded by a major lending boom from London, Paris, Frankfurt, and Berlin in the 1880s to finance railroads and other infrastructure worldwide. Capital flows also triggered a boom in land prices.	The international crisis was fueled by the collapse of Baring Brothers on November 8, 1890. Capital flows to Latin America and the rest of the periphery contracted sharply, leading to defaults in Latin America and banking crises in Australia and the United States.
1929 London and Wall Street Stock Market Crash	The 1920s experienced a major U.S. stock market boom associated with massive investment in the inventions of the late 19th century, such as electricity, automobiles, communications, and petrochemicals. There is a great surge in productivity and a boom in economic activity. Prices of commodities surge, leading to a capital flow bonanza to Latin America.	The Federal Reserve raised the rediscount rate four times, starting in January 1928 from 3.5% to 6%. The call market dried up, with the call rate reaching 12% in 1928. London and New York stock markets crashed in 1929. A massive collapse in liquidity follows. Panics in the financial centers led to a worldwide depression, devaluations, banking crises, sovereign defaults, and ultimately the collapse of the Gold Standard.
1981-1983 U.S. Large Commercial Banks Crisis	The 1973 collapse of the Bretton Woods System with the abandonment of the fixed exchange rate regime, allowed countries to eliminate barriers to international capital flows while maintaining independent monetary policies. Financial globalization restarted, with U.S. banks expanding internationally. The easy monetary policy in the United States in the 1970s together with the increase of OPEC Countries' savings (which were channeled mainly via U.S. banks to emerging markets) triggered the first international capital flow bonanza since the Great Depression.	In October 1979, the Federal Reserve took dramatic steps to rein in the U.S. runaway inflation, with the Fed Funds interest rate increasing 10 percentage points between October 1979 and December 1980. At that time, international borrowing consisted of syndicated loans with floating interest rates based on benchmark rates such as LIBOR or the Fed Funds. Interest rates on syndicated loans skyrocketed, with external debt becoming unsustainable for many developing countries. In August 1982, Mexico announced that it would no longer be able to service its debt. Other countries quickly followed suit, with U.S. banks balance sheets deteriorating dramatically. By the end of 1982, the nine major U.S. banks' exposure to all LDC Debtor countries reached 288 percent of banks' capital. To avoid major U.S. banks' bankruptcies, the U.S. adopted a myriad of stabilizing measures and regulations while the Federal Reserve reversed the contractionary monetary implemented in 1979. U.S. Commercial Banks exposed to LDCs were allowed to keep those loans at face value even when they were traded in the secondary market at big discounts. International capital flows collapsed during the 1980s and developing countries in Africa, Asia, Eastern Europe, and Latin America defaulted and received debt relief in the early 1990s oscillating around 30 percent.
2007-2009 U.S. Subprime Crisis	Low Interest rates in the United States in the early 2000s triggered a worldwide capital flow bonanza. This bonanza in turn led to a housing bubble in the United States and European countries and a stock market boom around the world. Excessive risk-taking by global financial institutions exacerbated the financial bubble.	The Federal Reserve raised the Fed Funds interest rate from 1% in June 2004 up to 5.25% in July 2006 to restrict the credit bonanza in the U.S. housing market. The first signals of tensions in financial markets appeared in 2006 as U.S. home prices started to decline. By 2007 the tensions spread to European banks. In August 2007, the European Central Bank injected liquidity to calm the markets. The crisis deepened in September 2008 with the Lehman Brothers bankruptcy. The financial crisis also led to growing fears about public debt levels, which contributed to the sovereign debt crises that erupted in Europe in 2010

Table 2**Is Monetary Policy more Volatile during Crises in the Financial Center?**

Interest Rate Volatility	First Episode of Financial Globalization		Second Episode of Financial Globalization	
	All Sample	Crises	All Sample	Crises
Standard Deviation	1.06	0.94	3.79	4.73
Coefficient of Variation	0.27	0.26	0.69	0.83

Notes: The Standard Deviation and the Coefficient of Variation are estimated using interest rates at annual frequencies. Crisis episodes are defined as the year of the crisis in the financial center and the 10-year episode around the crisis. The years of the beginning of the crises in the financial center are 1825, 1873, 1890, and 1929 for the first episode of financial globalization and 1981 and 2007 for the second episode of financial globalization. The interest rate for the first episode of financial globalization is the U.K. bank rate and the interest rate for the second episode of financial globalization is the U.S. federal funds rate.

Are Tightenings and Easings more Prolonged and Extreme during Crises in the Financial Center?

Episodes of Financial Globalization	Average Interest Rate Changes				P-Values	
	Crises		All Sample		Crises versus all Sample	
	Before	After	Tightening	Easing	Tightening	Easing
First Episode	6.97	-4.10	6.95	-4.53	0.99	0.55
Second Episode	31.71	-22.07	11.73	-12.68	0.00	0.00

Notes: The first two columns in this table show the average percent changes in the nominal interest rate for a 5-year episode before (after) the year of the beginning of a crisis in the financial center. The years of the beginning of the crises in the financial center are 1825, 1873, 1890, and 1929 for the first episode of financial globalization and 1981 and 2007 for the second episode of financial globalization. The next two columns show the average 5-year changes in the interest rate over all the sample. I separate the episodes into Tightenings (Easings) according to whether the 5-year averages are positive or negative. The last two columns report the p-values of comparing Tightenings (Easings) during crises to Tightenings (Easings) over all the sample. The interest rate for the first episode of financial globalization is the U.K. bank rate and the interest rate for the second episode of financial globalization is the U.S. federal funds rate. Since by construction these series are serially correlated and they are also heteroscedastic, the t-statistics and p-values have to be made robust to serial correlation and heteroskedasticity using HAC standard errors.

Table 3
Monetary Policy in the Financial Center and the Time-Varying Characteristics of Bonanzas and Busts

Explanatory Variables	Bonanzas (1)	Busts (2)
Exports Growth Rate	0.09 (0.01)	-0.01 (0.32)
Monetary Policy in the Financial Center*First Episode	0.01 (0.64)	-0.01 (0.13)
Monetary Policy in the Financial Center*Second Episode*Systemic Cycle	-0.01 (0.04)	0.02 (0.03)
Monetary Policy in the Financial Center*Second Episode*Idiosyncratic Cycle	0.00 (0.89)	0.00 (0.61)
Number of Observations	56	55
R-Squared	0.11	0.15

Notes: The dependent variable in column 1 (column 2) is the amplitude of bonanzas (busts) of the fifty-six identified capital flow cycles. Monetary Policy in the Financial Center is captured with the 3-year changes in the U.K. bank interest rate for the first episode of financial globalization and the 3-year changes in the U.S. federal funds interest rate for the second episode of financial globalization. The exports growth rates are also 3-year average growth rates. Column (1) shows the effects of monetary tightening during bonanzas and column (2) shows the effects of monetary easing during the bust. First Episode (Second Episode) is a dummy variable equal to one during the first episode (second episode) of financial globalization and zero otherwise. Systemic Cycle (Idiosyncratic Cycle) is a dummy equal to one for Systemic (Idiosyncratic) Cycles and zero otherwise. P-values are in parentheses below the coefficients. P-values are estimated with White heteroskedasticity-corrected standard errors when necessary.

Figure 1
Prospectuses

BUENOS AYRES 6% STATE LOAN, 1870,

*Under the authority of the State Laws of the 17th November, 1868, and the 27th January, 1870;
and of the 15th of February, 1869 (as varied by a further Law of the 3rd September, 1869), and the 27th January, 1870,*

FOR £1,034,700 STERLING,

In Bonds to Bearer for £100, £500, and £1,000 each,

The Interest Payable Half-Yearly in London.

The Loan to be redeemed at par by Annual Drawings in about 33 years, by means of
an accumulative Sinking Fund, which however the Government reserves to itself the
right to increase, so as to redeem the Loan at an earlier period.

PRICE OF ISSUE, 88 PER CENT.

CONVERSION AND REDEMPTION
OF THE
Argentine 6 per Cent. Loans of 1871 & 1882,
AND THE
Buenos Ayres 6 per Cent. Loans of 1870 & 1873
(SINCE TAKEN OVER BY THE ARGENTINE GOVERNMENT)
AUTHORISED BY THE LAW OF THE 1ST AUGUST, 1888.

Issue of £5,263,560 Argentine Government 4½ per Cent.
Sterling Bonds.

IN BONDS OF £1000, £500, £100, AND £20.

*Being Balance of the Loan of £5,290,000, authorised by the above Law.
The 1st payment on account of the Sinking Fund having, in conformity with the Law of the 1st August, 1888,
been made to the extent of £26,440, the amount of the Loan stands reduced to £5,263,560.*

THESE Bonds will bear interest at 4½ per Cent. per Annum from the 1st April, 1889, payable Half-yearly on the 1st April and 1st October of each year, and will be redeemed at Par within 39 years by means of an accumulative Sinking Fund of 1 per Cent. per Annum, applied by Half-yearly Drawings in London in the months of June and December of each year, payable on the following 1st April and 1st October respectively. The next drawing will be in June, 1889.

The Government reserves to itself the right of augmenting the Half-yearly Redemption, and also of repaying at any time the whole of the Loan still in circulation by giving six months' notice in advance. Both Principal and Interest are exempt from all present or future Argentine taxes or duties.

This Loan will be entirely applied to the Conversion and Redemption of the following 6 per Cent. Loans:—

The Buenos Ayres 6 per Cent. Loan of 1870, domiciled with Messrs. C. de Murrieta & Co. (since taken over by the Argentine Government).	Outstanding balance	... £ 715,000
The Argentine 6 per Cent. Loan of 1871, domiciled with Messrs. C. de Murrieta & Co.	Outstanding balance	... £1,495,400
The Buenos Ayres 6 per Cent. Loan of 1873, domiciled with Messrs. Baring Brothers & Co. (since taken over by the Argentine Government)	Outstanding balance	... £1,579,400
The Argentine 6 per Cent. Loan of 1882, domiciled with the Banque de Paris et des Pays-Bas, the Comptoir d'Escompte de Paris, and Messrs. L. & R. Cahen d'Anvers & Co.	Outstanding balance	... £ 700,000
		<u>£4,489,800</u>

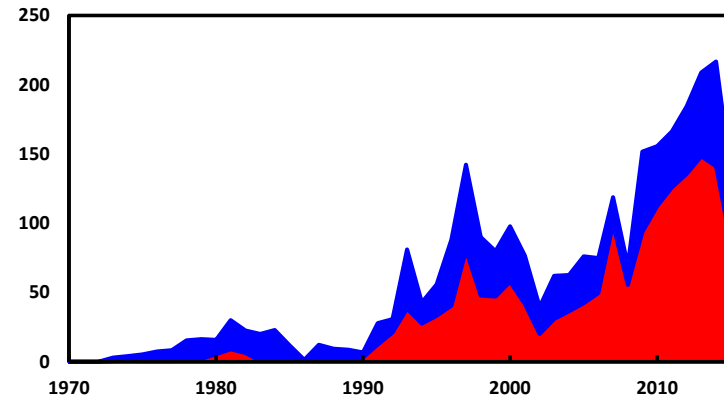
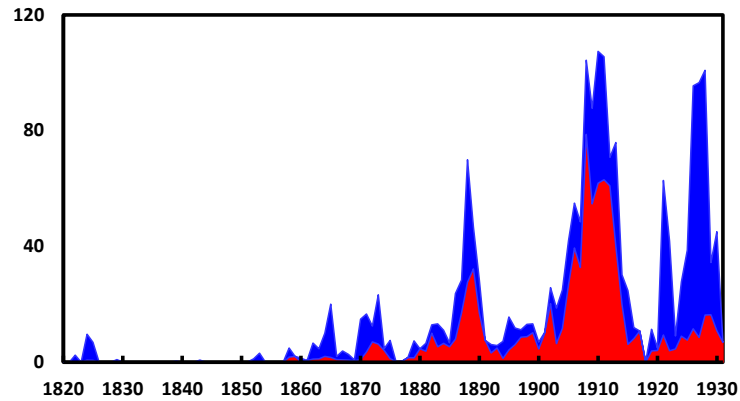
All outstanding Bonds of the Buenos Ayres 6 per cent. Loan of 1873, and the Argentine 6 per cent. Loan of 1871, have already been converted into the above Bonds.

Figure 2

First Episode of Financial Globalization

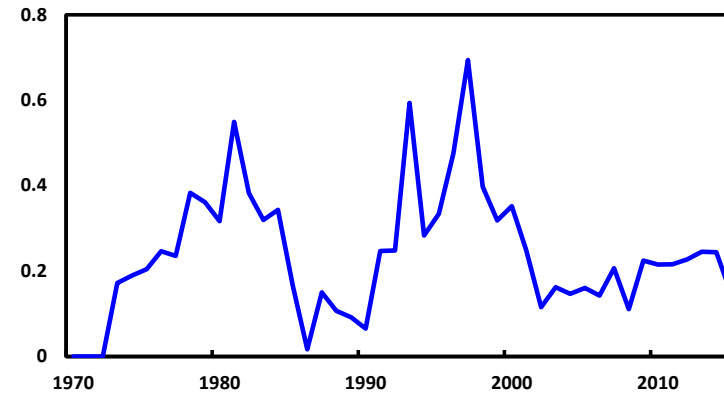
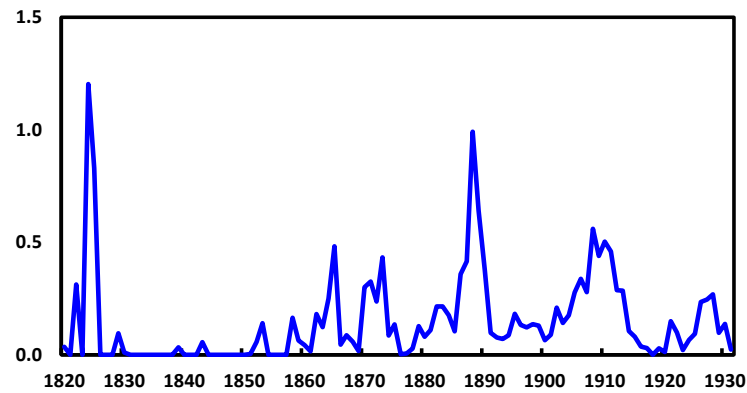
Second Episode of Financial Globalization

Total, Public, and Private International Gross Primary Issuance



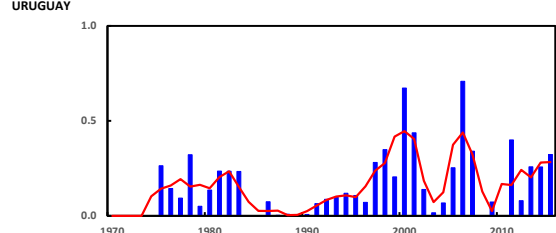
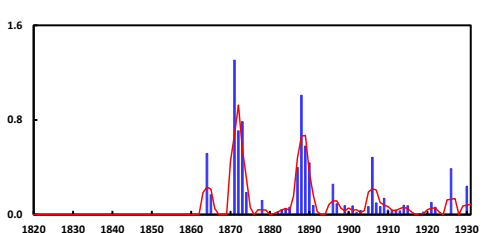
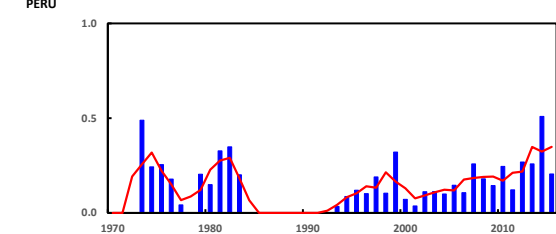
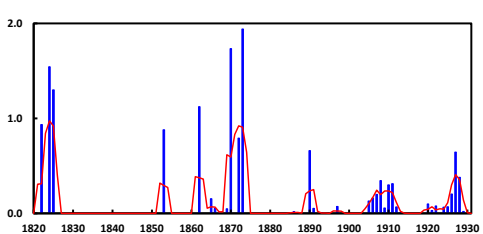
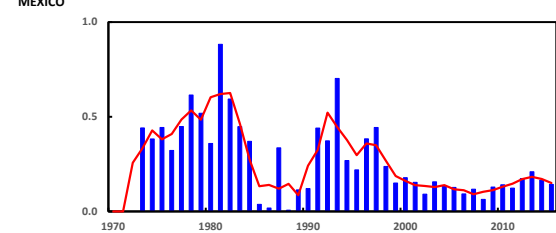
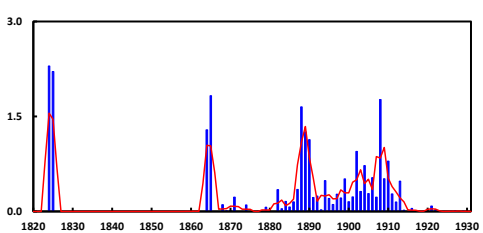
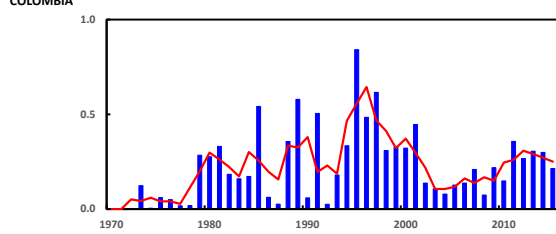
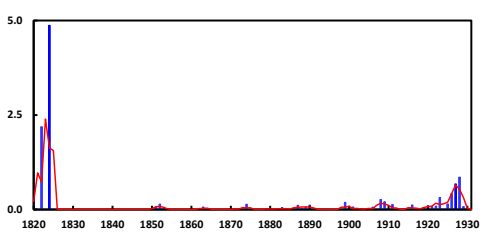
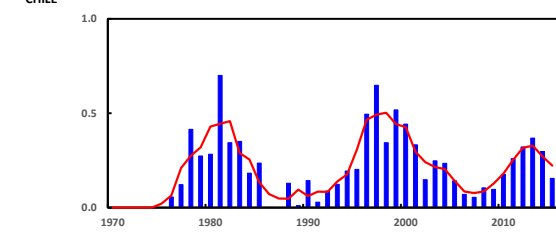
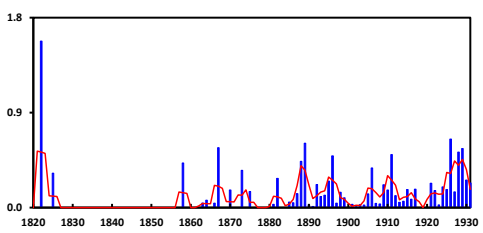
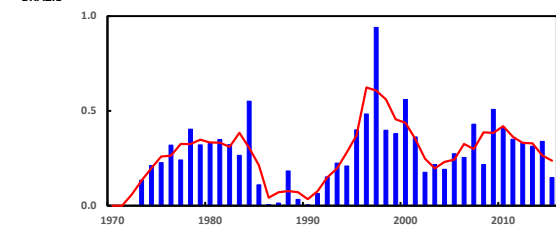
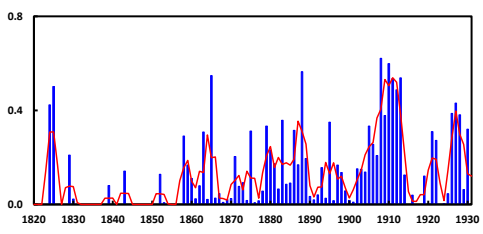
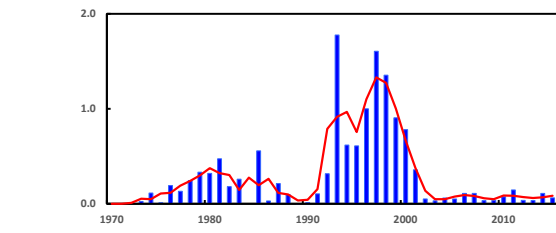
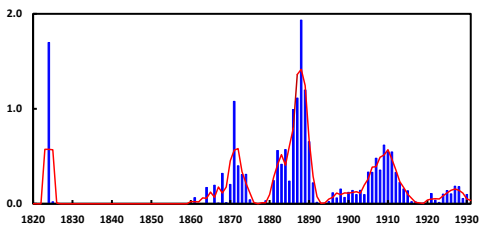
Notes: This figure shows Latin America's International Gross Primary Issuance as captured by the issuance of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. During the First Episode of Financial Globalization, International Gross Primary Issuance is in million British Pounds. During the Second Episode of Financial Globalization, International Gross Primary Issuance is in billion U.S. Dollars. Public Issuance is shown in blue and Private Issuance is shown in red.

Total International Gross Primary Issuance (Share of Exports)



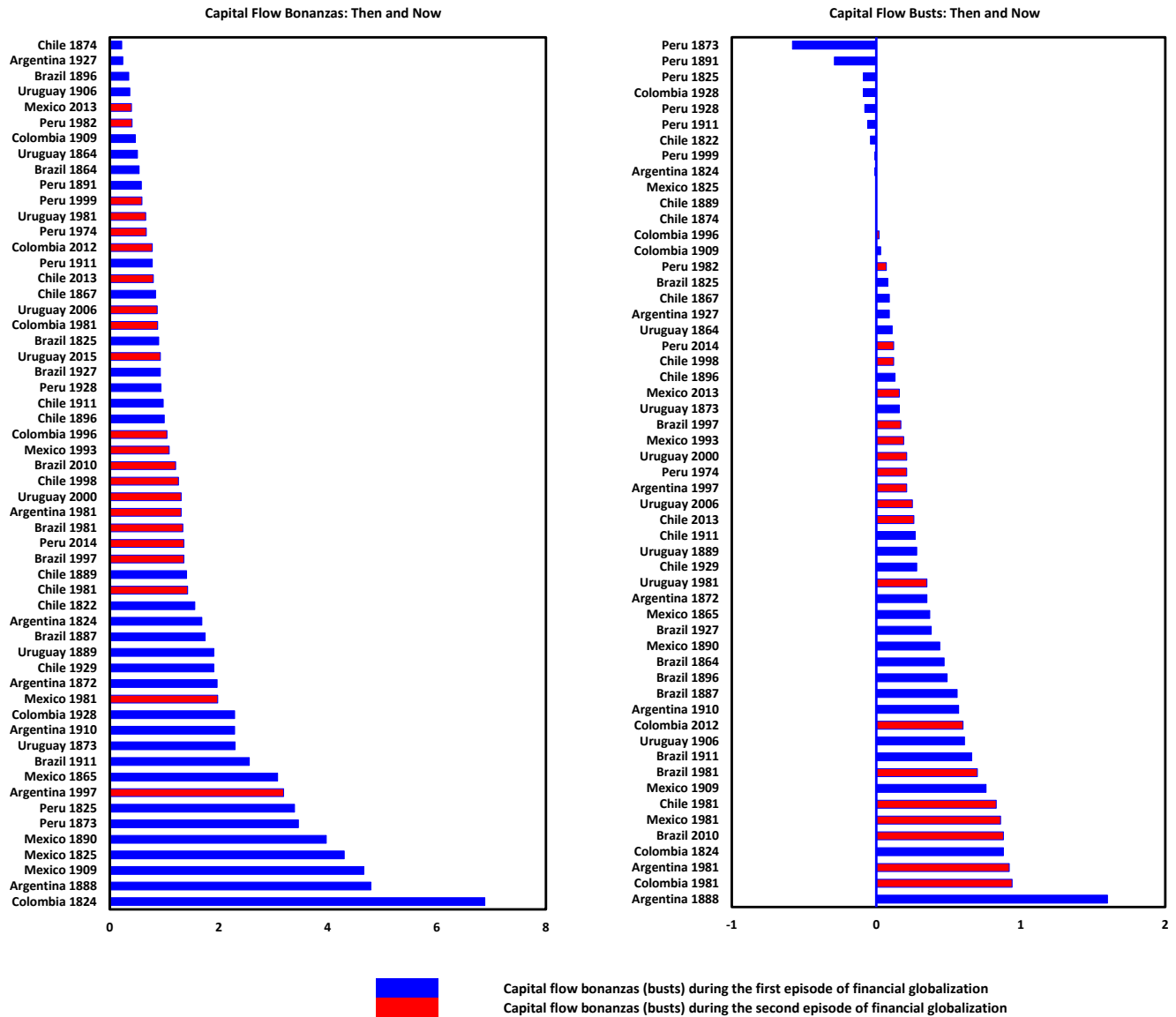
Notes: This figure shows Latin America's International Gross Primary Issuance (share of Exports) as captured by the issuance of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Uruguay.

Figure 3
 Total International Gross Primary Issuance (Share of Exports)



■ International Gross Primary Issuance (Share of Exports)
 ■ International Gross Primary Issuance 3-Year Moving Average (Share of Exports)

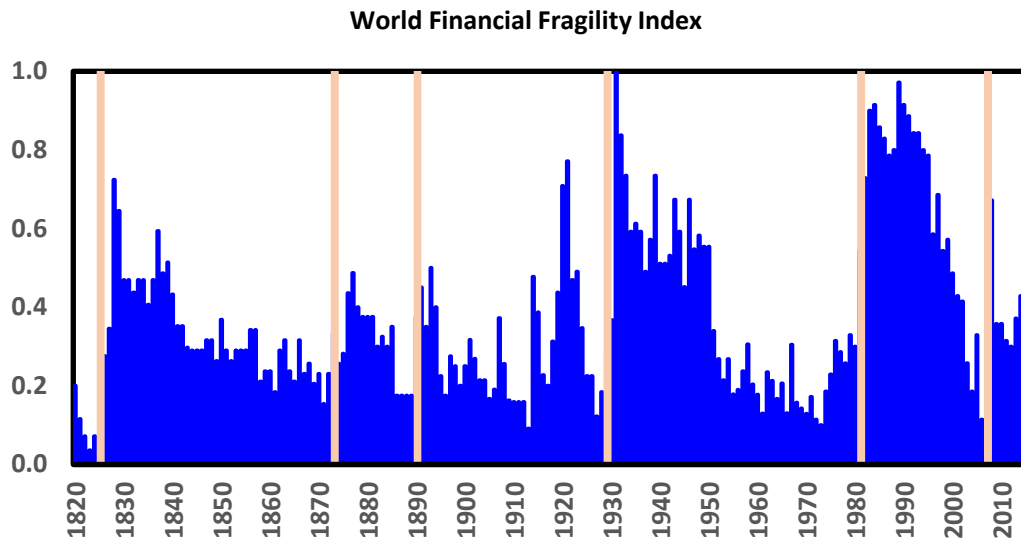
Figure 4
Are International Borrowing Cycles Changing?



Episodes	Amplitude	
	Bonanzas	Busts
First	1.94	0.25
Second	1.13	0.38
P-Value	0.01	0.09

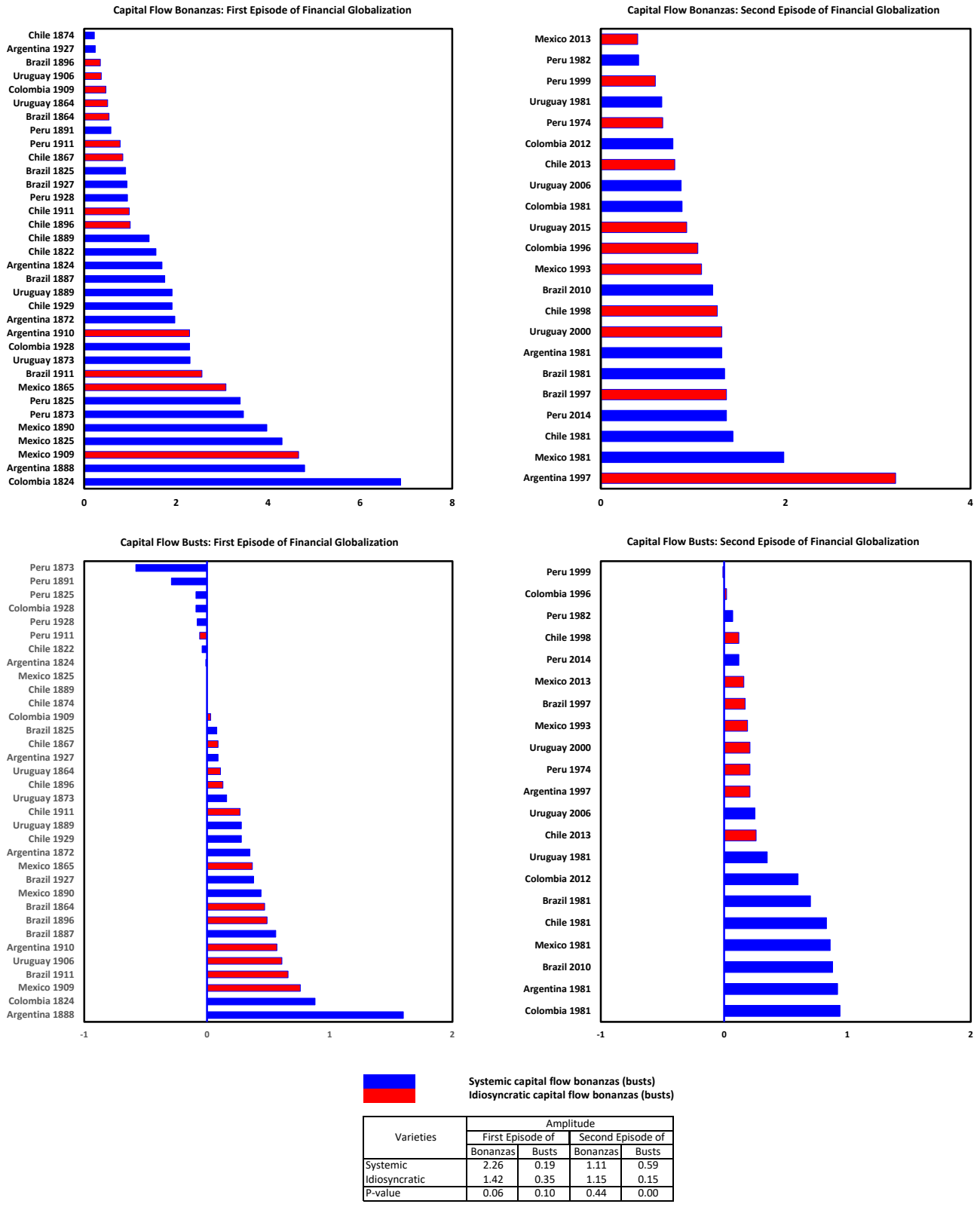
Notes: The amplitude of capital flow bonanzas (busts) captures the accumulated net issuance over the boom (bust) as a share of exports in the year of the peak (trough) of the cycle. The amplitude of the capital flow bonanza (bust) as a share of exports is shown on the horizontal axis. Each capital flow bonanza (bust) is identified on the vertical axis with the name of the country and the year of the peak of the capital flow cycle. The bottom table shows the average amplitude of capital flow bonanzas (busts) in the two episodes of financial globalization. The test statistics in this table show the one-tailed p-value at which the Null Hypothesis of equality of capital flow bonanzas (busts) in both episodes of financial globalization can be rejected.

Figure 5
Identifying Rare Disasters



Notes: The World Financial Fragility Index, shown in blue, is the average number of banking, currency, and sovereign debt crises across all countries. This index can fluctuate between zero (when none of the countries in the sample have crises) and 3 (when all the countries in the sample have banking, currency, and sovereign debt crises). The pink lines identify the year of crises in the financial center that trigger a sharp increase in financial fragility around the world. These crises are: London Panic (1825), Austria and Germany Stock Market Crash (1873), London Baring Crisis (1890), London and New York Stock Market Crash (1929), U.S. Large Commercial Bank Crisis (1981-1983), and U.S. Subprime Crisis (2007-2009).

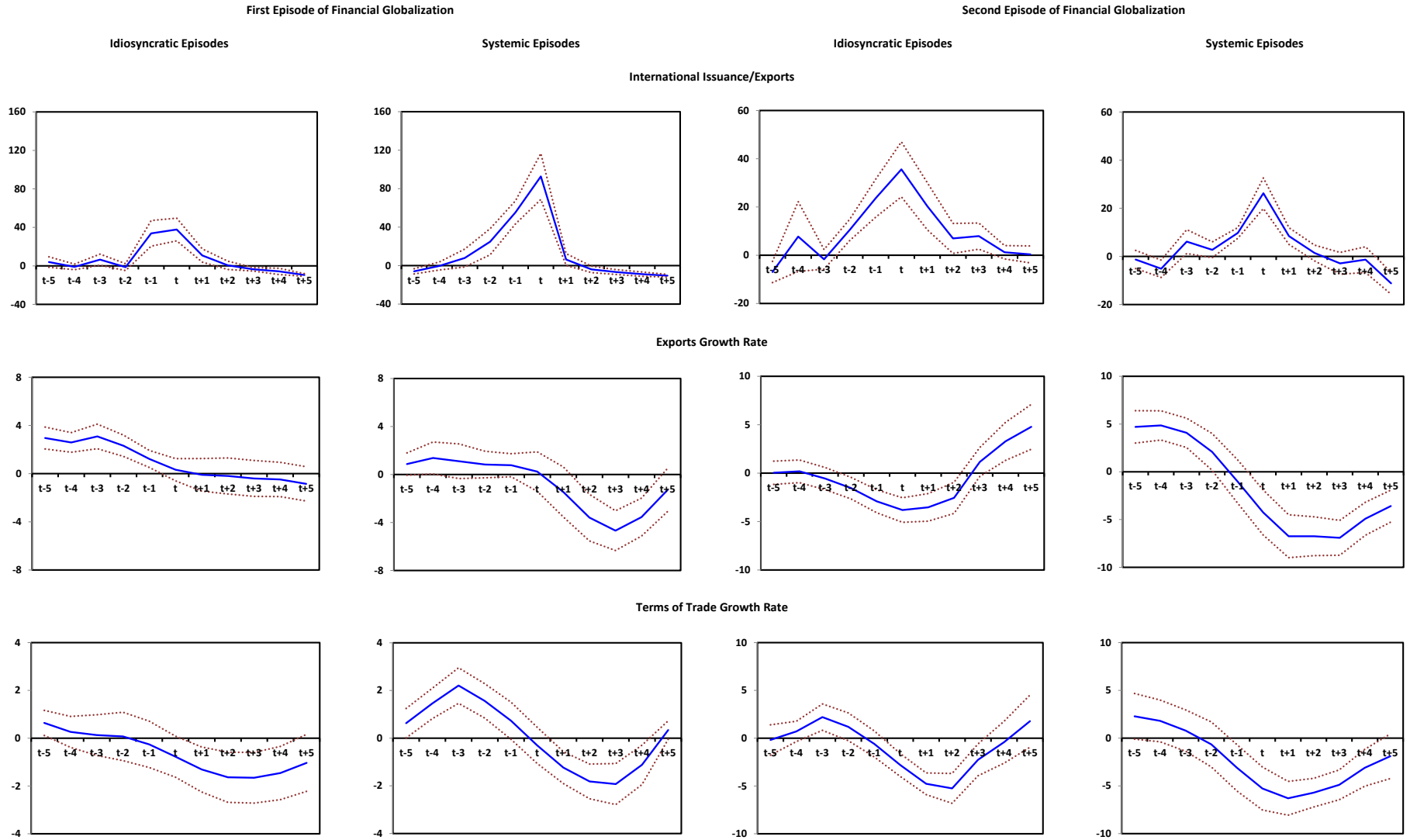
Figure 6
Are Systemic and Idiosyncratic International Borrowing Cycles Changing?



Notes: The amplitude of capital flow bonanzas (busts) captures the accumulated net issuance over the boom (bust) as a share of exports in the year of the peak (trough) of the cycle. The amplitude of the capital flow bonanza (bust) as a share of exports is shown on the horizontal axis. Each capital flow bonanza (bust) is identified on the vertical axis with the name of the country and the year of the peak of the capital flow cycle. The bottom table shows the average amplitude of capital flow bonanzas (busts) during systemic and idiosyncratic capital flow cycles in the first and second episode of financial globalization. The test statistics in this table show the one-tailed p-value at which the Null Hypothesis of equality of capital flow bonanzas (busts) during systemic and idiosyncratic capital flow cycles for each episode of financial globalization can be rejected.

Figure 7

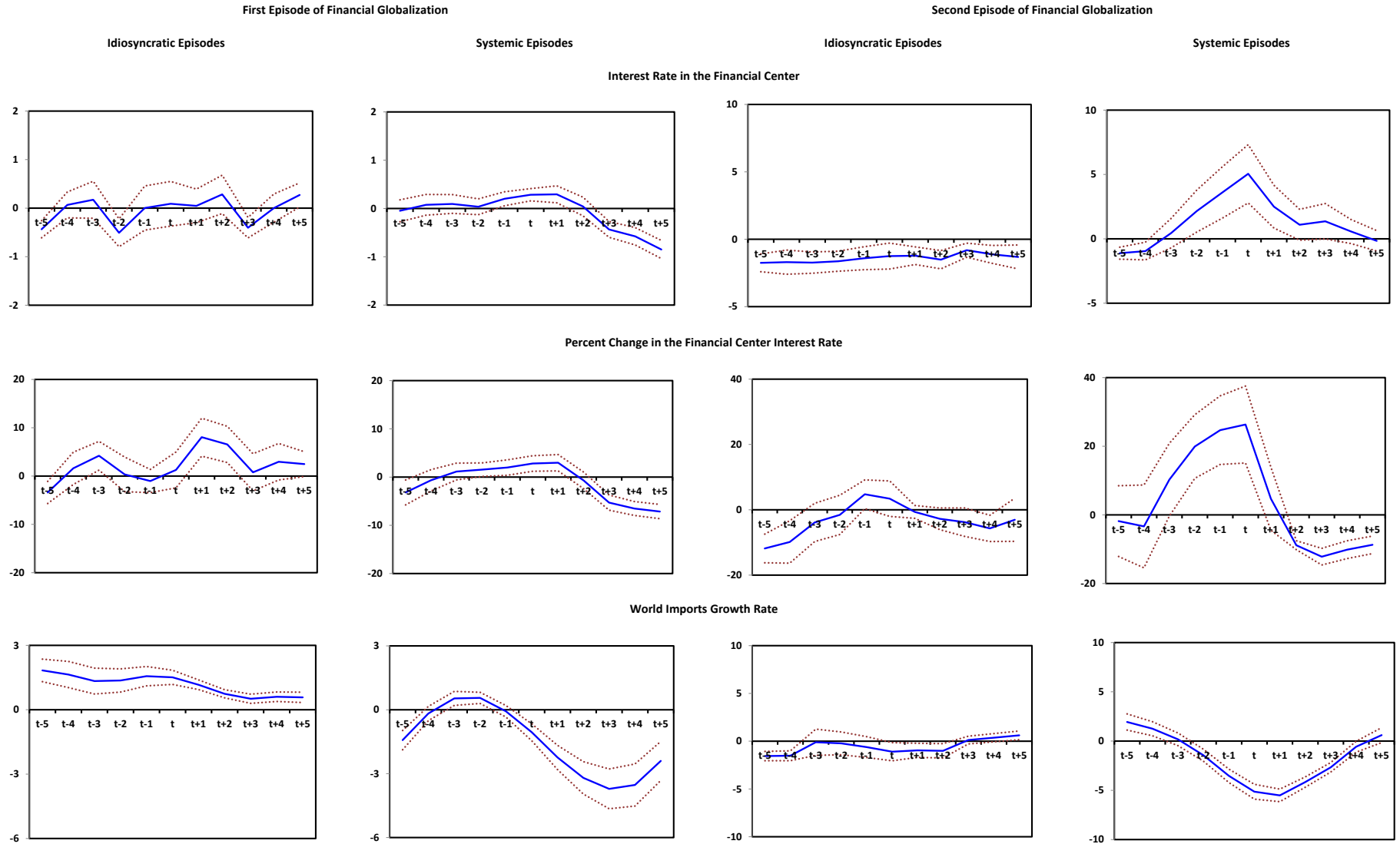
Capital Flow Cycles and the Pull Factors



Notes: Latin American countries international issuance is shown as a percent of exports. The growth rate of exports is the growth rate of trend real exports. The growth rate of the terms of trade is the growth rate of trend terms of trade. The three indicators are shown relative to their sample average (in percentage points). Year t is the year of the peak of the cycle. The solid line is the average behavior of each indicator across all cycles. The dotted lines are the plus/minus one-standard error bands around the average. See the text for the definitions of the indicators.

Figure 8

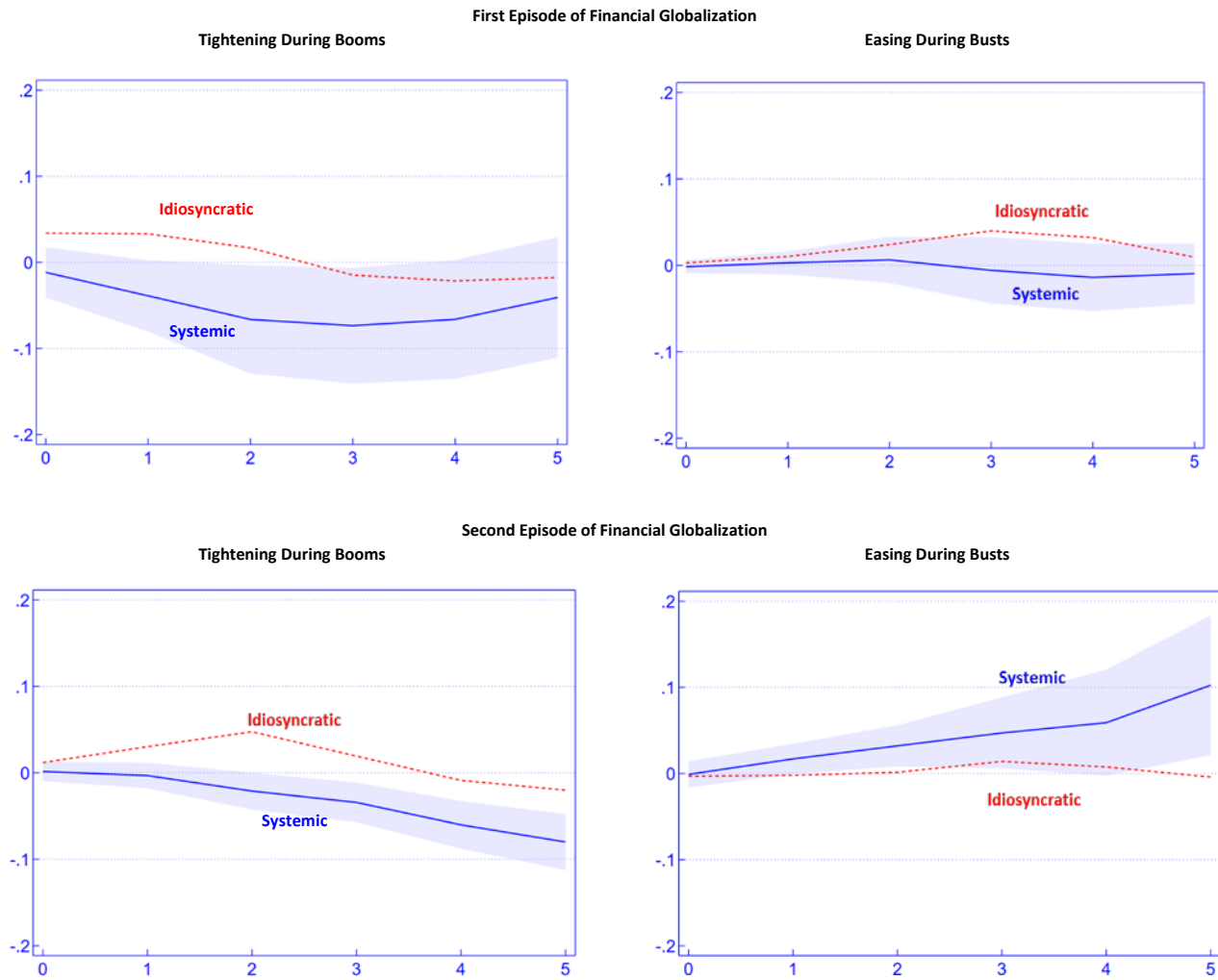
The Push Factors



Notes: The interest rate in the Financial Center is the U.K. Bank Rate during the First Episode of Financial Globalization and is the U.S. Federal Funds Rate during the Second Episode of Financial Globalization. The interest rate is in percent per annum. The Percent Change in the Interest Rate is the three-year percent change in the interest rate in the Financial Center. World imports in the bottom panel are the imports of France, the United Kingdom, and the United States in British pounds in 1900 prices (Germany, the United Kingdom, and the United States in U.S dollars in 2000 prices) during the First Episode of Financial Globalization (during the Second Episode of Financial Globalization). The growth rate of World Imports is the growth rate of the trend. The Interest Rate in the Financial Center and the world imports growth rate are shown relative to their sample average. These two panels are in in percentage points. Year t is the year of the peak of the cycle. The solid line is the average behavior of each indicator across all cycles. The dotted lines are the plus/minus one-standard error bands around the average.

Figure 9

Monetary Policy in the Financial Center: The Effect on Capital Flows to the Periphery



The above figures show the response of international issuance (as a share of exports) to a one-standard deviation monetary shock. The top panels show the responses during the first episode of financial globalization. The bottom panels show the responses during the second episode of financial globalization. The left hand panels show the responses during capital flow bonanzas and the right hand panels show the responses during capital flow busts. Each panel shows the state-dependent responses where the blue lines are responses during cycles around panics in the financial center (systemic capital flow cycles) and the red lines capture the same responses during tranquil times (idiosyncratic capital flow cycles). The shaded areas show the 95% confidence intervals around the responses during systemic episodes. The shock to monetary policy in the financial center is captured with the nominal interest rate of the Bank of England for the first episode of financial globalization and the Fed Funds interest rate for the second episode of financial globalization.