

Foreign Capital and Economic Growth in the First Era of Globalization*

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Abstract

We explore the association between economic growth and participation in the international capital market. In standard growth regressions we find mixed evidence of a *direct* association with economic growth. We also argue for a negative *indirect* channel via financial crises. These followed on the heels of large inflows, and sudden stops of capital inflows often erasing the equivalent of an average year's worth of growth. We then look at several other determinants of debt crises and financial crises including the currency composition of debt, debt intolerance and the role of political institutions. We argue that the set of countries that had the worst growth outcomes in this period of internationally mobile capital flows were those that had currency crises, foreign currency exposure on their national balance sheets, poorly developed financial markets and presidential political systems. Those that avoided financial catastrophe generated credible commitments and sound fiscal and financial policies. Such countries succeeded in escaping major financial crises and grew relatively faster despite the potential of facing sudden stops of capital inflows, major current account reversals and currency speculation that accompanied international capital markets free of capital controls.

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1. Introduction

The period from 1880-1913 was a period of globalization in both goods and financial markets comparable to the present era of globalization. Growth of international trade surged, so that by 1913, the principal economies of the world had ratios of merchandise exports to GDP of at least 15 percent. Globally the figure almost doubled from 4.5 to eight percent between 1870 and 1913. Transportation costs fell, and tariffs stayed low compared to their levels after 1913. It was also an age of mass migration with few impediments to the flow of people across borders. Financial globalization burgeoned—current account deficits persisted for long periods, and several nations imported foreign capital to the tune of at least three to five percent of GDP each year. In 1913 Obstfeld and Taylor (2004) estimate that the ratio of net foreign liabilities to global GDP was on the order of 25 percent. Of great importance, capital controls were non-existent.

Today, opponents and supporters of “globalization” argue vigorously about the benefits of such a process. With respect to financial globalization, optimists suggest that opening up to global capital markets can make crucial investment funds available at a lower cost, enhance risk sharing, transfer technology and reign in errant policy makers. Pessimists suggest that global capital flows are fickle and move for reasons unrelated to fundamentals causing financial disruption and economic volatility. Decoupling from the global capital market through the use of capital controls can help protect a country from temperamental financial markets.

Optimists might cite as evidence for their view the late nineteenth century when many countries seem to have benefited from the free movement of capital. The areas of recent European settlement such as Australia, Canada, the United States, and even parts of Argentina and Brazil had high standards of living and witnessed rapid economic growth. Inward investment to these areas, coming largely from Great Britain, was massive prior to 1913. Much of this financing went into fixed interest rate long-term bonds that national governments and local companies issued in London to fund infrastructure and railroads. The standard story in economic history holds that funds were essential in building productive capacity and improving the infrastructure that would

allow goods to reach ever larger international markets. But countries often squandered these inflows on frivolous military campaigns, excessive public consumption or poorly engineered projects. In addition, many countries built up large net foreign liability positions and were perilously unprepared for the rapid cessation of capital inflows that periodically afflicted such exposed countries. These sudden stops and reversals often sparked financial crises particularly in financially vulnerable countries. Currency crises, banking crises and twin crises were not an uncommon feature of the period. A number of nations also faced debt crises economic catastrophe.

This leads us to ask several questions:

- Was reliance on the global capital market associated with faster economic growth?
- Did foreign capital contribute to the probability of having financial crises and sudden stops? If so did these reduce the growth benefits of international financial integration?
- What were the determinants of financial crises? Why were some countries able to borrow so heavily and have so few financial crises while others borrowed relatively little and still suffered from financial meltdowns?

We find only weak evidence of a *direct* positive association in the short to medium run between economic growth and reliance on foreign capital. One possible explanation (following recent work by Gourinchas and Jeanne, 2006) includes the fact that countries may have already converged to somewhere close to their steady states by this period. But we also cite mismanagement of funds and the fact that there were long and variable lags associated with the infrastructure that foreign investment funded in this period as possible sources of our finding.

Moreover, we find an indirect link from capital market integration to output losses via financial crises. Nations that borrowed abroad heavily were more likely to have faced

a sharp turn around in their current accounts. These in turn were associated with currency crises when credibility and financial development were weak.¹ Currency fluctuations in turn deteriorated the ‘balance sheets’ of these nations and led to debt servicing problems. In nations where executive decisions ruled over democratic consensus, debt default and further economic losses ensued.

Our assessment of the growth benefits of capital market integration prior to World War I is thus mixed. The evidence is suggestive that the direct growth benefits of integration for many countries were not large. Moreover, crises seem to be associated with *temporarily* slower growth leading to lower levels of output per capita in any given year. Countries that faced perennial crises were significantly less wealthy than they might have otherwise been in the absence of international capital market integration. On the other hand, some nations with sound fundamentals avoided crises possibly reaping other ancillary benefits like improved risk sharing.

2. International Capital Markets and Economic Growth, 1880 - 1913

2.1 Measuring Integration prior to World War I

The period between 1880 and 1913 was one of deep integration in international capital markets. Capital moved across borders free of government controls. Cross border market-based financing in both the developed and the less-developed regions of the world reigned.

At the core of this global financial system was Great Britain with a vast surplus of savings. This surplus was channelled through the City of London to borrowers from all over the world. Net inflows were large even by contemporary standards. Figure 1 shows the average ratio of the current account to GDP in the economically advanced core (excluding the main capital exporters and the British offshoots), the economically

¹ Sylla and Rousseau (2003) claim that a well developed financial system has five key components. They are (1) sound public finances and public debt management (2) stable monetary arrangements (3) a variety of banks that operate both internationally and nationally (4) a central bank to stabilize domestic finances and manage international financial relations, and (5) well functioning securities markets.

advanced British offshoots and the United States, and the poorer regions of the world.² In the core capital importing countries, the average deficit in the later part of the period was on the order of three to five percentage points of GDP. On average the current account deficit in countries such as Australia, Canada, New Zealand and the US (although in the latter this was mainly prior to 1860), was on the order of three percent and much higher in many years. In the periphery, the levels were somewhat lower in absolute value but still significant in certain years. Foreign investment often accounted for about 20 percent of total investment in the typical developing country of the time and up to 50 percent in Australia, Canada, Argentina and Brazil (cf. Fishlow, 1986 and Williamson, 1964 on the USA).

Great Britain exported the majority of capital flows while France, Germany and Holland provided smaller amounts. In Great Britain the current account surplus never fell below one percent of GDP and averaged over four percent of GDP the entire period. France was the second largest capital exporter. The volumes exported were about half those of Britain.

Schularick (2006) estimates that gross world assets divided by global GDP, a global measure of capital market integration, reached about 20 percent in 1913 while he estimates it at roughly 75 percent today. Similar numbers are reported in Obstfeld and Taylor (2004).

Capital exports from Britain took the form of bond finance, private bank loans and direct investment. Early in the period, portfolio investment dominated, but by 1913 Svedberg (1978) argued that direct investment accounted for over 60 percent of all foreign investment. The type of inflow varied by country and by period. Marketable bonds were typically placed by London investment banks and bonds were actively traded on the London Stock exchange. Daily quotes were available in the *London Times*. Obstfeld and Taylor (2004), Mauro, Sussman and Yafeh (2006) and Flandreau and Zúmer (2004) all contain interesting discussions on the details of high finance in this

² We define the core countries to include Belgium, Denmark, Norway, Sweden and Switzerland. We place Australia, Canada, New Zealand and the United States into the “offshoots” category. These regions were extensive capital importers and also had a special institutional heritage being members (or once having been members) of the British Empire. The periphery is defined to include Argentina, Austria-Hungary, Brazil, Chile, Egypt, Finland, Greece, India, Italy, Japan, Mexico, Portugal, Russia, Spain, Turkey, Uruguay

first era of globalization. Obstfeld and Taylor (2004) emphasize that covered interest parity held tightly for a number of core countries. Mauro, Sussman and Yafeh (2006) study the efficiency of the London bond market and pay particular attention to the reactions of bond yields to political information. They argue that markets moved on news of domestic political turmoil and that comovement amongst bond prices was much lower than it has been in the past twenty to thirty years.

2.2 Where did the Capital Go?

A large amount of British lending went to the British Empire and of this portion the bulk ended up in Canada and Australasia. Ferguson and Schularick (forthcoming) argue that the public borrowing carried a lower risk premium than other similar countries outside of the empire. This was natural because of the nature of property rights, political ties and other institutional distortions such as the Joint Stock Acts which increased demand for colonial assets. Property rights and political ties would tend to reassure investors that debts would be repaid. And as a matter of fact *no* British colony ever defaulted in this period.

Clemens and Williamson (2004) take issue with this market failure view and suggest that that factor endowments mattered more for the direction of these flows. They note that key recipients of capital such as Canada, the various colonies of Australasia and other new world regions were richly endowed in natural resources, high in human capital and scarce in labor and capital. Such a combination apparently made for profitable investment relative to the domestic opportunities and those available in labor abundant resource poor Europe. After controlling for these factors, they find that the British empire did not receive greater inflows from Britain (i.e., quantities) than other regions such as Latin America and Asia.

Previous work by Edelstein (1982) has shown that ex post returns on British foreign investments were not extremely high compared to the alternatives at home and that debenture return differentials converged by 1910. Figure 2 shows that between 1870 and 1913 nominal bond yields (the coupon yield divided by the price) converged dramatically. This evidence would be consistent with the idea that default risk fell over

the period as development proceeded and projects and countries matured. Meissner and Taylor (2006) also show that the British yield on foreign investments relative to the yield paid on liabilities outstanding fell over the period. One reading of this is that international capital markets became more integrated and competitive and the number of high yield projects fell over time.

2.3 What Happened to the Capital Inflows?

On the receiving side, contemporaries mostly viewed foreign inward investment as something to be coveted. Policy makers of the period cited the need to attract greater foreign capital as one of the reasons to join the gold standard and fix their exchange rates to the British pound. Foreign capital was viewed an essential ingredient for savings constrained economies outside of northwest Europe. Without it these countries argued that further development of their economic potential would have been limited.

Fishlow (1986) characterized countries as revenue borrowers or development borrowers. It is possible to verify this dichotomy quite easily from *Fenn on the Funds* which recorded parts of sovereign bond prospectuses.³ The component colonies of Australasia and the future South Africa, and Canada and its provinces borrowed almost exclusively to fund railroads, harbors, sewage systems, and other infrastructure. For these places, *Fenn's* manual would often state something to the effect that 'the vast majority of funds have been for internal improvement'.

³ It is difficult to sort out whether new issues for unspecified projects were simple consolidations of old productive debt, whether war finance should be classified as productive spending or not (since the vanquished often paid large war indemnities or suffered economic repression), and to know the actual share for each country of sovereign borrowing versus private borrowing. Therefore we have not been able to systematically assess whether countries were revenue or development borrowers for each and every year of the period. Future work could attempt to delineate more clearly each kind of borrower and to correlate this variable with subsequent economic growth. Another problem is that it is not clear whether this source and the productive/revenue dichotomy could adequately characterize countries' prospects. For 1874 we catalogued the issues for the entire set of economically important countries. We found that for countries like the US (federal financing of the Civil War we know), and even Canada (which the very same source reported as being a sound infrastructure borrower), a majority of its issues were listed as unspecified. Compounding the difficulties would be judging between the quality and management of the projects such as railroads that actually seem on paper to be for productive purposes. For example in Bolivia one issue was for the construction of a canal to the Atlantic. This project failed to prove technically feasible and the market value of the issue sank.

Other countries like Russia (an issue to strengthen the specie [reserve] fund), Japan (to pay charges on pensions), Egypt (Pasha loan for re-payment of existing debt), Austria (an issue in 1851 to improve upon the value of the paper florin), and India (debt issued for many wars including the Sepoy mutiny of 1857) borrowed to plug revenue gaps or to fund offensive, defensive and civil wars.⁴ Many of these same countries had considerable amounts of issues dedicated to unspecified ends in the prospectuses. Of course unsound investment was often greeted coolly by the market with a low price at its initial public offerings making foreign financing more difficult. Nevertheless this is just the type of dynamic that leads to adverse selection and moral hazard in credit markets. And some of these countries ended up in a downward spiral of debt unsustainability. Egypt and Turkey are two key borrowers that fit the mold here. Both had debt defaults in the mid-1870s and both had over-borrowed relative to their capacity to generate revenue to re-pay

To gauge how much the market penalized poor prospects we totalled the face value of each bond listed in Fenn's 1874 edition that clearly stated in the abstracted prospectus whether the bond was issued for infrastructure or other productive investment. We then divided this value by the total face value of bonds outstanding. We then plotted the sovereign long-term bond yield minus the British consol yield against this development/revenue measure.⁵ As a matter of fact the yield spread roughly captures this distinction. The spread is calculated for a long-term issue listed in London and payable in gold minus the British consol yield. The correlation between the spread and the ratio of bonds issued for productive purposes to total bonds is -0.25. Figure 3 plots the spread versus the ratio and reveals a negative correlation. The coefficient on the spread in a regression is -0.03 and has a robust t-statistic of -1.96 (p-value = 0.06). Thus the bond

⁴ In 1876 Egypt defaulted on its sovereign debts leading to foreign administration of taxation and spending (see Mitchener and Weidenmier 2005 for a recent summary of the episode). Information about the use to which Egypt put its borrowing was sketchy at best during the run up to default. Fenn's Compendium does not list a single bond prospectus thus leaving the reader unaware of how the funds would have been invested. The Cave Report (quoted in Issawi 1982) which summarized Egypt's finances after the default claimed "...[Egypt] suffers from the ignorance, dishonesty, waste and extravagance of the East, such as have brought her Suzerin [Pasha] to the verge of ruin...caused by hasty and inconsiderate endeavours to adopt the civilization of the West". Even after default, British auditors found it difficult to evaluate the ultimate destination of borrowed funds.

⁵ Sovereign yields come from the annual average of all weekly observations on London as compiled by Kris Mitchener and Marc Weidenmier.

spread can be considered a more continuous measure of development versus revenue financing. Figure 3 reveals that both types of countries were able to issue at least some debt on international markets during this period of open capital flows. However, it is clear from the evidence on capital flows presented in Clemens and Williamson (2004) that the development borrowers were receiving the bulk of these funds.

Moreover, the calculation is not perfect. We see the Ottoman Empire, a fiscal disaster with a high spread but Brazil and the US with equivalent (low) measures of productive spending and low spreads. The latter two had sound finances and solid reputations (see Summerhill 2006 on Brazil). It is likely that markets had the belief that repayment was not an issue due to previously established reputations and credibility.

In sum, a sort of proto-Washington Consensus of free trade, fixed exchange rates, and liberal economies more or less reigned between 1880 and 1913. Capital markets became strongly integrated and many different types of nations relied on foreign and domestic capital to finance new projects aimed at meeting the demand of ever-larger and wealthier global markets. But a long-run, cross country comparative perspective on the impact of this epoch of integration is still needed.

3. Economic Growth and Foreign Capital: Some Testable Hypotheses

3.1 The Direct Impact of Foreign Capital on Economic Growth

The most general theoretical case for capital market integration is nearly the same as that for free trade. Opening to foreign capital allows for resources to be efficiently allocated. In addition, risk sharing is also enhanced with globally integrated capital markets. It is also argued that policy is improved since footloose capital harnesses errant policy makers.

Recent research on these direct benefits has not been as unambiguous about the salutary effects of globalized capital. Edison, Levine, Ricci and Slok (2002) and Prasad, Rajan and Subramanian (2006) find little evidence that greater reliance on foreign capital is accompanied by higher growth rates.⁶ Schularick and Steger (2006) apply the Edison

⁶ See Kose et al (2006) for a survey of these issues.

et. al. methodology as closely as possible to the years between 1880 and 1913 and find evidence of a positive link between capital inflows and growth.⁷ Fishlow (1986), Foreman-Peck (1994) and Collins and Williamson (2001) all argued that a lower cost of capital and greater inflows should have been associated with higher growth in this period.

In a standard neo-classical, Ramsey-style growth model, Gourinchas and Jeanne (2006) argue that the long-run growth and welfare effects of capital market liberalization are surprisingly small. Their paper studies a move from autarky to full integration with the international capital markets. This move has the effect of lowering the interest rate from high autarky levels to a low international level. The international rate equals the interest rate all economies will achieve in the long-run in their steady states. Therefore in the medium term, say at the five year horizon, the impact depends on the distance from the steady state capital-labor ratios. A country that has an initial capital-labor ratio of one-half its steady state value will grow about 2.7 percentage points faster than it would have in autarky during this period.⁸ After 10 years or more, the growth effects are negligible. The reason is that opening up simply accelerates a country towards its steady state. Since in a standard growth model convergence towards the steady state is quite quick (11.49 percent of the output gap is eliminated each year in the Gourinchas and Jeanne calibration), most countries are on average very near their steady state already, the growth and welfare impact is small. To achieve a larger impact, one would have to argue that capital market liberalization *changes* the steady state potential of a country.

We would expect a much smaller impact in the historical period than Gourinchas and Jeanne illustrate. There were no discrete liberalizations in the period we study between 1880 and 1913. Most countries had been able to borrow fairly continuously from Britain and other surplus countries since the beginning of the nineteenth century.⁹

⁷ Their methodology relies on a GMM estimator that jointly imposes a relationship between the levels of GDP per capita and the levels of their right hand side variables and the growth rate of GDP per capita and the rates of change in their right hand side variables. We are unaware of a standard growth model that suggests estimating such a relationship. In Mankiw, Romer and Weil (1992) for instance both the growth rates and the levels of GDP per capita are functions of the levels of the fundamentals. We rely on a more conventional specification similar to Mankiw, Romer and Weil (1992).

⁸ Bekaert, Harvey and Lundblad (2005) find that growth increases by one percent after a liberalization in the modern period.

⁹ China and Japan are perhaps notable exceptions. Foreign issues in Europe did not start in earnest until the 1870s and later. See Sussman and Yafeh (2000) on Japan and Goetzmann, Ukhov and Zhu (2007) for the Chinese case.

Therefore we might expect the growth impact to be weak if the standard neo-classical growth model holds. Quite simply the counterfactual to closed international capital markets might have implied savings constrained economies financing development at a higher price than otherwise. But these interest rate differentials would have been eliminated over the long-run, so that countries would be converging on their steady states.

Moreover we have the argument put forward by Fishlow and many others that many countries simply mismanaged these inflows. This would suggest that the unconditional relationship between foreign capital and economic growth might be very slight. Finally some countries suffered financial crises, which arose directly due to their connection with foreign capital markets. It is quite possible that these crises brought growth down for significant periods of time.

Finally there is the possibility that there were long and variable lags in the impact of foreign capital on economic growth. Since foreign capital often funded large infrastructure projects like railroads perhaps it took a number of years for the growth to show itself in the data. Williamson (1964) and Eichengreen (1995, p. 79) suggest there were long lags between the capital inflows and real impact on the domestic economy.¹⁰

3.2 Financial Crises: The Indirect Association between Growth and Capital flows

There are only a few papers that consider the indirect channel from integration to financial crises and then on to lower growth. Nearly all of these focus only on the last 30 years. But crises and sudden stops of international capital flows are, and have been, part and parcel of liberalized international capital markets. Crises are known to be costly events in terms of output losses, and they most likely reduce welfare due to market coordination failures.¹¹ Moreover crises were not rare events in this period.

Recently Sebastian Edwards (2007) has argued that Latin American growth in the late twentieth century has suffered been significantly slower due to financial crises,

¹⁰Eichengreen notes: “In Canada, for example, although railway construction peaked in the final decades of the nineteenth century, significant gains in wheat production and rail traffic did not occur until the second decade of the twentieth century.”

sudden stops and current account reversals.¹² Eichengreen and Leblang (2003) study the period 1880-1913 together with the subsequent 100 years. They concluded that capital controls are associated with higher growth, crises are associated with lower growth, and controls limit the probability of a crisis. Since no country had such controls in the pre-World War I period so we take a different tack and use information on gross inflows as in Edison et. Al. (2003) and Schularick and Steger (2005). Ranciere, Tornell and Westermann (2006) also investigate the impact of capital market liberalization (1980-2002) on annual growth in GDP per capita and an indirect channel going from liberalization to crises and back into (lower) growth. They find a direct positive effect of liberalization and a negative indirect effect. Countries have higher growth rates (on the order of 1 percentage point faster) after liberalization but growth is brought down (in expectation) by 0.15 percentage points due to increased exposure to crises.¹³ Were similar forces at play in the period prior to 1913?

3.2.1 A Framework Linking Integration to Crises and Crises to Growth

Our framework for thinking about financial crises follows Mishkin (2003) and Jeanne and Zettlemeyer (2005).¹⁴ This view is inspired by an open-economy approach to the balance sheet view of the credit channel transmission mechanism. Balance sheets, net worth and informational asymmetries are key ingredients in this type of a model. Moreover the development of the financial system is crucial. We present a diagram in Figure 4 that follows our chain of logic described below.

In our view, initial trouble might begin in the banking sector for a number of reasons. One possibility is that a credit boom occurs which inevitably leads to a rise in the proportion of banks' balance sheets represented by risky investments. Moreover foreign capital inflows usually accelerated in the later stages of these credit booms (see for instance Williamson, 1964). Often it only takes a rise international interest rates rise or a little bad news to spark an initial slowdown in capital inflows.

¹² Edwards does not study the direct impact of international capital market integration on growth.

¹³ Conditional on having a crisis the output loss is on the order of 10 percent of GDP.

¹⁴ Mishkin's informal analysis follows a stream of literature from the late 1990s on the links between net worth, crises and depreciation.

Modern observations on sudden stops suggest that these are much more likely to occur in countries that run large and persistent current account deficits although no such link has been made in the economic history literature to the best of our knowledge. When interest rates rise, this worsens the balance sheets of non-financial firms and banks alike. As the number of non-performing loans rises and net worth falls, a decline in lending can occur, contributing further to output losses. Net inflows of capital may also slow to a trickle perhaps culminating in a sudden stop. Financing gaps arise, and more trouble comes up in the financial sector.

At this point, reserves, if any are held, may be used as a first line of defense as internationally mobile capital takes a pessimistic view. Such self-insurance can help avoid economic adjustment (i.e., a recession or a fall in output) that might have to accompany a current account reversal. Alternatively, if there is a strong financial system, countries can pull through the turbulence and avoid further economic fallout. Such a system is one where any or all of the following obtain: there is a lender of last resort; deep and liquid financial markets exist; the quality of private lending has been high; the fiscal position is sound. These factors help generate credibility and confidence and assure markets that the exchange rate will not move too much hence countries can avoid a balance sheet crisis.

On the other hand, if the financial sector is weak or underdeveloped there could be increased stress for both financial and non-financial firms if they are forced to cut investment due to a lack of financing. Coupled with nominal rigidities, an economic downturn might be expected.

Low investment could drive down demand for nontradeable goods or decrease the supply of tradeables contributing to a real depreciation. If policy makers wanted to maintain economic activity this could lead to an expectation of easy future monetary policy, inflation, and an expected exchange rate depreciation.¹⁵ Governments may also

¹⁵ Many countries cut the link to the gold standard in times of financial distress or never had a formal link to the gold standard even in this hey day of the classical gold standard. Such countries typically ended up with accelerated money supply growth, inflation and nominal depreciations. Countries that adhered strictly to the gold standard were supposed to “play by the rules of the game” or implement a procyclical monetary policy. In the short run they did not necessarily do so. Nevertheless, countries that credibly adhered to the gold standard would often see stabilizing speculation and markets often expected tighter policy and/or deflation in countries running balance of payments deficits. These types of countries, because of their credibility could avoid the third generation fallout which we describe in the next few paragraphs.

have trouble making interest payments on debt coming due as capital markets become unwilling to continue rolling debt over and monetization and depreciation could be expected. The abandonment of an exchange rate peg, as reserves are depleted, is a possibility and floating regimes could also see large depreciation (expected and/or actual) occurring under such a scenario.

The impact of an exchange rate depreciation and a sudden stop may be contractionary.¹⁶ This is where foreign currency liabilities (some call it original sin) enter the picture. Since the majority of obligations for nearly all countries are in foreign currency or, in the late nineteenth century, denominated in terms of a fixed amount of gold, depreciation vis-à-vis creditor countries or breaking the link between gold and the domestic currency could lead to increases in the real value of debt. This is a redistribution of wealth from domestic borrowers to their creditors who are expecting a certain amount of gold or foreign currency.¹⁷ This decline in the net worth of debtors can lead to another round of “disintermediation” because net worth matters for lending decisions. Less lending implies the possibility of widespread bankruptcies due to liquidity problems. Of course a few countries had low original sin, and some of them were even relatively undeveloped (financially and economically) such as Russia. In such a country, the probability that the depreciation causes further trouble may be limited. The deterioration to debtors’ balance sheets would be more severe the greater the amount of hard currency debt outstanding.

But also as Goldstein and Turner (2003) have argued, often countries insure themselves or are naturally hedged against adverse exchange rate movements. Hard currency debt can be, and often is, backed up by hard currency assets. Alternatively, countries could have enough export capacity (or capability) to offset changes in liabilities due to exchange rate swings. To gauge the actual effect of original sin one must take account of the mismatch position or the entire balance sheet position of an economy.

¹⁶ Theoretical work by Céspedes, Chang and Velasco (2004) demonstrates how under certain very plausible circumstances original sin can lead to contractionary depreciations.

¹⁷ Eichengreen, Hausmann and Panizza (2003) argue that what matters is the aggregate external mismatch and if all debt is domestic, that one sector’s losses are the others’ gains. Our view however is that net worth matters. When a debtor’s net worth deteriorates, borrowing capacity falls, and the capital markets seize up. This is one reason why we focus on domestic and external hard currency debt rather than just foreign holdings (or issues) of hard currency debt.

It could also be the case that a solid financial system matters. When financial frictions are smaller and capital can get to most of the projects that are worthwhile (i.e., net worth and collateral constraints play less of a role in lending decisions perhaps due to better monitoring technologies or better property rights systems) the impact of depreciation and the loss of international capital could be less crucial. Lending dries up more slowly when there is a lender of last resort or a large liquid domestic asset market. When finances are sound in the first place, a liquidity problem has a high chance of being resolved and massive losses can be stemmed before they occur. Jeanne and Zettlemeyer (2005) emphasize that international crisis lending (into the official budget) from multilateral institutions can forestall crises if the government's finances would be sound in the absence of the "bad" no financing equilibrium.¹⁸ This underscores the importance of fiscal probity in the definition of financial development.

In addition to the capital markets' decisions we must also consider the political decision making mechanisms that determine a sovereign's actions. Reinhart, Rogoff and Savastano (2003) have argued that original sin is a proxy for a weak financial system and poor fiscal control so we control for this possibility below. But we also think it is important to emphasize a *political channel* that interacts with an unfortunate financial hand of cards.

Emanuel Kohlscheen (2006a, 2006b) demonstrates theoretically that presidential democracies are much more likely to default than parliamentary democracies. A presidential executive may hand the costs of a default to an interest group that is out of favor, and is usually not going to face a no confident vote that would occur in a parliamentary democracy. Empirically Kohlscheen (2006) finds that between 1970 and 2000 presidential democracies were more likely to default on sovereign debt than parliamentary democracies.

Bordo and Oosterlinck (2005) also find preliminary evidence that debt defaults were more likely amongst presidential democracies in the late nineteenth century. Another hypothesis compatible with the revenue/development borrowers dichotomy is also possible. Perhaps countries with few checks and balances, coded as 'presidential'

¹⁸ In this period it would have been more likely to see "cooperation" between central banks and governments and private actors as highlighted by Eichengreen (1992).

simply applied foreign fund to unprofitable projects while countries with more democratic institutions found it easier to monitor project quality. This could also give rise to a higher propensity to default by less democratic regimes.

The point of this chain of logic is to highlight a number of other underlying factors can exacerbate the potential for a crisis. Some countries borrowed for productive purposes and only prudently ran up large current account deficits. They also maintained strong reserve positions, were open to international trade, had sound financial development, and political institutions geared towards adhering to contractual obligations. On the other hand, other countries were extremely vulnerable to the capricious international capital market and its expectations that accompanied the free movement of capital. Their outcomes differed from the first group because they borrowed for revenue purposes often in heavy spurts when global interest rates were low and the risk appetite was large.

In the next section we attempt to gauge the direct growth benefits of capital market integration and the indirect, and possibly negative effects, via financial crises. After that we proceed to isolate the determinants of financial crises and hence to ascertain how some countries were able to avoid crises and the indirect side effects of integration in the earlier period of unfettered capital flows.

4. Growth and International Capital Market Integration: The Empirical Evidence

We present a series of cross-country growth regressions which include as key explanatory variables a measure of international financial integration and financial crises. Our measure of international capital market integration is Stone's (1999) total capital calls on London which includes public and private issues of debt purged of any refinancing issues.¹⁹ The conventional wisdom for the period is that these period gross flows were roughly equal to net flows for the capital importers (cf. Obstfeld and Taylor

¹⁹ We also carried out tests, but do not report, using the current account relative to GDP as a measure of the net inflow or outflow of capital.

2004).²⁰ Figure 5 presents a scatter plot of annual growth of GDP per capita against the five-year moving average of these inflows.²¹

In the three panels of Figure 6, we break the period into three parts (1880-1889, 1890-1899, and 1900-1913). We also average the growth rates within the period and average the ratio of inflows to GDP within each period. In the first period, there is no obvious simple correlation. In the second period, a period of financial turmoil beginning with the Baring crisis, a default in Portugal, American currency speculation (i.e., free silver problems) and a further debt default in Greece, there appears to be a negative relationship.²² The third period suggests a positive relationship.

Tables 1 and 2 explore these correlations further with multivariate regression analysis for a set of 12 countries and then a set of the same 12 plus seven other countries between 1880 and 1913. In Table 1 we pool the data and use annual observations. Typically growth regressions look at lower frequencies, and we do this in a second set of regressions by looking at non-overlapping five year periods. The justification for the first set of regressions is that financial crises are discrete events that have immediate short-run impacts. Here we are interested in looking at deviations of growth from within country long-run average growth rates associated with financial crisis years and increases in capital inflows. Our growth specification is standard and based on Mankiw, Romer and Weil (1992) and later papers in the empirics of economic growth.

We include the following controls in Table 1: the logarithm of GDP per capita in 1880, the lagged five year moving average of population growth rate, the lagged five year moving average of the percentage of the population enrolled in primary school, and the lagged level of exports divided by GDP.

To capture the impact of global capital market integration in year t we use the (lagged) five year moving average of the ratio of the Stone inflows to GDP. Of course, in an open economy, investment is the sum of two components: foreign savings (i.e., foreign borrowing—negative in the case of outflows), and national savings. Hence we

²⁰ The correlation between Stone's flows and the current account data from Jones and Obstfeld is -0.69.

²¹ Separating flows to the private sector and flows to the public sector does not change the look of our scatter plots.

²² A similar picture emerges if we use the lagged average inflows from the period 1880-1889 instead.

also include the five year moving average of the ratio of domestic savings to GDP.²³ Since savings ratios are only available for a restricted sample of 12 countries, we also report regressions without this variable. Econometrically this is a problem only if the saving rate is correlated with foreign financing. Actual savings ratios are fairly stable over time, so we think this it is a fair assumption to assume low correlation. Finally we control for the impact of crises by including a dummy if there was any type of currency, banking, twin or debt crisis in the previous year. use Regressions are of the form

$$Growth_{it} = \alpha_0 + \alpha_1 \left\{ \left(\frac{ForeignK}{GDP} \right)_{it-1,t-5} \right\} + \alpha_2 Crisis_{it} + \alpha_3 \left\{ \left(\frac{Savings}{GDP} \right)_{it-1,t-5} \right\} + \alpha_4 \ln(\overline{Enrol}_{it-1,t-5}) + \alpha_5 \left(\frac{Exports}{GDP} \right)_{it-1} + \alpha_6 (\Delta \ln(Population_{it-1,t-5})) + \alpha_7 \ln \left(\frac{GDP}{population} \right)_{i1880} + d_t + \mu_i + \varepsilon_{it}$$

Where *Growth* is the annual growth of per capita output, *d* is a set of annual time dummies, μ_i is either a country dummy or a mean zero country “random effect” and ε is an idiosyncratic error term.²⁴

Columns 1 and 1a in Table 1 are random effects and then fixed effects specifications respectively. Both columns display a negative, economically small and statistically insignificant relationship between economic growth and capital market integration. A financial crisis is associated with a one year fall in output of about two and a half percent. In column 1 the initial level of GDP is negatively related to growth implying conditional convergence.

In columns 2 and 2a we include seven more countries and 213 more country-years than were available in the first samples. This comes at the cost of excluding the domestic savings ratio as a variable. Here we find a coefficient on foreign capital inflows which is

²³ Where we do include savings, we do not adjust the savings variable downward for countries with capital outflows because the main capital suppliers are already excluded from the data set. Also the current account data is not directly comparable with the capital inflow data which would make a proper adjustment difficult. This savings data is from Taylor (2002) who calculated the ratio of savings to income as the current account divided by GDP plus the ratio of investment to GDP. We also substituted both savings measures with the investment ratio and found that the investment ratio was not statistically significant in the growth regressions.

²⁴ We allow for heteroscedasticity by using robust standard errors. We also cluster these at the country level.

not statistically different from zero in both the fixed effects and random effects regressions. We still find that the crisis variable is statistically significant. In this sample the average financial crisis could be expected to decrease growth relative to its within country average by one and a half percentage points. This is a little over a year of growth at a median rate of 1.2 percent per year.²⁵ The education and initial GDP variables have similar signs to those reported in columns 1 and 1a. The conclusion from these annual regressions is that there is no clear evidence that international capital flows were directly associated with stronger economic growth in the short-run prior to World War I. However, there is some evidence, of a negative indirect channel from flows to crises and on to output losses or temporary deviations of growth from the within country long-run trend.

In Table 2 we average the growth of GDP per capita over non-overlapping five-year periods. Explanatory variables are averaged within the five year period. This specification is a compromise between looking at the short-run (as in Table 1) or very long run growth. Our prior is that foreign capital should have an effect at a lower frequency. On the other hand, the crisis control becomes more imprecisely measured since the annual dummy indicator must be averaged over the five years.

In column 1 we present a random effects specification which includes all the controls from Table 1 including domestic savings. Column 2 leaves out national savings. Once again there is no clear association between international capital market integration and growth. In column 1 the coefficient is positive and just statistically significant at the 10 percent level, but not significant in column 2. The point estimate on the average number of years in the five year period spent in some sort of crisis has roughly the same magnitude as in Table 1 but is one statistically significant in column 2. Finally the results on the standard growth controls (especially initial GDP and schooling) are more satisfactory as we would expect when we move to lower frequency data. Domestic savings is positive (though again not statistically significant), school enrolment and trade

²⁵ Bordo et al. (2001) also studied growth losses from financial crises. They found that the (unconditional) drop in the growth of income per capita during various types of crises was 30 to 50 percent larger in the first era of globalization than between 1973 and 1997. Overall, currency crises and banking crises were associated with growth losses of roughly eight percent (not percentage points), and twin crises with losses of upwards of 15 percent. At a pre-crisis trend growth rate of roughly 1.5 percent these are equivalent to losses of up to a year of growth since the average length of these crises was between two and four years.

exposure are positive, and initial GDP is negative and statistically significant implying conditional convergence.

Columns 3 and 4 check whether there are long lags in the impact of foreign capital. Hence we lag average investment flows back to the period 10 to 15 years prior to the first year of the current five year period. Here we find a positive coefficient, and in Column 4, which is a larger sample, it is statistically significant. A two standard deviation increase of inflows (roughly .075) would imply an increase in the growth rate of almost 1 percentage point (i.e., .009). The average growth rate is 1.3 so this is an economically significant figure.

Un-reported regressions tested the robustness of this finding by using various lag structures and other measures of integration including the current account deficit or the trade balance. Repeatedly we found that only after lagging measures of capital market integration by more than 10 years could any evidence be found of an association between foreign capital and growth at the annual or five-year level. This suggests to us that there is some possibility that these factor flows did stimulate growth but only when they were applied to infrastructure at the impact could take quite a long time to surface.

Discussion of the Direct Impact of Capital Inflows

Many possibilities come to mind as potential explanations for why greater capital market integration was not directly associated with immediately faster economic growth.

The Gourinchas and Jeanne framework argues that there will be no long-run impact of liberalization. Perhaps we are looking at the countries which had already converged to close to their steady state capital labor ratios since they had been participating in international capital markets from the 1830s onwards. Clemens and Williamson (2004) also argue that factor endowments mattered more than institutions like the gold standard or empire membership for attracting British capital. These factor endowments essentially determined the steady state growth rates and levels of GDP per capita of countries. Hence, to a certain degree, international capital flows may simply be redundant in our regressions. The included variables including school enrolment ratios, population growth, openness and the fixed factors could be controlling for growth

prospects already. Finally, although markets attempted to curtail lending by poor risks, we know ex post that some countries did access London's markets and did end up 'over borrowing' and misallocating funds. These observations are surely bringing the growth impact down. As outlined above, financial malfeasance, misallocation of resources and general institutional incapacity at the local level surely reduced the ex post marginal product of capital. We now turn to the discussing how integration *indirectly* worsened economic outcomes by contributing to the probability of suffering a financial crisis.

5. The Determinants of Financial Crises

The goal of this section is to see whether the chain of logic proposed in Figure 4 represents a reasonable approximation to the globalized capital markets of the late nineteenth century. Most importantly we are looking to substantiate a link from capital flows to sudden stops and current account reversals and from reversals to crises. Along the way we will explore what other fundamentals made crises more likely.

In Figure 7 we present the frequency of various types of financial crises (banking, currency, twin, debt, "third generation" crises and all types of crisis together) for the period 1880 to 1913.²⁶ The frequency is measured as the number of years a country was in crisis divided by total possible years of observation. We use the country-year as the unit of observation and eliminate all country-years that witness ongoing crises to come up with a total number for years of observation.²⁷ The predominant form of crises before 1914 was banking crises, followed by currency crises, and then debt crises.²⁸ Mitchener and Weidenmier (2006), in a more inclusive sample, document 46 debt defaults by 25 different countries (out of roughly 40 to 50 sovereign countries) between 1870 and 1913. Overall, the average country could expect to be in crisis once a decade prior to 1913.

Figure 4 starts with real shocks and banking trouble leading to reserve losses, a currency crisis and eventually a halt to fresh capital inflows from abroad. There is a vast

²⁶ Box 3 explains the various types of crises we consider and how we define them. Our crisis dates are listed in the appendix to Bordo and Meissner (2006a).

²⁷ For third generation crises we do not eliminate ongoing banking and currency crises and in the sudden stop and crisis measure we allow ongoing banking, currency or debt crises to enter the set of country-year observations.

²⁸ Debt crises were not studied by Bordo et al. (2001)

literature on American banking crises that suggests a major determinant of banking trouble was the rigidity of the local currency under the national banking system and the gold standard. Shocks to the market rate of interest due to unusually high demand for funds (for example, seasonal demands combined with cyclical financial stress) often led to banking failures and suspension of payments. But tracking the determinants of banking crises in a large sample of countries with standard macroeconomic controls is difficult as our previous work shows (2007). This suggests that one trigger for banking crises, which may end up cascading into other types of crises, are idiosyncratic real shocks, and banking panics. The major banking meltdown of the early 1890s in Australia Was due to poor regulation and over lending to the real estate sector which contributed to something of a bubble (Adalet and Eichengreen 2006). The roots of the famous 1890 Baring crisis in Argentina and London have been attributed by Flores (2006) to intensified competition amongst lenders.

But still sudden stops and current account reversals are also related to crises. In preliminary work with Alberto Cavallo find evidence that sudden stops in capital inflows are preceded by large inflows of foreign capital or large and persistent current account deficits. The spark that ignites the crisis in this story is similar to above but countries become more prone to crises when they take on large international liabilities. The larger literature on sudden stops, based on modern evidence, also find that lagged current account deficits are a key predictor of sudden stops.

Subsequent sharp reversals in the current account when reserves are deficient are alleged to be problematic for countries suffering from currency mismatch and which also are not very open to international trade (cf. Calvo, Izquierdo and Mejía, 2004). Calvo and Talvi (2005) show how Argentina and Chile both suffered a sudden stop in the late 1990s and first decade of the 21st century. Financially fragile Argentina was hit by an “excruciating collapse” but Chile was hit by a growth slowdown.

Adalet and Eichengreen (2005) and Meissner and Taylor (2006) note that current account reversals or sudden stops do not always come along with slower economic growth and financial crises. Adalet and Eichengreen report that between 1880-1913, 15 percent of the crises preceded by current account deficits involved a sudden stop, whereas the percentage was 37 percent between 1973 and 1997. In Figure 7 we also give the

incidence of sudden stops and the incidence of sudden stops accompanied by some sort of a financial crisis. We see that about half of the sudden stops were accompanied by some sort of a financial crisis.²⁹ So there appear to be mitigating factors that determine whether sudden stops and reversals turned into output losses.

In Table 4 we use a probit model where the dependent variable is one if there was a currency crisis and zero otherwise. We control for international and year-specific factors using the rate of interest on long-term consol bonds in London. We condition on the change in the ratio of the current account to GDP, a gold standard dummy, and the presence of a banking crisis in the current or previous year. We also include the currency mismatch and the level of original sin.³⁰ The idea is that higher levels of either variable could lead to an expectation of deeper trouble. The long-term interest rate, debt to revenue ratio, growth of the money supply and the ratio of gold reserves to outstanding bank liabilities roughly control for the level of financial development of an economy. The long-term interest rate also proxies for the quality of investment as per our discussion above.

Column 1 of Table 4 shows that a large positive change in the current account to GDP ratio, and a lower level of reserves to notes outstanding are both associated with higher probabilities of a currency crash.³¹ These are the only variables that are statistically significant. They As mentioned above, the indicator for lagged banking crises is positive but not highly statistically significant. The original sin, mismatch variable, exchange rate regime, money supply growth and London interest rates are also not highly statistically significant. Table 4 suggests that currency crises are driven in part by current account reversals. These are in turn generated by previously large current account deficits (as we show elsewhere and the literature on sudden stops emphasizes). In this way,

²⁹ We consider a country has a sudden stop during a given year if there is an annual drop in net capital inflows of at least 2 standard deviations below the mean of the year-to-year changes for the period, and/or it is the first year of a drop in net capital inflows that exceeds 3 percent of nominal gdp over a period shorter than four years, and there is a drop in real gdp (any magnitude) during that year or the year immediately after

³⁰ These variables are defined in the Appendix.

³¹ The results are robust if we use the percentage change in the ratio of the current account to GDP. We follow Edwards (2004) and the current account literature that looks at the change in percentage points rather than in percent.

international capital flows appear to have an indirect impact on financial crises and hence lower economic growth.

The next link in our framework in Figure 4 relates currency depreciation, liability dollarization and balance sheets to further trouble including debt default. A probit regression (column 2 Table 4) using as a dependent variable the first year in which a country defaults (partially or in whole) on its sovereign debt obligations finds evidence consistent with our previous arguments.

First we see that a higher ratio of hard currency debt to total debt outstanding is associated with a higher probability of having a debt crisis. In column 3 we interact our original sin variable with an indicator variable equal to one if there was a currency crisis in the same year. This variable is positive and statistically significant. It implies that the marginal impact of a given level of hard currency debt relative to the total debt on the probability of having a debt crisis would be more than doubled from 0.03 to 0.07. We find evidence consistent with the hypothesis that hard currency debt combined with currency crises bring growth down.

We also find that a larger mismatch would lead to a higher risk of having a debt crisis. We include a squared term on this variable too and find that as the mismatch becomes very high the marginal impact becomes slightly smaller. It is possible that at very high levels of mismatch other policies are implemented to mitigate the impact but we are not controlling for these and venture few guesses as to what these policies might be.

As for the debt intolerance and political variables, we find that constitutions matter while default history does not (column 2, Table 4). We find that presidential regimes raise the probability of having a debt crisis by 0.10 compared to parliamentary regimes.³² The partial effect associated with having a presidential regime is substantive. It is also highly statistically significant. One possibility is that political institutions become crucial at the point that financial markets lose confidence, the country's net worth takes a major hit and default is being considered. Based on this indirect evidence it also appears that parliamentary democracies were able to find other ways of resolving their financial troubles besides default. Part of the difference, could also be that most

³² There are no countries classified as dictatorships in our sample.

empire observations in our sample were parliamentary democracies, while Latin American countries in our sample were presidential. We cannot rule out the possibility that omitted factors correlated with presidential systems are driving this result. Finally, another explanation could be that less democratic political regimes took less care in allocating their capital inflows to productive projects and hence ended up in unsustainable positions more often.

Previous default history does not make sustaining any given level of debt to revenue ratio more difficult. The notion that debt intolerance existed in the nineteenth century and manifested itself simply by the default record does not stand up. It appears more likely that institutional or structural factors and their interactions could have been at work in creating the phenomenon of serial default.

We also find that a large surplus in the current account (or a smaller deficit) is related to fewer debt crises. This result is robust to swapping the current account measure with our inflow measure directly so it appears that lower international capital market integration is associated with fewer debt crises. Also higher interest rates at home and abroad are associated with a greater risk of a crisis and there is only weak evidence that contemporaneous banking crises are associated with debt crises. Overall then we find strong support that original sin and balance sheets matter, but we also find evidence that financial development and deeper institutions are important for explaining the incidence of major financial meltdowns.

7. International Capital Markets and the Net Benefits of Laissez Faire Financial Globalization: Some Tentative Conclusions

We began by highlighting the fact that there were basic features of the first era of globalization in capital markets quite similar to those today. We then proceeded to look at the stylized facts of globalization between 1880 and 1913. Cross border capital flows were often large. Asset trade was unencumbered by capital controls. British and European capital scoured the planet in search of high returns going to where natural resources were abundant and capital and labor were scarce. Coincident with all of this, growth in many countries was strong. Some countries no doubt benefited directly from

foreign capital. Canada and the other dominions and the United States prior to the Civil War come to mind.

On the other hand, these rather special examples obscure the difficulty that many other nations had in dealing with their foreign capital market connections. When funds dried up after a borrowing spree and the fundamentals were weak, this combined to generate economically pernicious financial crises. Growth was substantially lower around the time of financial crises.

We have outlined the role that hard currency debt, currency mismatches and financial development played in interacting with sudden stops of capital flows from the core countries. We also highlighted that political issues mattered. Nevertheless, and much like today, presidential constitutions seem to have been one of the decisive factors in leading countries to default.

Our assessment of the growth benefits of market-based accumulation of capital via international integration is thus mixed and cautious. Continued integration may not prove directly crucial for economic growth in and of itself. On the other hand, foreign borrowing binges can lead to crises. Poor governance and weak credibility combined with original sin and skittish capital markets exacerbate the downturn associated with such events. However, some exceptional countries accumulated a domestic capital stock through the judicious use of foreign capital and also avoided crises. They had already become relatively financially developed and had earned credibility in the eyes of international capital markets.

While there is no strong evidence of a direct positive impact on growth, foreign financing may have been conferred other benefits such as enhanced risk-sharing and consumption smoothing opportunities. We leave these dimensions of integration to further research. Further investigation into how countries transition from being crisis prone to having credibility will also be fruitful for understanding the long run evolution of the benefits and costs of a financial system with global reach.

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Data Appendix

Most of the data underlying this paper was used in our previous work (Bordo and Meissner 2007 and Bordo and Meissner 2006) and is explained thoroughly in those sources. The bulk of the macro historical data set is that used in Bordo et. al. (2001). Even more expansive data descriptions and sources are listed in the working versions of our work on crises in NBER working papers 11173 and 11897.

Country Sample:

The countries in our regressions include two sets. The first is constrained by availability of savings data. Countries in this set include: Argentina, Australia, Canada, Denmark, France, Germany, Italy, Japan, Norway, Spain, Sweden, USA. The second set includes the following additional countries: Austria, Brazil, Chile, India, New Zealand, Portugal, and Uruguay.

Constitutional Rules: Data kindly supplied from David Leblang.

Crisis Dating:

As in Bordo et. al (2001) we date currency and banking crises using both qualitative and quantitative evidence. For all countries besides Austria-Hungary, Russia, New Zealand, South Africa, Mexico, Turkey, Egypt, Uruguay and India we have relied on the dates of Bordo et. al. in both periods. In the earlier period we have tried to date currency crises, when possible, by using an approach based on the exchange market pressure (EMP) methodology which looks at changes in reserves, the exchange rate and the interest rate.

Debt crisis dates were based on Beim and Calomiris (2001). Only private lending to sovereign nations is considered when building those default dates. Not every instance of technical default is included in the chronology, the authors identified periods (six months or more) where all or part of interest/principal payments were suspended, reduced or rescheduled. Some of those episodes are outright debt repudiations, while others were reschedulings agreed upon mutually by lenders and borrowers. Also data is taken from a spreadsheet underlying Reinhart, Rogoff and Savastano (2003).

Mismatch

We focus on the government's mismatch due to severe data constraints. But we believe this is a relatively good proxy for the economy-wide mismatch. The functional form we choose is different from Goldstein and Turner and slightly closer to that found in Eichengreen, Hausmann and Panizza (2003).³³ For country i we have

$$\text{Mismatch}_i = \frac{\text{total hard currency debt outstanding} - \text{international reserves}}{\text{exports}}.$$

Our measure of reserves usually only includes gold reserves held at the central bank, in the banking system or held by the government treasury. The sources are listed in the appendix to our previous papers (cf. Bordo and Meissner 2007 and 2006). Total hard currency debt (domestic and international issues) is calculated directly if the data are available or by multiplying the total debt outstanding by the percentage of total debt that is payable in gold or foreign currencies.

Original Sin

We collected data from various national sources on hard currency debt (cf. Bordo and Meissner, 2007) and augmented and compared this with data made available by Flandreau and Zúmer (2004). What we refer to as hard currency debt (or original sin) is

³³ Eichengreen Hausmann and Panizza (2003) report that the correlation between their measure of mismatch and the Goldstein and Turner measure is 0.82.

debt that carried a gold clause or was made payable at a fixed rate in a foreign currency.³⁴ Our measure of original sin, OS , is the ratio of this quantity to total public debt outstanding.

$$OS_i = \max\left(1 - \frac{\text{Securities issued in currency } i \text{ by country } i}{\text{Securities issued by country } i}, 0\right).$$

³⁴ The data appendices and the text in our previous work on crises has more to say about the structure of this debt.

Figure 1 Average Levels of the Ratio of the Current Account to GDP for Different Types of Capital Importers, 1880-1913

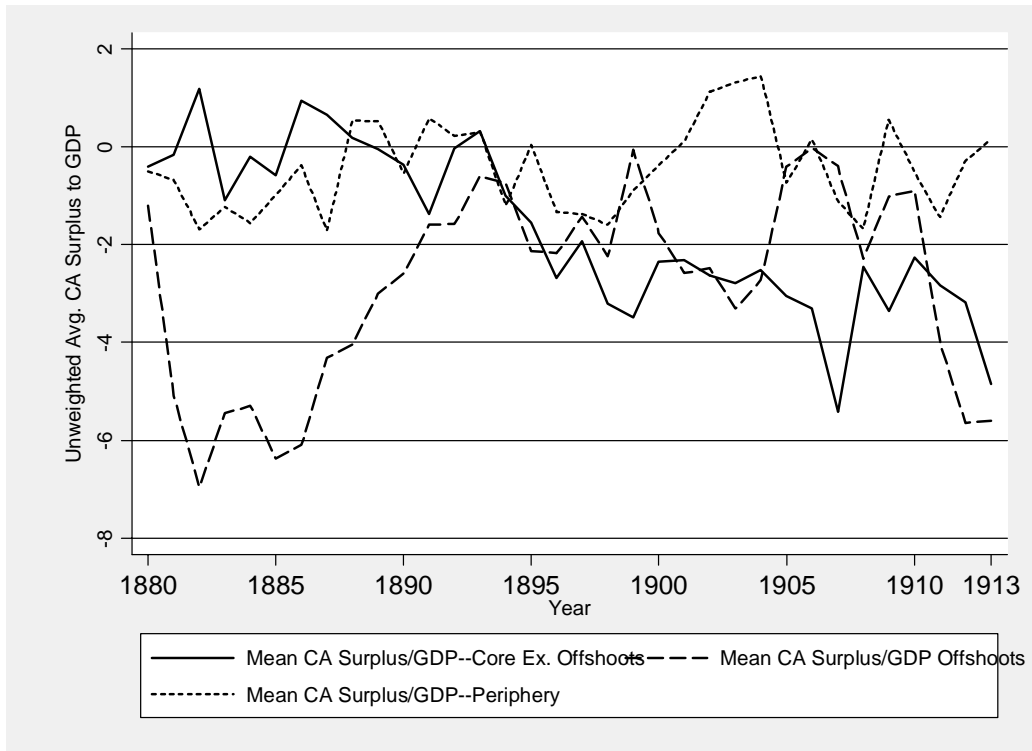
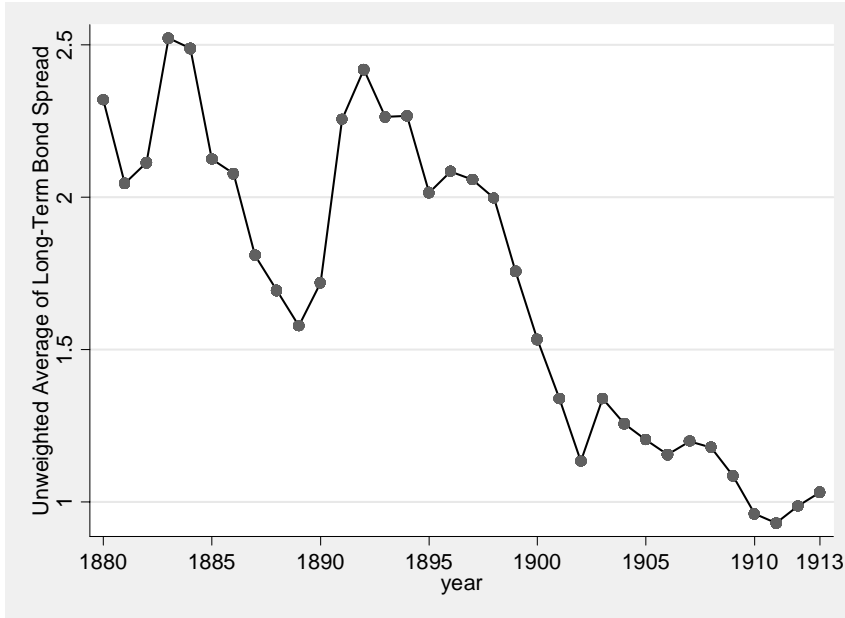


Figure 2 Average Bond Spreads, 1880-1913



Notes: Averages exclude bonds in default with spreads greater than 1200 basis points.

Figure 3 Bond Spreads versus a Measure of Productive Investment, 1874

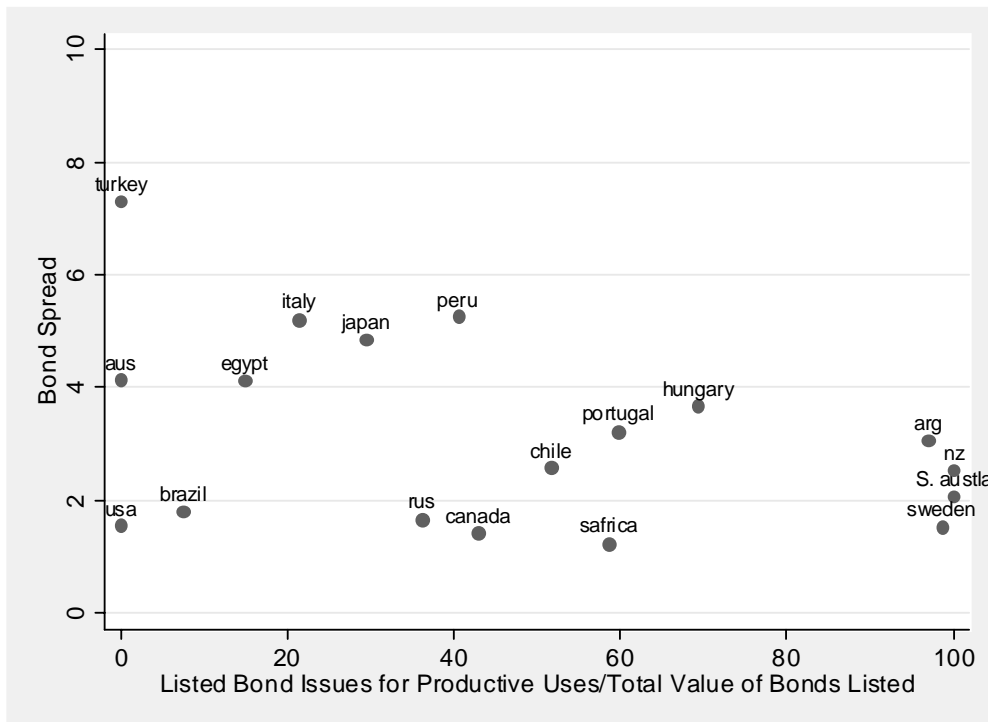


Figure 4 Framework for Balance Sheet Crises

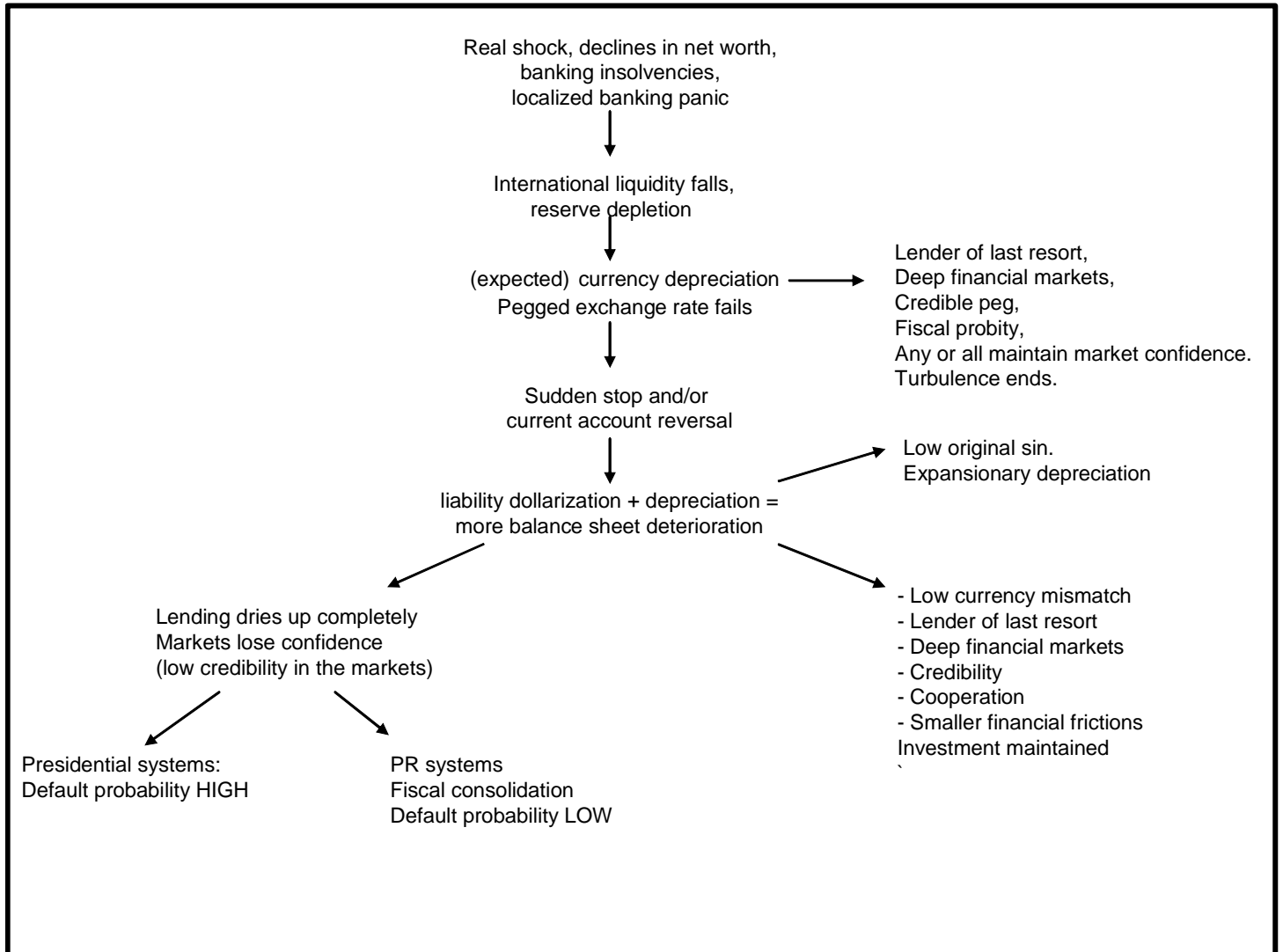


Figure 5 Annual Growth in Per Capita GDP versus International Capital Market Integration, 1880-1913

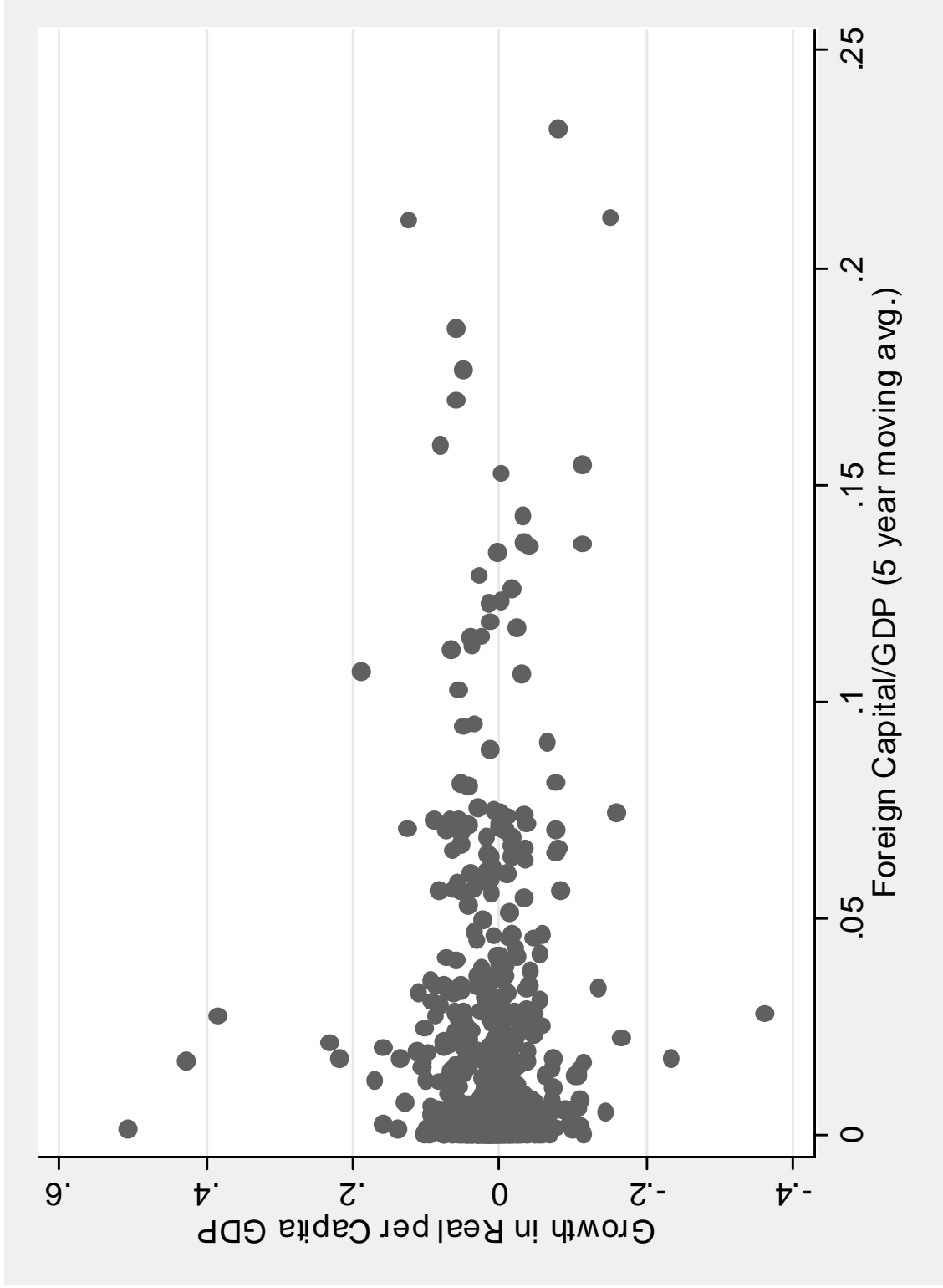


Figure 6 Growth in Per Capita GDP for three Sub-Periods versus Gross Inflows of Capital.

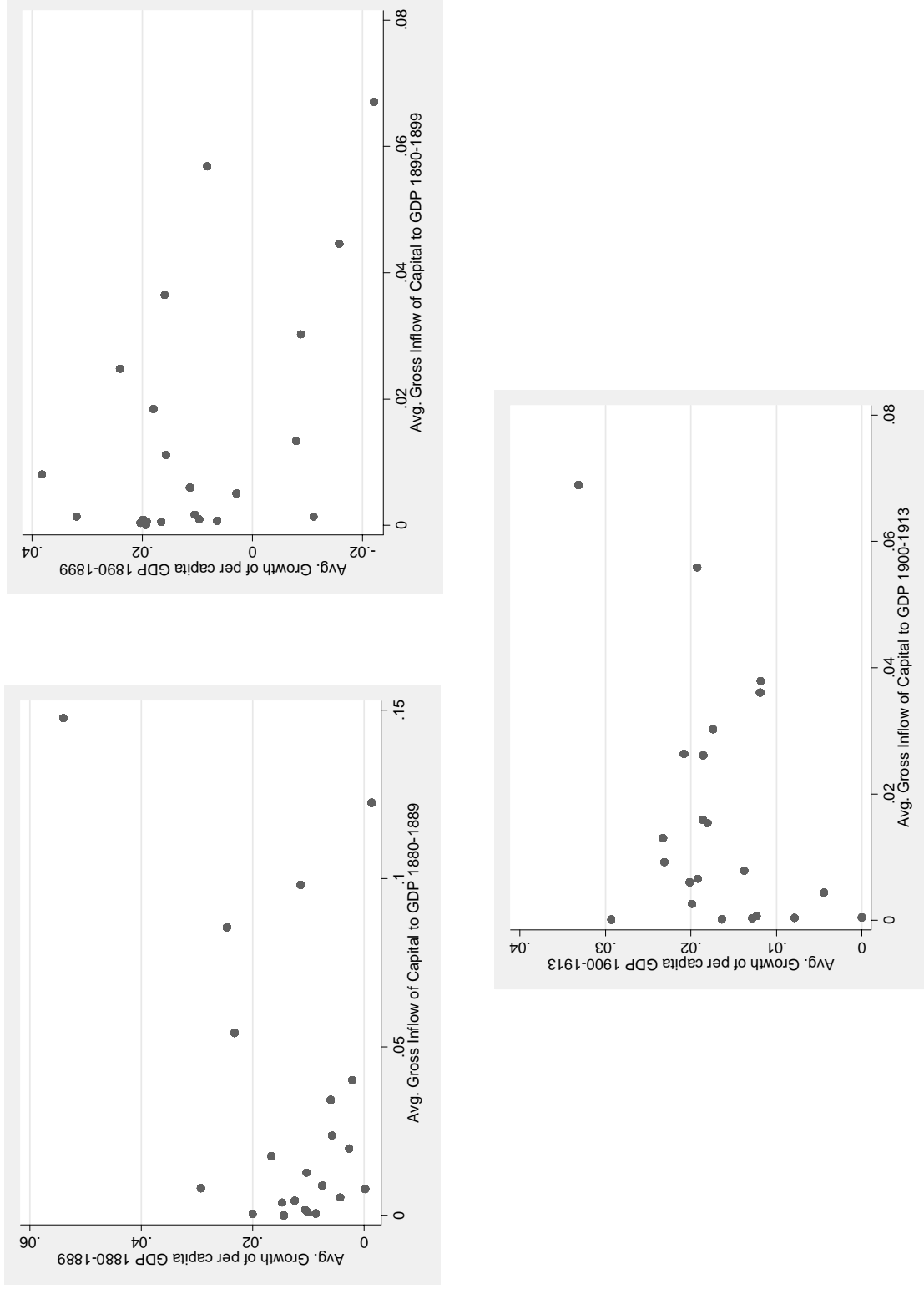


Figure 7 Crisis Incidence, 1880-1913

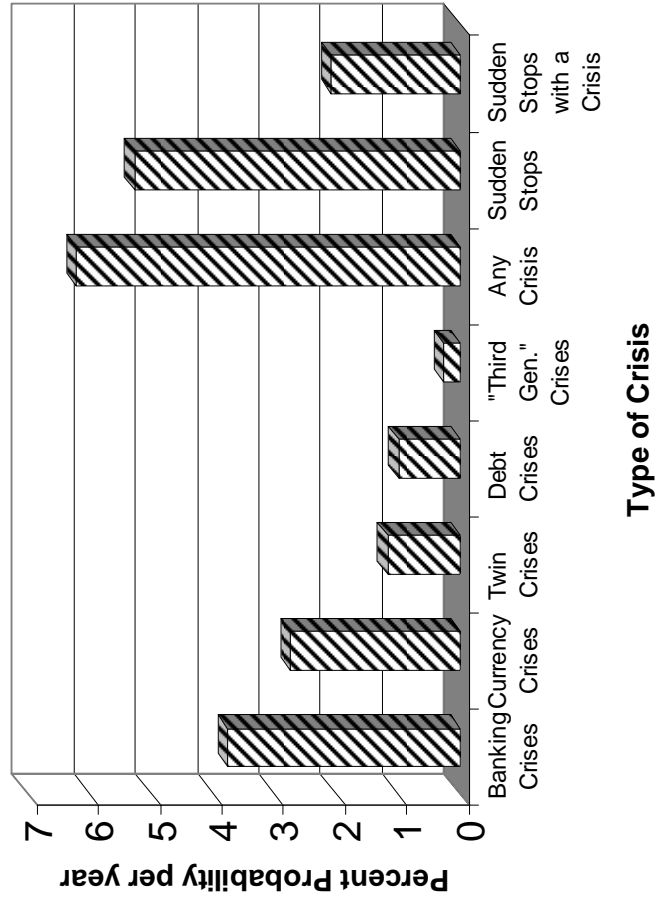


Table 1 Growth, Capital Market Integration and Financial Crises

Regressors	(1)	(1a)	(2)	(2a)
{[Avg Gross Capital Inflows/GDP] $t-1, t-5$ }	-0.036 [0.030]	-0.058 [0.063]	0.013 [0.027]	-0.016 [0.036]
Financial Crisis $t-1$	-0.024 [0.014]*	-0.026 [0.014]*	-0.016 [0.009]*	-0.017 [0.008]*
{[Avg. Savings /GDP] $t-1, t-5$ }	0.003 [0.037]	-0.019 [0.073]	---	---
{Avg. Percentage of the Population Enrolled in School $t-1, t-5$ }	0.07 [0.050]	0.01 [0.216]	0.085 [0.033]***	0.056 [0.097]
Exports/GDP $t-1$	0.025 [0.029]	0.009 [0.141]	-0.003 [0.008]	-0.039 [0.027]
{Avg. Growth rate of Population $t-1, t-5$ }	0.09 [0.160]	-0.509 [0.561]	-0.042 [0.173]	-0.527 [0.257]*
ln {GDP per capita 1880}	-0.007 [0.003]**	0 [0.000]	-0.003 [0.003]	0 [0.000]
Constant	0.039 [0.022]*	0.018 [0.032]	0.028 [0.020]	0.018 [0.016]
Number of obs	346	346	550	550
Country Fixed Effects	no	yes	no	yes
R-squared	0.15	0.14	0.08	0.05

Notes: Dependent variable is the annual growth rate of GDP per capita. Heteroscedasticity robust standard errors clustered at the country level are in parentheses. See the text for precise definitions of variables.

* p-value < 0.1; ** p-value < 0.05; *** p-value < 0.01

Table 2 International Integration and Growth, Five Year Periods, 1880-1910

Regressors	(1)	(2)	(3)	(4)
{Avg Gross Capital Inflows/GDP}	0.16 [0.099]*	0.055 [0.086]	---	---
{Avg Gross Capital Inflows/GDP $t-11, t-16$ (years in crisis)/5}	-0.012 [0.013]	-0.013 [0.008]*	0.089 [0.061]	0.124 [0.054]**
{Avg. Savings /GDP}	0.032 [0.021]	---	---	---
{Avg. Savings /GDP $t -11, t-16$ }	---	---	-0.019 [0.025]	---
Avg. Percentage of the Population Enrolled in School}	0.111 [0.054]**	0.122 [0.041]**	0.138 [0.062]**	0.141 [0.046]**
Exports/GDP $t -1$	0.031 [0.029]	0.006 [0.006]	-0.004 [0.030]	-0.021 [0.011]*
{Avg. Growth rate of Population}	-0.176 [0.184]	0.021 [0.194]	-0.115 [0.189]	-0.025 [0.150]
In {initial GDP per capita}	-0.011 [0.007]*	-0.008 [0.005]*	-0.002 [0.004]	-0.005 [0.005]
Constant	0.082 [0.044]*	0.064 [0.031]**	0.017 [0.030]	0.042 [0.030]
Number of obs	82	136	46	80
R-squared	0.28	0.17	0.22	0.30

Notes: Dependent variable is the average growth rate of GDP per capita within non-overlapping five year periods. See the text.

Heteroscedasticity robust standard errors clustered at the country level are in parentheses. See text for precise definitions of variables.

* p-value < 0.1; ** p-value < 0.05; *** p-value < 0.01

Table 3 The Determinants of Currency and Debt Crises

<i>Regressors</i>	<i>Currency Crises</i>	<i>Debt crises I</i>	<i>Debt Crises II</i>
	(1)	(2)	(3)
Original Sin	0.001 (0.019)	0.070** (0.032)	0.031** (0.014)
Original Sin x currency crisis	---	---	0.043* (0.023)
Original Sin x gold standard indicator	---	-0.051 (0.033)	---
Mismatch	0.003 (0.003)	0.011** (0.004)	0.013** (0.006)
Square of mismatch	---	-0.002*** (0.001)	-0.002*** (0.001)
Debt/Revenue	-0.002 (0.003)	0.002 (0.002)	0.003* (0.001)
Debt/Revenue x Pre-1880 Default	---	0.003* (0.002)	0.001 (0.001)
Pre-1880 Default	---	-0.064* (0.035)	-0.017 (0.015)
Presidential System	---	0.10 (0.02)***	0.11 (0.02)***
Change in the Current Account/GDP	0.004 (0.002)**	---	---
Current Account/GDP	---	-0.003*** (0.001)	-0.004*** (0.001)
Long-term interest rate	0.0001 (0.003)	0.009** (0.003)	0.009*** (0.003)
Consol interest rate	-0.006 (0.021)	0.033** (0.016)	0.038** (0.017)
Gold standard dummy	0.023 (0.018)	0.044 (0.030)	0.004 (0.004)
Percentage Change in the money supply	-0.053 (0.098)	---	---
Gold reserves/notes in circulation	-0.055** (0.025)	---	---
Currency crisis in <i>t</i>	---	0.061*** (0.023)	-0.003 (0.008)
Currency crisis in <i>t</i> -1	---	-0.007* (0.004)	-0.007* (0.004)
Banking crisis in <i>t</i>	0.022 (0.040)	0.016 (0.011)	0.016 (0.010)
Banking crisis in <i>t</i> -1	0.082 (0.075)	0.004 (0.006)	0.012 (0.011)
constant	-1.46 (1.16)	-27.77 (9.73)	-26.36 (11.7)
Number of obs	596	604	604
Pseudo R-squared	0.103	0.71	0.69

Notes: Dependent variable in column (1) is currency crises. Dependent variable in columns (2) and (3) is a debt default. Robust clustered standard errors are in parentheses. See the text for precise definitions of variables.

* p-value < 0.1; ** p-value < 0.05; *** p-value < 0.01