

Financial Globalization, Financial Development and Financial Crises in the Golden Age, 1870-1914*

March 21, 2015

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Abstract: Why did some countries learn to grow up to financial stability and others not? We explore this question by surveying the causes and responses to banking, currency, and debt crises between 1880 and present. We divide countries into three groups: Leaders, learners, and non-learners. Each of these groups had very different experiences in terms of long-run economic outcomes, financial development, financial stability, crisis frequency, and their policy responses to crises. We illustrate this by way of case studies for three kinds of financial crises for four countries (Argentina, Australia, Canada and the United States) over the long-run. The countries that grew up to financial stability have rule of law, democracy, political stability and other institutional features highlighted in the literature on comparative development.

*Paper prepared for the conference “Financial Systems and Economic Growth: Conference in Honor of Richard Sylla” Stern School of Business, New York University March 27-28 2015.

1. Introduction

An important theme in Richard Sylla's work has been financial development. His work in economic history strongly complements the extensive empirical research by King and Levine (1993) and many others who have established a strong connection between financial development proxied by the ratio of broad money to income and by various measures of stock market capitalization and future economic growth. Rousseau and Sylla (2003) have developed the concept of financial revolutions. They argue based on the history of the Netherlands, Great Britain, the United States, France, Germany and Japan, that these countries grew rapidly after financial revolutions which created "good" financial systems. Such systems have five key components: sound public finance and public debt management; a stable monetary regime; a banking system; a central bank; and well-functioning securities markets.

Financial development in the past three centuries has also been accompanied by two other complementary important phenomena: financial globalization and financial crises. Financial globalization is a term for the opening up of international capital markets and the export of capital from advanced to emerging countries. More recently financial globalization has seen capital flowing in both directions (from poor to rich and rich to poor) with very high gross flows being the hallmark of the last two decades. Capital inflows to capital scarce regions, have long been crucial to the economic development of the recipient countries. Financial crises (banking, currency, and debt) also became more of an issue along with each successive wave of financial development and globalization. Recently it has been argued that capital inflows often lead to an expansion of bank lending which can create an asset price boom, especially in real estate, an asset price bust and a financial crisis (Borio, James and Sinn 2014). In this paper we focus on the interface between financial development, globalization and financial crises. In our case studies we concentrate primarily on the period 1880-1914, the first era of globalization, but we also explore these issues in the twentieth century and earlier in the 19th century to some degree. We ask several questions:

1. Why were some emerging markets able to access international capital markets and successfully use these funds to finance their development?
2. Why are some countries hit by financial crises which delay their development?
3. Why have some countries been able to avoid financial crises altogether?

4. Why is it that some countries have learned from their crisis experience and developed ways to reduce the likelihood and impact of financial crises while others have not?

In sum the question we ask is “Why did some countries learn to grow up to financial stability and others not?”

In this paper we survey the empirical and narrative evidence on the experience of emerging market countries from the 19th century into the 20th century. We complement this evidence with case studies on four emerging countries (U.S., Canada, Australia, and Argentina) which were recipients of capital flows, experienced financial development and had varying experiences in coping with financial crises.

2. Overview : Capital Flows, Financial Crises and Financial Development

The period 1870–1914 was the first era of globalization characterized by the rapid growth of international trade, extensive international financial integration and massive international migration comparable to the present era of globalization (Bordo, Williamson and Taylor 2003). Key elements of this era were: adherence to the gold standard and stable exchange rates; political stability attributable to Pax Britannica and the balance of power; it was an era of limited government involvement in the economy. During this period many of today’s advanced countries were essentially emerging market economies. Many also went through financial revolutions (Rousseau and Sylla 2003)

Financial globalization raises real economic growth in emerging market countries but it is also often accompanied by financial crises (sudden stops, currency crises, banking crises and sovereign debt defaults). Indeed there has been considerable recent debate on whether financial integration contributes to growth or whether growth was negated by financial crises. Gourinchas and Jeanne (2006) argued that capital flows had limited effects on growth.¹ Others have argued that on net capital flows aid growth and that crises only have temporary effects (Tornell and Westerman 2003 and Bordo and Meissner 2011).

Bordo and Meissner (2011) found that the British Dominions and Northern Europe did better than Southern Europe and Latin America in absorbing capital flows and avoiding financial crises or learning from them. The British Dominions and Northern European

¹ Also see Henry (2007) and Edison et al (2006).

countries were more financially developed, and based on their development and institutional arrangements they learned from their financial crisis experience to improve their institutions and policies. Crises could not be eliminated, but their frequency and severity seems to have been reduced when comparing these countries to a set that included Argentina, Brazil, Chile and Greece amongst others. In addition, regulatory and legislative efforts in these countries usually attempted to redress the deficiencies that caused the last crisis. While regulators might be accused of “fighting the last war” such a strategy in a complex world may be better than no or only cosmetic reform.²

Other countries (e.g., Argentina, Brazil, Chile, and Greece) to cite some extreme examples, faced two centuries of capital inflows, asset booms and busts and recurrent financial crises whose origins and causes were strikingly similar from one crisis to the next. Sovereign debt crises were a particular problem, but currency instability and banking crises also were quite prevalent. In many instances, minimal efforts at reform were undertaken and quite often policy change was truly cosmetic such that subsequent crises unfolded in dramatically similar ways with outcomes such as high or hyper-inflation, debt default, and financial system collapse being repeated over and over again.

The successful countries were more financially developed and had the following attributes: political stability, competitive political systems, lower income inequality, adherence to the rule of law; well defined property rights and democracy. There is an extensive literature on these institutional forces (e.g., North and Weingast, 1989, Rajan and Zingales, 2003b, North, Wallis and Weingast, 2009, Acemoglu, Johnson and Robinson, 2004, Engerman and Sokoloff, 1997, and Calomiris and Haber, 2014).

To fully understand the process of growing up to financial stability and of learning and adapting while under the pressure of finicky financial markets, one needs to understand the drivers of market and policy responses to moments of great financial stress. Political institutions, the constitutional framework, legal traditions and property rights help shape how the economic landscape responds to both the shocks of globalization and those that arise for other reasons. Before that however we also need to understand the drivers of

² Hubbard, Glen “How to Stop the Next Financial Crisis: The Fed Might Be Our Last Great Hope” 9/12/2013 The Atlantic <http://www.theatlantic.com/business/archive/2013/09/how-to-stop-the-next-financial-crisis-the-fed-might-be-our-last-great-hope/279594/>

financial crises, what the historical record shows regarding the frequency of crises and how this informs our ideas on learning or growing up to financial stability.

3. Theoretical Perspectives; Foreign Capital Economic Development and Financial Crises in the Long-Run

A useful long-run typology identifies three main types of crises: banking crises, sovereign debt crises, and currency crises. Banking crises are often associated with large asset losses and significant bank failures, large deposit withdrawals, and government interventions in the banking sector either via fiscal or monetary support (Laeven and Valencia, 2013). Sovereign debt crises are defined by partial default, outright repudiation or significant de facto default caused by monetary expansion and inflation; all of these are breaches in the original terms of the nominal debt contracts that sovereigns contract. Currency crises involve large and sudden nominal depreciations, intense (negative) pressure on reserve assets and possibly an interest rate defense of the currency (Eichengreen, Rose, Wyplosz, 1996). Other categories of crises exist. For instance, twin crises involve banking and currency crises with one crisis preceding the other and one often being the proximate cause of the other. Triple crises witness a banking, currency and a debt crisis. We discuss the mechanics of each kind of crisis below indicating some instances from the historical record where such crises occurred.

3.1 Banking Crises

The fundamental vulnerability of the banking sector is a maturity mismatch. Long-dated investments and the ability of creditors to withdraw funding can lead to a bank's failure (Diamond and Dybvig, 1983). The types of shocks that can cause bank failures include shocks to the underlying assets leading to outright insolvency, or in a model of imperfect information, concerns about the solvency of a bank.³ Liquidity panics, when the supply of funds to banks dries up precipitously can arise due to concerns about the value of

³ See Calomiris and Mason (2003) on liquidity versus insolvency the Great Depression. See Ó Gráda and White (2003) on information and bank panics in the 1850s in the United States.

the banks' assets and/or because of a sudden desire to hold cash by creditors and/or depositors.

Of course, true banking crises are systemic events and the historical evidence suggests that direct economic linkages and connections, financial market shocks and information cascades within the depositor network are all prime drivers of a banking collapse. Hanes and Rhode (2013) specify a monetary channel for systemic banking panics in pre-World War I US emphasizing linkages between institutions in the money market and via reserve pyramiding could lead to systemic crises.

Banking crises can also have an international dimension as for example during the Baring Crisis of 1890-1891, the global instability of 1907, the Credit Anstalt crisis of 1931, the Asian Financial crisis, or the sub-prime crisis of 2007. In all of these cases, cross-border claims and faltering foreign banks or counterparties led to solvency or liquidity problems at home. In addition, interest rate shocks (e.g., US interest rate rises via monetary policy shocks in 1980-81 or in 1929) may contribute directly or indirectly to starting or exacerbating financial stress.

Banking crises can be regulated out of existence. Between 1945 and the 1970s most countries limited international financial flows and imposed strict regulations on banking activity. Such controls took many forms including partial or complete nationalization of the financial sector, strict limits on competition, interest rate ceilings etc. Prior to World War II and after the 1970s, regulation was less restrictive. It took many forms and evolved over time. The following were methods used: market discipline, clearing house membership, and government regulation, capital and reserve requirements, limits on note issues, branching restrictions, unlimited liability, financial reporting, and government supervision. All of these were common instruments that were intended to keep the banking system from becoming precariously overleveraged or committing outright fraud in an environment of imperfect information.

Ex post, liquidity support and government guarantees are common tools to fight liquidity crunches and avoid systemic crises. Liquidity support became common in the late 19th century (Bignon, Flandreau and Ugolini, 2012). Bordo and Eichengreen (1999) highlight numerous instances of domestic and foreign liquidity support in systemic banking crises of the 19th century. Outright government guarantees of the liabilities of financial institutions were used already in the 19th century as for instance in Denmark in 1908 and France 1888-

1889 amongst many others (Bordo and Eichengreen, 1999 and Grossman 2010). But these techniques have become more preponderant over time as deposit insurance and direct government intervention has increased.⁴

Notwithstanding these attempts, as we discuss below, only a handful of countries were able to strike the right balance of preventative and palliative mechanisms and ultimately avoid financial crises. This observation indicates two things. First, and foremost, the maturity mismatch is the fundamental driver of financial fragility. Second, financial instability can arise even where the banking system is ostensibly regulated. This could be due to political capture of the financial regulator or because of financial innovation that avoids or actively evades regulatory authority. Moral hazard and the excessive risk taking it encourages has also been cited as a driver in some cases (Hautcoeur, Riva, and White, 2014). Third, in an open economy, the financial system is often affected by systemic effects via “contagion” whose origins are outside of country in question.

3.2 Debt Crises

Over the long run, governments have issued debt on international markets for the following reasons: cash flow, infrastructure investment and public goods expenditures, wars. Since World War II, counter-cyclical initiatives have also been in play. Whatever the reason, the fundamental problem remains, as with all debt in a world of incomplete markets, maturity mismatch and imperfect risk-sharing. Sovereigns in the post-World War II environment typically have borrowed at short-term maturities, but prior to World War II this problem seems to have been less crucial (Bordo, Meissner and Redish, 2005). Still, prior to World War II, variable, or surprisingly weak revenue outturns and poor oversight in choosing projects often led to debt defaults.

Sovereign default has been a fact of life since the invention of coinage which could be debased. The medieval period was rife with debasements and outright defaults in European kingdoms (Drelichman and Voth, 2011 Reinhart and Rogoff, 2009). A wave of sovereign defaults tied to international capital flows occurred in the 1820s in many Latin American Republics as over-optimist investors from Europe lent these fledgling republics more than their weak public finances could handle (Flandreau and Flores, 2009) . In the

⁴ Laeven and Valencia (2013) provide a comprehensive data set for the 1970-2012 period showing the size and nature of various forms of guarantees.

1930s a series of global demand and commodity price shocks, mis-use of funds, global recession and a sharp shift backwards in the international supply of capital led to a series of defaults by commodity exporters (Eichengreen and Portes, 1986). In addition Germany defaulted on its reparations payments to the Allies in 1933 causing the Allies to default on their war debts to the United States and other allies (Reinhart and Rogoff, 2013). In the 1980s a number of Latin American countries and financial and non-financial firms in those countries defaulted when US interest rates skyrocketed.

As in the private sector, the currency mismatch problem has also caused problems. Foreign currency denominated debt was common in 19th century sovereign debt contracts with rare exceptions to the rule (Bordo, Meissner and Redish, 2005 Flandreau and Sussman, 2005). Eichengreen, Hausman, and Panizza (2005) argue that in recent decades currency instability and foreign capital flows have induced financial instability.

Although small open economies can rarely avoid issuing debt in foreign currency, they have in fact been able to rely on domestic debt markets to some extent even in the 19th century (Bordo, Meissner and Redish 2005). Building local debt markets is one strategy to avoid the currency mismatch problem. However, up to World War II, domestically issued debt often, but not always, contained a gold clause which could cause the burden of debt to rise when the local currency price of gold fell. Even during commodity money regimes, governments often had a free hand and issued local currency denominated debt without gold clauses. With domestically denominated liabilities, inflation induced by the printing press could and did lead to implicit default as for instance in Austria (1811, 1868), Argentina (1890), Brazil (1889-1891) Chile (1887), Italy (1890s), Spain (c. 1900), and Russia (1870s) amongst many others.⁵

3.3 Currency Crises

Many authors portray the 19th century and the classical gold standard period as one of relative stability. The actual record is more complicated. While most advanced nations adopted and stuck to the gold standard between 1880 and 1914, nearly all countries faced some level of currency instability at some point. In Latin America, financial development had gone far enough to make note issue a commonplace by the 19th century, and in many cases governments or “banks of issue” printed sufficient money to generate significant

⁵ See Reinhart and Rogoff (2009) for a survey of default through inflation over the long-run.

depreciation and inflation. The practice continued well into the 20th century in Europe in for instance Germany, France, Poland and Austria amongst others. In the post-World War II period, Brazil (1988-1994) and Argentina (1984 and again in 1989) resorted to the printing press, and hyperinflation or sharp depreciation in the exchange rate was a fact of life in developed countries and even more so in developing countries. In the US case the Civil War brought strong inflation in both the North and South. A long political battle about whether the US should adhere to a gold standard, a silver standard or a fiat regime culminated in the 1890s with a drawn out speculative attack on the dollar (Miller, 1996). Southern and Eastern European countries were often unable to maintain their gold (or silver) reserves and had many outbreaks of inflation across the 19th and 20th century. Even the leading countries of Europe had to appeal to ad hoc reserve pooling arrangements on specific dates. France borrowed reserves from the Bank of England in 1882; Great Britain borrowed from the Bank of France and the Bank of Russia in 1890; Sweden borrowed from the Bank of France in 1907. Such operations relaxed the constraints for central banks attempting liquidity support under the gold standard.

Currency crises have often been systemic and international and this was especially so in the 1930s. By the 1920s, the gold standard had evolved into a gold exchange standard. This rendered any one country's commitment to gold only as good as the commitment of the anchor currencies (in this case the pound sterling or the dollar). From 1928 until the mid-1930s, France accumulated massive gold reserves but instead of loosening monetary policy France sterilized these inflows (Eichengreen, 1991; Irwin, 2011). The scarcity of gold helped contribute to a bank run mentality. Nations as diverse as Brazil, Denmark, and Great Britain, amongst many others, were forced off the gold standard by such "destabilizing speculation".

Currency instability did not disappear in the Bretton Woods period (Edwards and Santaella, 1993).⁶ International speculative attacks did not totally disappear in the 1950s and 1960s. Although capital and exchange controls were used extensively, offshore currency markets and delayed remittances associated with trade ("leads and lags") allowed for pressure

⁶ This paper identified 69 large devaluation episodes in developing economies 1948-1971. In the developed world depreciation and "re-alignment" also occurred frequently. Amongst others the United Kingdom faced currency crises in 1964, 1967, again in the 1970s, and in 1992, France in 1957 and 1968, and 1992, the US in 1960 and 1971, Sweden in 1992, and Italy in 1964, 1976, 1992 and 1995.

to exerted. One could conceptualize these crises as first generation crises in the spirit of Krugman (1979).

A number of super-sized speculative attacks on currencies in the early 1990s occurred. This wave of crises led to the notion that many governments, committed to full employment as they had been since World War II, would not be able to stand the economic costs of an exchange rate defense which typically involved raising interest rates and sending the economy into recession. Once again, there is historical precedent. Eichengreen (1991) identifies this as a key problem in the interwar gold standard.

3.4 Third Generation Crises

Continuing into the 1990s and into the first decade of the 21st century many other nations faced currency crises. In many instances these crises were the product of the following sequence of events: nations pegged their exchange rates and liberalized their financial systems; capital inflows contributed to credit growth and increased indebtedness with liabilities payable in dollars. The potential that a shock or a change in expectations could disrupt this process and create large losses was directly related to the accumulated deterioration in the net international investment position; a change in expectations occurred; a sudden stop in capital inflows made for significant pressure on the currencies of these countries and led to depreciation; the expectation and realization of these exchange rate changes led to private sector defaults as the real depreciation enlarged foreign obligations faster than export revenue could rise.⁷ Many countries either explicitly or implicitly guaranteed the liabilities of the financial system generating enhanced risk-taking and endogenous fiscal crises. In this way currency and banking crisis problem become intertwined with a strong potential for sovereign difficulties too. This dynamic and variants of it have been described and analyzed in the case of East Asia and the 1990s and other small open economies (Burnside, Eichenbaum and Rebelo 2005).

Once again, it would be a mistake to think that such dynamics were not present prior to the 1990s. Bordo (2006) and Bordo, Cavallo and Meissner (2010) study sudden stops in the 19th century and find that the size of the lagged current account deficits and foreign

⁷ This is a simplified version of events in 1996/97 in Thailand and in 1997 in several other countries in East Asia. See Krugman (1999a), Krugman (1999b), Dooley (1994) and Corbett, Irwin and Vines (1999).

currency debt interact to heighten the probability of a financial crisis. Moreover, Bordo and Meissner (2006) and Bordo, Meissner, and Stuckler (2010) find that weak financial fundamentals contributed to even higher predicted probabilities of crises in the presence of significant current account deficits. These “fundamentals” include the level of public debt to GDP, the ratio of foreign currency debt to total public debt, the ratio of reserves relative to narrow money, and openness to trade. The implication is that countries that keep debt down, are not exposed to foreign currency debt and can accumulate reserves can withstand the turning tides of international capital markets much better than countries which cannot do so. No comprehensive study like those cited here has been undertaken for the 1930s. However Accominotti and Eichengreen (2013) show that capital inflows were a function of both lending and borrowing country characteristics in the 1930s.

3.5 Summary of Financial Crises over the Long-Run

Over the long run financial crises have had both domestic and international causes. What have we learned about the causes of financial crises? How do these lessons relate to repeat offenders versus countries that have learned to avoid crises or have always had lower propensity to have such crises?

Banking stability has numerous determinants. What the record shows in that countries like Canada, Australia, New Zealand, Sweden, Denmark, Japan, the UK and others have over the long run had fewer banking crises than another set of countries such as Spain, Portugal, Argentina, Brazil, Italy, Austria etc. Some of these countries are more comparable than others. We think that the emerging markets classification that compares new world countries like Canada, Australia and New Zealand with Argentina, Brazil and Chile is very apt. In Europe, the northern periphery such as the Nordics in the 19th century might be compared to the Southern and Eastern European nations who had approximately similar levels of development in the mid-19th century.

What proximate sources of success can we identify? In many of these countries, entry was limited and tightly regulated in the financial sector. Governance was usually sound and transparent at the bank level and at the industry level. Political favoritism may be the hallmark of the banking sector (Calomiris and Haber, 2014), but the former set of countries managed to limit the pernicious venality that has plagued other less developed countries. Market-based regulations or strong and relatively impartial government regulations have

helped. Ex post, liquidity support from central banks following best-practice and making informed decisions have been supportive of financial stability.⁸

In terms of avoiding instability due to entanglement with finicky international capital flows a number of factors can be identified. Strong development and economic growth to ensure repayment of accumulated debts were without a doubt the prime driver of success. At the macro level, stable monetary policy and credible exchange rate commitments short-circuited twin crises. As in the recent crisis of 2007 with international swap lines, international cooperation in the first wave of globalization helped stave off many systemic liquidity problems when all else failed. Numerous times large and systemically important nations as well as trustworthy smaller open economies have relied on informal reserve pooling and liquidity.

As has been highlighted in the literature on modern and historical financial stress, small open economies faced special challenges when capital flows became finicky (Catão, 2005). In the 19th century, playing by the rules of the game meant raising interest rates, cutting the growth of credit, and hoping that capital flows would be stabilizing in the sense that an anticipated appreciation would incentivize them to return to the country. Most small open economies lacked the financial depth to engineer anything like such a defensive position not to mention the political mettle. On the other hand, special relationships with the leading financial centers of the period worked time and again to the advantage of places like Australia and Canada. Not only did the colonial banks maintain close contact with the London financial markets but their debt was issued under the Colonial Stock Acts and the Trustee Act. These gave oversight to new issues in the colonies which was unheard of outside of the British Empire. In the US, large financiers like JP Morgan and others often rose to the occasion and swayed market sentiment towards optimism by giving a seal of approval to government and financial institutions' action plans. Additional proximate factors that mattered here were strong reserve positions, an ability to boost exports in times of financial and economic stress, and credibility of the monetary regime.

To avoid sovereign defaults nations have taken many strategies. In the leading countries, the 19th century was crucial in terms of building fiscal capacity. Leroy –Beaulieu

⁸ See Catão (2005, pp264-265). He notes that for Brazil was exceptional in Latin America prior to 1890 in that entry in the banking sector was limited but that government demands for liquidity and entry caused an unprecedented monetary expansion. 1890-91 witnessed a severe financial crisis after despite Brazil having experienced no previous debt default or major problems in the banking sector.

(1883) long ago highlighted the consolidation of central government finances. Dincecco (2009) and Dincecco (2011) has argued that centralization and limited government, along the lines of controls on the executive contributed to the ability to avoid fiscal financial catastrophe. While currency mismatch was a central theme of recent studies it stands to reason that this was not the crucial variable. Even in the face of currency mismatch countries as disparate as Canada, the US and Australia avoided sovereign defaults from the mid-19th century onwards. Instead sound public finances and an ability to maintain price stability mattered more. These forces have deeper institutional determinants than might at first be realized and as we illustrate below. Examples of such deep institutional determinants include the much-discussed turn towards limitation on the executive in the Glorious Revolution which was an institutional innovation that diffused to the settler colonies more readily than to Latin America, independent Asian nations and former colonies.

During the 19th century, many emerging markets and less developed countries offered to collateralize their sovereign obligations. They did so by pledging dedicated revenue streams to repayment of foreign debt. In many cases debt was offered on the understanding that creditors would have the opportunity to appropriate revenue by taking over revenue collection for the sovereign. This occurred in the Ottoman Empire after default in 1876, as well as Egypt (1880s) , Greece (1897-1898), Morocco, Santo Domingo, and Tunis (Mitchener and Weidenmier, 2010), In many smaller Central American nations in the late 19th century the US threatened takeover of revenue collection and in some cases actually imposed such sanctions. The Chinese authorities attempted to modernize revenue collection and make repayment of debts more credible by allowing foreigners control over customs revenue collection ex ante. Many railway contracts included explicit guarantees by host governments or control of the railway to creditors in the case of default.

Despite these best efforts, default occurred frequently in these places revealing that risk was an inherent factor in international lending of the time. Mitchener and Weidenmier (2010) argue that takeover typically heralded credibility and capital flows could eventually resume. As time progressed, nations began to lay blame for default and economic backwardness on such foreign controls. The principle of sovereignty evolved in international law such that such super-sanctions were not possible by the 20th century. Market discipline substituted for direct oversight. Indeed Eichengreen and Portes (1986) suggest that risk premia compensated investors such that ex post calculations of yields on defaulted bonds

were about the same as in less risky assets. By the late 20th century the IMF began to play a role not totally dis-similar to earlier takeovers often lending its credibility to defaulting sovereigns in the wake of default. Evidently debt defaults have not been eliminated either in non-IMF program countries nor in those who have participated in such programs.

Leading figures almost surely played a role here. Alexander Hamilton in late 18th century America generated financial stability for the long-run with a number of key reforms. Here a strong re-orientation of public finances as well as a plan to distribute domestic debt as widely as possible amongst ordinary citizens in order to align the incentives and ensure fiscal solvency of the nation seems to have worked. Summerhill (2006) reports similar success in Brazil prior to the 1890s. Unique amongst Latin American nations, fiscal stability and sustainability reigned during this period. The triumph of innovative policies geared towards better revenue collection and financial system governance in Japan and other leading nations in Europe like France helped promote these nations from the ranks of serial defaulters that are identified in the work Reinhart, Rogoff and Savastano (2003) and Reinhart and Rogoff (2009).

What does it take to learn and graduate then? North (1997) emphasizes adaptive efficiency as a key force for long-run economic performance

“The keys to the story are the way beliefs are altered by feedback from changed perceived reality as a consequence of the policies enacted, the adaptive efficiency of the institutional matrix--how responsive it is to alteration when outcomes deviate from intentions--and the limitations of changes in the formal rules as correctives to perceived failures.”

Learning implies that institutions and policies can be changed in the wake of a crisis in an attempt to eliminate past deficiencies. To succeed, collective action problems need to be overcome. Entrenched incumbents (political, market based or both) must either be willing to make changes or else their references must be overcome by other more powerful actors either in a regular and orderly transfer of power or via regime change. Rajan and Zingales (2003a) suggest that global capital markets can fashion “good behavior” by allowing entry into the financial sector and disciplining “bad behavior” by leaving nations without capital.

In any case, the past casts a long shadow. Property rights systems have evolved over the long-run. Acemoglu, Johnson and Robinson (2004) focus on persistence in former European colonies. Where Europeans from countries with strong property rights settled,

institutions that protected property rights developed thus fomenting economic development. Property rights are a key factor in deciding what investor protections there are in the event of defaults. They provide organizing principles for settling contentious claims on collateral and other assets. Property rights systems and balanced judicial systems also constrain actors within financial markets so as to eliminate the potential for malfeasance. A strong judiciary also provides redress for those maligned in fraud as well as supplying aligning incentives ex ante. If property rights can be protected, then the types of crises and instability nations face may also be altered and thus make change in the wake of such crises less problematic.

The political system sets the stage for what can and cannot be achieved. A fully functioning democracy defined by established political parties and regular peaceful elections is likely to be more beneficial to learning from crises than an autocracy. The assurance that leaders will be held accountable for regulatory failing or corrupt business dealing will reduce the chances that previous inefficiencies remain.⁹ The process of political competition allows political entrepreneurs to emerge and take advantage of popular discontent. Democracies surely do better at adaptation than autocracies where policy, rules and outcomes express the arbitrary preferences of an entrenched elite. Moreover, democracies have regularly scheduled handovers of power and due to inter-party competition the policies implemented are more likely to be centrist in orientation. Without such an institutional apparatus, governance by a minority elite provides private goods for its supporters. While democracies can surely exhibit such patterns of behavior the constraints are surely much tighter, and deficiencies can be expected to be remedied by popular discontent sooner rather than later should the need arise.

The determinants of the political and legal aspects of a nation might act to influence learning. Engerman and Sokoloff (1997) present a factor endowment hypothesis: factor endowments give rise at an early stage to different levels of inequality. The level of inequality was directly related to the formation of institutions that protected a rent seeking and rent-defending elite. These institutions persisted over time as well. In this regard, the long-run record on financial crises is very suggestive.

⁹ Kohlscheen (2010) shows that sovereign defaults usually occur in presidential systems rather than in parliamentary systems where the executive is much more worried about the immediate continuation value holding office which often depends on the state of the economy. This assumes the economic costs of sovereign default in terms of lost output and political reputation are high.

4. Empirical Evidence on Crises over the Long-Run

Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) first provided a comprehensive chronology of banking, currency and twin crises from 1880 to 1997. Recent work by Reinhart and Rogoff (2009) extends these series back into the early 19th century and forward into the 21st century. Although these studies, and data sets for recent decades disagree about the exact timing and dating of several smaller banking and currency crises, by and large they are consistent.

Based off of the historical record we propose to classify countries into three groups in order to illustrate the long-run record on financial stability. One could be considered the “leaders” in terms of institutional outcomes, financial development and stability. This group includes Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. A second group might be termed “learners”. These were historically settler colonies but they worked their way up the economic ladder from the ranks of the emerging markets of the day to first-class citizens in terms of financial stability and development. This set includes: Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Finally a third group a “non-learners” or “repeat offenders” includes: Argentina, Brazil, Chile, Greece, Italy, Portugal, Spain. Others could be included in this group but we feel this is a representative sample of reasonably sized nations that have been independent over the long-run and which have had significant engagement with international capital markets or market access.

In Figures 1-3 we present evidence on financial development as measured by the population weighted averages of the ratio of broad money to GDP for these three groups of countries 1880 to circa 1995.¹⁰ In the period 1880 to 1913 the leaders show the highest ratios and the steadiest growth rates. In the same period the learners make great progress though show some evidence of instability particularly centered around the mid-1880s and the 1907 period, both moments of great international financial stress. The non-learners show a boom and bust in the 1890s leading to a secular decline up to World War I. The Interwar period illustrates greater levels of similarity in these ratios with the non-learners having the lowest levels in most years. Since the US is included in the Learners category it is not surprising to

¹⁰ There are missing data on the ratio of money to GDP for France and Germany from 1990 to 1997. For similar reasons our series for the learners ends in 1994 and that for the non-learners ends in 1995

see that this group posts the highest values. By the post-World War II period the learners have clearly taken the lead in terms of financial development with high and stable ratios. The countries we classify as leaders are in second place although a comeback is evident at the tail end driven by the UK and financial deregulation in the 1980s. Finally the non-learners are behind. The gap between the first two groups increases from the 1980s beginning with the debt crises and the associated financial turmoil of the 1980s. As in the post-1890s period these ratios show a secular decline in the wake of major financial crashes.

In Figure 4 we present the sample probability that a country would experience a financial crisis of any kind (banking, debt, currency, or twin) in each of four periods (1880-1913, 1919-1939, 1945-1972, and 1973-2011) This values is calculated as the total number of country years in which countries in each of the country subsets is in the first year of a financial crisis divided by the total number of country years within that sub-sample. We see significant heterogeneity between the groups. Two facts emerge from this figure. First, the non-learners have, with the exception of the interwar period, always had a greater likelihood of experiencing a crisis. In both periods of globalization a clear ranking emerges with the leaders having the lowest probabilities, the learners occupying the middle range and the non-learners having the highest values. If we pool all years we find the probabilities are 0.068, 0.061 and 0.118. We cannot reject that the means across the first two groups are different but we can reject that the mean of the non-learners is different from that of the leaders (p -value = 0.07) and the learners (p -value=0.05).

Figure 5 pools across all years and breaks the sample by category and type of crisis. In every category the non-learners have a higher sample likelihood of having a financial crisis. In some cases such as banking crises these means are not too dis-similar. Pooling across years we cannot reject equality of means by category for banking, currency and twin crises. For debt crises we can reject the hypothesis that the frequencies are similar in the non-learners and in the other two categories.

Figures 6 to 9 reveal differences across categories by period for each type of crisis. Figure 6 reports shows that with the exception of the period 1825-1913 the non-learners were more likely to have banking crises. This group of countries is the only group to have such crises in the so-called quiet period 1945-1972. As regards the lower frequency prior to 1913 we believe that two forces may be at work. First, some of the non-learners' banking crises in the period 1825-1880 have yet to be identified by economic historians. This

research remains to be done in a careful way and we hope to do so in future research. It may also be the case that at low levels of financial development when the formal banking sector is small and capital markets are not highly integrated, countries may not be as prone to financial crises. To have a financial crisis one must have a financial sector by definition and these countries were at very primitive stages in their monetary development prior to the 1870s.

In Figure 7 we note that the non-learners always have a higher propensity for a currency crisis with the exception of the 1930s. The rise and decline in the probability of currency crises in the leading and learning countries is attributable to the problems highlighted by Eichengreen (1992) in the interwar. In the post-War period imbalances were a non-trivial problem. The data display some learning in leading two groups of countries as these nations have moved to floating exchange rates or more solid pegs such as currency union in Europe.

Figure 8 shows that twin crises emerged as a major problem for all countries in the 1930s. While the non-learners have not progress much in post-1972 compared to the levels seen in the 1930s the other two groups of countries have made some progress since the 1930s albeit unevenly with a trough in the 1945-1972 period and a slight rise post-1972. Finally, Figure 9 suggests that sovereign debt crises are recurrent in the non-learners. In the other two groups only a handful of defaults are recorded and those are associated with the Great Depression (Germany in 1933, Australia in 1932 in a debt conversion and the US in 1933 with the rescinding of the gold clause).¹¹

Figures 10 and 11 zoom in and show the record on financial crises for a select set of countries. Each bar represents a particular kind of crisis and its width records the duration of the crisis.¹² It is notable that banking crises are historically extremely rare events in Canada and Australia. The United Kingdom shows a number of banking crises prior to 1866 but a long-quiet period associated with substantial learning that took place in during the Overend-Gurney in 1866. From this period onwards the Bank of England acted deftly in accordance with Bagehot's rule. Only two more crises are recorded in the subsequent 145 years. Canada

¹¹ One could include the defaults of the allies on the war debts with the US and others. The allies argued that it was understood that repayment was conditional on German payments of reparations. This is admittedly a grey area. The same could be said for the US and Australia's voluntary conversion.

¹² Duration for banking, currency and twin crises was defined by Bordo et. al. (1999) as the number of years from the start of the crisis until GDP began growing at its pre-crisis trend rate. The duration of debt crises is measured as the number of years until a definitive settlement and restructuring occurs.

stands alone amongst these seven countries in terms of its ability to avoid banking crises. The United States, as we detail below undertook some learning but faced significant setbacks along the way.

Currency crises are visible in the first set of countries, but the nature and frequency of these countries is almost surely different from the record in Figure 11 for the non-learners. The United States has been the weakest performer in some respects, but Canada has also faced pressure. Notably the UK maintained currency stability for the greater portion of the 19th century. It is very likely that this contributed to London's financial pre-eminence but it may also be the case that being a financial center helped ensure currency stability by providing a deep and liquid financial system.

In Figure 11 three non-learners (Argentina, Brazil and Chile) show patterns consistent with our previous figures. Debt crises predominate. In this case we also can see the length of time until settlement of default is often quite high and much higher compared to the few debt crises evident in Figure 10. The period between 1970 and 2011 also presents itself as a highly unstable period for these three countries in the Southern Cone of South America.

In Figure 12 we explore Kaplan-Meier non-parametric survivor curves for our subsets of countries over the long run. The survivor curve gives the probability that a country within the subset (or set of countries) would experience a financial crisis *after* a given numbers of years since the last crisis. If there is evidence of learning, then the survivor curves should shift out over time as the time between crises lengthens. Also the higher the survivor curve within a period the less likely a country is to quickly relapse into another crisis. Analysis time here runs over four periods: period 1 (1880-1913), period 2 (1919-1939), period 3 (1945-1972), period 4 (1973-2007).¹³ For the top two sets of countries, the ranking for highest survivor curves is period 3, period 1, period 4 and then period 3. This suggests that period 2, the Great Depression years, led to a higher frequency of crises. However, nations learned to avoid these crises in the Bretton Woods period. Due to a higher hazard rate of currency crises in the lower panel of countries, the period 3 survivor curve actually falls below the blue line after the 13 year mark.

¹³ Little would change if we updated the sample to 2012.

We can also compare within period survivor curves across groups of countries. In period 1, after about 20 years all sets of countries are fairly identical. One large difference is visible in period 4, the most recent period. For the non-learners there is a 75% chance that a country would experience a crisis prior to 10 years since the last crisis. This probability is significantly lower in the leaders panel standing at less than 40%. In the learners panel, the figure is 50%. From this we conclude that while few countries can avoid crises, the upper two panels (the leaders and the learners) seem to have a lower likelihood of relapsing than the bottom panel of countries (the repeat offenders).

5. Case Studies

In this section we study the cases of four emerging countries in the pre World War I era. In some cases we extend the story into the twentieth century. Each country had a different political and institutional history and each had a different response to the waves of capital flows and financial crises of the era. As will be seen, some did better than others and learned from their crisis experience and others did not. The four cases are: the United States, Canada, Australia, and Argentina . We study the crisis history of these countries and try to infer the learning process. For each country we focus on their history of banking, currency and debt crises.

5.1 The United States

5.1.1 Banking Crises

The U.S. Constitution of 1787 gave the Congress the power “to coin money and regulate the value thereof” but it did not explicitly give the federal government the power to begin chartering commercial banks. That was left to the states. Alexander Hamilton, the first Secretary of the Treasury chartered the First Bank of the United States amid protest from populists and states’ rights advocates. In many ways it was modeled after the Bank of England. It was established as a bank of issue, as the government’s bank to help it fund its debt and also to make loans to the private sector to promote commerce. It was allowed to have branches in every state. It may also have been an early lender of last resort. It was well capitalized and had considerable financial power. Considerable opposition to the First Bank by the Jeffersonians led to the revocation of its charter in 1811. After a brief chaotic period when the States chartered a large number of banks which contributed to the inflation of the

War of 1812, the Second Bank was chartered to stabilize the country's finances, to unify the currency and to act as a lender of last resort. In the first four decades of the Republic, the number of banks chartered by the states grew rapidly and there were banking panics in 1792 and 1811. Sylla and Wright (2002) argue that the crisis of 1792 was effectively headed off by Bagehot (1873) style lender of last resort actions by Alexander Hamilton and the First Bank.

The charter of the Second Bank was revoked in 1832 by Andrew Jackson, an ardent populist and opponent to centralized federal financial power. For the next 80 years there was no federally chartered institution to act as lender of last resort and to provide other central banking functions had been performed by the two Banks of the United States and which were common at the time in Europe.

After the demise of the Second Bank, the states controlled the creation of commercial banks. Most states adopted Free Banking laws which greatly eased entry to provide credit to the rapidly growing country (Rockoff 1974). The banking system, characterized by a plethora of undercapitalized unit banks issuing notes of varying quality, a prohibition on interstate banking, and weak oversight, was easily subject to local/regional shocks which led to numerous bank failures, some fraud and a series of banking panics (1837, 1839 , 1857 and 1861).

During the Civil War, when the southern states who had most vociferously opposed a federal presence in banking were absent, Congress created the National banking system to help finance the war, but also to create a uniform note issue and improve upon the flawed payments mechanism of the pre-Civil War banking system, under which a myriad of state bank notes circulated at varying rates of discount. It was also supposed to reduce the incidence of banking panics by requiring national banks to have higher capital and reserve ratios and to be stringently regulated. In some respects it could be viewed as an example of institutional learning from the earlier experience of banking crises.

Under the National Banking System, the Federal Government chartered unit national banks which issued U.S. government bond backed notes. This created a uniform currency and a viable payments system. But the National Banking system also had serious flaws which made it crisis prone. The flaws included the persistence of unit banking (Calomiris and Haber 2014), the inverted pyramid of credit which linked the stock market to the banking system and created a source of systemic risk, and a strong seasonal in money

market interest rates which made the system crisis prone (Bordo and Wheelock 2011). The most serious flaw was the ‘inelasticity of high powered money’ (i.e., there was no lender of last resort to quickly meet the demand for high powered money in the face of a banking panic).

In addition the inability of the unit banking system to provide sufficient credit to finance the growth of large enterprises led to the development of securities markets and non-bank financial intermediaries (i.e., non-regulated shadow banks like trust companies) which in turn became sources of systemic risk (Rockoff 2014). The National Banking system competed with the state banking systems after the Civil war. The latter made a comeback as these institutions could lend against real estate. The regulatory environment varied substantially across states, but at the same time, regional and local financial markets were tied to the national market via the New York money market, correspondent bank networks, and reserve pyramiding.

The national banking era had three serious banking panics (1873, 1893 and 1907) and four minor crises. Private sector innovations helped allay the minor panics—Clearing house loan certificates pooled the resources of the member banks and provided emergency currency (Gorton, 1985). The U.S. Treasury also did some limited LLR actions as did JP Morgan in 1893 and 1907, but their interventions were insufficient to allay the panics, which only ended after suspension of convertibility of deposits into currency.

The Crisis of 1907 was ‘the straw that broke the camel’s back’ and led to a successful movement towards reform of the U.S. financial system. The Aldrich Vreeland Act of 1908 institutionalized the clearing house loan certificates into National Currency Associations. It also created the National Monetary Commission to recommend on the creation of a U.S. style central bank. A secret meeting at Jekyll Island, Georgia in 1910 led to a blue print for a new central bank in the Warburg Plan which became the Aldrich bill in 1912, which after some modifications became the Federal Reserve Act in 1913 (Bordo and Wheelock 2011).

The Federal Reserve System was made up of 12 regional Federal Reserve Banks, coordinated by the Federal Reserve Board in Washington DC. The Fed was designed to serve as a lender of last resort, smooth the seasonal in short-term interest rates, manage the gold standard and conduct countercyclical monetary policy. The Fed did a good job in the 1920s in providing financial stability by smoothing the interest rate seasonal and moderating the business cycle (Miron 1988). It also may have prevented banking panics by its discount

rate policy (Gorton and Metrick 2013). In that sense considerable institutional learning was accomplished. However, going beyond the Golden Age, major flaws in the design of the Federal Reserve Act which did not appear in the relatively benign conditions of the 1920s led to the Great Contraction in 1929 -33. These include the real bills doctrine (Meltzer 2003); structural flaws (Friedman and Schwartz 1963); adherence to the gold standard (Eichengreen 1992) and an inadequate discount window (Bordo and Wheelock 2011). The Fed failed to prevent a series of banking panics in 1930-33 which turned a serious recession into the Great Depression.

The debacle of the Great Contraction led to major institutional adaptation and learning. The newly elected Franklin Delano Roosevelt blamed the Fed and the banks for the Depression. Major legislation in 1933 and 1935 increased the power of the Federal Reserve Board relative to the regional Reserve banks; created federal deposit insurance and many regulations on the banking system. These reforms ushered in four decades of financial stability and financial repression. The Great Inflation of the 1960s and 1970s, (largely a consequence of Fed policies Bordo and Orphanides 2013) undermined the New Deal regulations and led to a return to banking instability. By the 1980s, deregulation and lax oversight in some instances led to significant losses in the Savings and Loan industry and several other hiccups such as the run on Continental Illinois in 1984. Too big to fail, further de-regulation, a number of new financial innovations, and a rogue shadow banking sector led to the crisis of 2007-2008. The latest crisis was centered in the shadow banking system where maturity mismatch in the repo markets led to an “invisible” banking panic that eventually spilled over into the commercial banking sector to a degree.

5.1.2 United States: Currency Crises

The U.S. was on the specie standard (gold and silver bimetallism) since 1791. There were no currency crises until the Civil War in 1861 when it became apparent that the Treasury would issue fiat money to finance the war and that it would threaten specie convertibility. A run on the specie reserves of the New York commercial banks and then on the Treasury led to a suspension of convertibility in December and the U.S. went on the Greenback standard and a floating exchange rate. Resumption to the specie standard (de facto gold) at the pre-war parity occurred on January 1 1879 following a vociferous political debate between the advocates of hard money (a return to specie at the original parity) and

the advocates of soft money (either staying on the fiat money regime, resumption at a devalued parity, or bimetallism at a mint ratio below the rapidly rising world silver price of gold).

The specie standard that was restored was de facto a gold standard because silver had been undervalued at the mint since the gold discoveries of the 1840s and moreover convertibility of the standard silver coin had been removed by the Currency Act of 1873 (the Crime of 1873). By 1879 following massive silver discoveries in Colorado and Nevada, which reduced the market value of silver to the point where under bimetallism silver would have begun to enter the currency supply, led to a new debate between those who advocated Free Silver and those who advocated that the US be on the gold standard. The passage of the Bland Allison Act in 1878 and the Sherman Silver Purchase act in 1890 greatly increased the share of silver in the US monetary base. This led to a run on the Treasury's gold reserves in January 1895 when speculators became concerned that the US would be forced to abandon the gold standard. The Treasury was rescued by a syndicate organized in February 1895 by JP Morgan and August Belmont (two prominent investment bankers) to market US Treasury bonds in Europe in exchange for gold to be transferred to the Treasury (Garber and Grilli 1986).

The Gold Standard Act of 1900 put the US on the gold standard de jure at \$20.67 per ounce and ended bimetallism. The outbreak of World War I in the summer of 1914 led to a massive global scramble for liquidity and gold. A major banking panic and currency crisis was headed off by Treasury Secretary McAdoo and the newly formed Federal Reserve (Silber 2007) and the US did not suspend gold convertibility as did virtually every country in the world. However in September 1917 after the US entered the war an embargo was placed on gold exports, to preserve the gold reserves. It was removed two years later.

The Fed followed a very expansionary monetary policy during World War I which led to high inflation. After hostilities ceased in November 1918, the inflation continued. After the gold embargo was removed in June 1919, continued inflation led to a growing balance of payments deficit and a significant decline in the Fed's gold reserve ratio towards the legal limit. In fear of a possible attack on its reserves the Fed shifted to a very tight monetary policy stance in early 1920 which both restored the gold reserves and led to the serious but short-lived recession of 1920-21.

The next threat to the dollar was during the Great Contraction in September 1931 when the UK left the gold standard. This led to an attack on the dollar and a massive gold drain. The Fed reacted by raising its discount rate by 200 basis points in the midst of a banking panic. The gold reserves were protected but the Depression deepened. A second attack on the dollar occurred in the winter of 1932-33 in the midst of a massive banking panic which both involved attempts by the public to convert deposits into currency and attempts by both domestic residents and foreigners to convert dollars into gold. The run threatened the reserves of the New York Fed. After Roosevelt's inauguration one of his first actions was to suspend the gold standard in April 1933. The dollar was then devalued by 60% in January 1934 and the gold standard was officially restored at \$35 per ounce, but until World War II it became a managed gold standard (Friedman and Schwartz 1963).

After World War II, the US became part of the Bretton Woods adjustable peg exchange rate system. Under the Bretton Woods Articles of Agreement, the U.S. would peg the dollar to gold at \$35 per ounce and the rest of the world would peg their currencies to the dollar. Once the Western European countries adopted current account convertibility in December 1958, the Bretton Woods system evolved into a gold dollar standard under which the rest of the world increasingly used dollars as international reserves. This created the Triffin Dilemma which stated that as the outstanding amount of dollars held by the rest of the world increased relative to US gold reserves, the likelihood of a run on the dollar would increase (Triffin 1960). In an attempt to prevent this from happening, the US Treasury imposed capital controls and made other arrangements including the Gold Pool. The Federal Reserve created an extensive swap network with the central banks of other advanced countries (Bordo, Humpage and Schwartz 2015). These policies were effective in protecting the gold reserves until the mid 1960s when the Fed shifted to an inflationary policy to both reduce unemployment and finance growing fiscal deficits. A run on the dollar in 1968 led to the creation of a two tiered gold market to insulate official gold reserves from private speculation. These arrangements quickly broke down and when the UK and France began converting their outstanding dollars into gold in 1971 President Nixon closed the gold window on August 15. The Bretton Woods par value system ended in 1973 and most countries, including the US, let their exchange rates float which inaugurated the present system of managed floating.

5.1.3 United States: Debt Crises

The United States began with a debt crisis. The Revolutionary war was financed by paper money (the continental) and some Dutch and French debt to the States and the Congress. This debt was defaulted on. The Confederacy (1782 to 1787) did not resolve the debt problem. It was resolved after the Constitution was adopted by Alexander Hamilton in his Stabilization Plan of 1790. In this plan the Federal government assumed the States' debts at par and consolidated them into specie denominated consols. The European creditors were paid in full in specie. The US debt was to be serviced by import tariffs and excise taxes. A concerted effort to reduce debt and to rely as much as possible on domestic debt markets so that democratic politics would lead to an electorate vested in financial stability helped eliminate federal debt crises. The new US debt issue proved to be so successful that within a few years US bonds sold in Europe at prices comparable to that of many European countries (Perkins 1994)

The next US debt crisis involved many of the States in 1841. In the first half of the nineteenth century the federal government played only a minimal role. Its budget was no more than one per cent of GDP. By contrast, the States were actively involved in developing infrastructure improvements (canals and later railroads) and much of this was financed by British capital inflows. The loans were made on the assumption that economic growth would generate the needed tax revenue to service the debt. The financial crises of 1837 and 1839 led to a serious recession which prevented 10 States from being able to service their debt (Wallis 2004). The Federal government refused to bail them out leading them to default on their loans to the British. As a consequence the US was cut off from British capital (a sudden stop). This worsened the recession. Since then most states adopted, by popular approval, balanced budget rules and other mechanisms to limit similar self dealing and corruption. This represented major institutional learning.

After the Civil War, a number of confederate states defaulted on their debt. There was no federal bailout. In the twentieth century, Arkansas defaulted on some of its debt in 1936. Again there was no federal bailout. Today states continue to borrow but at relatively low levels. Most states have balanced budget rules and they ask their voters to approve any significant borrowing which is typically backed by dedicated revenue streams. There is no direct federal bailout although the fiscal federal arrangement worked out in the 1930s and has taken pressure off states in hard times.

5.2 Canada

5.2.1 Banking Crises

Canada adopted the Scottish banking system of note issuing branch banks with double liability and the real bills doctrine of short-term lending. The Bank of Montreal, first chartered in 1817, may have been modeled after the First Bank of the United States (Calomiris and Haber 2014). Other banks were chartered in later years. The Canadian banking system never experienced a banking panic although there were a number of large bank failures, (e.g., the Bank of Upper Canada which failed in 1866) (Bordo, Redish and Rockoff 1994). It had engaged in real estate lending in a land boom and failed in the bust. In reaction, the Bank Act of 1871 made mortgage lending illegal.

The British North America Act of 1867 leading to Confederation gave the Federal government the power to charter banks. This is very different from the U.S. where the States chartered commercial banks. According to Calomiris and Haber (2014) the difference between the two countries reflected the different political bargain struck between the principle players in the “game of banks”: the government, the bankers and the public. In the U.S. where the Constitution gave the states the power to charter banks, the states’ rights and populist forces controlled the political economy of banking from 1832 until the 1980s. This led to the predominance of unit banks and the prohibition of interstate branching. This created a weak undercapitalized and crisis prone system. In contrast the English and Scottish merchants dominated the banking industry and preferred central government control of banking. According to Calomiris and Haber, central government control of banking was done to prevent conservative French Canadian interests from blocking economic development.

In Canada, bank charters were renewed and reviewed every decade in Bank Acts which became avenues to incorporate intervention. They enforced the Grand Bargain whereby the banks would deliver stability in exchange for government enforced barriers to entry (Bordo, Redish and Rockoff 2015).

Large losses to note holders and deposit holders in the 1870s and 1880s also led to institutional learning. The Bank Act of 1890 authorized the creation of the Bank Circulation Redemption Fund in which each bank was required to contribute 5% of its average note circulation. This Fund would protect note holders from losses.

Subsequent Bank Acts beginning in 1900 allowed and encouraged mergers within and between provinces. The merger movement in the next two decades, as had occurred in the UK a decade before, led to the creation of a small number (10) of nationwide branch banks by the eve of World War I. These banks developed a number of safeguards against failures, most notably a consortium of banks would agree to take over the assets of a failing bank to protect its depositors and note holders.

The Canadian nationwide branch banking system provided a strong bulwark against both bank local and regional shocks, but it did not create a complete safeguard against nationwide liquidity shocks. Canada did not create a central bank until 1935, but a number of safeguards against global financial crises were developed beforehand. These included: holding reserves in the New York money market; asset backed notes; and the Bank of Montreal on occasion acted as a quasi-lender of last resort by arranging lifeboat operations as had been done by the Bank of England in the Baring Crisis of 1890. The Canadian government first acted as a lender of last resort in the Crisis of 1907 by issuing Dominion notes as an emergency currency. The Finance Act in 1914 created a discount window facility. When the Home Bank, a large Winnipeg bank, failed in 1923 its assets were assumed by the other banks without creating a panic. In the Great Depression there were no bank failures or panics in Canada. Canada finally established a central bank, the Bank of Canada in 1935--not to provide financial stability or to fight the depression--but because other Commonwealth countries had adopted them (Bordo and Redish 1987).

5.2.2 Canada: Currency Crises

Canada was on the gold standard before 1914 and there were no actual currency crises but there were several periods of stress (Bordo, Eichengreen et al 2001). Canada left gold with the UK at the outbreak of World War I and returned in 1926 at the original parity. Canada left the gold standard in September 1931 after the UK and the Canadian dollar floated until World War II when it was pegged to the US dollar. Canada joined the Bretton Woods System in 1945 at a parity of 90.9 cents US. The Canadian dollar was revalued to parity with the US dollar in 1946. Then in 1949 it was devalued back to 90.9 cents after the UK devalued sterling. In the face of massive capital inflows from the US at the start of the Korean War, Canada allowed the Canadian dollar to float in September 1950 in violation of

the Bretton Woods articles. It returned to the par value system at a devalued peg of 92.5 cents in May 1962 after a speculative attack on the Canadian dollar in April which ended with a rescue by the IMF and the U.S. (Bordo, Dib and Schembri 2010). It then left the Bretton Woods system in 1970 as the system was unraveling and has floated ever since.

5.2.3 Canada: Debt Crises

Canada did not have any debt crises in the pre-1914 era. In 1929 in the face of the collapse in world trade, Canada did not follow other commodity producing countries and default on its debt. It maintained the servicing of its outstanding foreign debt in gold but it stopped paying domestic debt holders in gold (Bordo and Redish 1990). Reinhart and Rogoff (2009) would categorize this action as a domestic default.

The Canadian fiscal federal system, unlike that in the US, did not have a “no bailout clause”. The provinces have always borrowed extensively on global markets and have relied on market discipline. In 1936 Alberta defaulted on its debt after rejecting the conditions of a federal bailout. In the 1980s and 1990s, a number of provinces ran large deficits and built up high debt to GDP ratios. This led to high risk premia and downgrades by the credit rating agencies. In the 1990s both the Federal government and the provinces undertook a major fiscal retrenchment in the face of external pressure. Canada has had the strongest fiscal position of the G-10 ever since. These actions suggest significant policy and institutional learning and a persistent ability to avoid going over the brink with outright default.

5.3 Australia

5.3.1 Australia: Banking Crises

Like Canada, Australia adopted British/Scottish banking institutions including branch banking and the real bills doctrine (Davis and Gallman 1999). The Australian trading banks relied heavily on British deposits. There were two types of banks: Imperial banks headquartered in London; Colonial banks headquartered in Australia with offices in London. Australia also had other types of non-bank financial intermediaries including building societies, mortgage banks, land banks, savings banks, and pastoral companies. Banking regulation came under the purview of the colonies by the 1860s. Typical restrictions included limited or double liability on capital, unlimited liability on note issue and a limit on lending for real estate (Hickson and Turner, 2002).

Australia experienced a massive land boom in the 1870s and 1880s in the face of rapid immigration and British demand for wool. Capital flows from London funneled through the trading banks financed the building of cities and the extension of pastoral land. The trading banks funded the non-bank financial intermediaries that financed mortgages so that de facto they violated the real bills doctrine and they were exposed to a maturity mismatch. Hickson and Turner (2002) report that while real estate lending had long been banned or discouraged the colony of Victoria removed this restriction in 1888.

The trading banks actively solicited deposits in England and Scotland, offering a higher rate of interest on savings accounts than the domestic British banks. In a sense they fooled the British(mainly Scottish) savers into believing that the Australian banks were similar to the Scottish banks. The Law of Gravity kicked in in the late 1880s when the terms of trade turned against Australian wool. The commodity boom (which was worldwide) led to the failures of many pastoral companies and mortgage companies in 1891 -92.

The crisis spread to the trading banks in 1892-93 (the Mercantile Bank of Australia, the Federal Bank of Australia and the Commercial Bank of Australia) leading to a full-fledged banking panic. Although the Associated Banks were supposed to pool the assets of the Melbourne banks to save banks from liquidity problems they failed to do so for the Federal Bank. While the forum re-iterated its intentions a large bank, a second major bank, the Commercial bank was soon also allowed to fail. Finally the Commercial Bank was bailed out (restructured) along with other banks by the colonial government. In New South Wales, bank notes were given legal tender status to ease access to means of payment, and the government declared a 5 day banking holiday (Bordo and Eichengreen 1999). Depositors were forced to exchange their demand and savings deposits for long-term deposits and debentures and hence lost liquidity. The government of Victoria tried to collaborate with the Associated Banks in Melbourne to save the Commercial Bank.

British depositors also were caught by the crisis and pulled their funds from the Australian banks. In consequence, Australia was hit by a classic sudden stop of international capital and Australia suffered a serious depression for much of the 1890s. This was aggravated by a severe drought.

In reaction to the crisis, unlike what occurred in the US and Canada, the banks were not regulated by the government. The surviving banks retrenched heavily; raised their capital

and liquidity ratios and gave up mortgage lending. The colonial governments set up their own mortgage banks and thereby funded agricultural expansion and urban building.

Australia federated in 1901. The Federation set up the Commonwealth bank to help fund the government. It also competed with the trading banks for private business and had an advantage since its notes were not taxed. It became more like a central bank over time and was eventually superseded by the Reserve Bank of Australia founded in 1959. During the 1930s Australia suffered greatly from the Great Depression although there were no bank failures or panics. The banks and the rest of the financial system were heavily regulated (as in the U.S.) and financial repression prevailed until the 1980s.

5.3.2 Australia : Currency Crises

Australia, like Canada was on the gold standard, and effectively in a monetary union with Great Britain prior to the establishment of the Commonwealth Bank, throughout the nineteenth century. There were no currency crises before 1914. Like the UK, Australia left the gold standard at the outbreak of World War I and returned to gold at the original parity in 1925. Australia was hard hit by the global collapse of commodity prices in the late 1920s and left the gold standard in 1929.

After World War II, Australia joined the Bretton Woods system and maintained pegs until 1983. It devalued its currency in 1949 along with Great Britain and experienced a currency crises in 1971, when the Bretton Woods system was in collapse, and then in 1976, 1983 and 1985.

5.3.3 Australia: Debt Crises

Australia did not have any sovereign debt crises before 1914, but one of the states, New South Wales defaulted in 1931. However the federal government maintained debt service the next day (Reinhart and Rogoff 2010). The Australian Loan Council had been established in December 1927 which formalized state cooperation that had existed since World War I. It set limits on state borrowing at the national level. Cooperation via a Gentlemen's Agreement between national and sub-national governments also kept the borrowing of the cities and municipalities in line (Grewal, 2000). In addition the Australian government forced conversion of its internal/domestic debt and implemented a voluntary loan conversion on its external debt.

5.4 Argentina

5.4.1 Argentina: Banking Crises

Argentina has had a long history of banking instability: 10 banking crises between 1880 and the present according to Reinhart and Rogoff (2009). The largest historic crisis was the Baring crisis in 1890. It precipitated a global financial crisis. Argentina in the 1880s was the largest borrower in terms of the share of GDP and it accounted for almost half of British foreign lending. The crisis followed a foreign capital induced land boom to develop the pampas. It was funded by a massive expansion of bank credit .

The explosion in bank credit was facilitated by the creation of the National Guaranteed Banking System in 1887. Under the law, banks were required to buy National Gold Bonds directly from the Treasury as a requirement for note issue.¹⁴ The banks raced to borrow as much as they could on foreign markets, mostly in London, and deposited the gold with the Treasury. They could then use the banknotes as a basis for domestic bank credit expansion. After 1887 money creation surged (Cortes Conde 1989). The land price bust in 1889 led to a 50% decline in land prices. The Banco de la Nacion, a quasi-central bank, found itself unable to pay its dividend, triggering a run. All banks suspended convertibility. The peso fell by 36 per cent against sterling in 1890 and by 37 per cent in 1891.

To cope with the crisis, the government created the Bank of the Argentine Nation from the ruins of the old Bank of the Nation and other provincial banks. It took bad loans off their books while requiring the old banks to surrender their specie and bonds and declare a three year moratorium on interest payments. The twin crisis led to a serious depression with real GDP falling by 15%. Underpinning this crisis and most of the others in the nineteenth and twentieth century was a faulty system of banking regulation.

5.4.2 Argentina : Currency Crises

Argentina had 19 currency crises between 1880 and the present. Before 1914 it, along with other Latin American countries, had considerable difficulty in adhering to the fixed parity of the gold standard. Between 1865 and 1914 Argentina was off gold in three episodes of suspension totaling twenty four years (Bordo and Schwartz 1994). In each case

¹⁴ Della Paolera (1994) notes that in the US National Banking System banks were to purchase government bonds on a secondary market.

expansionary monetary and fiscal policy inconsistent with adherence to the peg was the culprit.

Gold convertibility in Argentina began after a failed attempt in 1863. Convertibility was suspended in May 1876 after several years of political unrest and rising government deficits. Convertibility was restored in 1883 but lasted only until January 1885 following a period of expansionary fiscal policy. Inconvertibility until 1899 was associated with lax fiscal policy leading to debt default in 1890. In 1899 convertibility was restored with the return to fiscal orthodoxy in 1896 and the establishment of a form of currency board. Argentina suspended convertibility in 1914 at the outbreak of World War I. It resumed convertibility at a changed parity in August 1927, and suspended again in 1929. Inconvertibility prevailed during the balance of the interwar period (Bordo and Schwartz 1994 page 16). In the post-World War II period, Argentina like the other Latin American countries had high inflation, frequent currency crises and devaluations.

5.4.3 Argentina: Debt Crises

Argentina had two major debt crises before 1914. In 1825 Argentina, along with other Latin American countries, defaulted on British debt. Much of the capital flows were used to fund government expenditures on infrastructure. As in the case of the American states in 1841, when the economy didn't perform well enough to service the debt, defaults ensued. It took four decades before debt servicing began during which time there were no capital inflows.

The second major default occurred in 1890 along with the banking and currency crises described above. Much of the foreign capital flowed into fiscal expansion and growing fiscal deficits. The recession associated with the financial crisis led to a collapse in tax revenues. This was aggravated by the money induced run up in inflation which made Argentina uncompetitive, reducing tax revenues.

The Province of Buenos Aires and the national government defaulted on their debt in 1890 as did the other provinces. This led to a sudden stop that lasted through the 1890s. In January 1891, Argentina secured a 15 million pound sterling funding loan in London at 6 per cent. As conditions, investors demanded that the government not incur additional liabilities for three years and that it retire 15 million pesos worth of notes in any year in which the gold premium exceeded 50 per cent. Although this loan provided breathing space,

by 1892 it was clear that the plan would not sustain the public finances. The Rothschild orchestrated ‘Romero fix’ (arreglo Romero) of 1893 rescheduled Argentina’s debt repayment plan. Under this agreement, Argentina was obligated to pay only half of its contractual obligations until 1901, when the amortization of principal resumed (Bordo and Eichengreen 1999 page 51).

It is interesting to note that Argentina, nearly unique among Latin American countries, did not default during the Great Depression although it did suspend the gold standard and had heavy provincial borrowing. It may have been aided by heavy exchange controls. In the post-World War II period, Argentina defaulted five times, the latest episode began in 2001 and still has not been fully resolved (Reinhart and Rogoff 2010).

6. Conclusion

Our paper seeks to provide an answer to the question “Why did some countries learn to grow up to financial stability and others did not? Our survey of the theory of financial crises in the context of history and our empirics for the nineteenth and twentieth centuries, combined with the narratives of four countries suggests that the answer is not so simple. The empirical evidence shows clear differences between “leaders”, “learners” and “repeat offenders” The narratives based on four emerging countries back up the nomenclature of the last two categories.

The U.S. experience in banking is one of institutional and policy learning from financial crises. The process was not linear. It involved both progress and regression. The instability of the pre-Civil War period led to the institution of the National Banking system which was an improvement in the sense that it created a uniform national currency and a safe payments system. But there was retrogression in the inability to deal with the bank panic problem. The creation of the Federal Reserve was a major institutional step forward to dealing with the banking panic problem but again it failed during the 1930s. Progress in the bank stability front occurred with the New Deal reforms but they in turn led to serious problems in the Great Inflation period which ultimately created Too Big to Fail and seeds of the recent crisis.

Like the case of banking crises, there was nonlinear institutional/policy learning with respect to currency crises in the U.S. The specie standard instituted in 1791 brought long run price stability and sanctity of long term contracts, but it had to be temporarily abandoned to

efficiently finance the Civil War (Bordo and Kydland 1995). The U.S. returned to the specie standard (gold) after Resumption in 1879, but uncertainty over the possible adoption of a silver standard led to a speculative attack on the dollar in 1895 which was offset by a private intervention. The Federal Reserve became the protector of the currency in 1914, successfully (with the Treasury) holding off a speculative attack in July 1914. It also did so in September 1931 at the expense of a banking panic. During Bretton Woods the Fed and the US Treasury preserved the dollar peg to gold for a decade but failed when the Fed changed its priorities from price stability to full employment and monetizing the fiscal deficit. This led to a shift to floating exchange rates in the 1970s and with some trial and error in the use of exchange market intervention, the Fed achieved price and exchange rate stability by the 1980s. With this innovation, currency crises were by definition assigned to the dustbin of history.

The U.S. was very successful in dealing with sovereign debt crises. Alexander Hamilton's Stabilization Plan in 1790 resolved the Revolutionary War debt default and put the country on a sound fiscal footing. However the states ran into fiscal difficulties in the early 1840s and were not bailed out by the Federal government, leading them to default. From that experience, the states learned over the subsequent century to adopt balanced budgets making them also models of fiscal probity.

Canada was the most successful in institutional learning with respect to banking crises of all of our countries. From the very beginning, it adopted the Scottish model of nationwide branch banking which provided insurance against regional and local shocks which can produce banking panics. Via successive Bank Acts, innovations, often responding to near miss-systemic events, improved the soundness of the Canadian chartered banks which have avoided systemic banking instability to the present day.

Canada also had a successful experience with respect to currency crises. It had none under the gold standard and only one during the Bretton Woods period. It was brought on in 1962 by the Finance Minister who wanted to end Canada's float and return it to its Bretton Woods peg. He announced that he would like to see the value of the Canadian dollar reduced, leading speculators to dump Canadian dollars. Since then the government and the Bank of Canada have learned to let the exchange rate be determined by fundamentals.

Canada also had an excellent record with respect to avoiding debt crises. Moreover it avoided a sovereign default in 1929 when most countries in their league could not. Fiscal

difficulties by several provinces in the 1980s led to a Federal Provincial compact in the 1990s that has made Canada one of the most fiscally prudent countries in the world.

The Australian experience with banking crises in the golden age was quite different from its sister Dominion, Canada. Like Canada its banking system was modeled on the Scottish system of nationwide branch banking but it violated the prohibition on real estate lending, leading to the crisis of 1893. Institutional learning occurred via private sector retrenchment but also in the creation of new government financial institutions. Later during the Great Depression, Australia followed the model of other countries of adopting extensive regulation and financial repression which was only removed later than many other advanced countries. The Australian banking system, like that of Canada, avoided the recent financial crisis.

The Australian experience with currency crises was different from Canada's. There were no crises in the golden age. But Australia ran into trouble during the Great Depression and Bretton Woods, by following the UK's example. Since the 1980s Australia has deepened its financial markets and followed monetary rules towards price stability. Australia is no longer vulnerable to speculative attacks per se but its currency does follow the vagaries of commodity markets.

Like Canada, Australia had an excellent record with respect to fiscal probity during the golden age but there were some relatively small problems with the states during the Depression. Because the British pound sterling was devalued, Australia avoided some of the perils of currency mismatch. In addition it was able to increasingly shift towards domestic debt and thereby strike better bargains with bondholders. Argentina's experience with banking crises was very different from the other countries. It had many more crisis than the others. Its record of learning from crises was dismal. It did adopt institutions from other countries like Free banking and the national banking system from the U.S. but these institutions did not transfer well into the southern hemisphere where substantive changes to the prototype policies were introduced leading ultimately to greater potential for instability (Della Paolera, 1994).

Argentina's record with currency crises was also different and much more turbulent from the learners. It had a bad experience under the gold standard because it could not follow the monetary and fiscal orthodoxy consistent with a hard currency regime. Some learning did occur after the crisis of 1890 but by the 1930s Argentina had once again lost its

ability to ensure stability when engaged with the global economy. It had much worse problems in the late twentieth century regime of fiat money and high inflation. Finally, the Argentine experience with debt crises was also disastrous. There appears to be very little evidence of institutional learning. Many of the crises being repeats of the older ones combining hard pegs, currency and maturity mismatch, sudden stops and lax regulatory environments.

In conclusion we ask “how much did the four countries learn from their crises?” The US did learn from its experience with the three types of crisis but not enough to prevent their reoccurrence. One can characterize its experience as two steps forward and one step back. Canada had an exemplary record, it had adopted sound institutions from the beginning and it always learned from its crisis/near crisis experience. Its learning can be characterized as two steps forward, no steps back.

Australia was more like the U.S. It can be characterized as two steps forward, one step back. Argentina was very different from the other three. It rarely learned from its crisis experience. Its experience can be characterized as no steps forward or even worse, as one step forward, two steps back.

What explains the experiences of the different countries? The extensive literature on institutions and economic performance suggests that precisely the countries that successfully financially developed had greater political stability, adherence to the rule of law, well defined property rights, and better democracy. The three successful countries that we describe certainly have these attributes. By contrast, Argentina has been deficient in all respects.

It would appear that the lesson from history is that financial stability is in part also determined by these forces. This is natural since sound financial and monetary policies can minimize the problems inherent in a world of incomplete markets, and maturity mismatch. These institutional determinants help in many ways. Political stability and rule of law can help avoid excessive rent seeking and limit corruption. Rule of law gives rise to better regulatory frameworks regardless of “legal origins” (Musacchio, 2008). Democracy gives those aggrieved by the market externalities of financial instability a chance for redress via civil interaction and consensus. Political stability leads to longer time horizons in financial and political “markets” and it may also enhance the credibility of monetary authorities.

Financial crises can never be fully eliminated in the same way that complex machines and systems cannot avoid occasional failure. Besides, the environment is never constant in

an evolutionary sense. Financial market participants as well as regulators may act rationally but market failures and unseen complexities make for new and unforeseen challenges much like the in the battle against constantly evolving pathogens each living species faces. What we assert is that certain constellations of political, institutional and economic variables increase the possibility that countries redress earlier failures and attempt to look ahead to avoid future crises.

We end with two final thoughts. Barry Eichengreen (2014) recently argued that:

“The experience of the 1930s suggests that radical reform is possible only in the wake of an exceptional crisis. Absent that crisis, business as usual remains the order of the day The problem starting in 2009, if it can be called a problem, was that policy makers managed, just barely, to prevent a 1930s-style crisis”. (p. 324)

While there is much to agree with here, we do not think that the long-run record from the non-learners is totally consistent with this argument. Major crises rocked the non-learners over the last two centuries and reform was largely feeble. We suggest that, while a large crisis is a necessary condition for significant reform and learning, institutions are also a key variable. In the absence of the factors we discuss above, large crises cannot alone spark major changes.

Second, following the insightful work of Reinhart and Rogoff (2009) the ironic mantra of “This time is different” has become common place. We think the long-run record shows that less irony may be required. The crisis of 2007-2008 in the US and other leading countries had its roots, as all crises do, in an environment of imperfect information and maturity mismatch (e.g., in the repo market). A number of contributing factors (e.g., deregulation, mis-guided regulation, opportunism, overly loose monetary policy, global imbalances, and moral hazard) probably enhanced the likelihood of a crisis. But given the supreme complexity and disagreement about the leading causes of the crisis in the literature to date, the fact that the repo market was largely un-documented by regulators, historically un-paralleled levels of securitization and financial innovation such as CDS and associated options were all present suggest that it would have been hard to foresee exactly how the crisis would unfold and whether it would be systemic in nature. Also, what can explain the fact that Australia, Canada and New Zealand sat this crisis out despite their ostensible similarities to the US and the UK? So much cannot be said for the real estate booms in Spain and Ireland or the excessive borrowing based on falsified national accounts that occurred in

Greece. These crises bear much more similarity to previous crises as our selective analysis of the long-run illustrates. The crisis in 2001 in Argentina, that of Brazil in 2002 and those of the 1980s and the 1990s in Latin America and Asia bear significant resemblance to previous crises despite “real time” optimism. What we conclude is that next time may very well be different in the leading countries, but in others it may not be so different.

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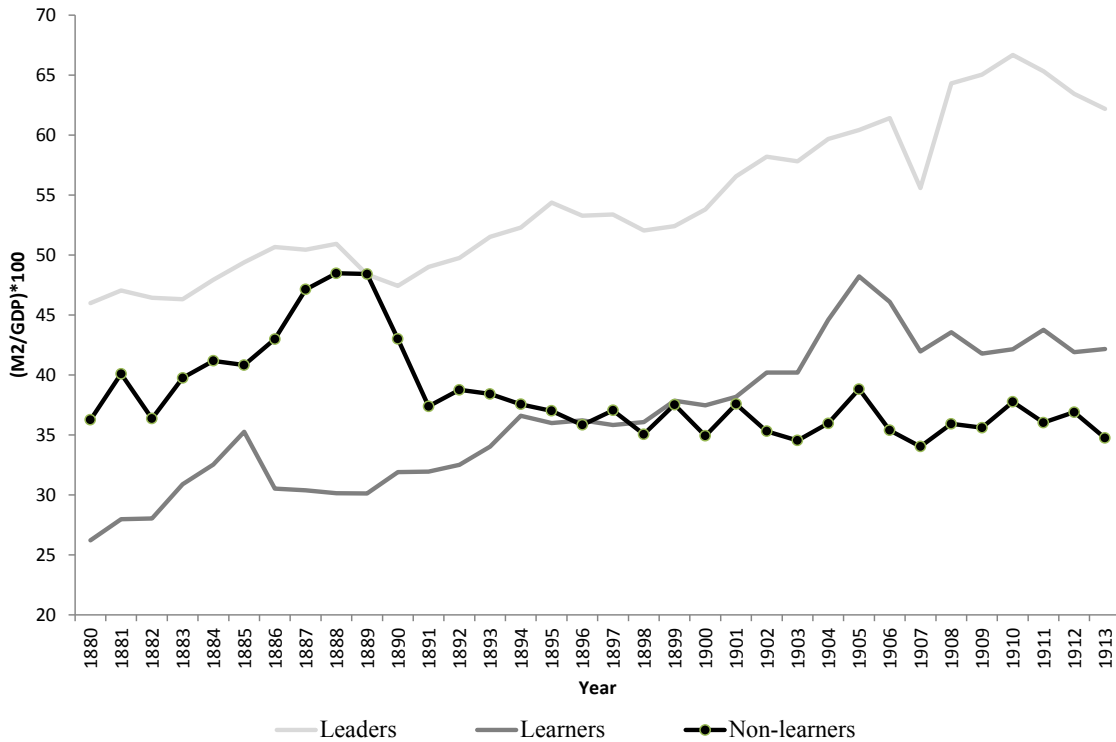
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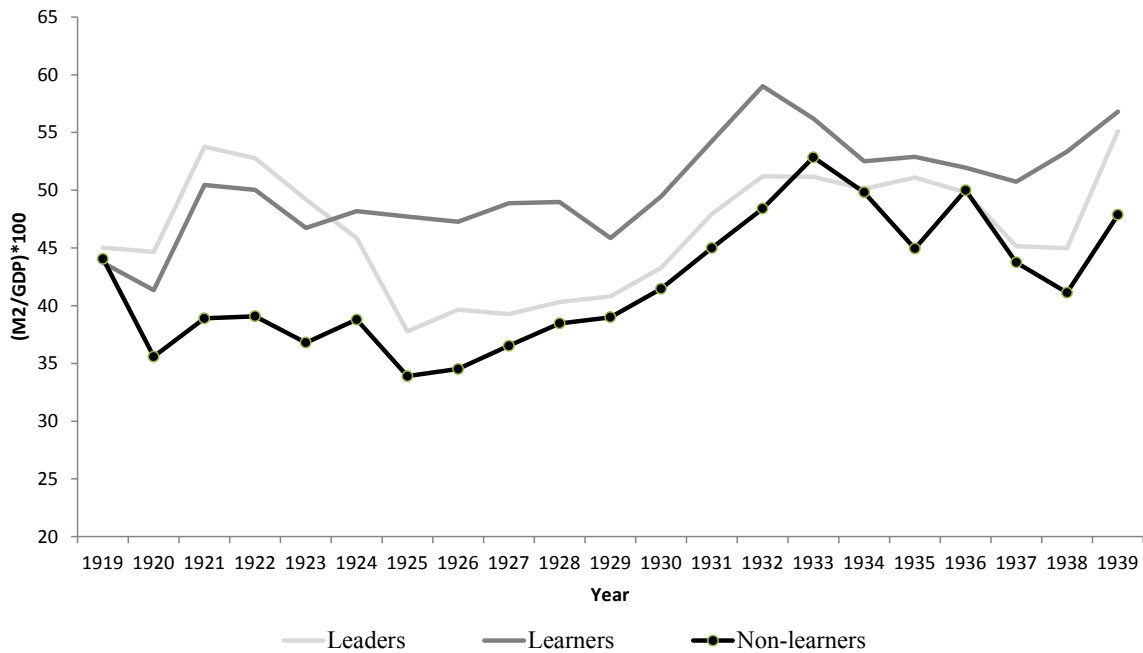
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Figure 1 Ratio of M2 to GDP for Three Sub-sets of Countries, 1880-1913



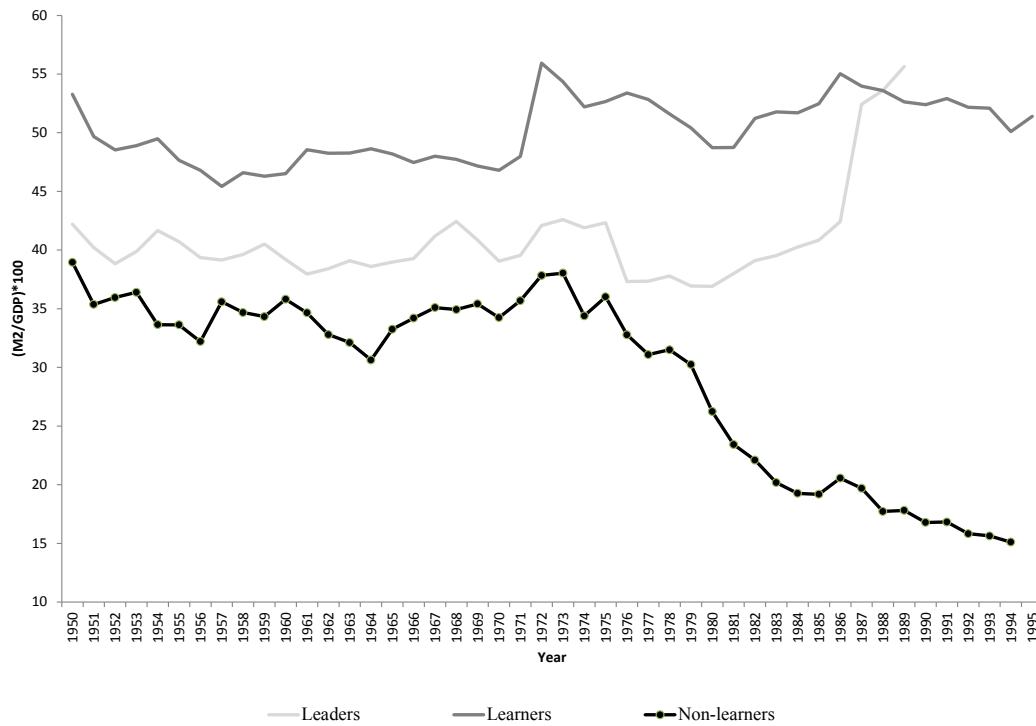
Notes: Figure shows the population-weighted average ratio of broad money (M2) to GDP. Data are from Bordo et. al. (1999) Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 2 Ratio of M2 to GDP for Three Sub-sets of Countries, 1919-1939



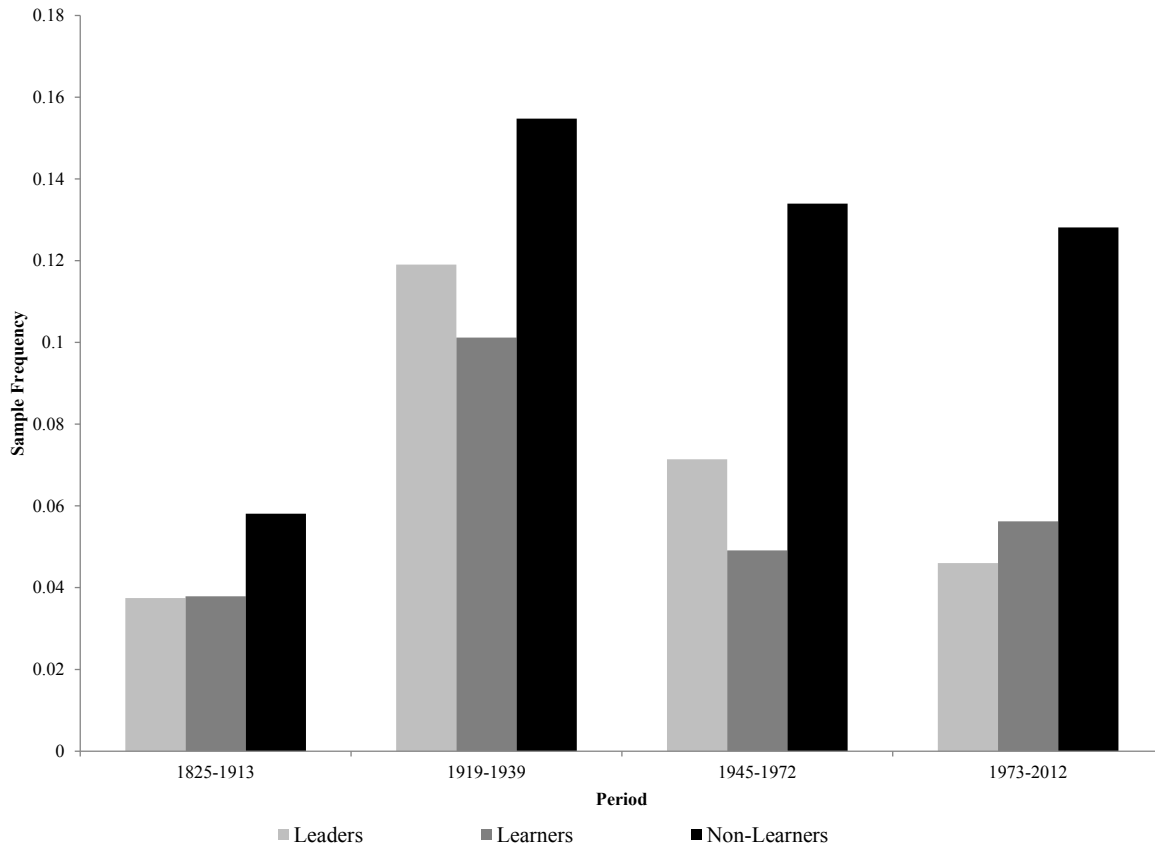
Notes: Figure shows the population-weighted average ratio of broad money (M2) to GDP. Data are from Bordo et. al. (1999) Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 3 Ratio of M2 to GDP for Three Sub-sets of Countries, 1950-1995



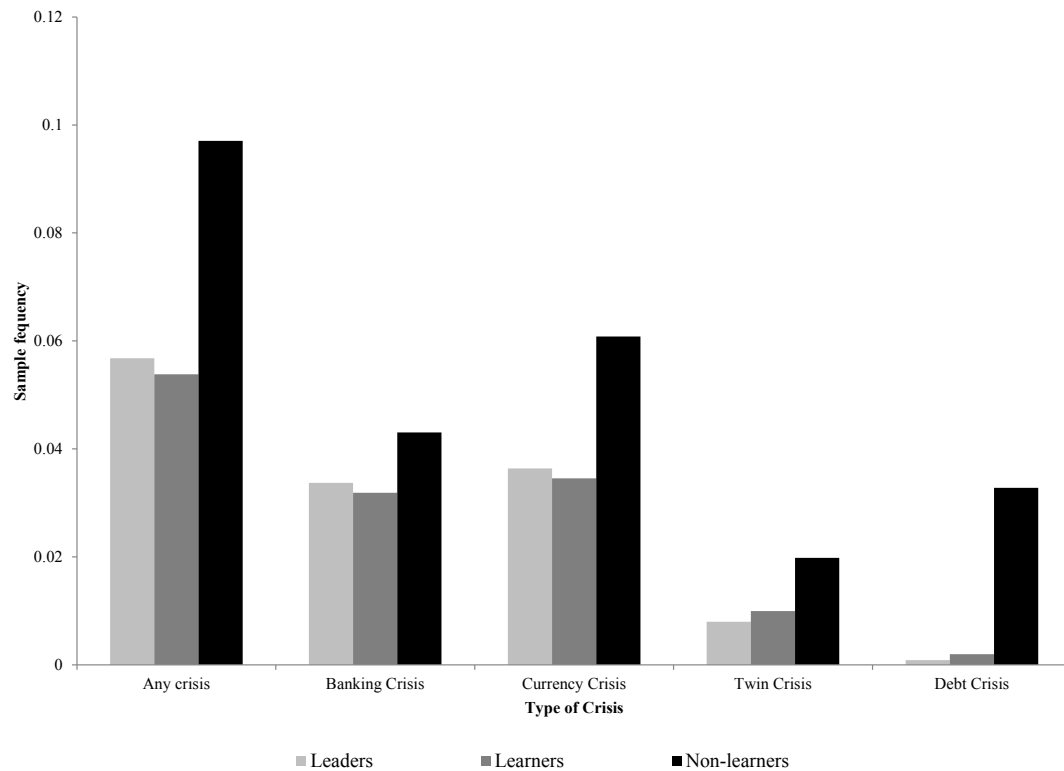
Notes: Figure shows the population-weighted average ratio of broad money (M2) to GDP. Data are from Bordo et. al. (1999) Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 4 Probability of Experiencing any Kind of Financial Crisis, 1825-2012



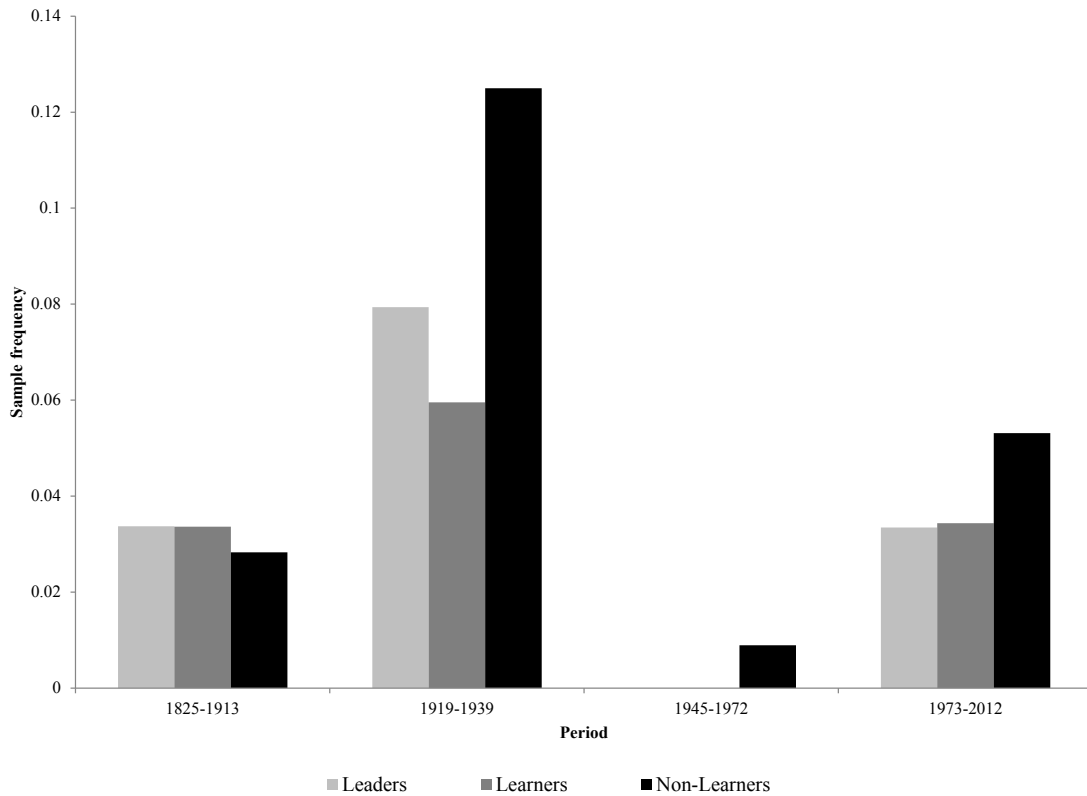
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of a banking, currency, twin, or debt crisis to the total number of country years within the period. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 5 Probability of Experiencing Various Types of Financial Crisis, 1825-2012



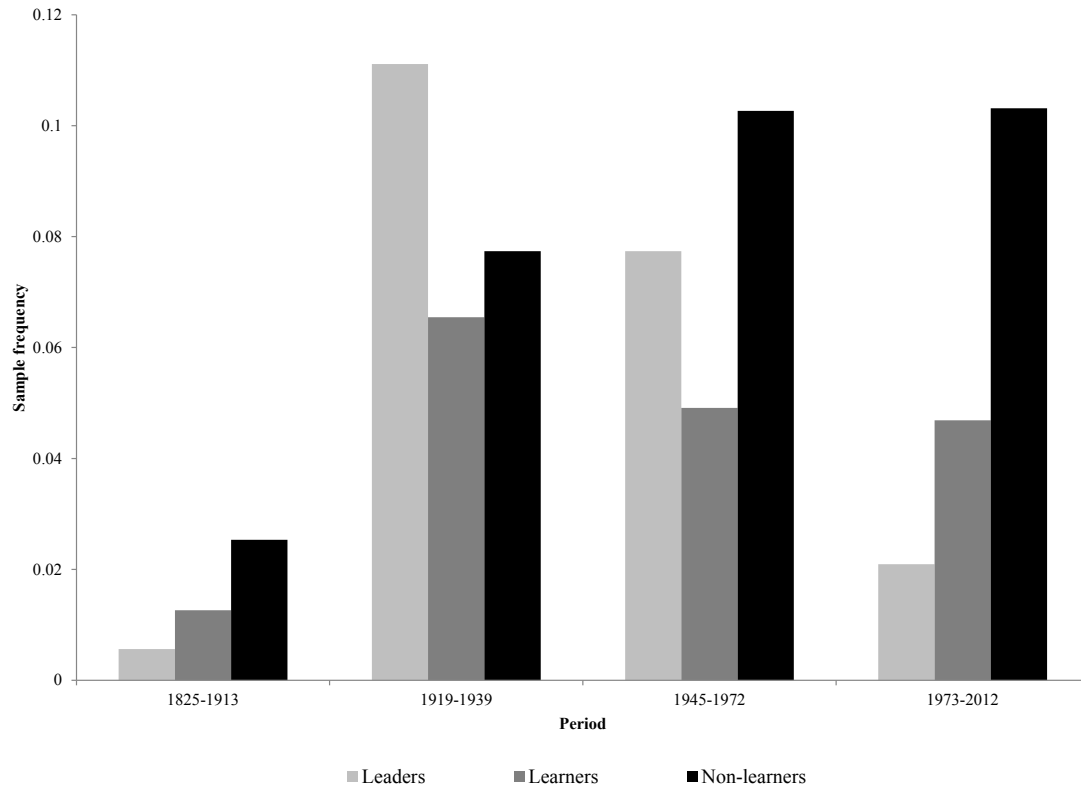
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of either a banking, currency, twin, debt crisis or any kind of crisis to the total number of country years within the period. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain. Each probability is calculated for all years between 1825 to 2012.

Figure 6 Probability of Experiencing a Banking Crisis, 1825-2012



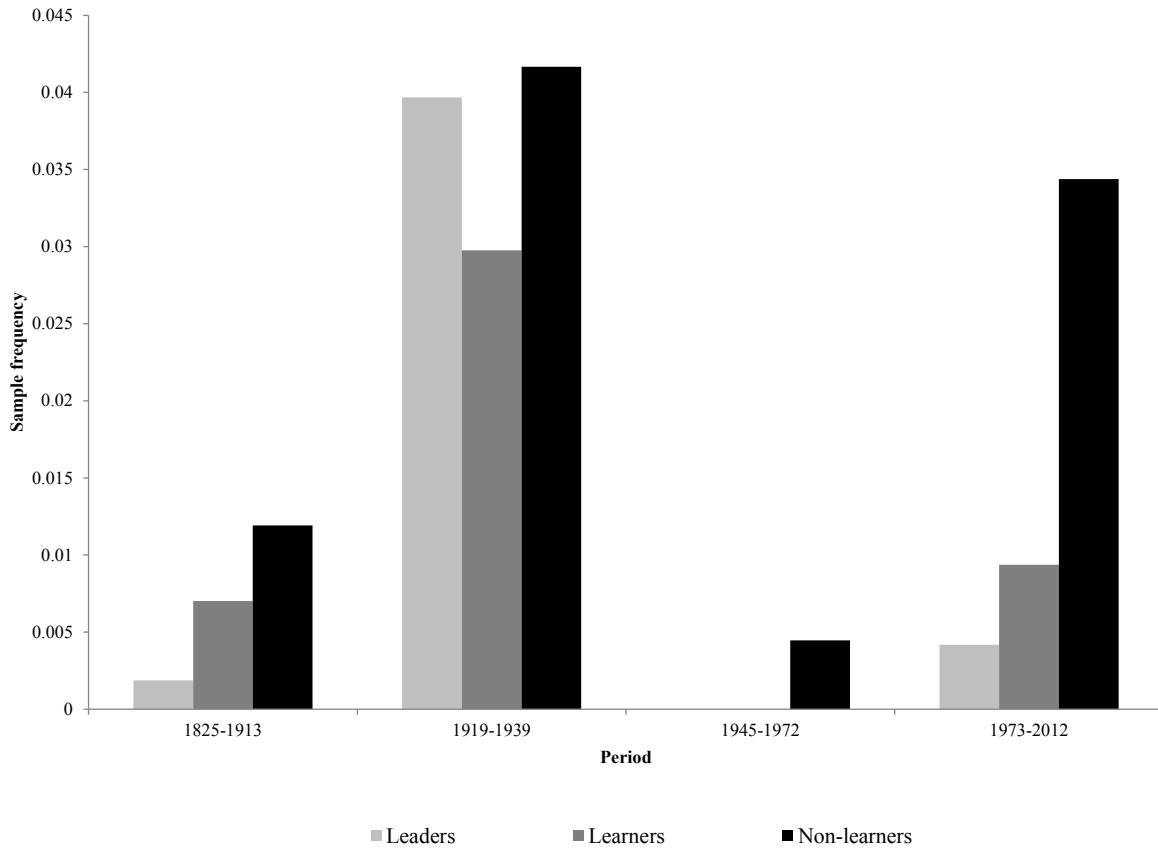
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of a banking crisis to the total number of country years within the period. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 7 Probability of Experiencing a Currency Crisis, 1825-2012



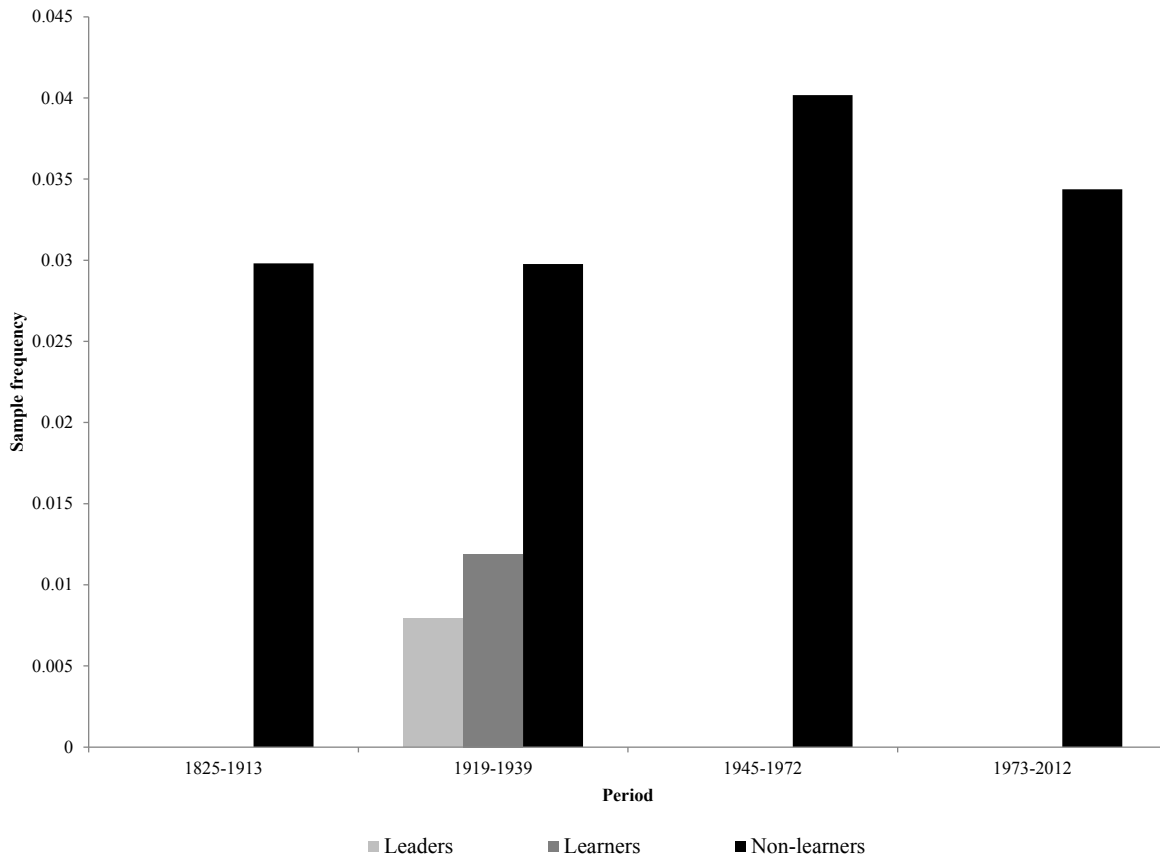
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of a currency crisis to the total number of country years within the period. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 8 Probability of Experiencing a Twin Crisis, 1825-2012



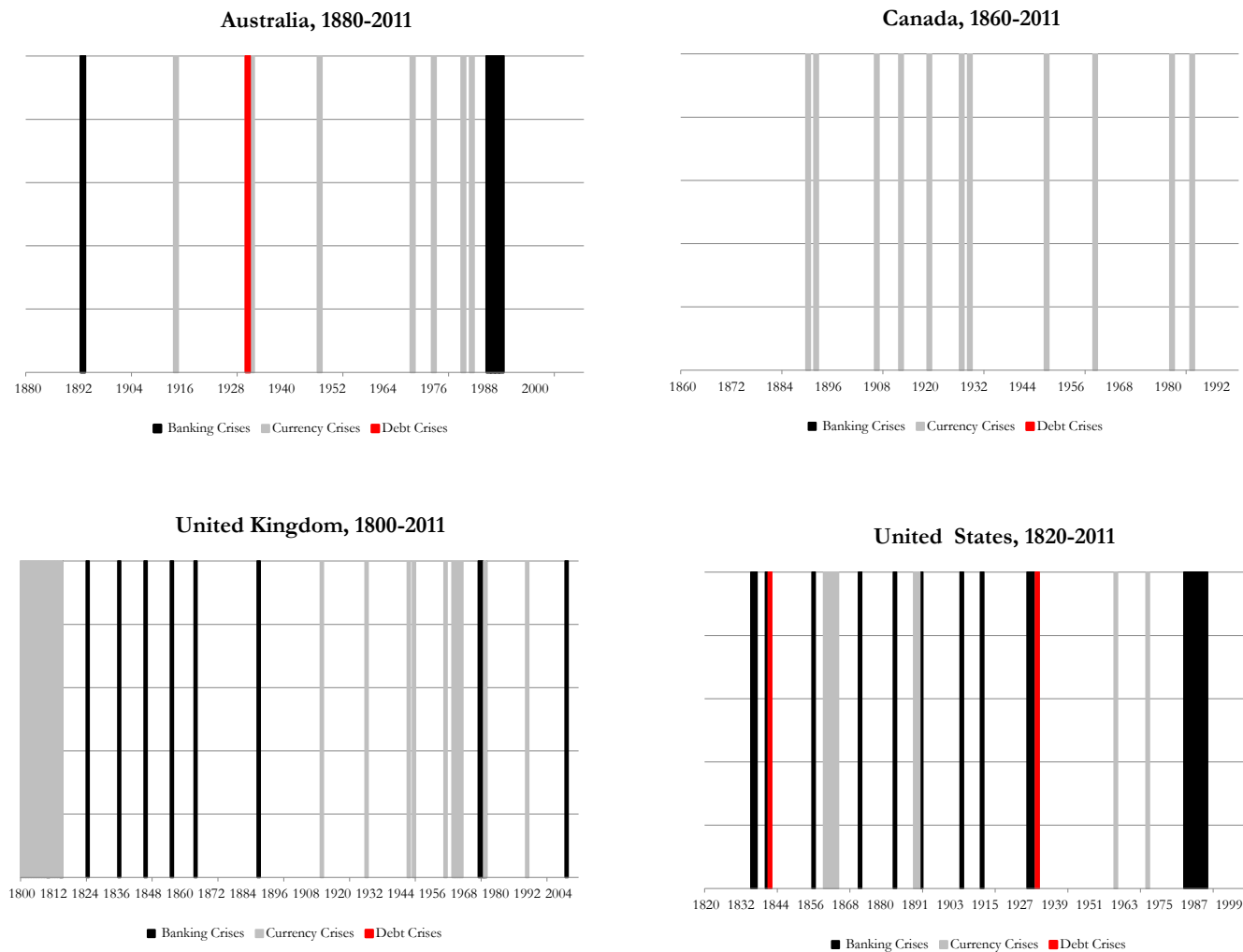
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of a twin crisis to the total number of country years within the period. Twin crises occur when a banking crisis and a currency crisis affect a country within a span of two years. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 9 Probability of Experiencing a Debt Crisis, 1825-2012



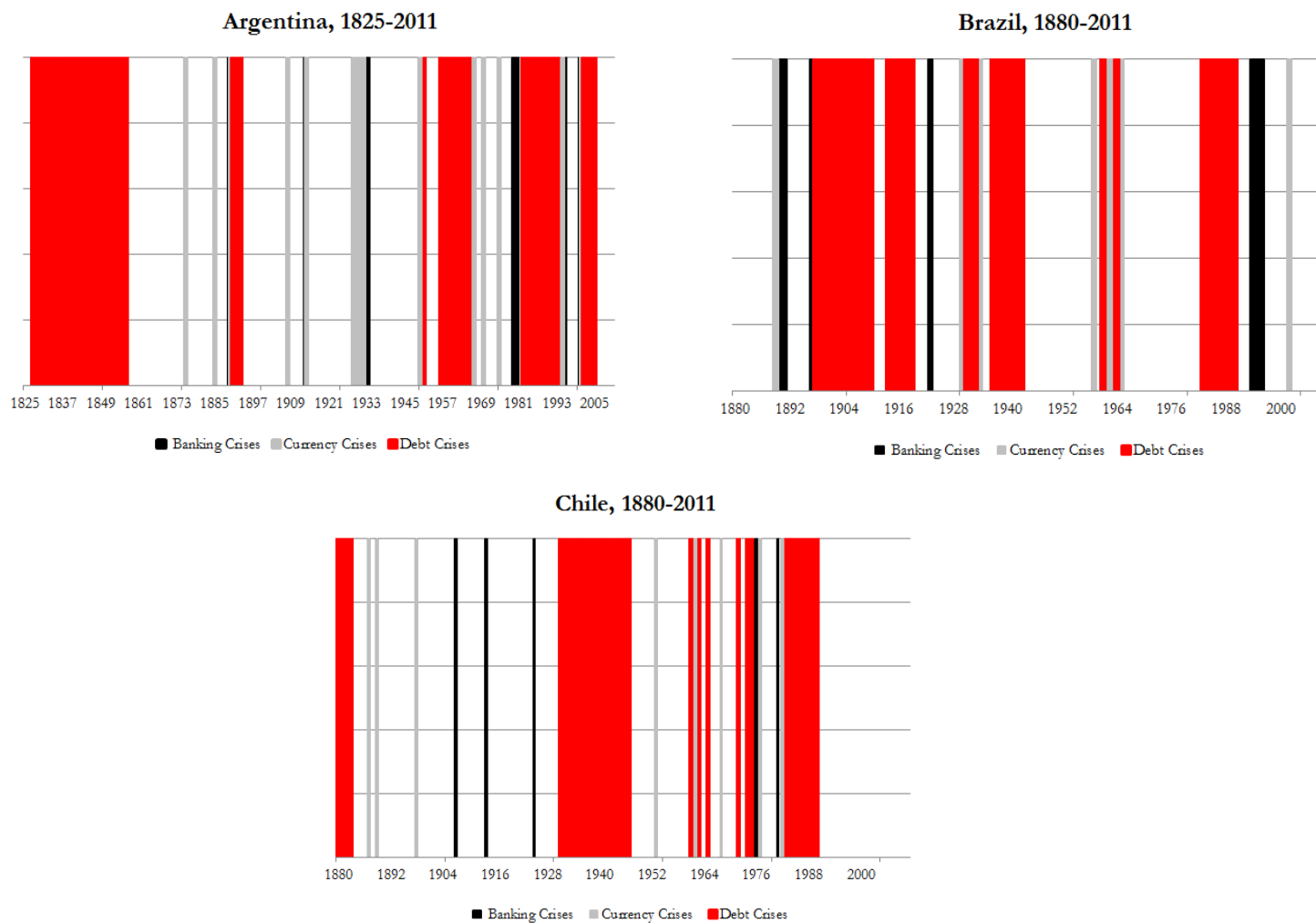
Notes: The probability of experiencing a crisis is calculated as the ratio of the number of country years in which countries in each sub-sample are in the first year of a debt crisis to the total number of country years within the period. No bar signifies no debt crisis occurred within the period. Leaders include Belgium, France, Germany, Netherlands, Switzerland and Great Britain/UK. Learners include Australia (or its component colonies prior to 1901), Canada (its component colonies prior to 1867), Denmark, Japan, New Zealand, Norway, Sweden and the USA. Non-learners include: Argentina, Brazil, Chile, Greece, Italy (post-1861 only), Portugal, and Spain.

Figure 10 Long-Run Frequency of Crises for Four Countries



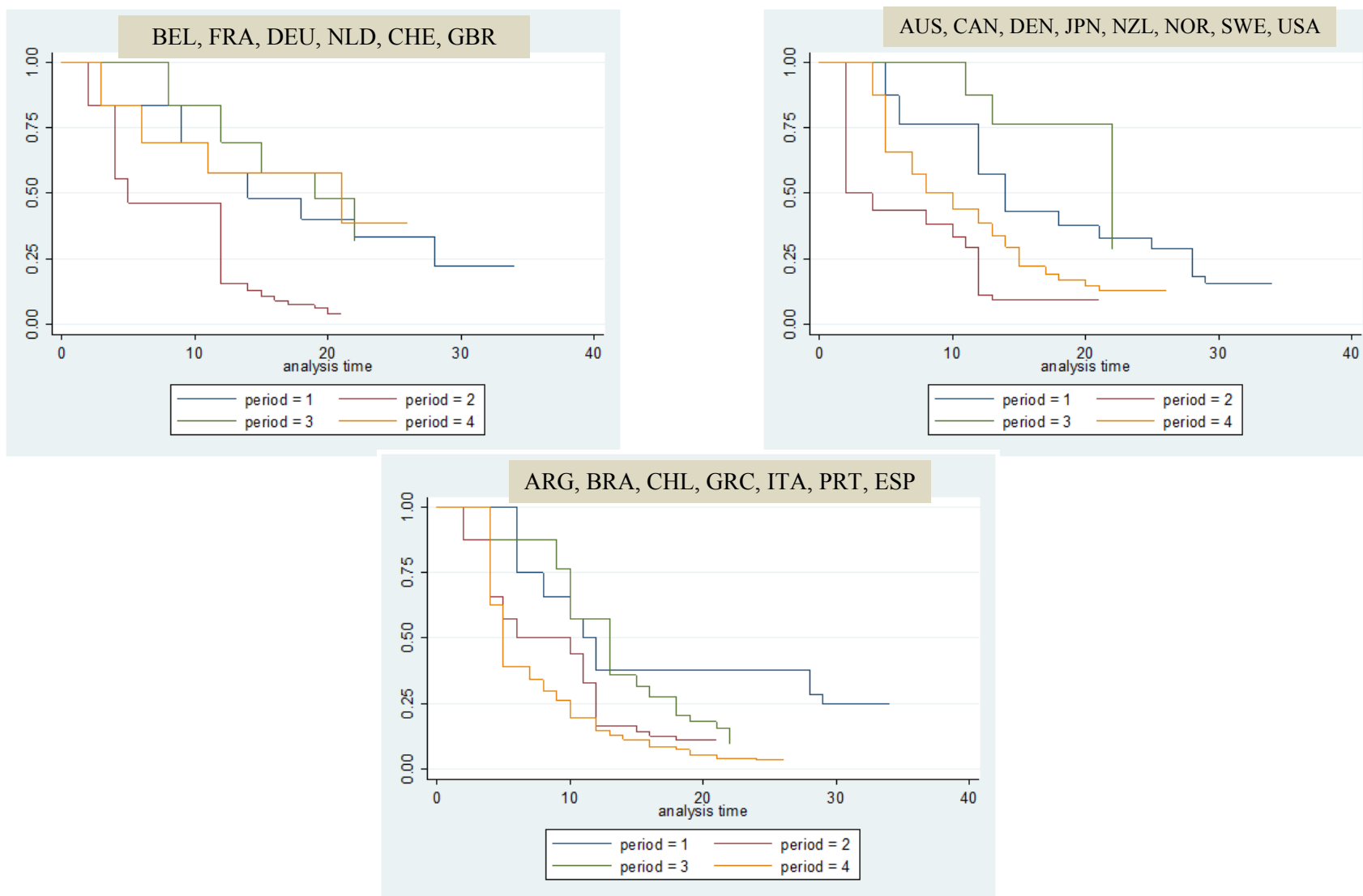
Notes: Bars represent the incidence of a given type of crisis. The width represents the time in years until a country resumed growing at its pre-crisis trend as in Bordo et. al. (2001).

Figure 11 Long-Run Frequency of Crises for 3 “non-learning” Countries



Notes: Bars represent the incidence of a given type of crisis. The width represents the time in years until a country resumed growing at its pre-crisis trend as in Bordo et. al. (2001).

Figure 12 Kaplan-Meier Survivor Curves for Three sets of Countries



Notes: Figures show the Kaplan-Meier non-parametric survivor function for three sets of countries. The curve represents the empirical average probability that country will have any kind of financial crisis in T years' time after the last crisis.

