

# Is Our Current International Economic Environment Unusually Crisis Prone?

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## 1. Introduction

From popular accounts one would gain the impression that our current international economic environment is unusually crisis prone. The European of 1992-3, the Mexican crisis of 1994-5, the Asian crisis of 1997-8, and the other currency and banking crises that peppered the 1980s and 1990s dominate journalistic accounts of recent decades. This “crisis problem” is seen as perhaps the single most distinctive financial characteristic of our age.

Is it? Even a cursory review of financial history reveals that the problem is not new. One classic reference, O.M.W. Sprague’s *History of Crises Under the National Banking System* (1910), while concerned with just one country, the United States, contains chapters on the crisis of 1873, the panic of 1884, the stringency of 1890, the crisis of 1893, and the crisis of 1907. One can ask (as does Schwartz 1986) whether it is appropriate to think of these episodes as crises — that is, whether they significantly disrupted the operation of the financial system and impaired the health of the nonfinancial economy — but precisely the same question can be asked of certain recent crises.<sup>2</sup>

In what follows we revisit this history with an eye toward establishing what is new and

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<sup>1</sup> Rutgers University and University of California at Berkeley, respectively. This paper is prepared for the Reserve Bank of Australia Conference on Private Capital Flows, Sydney, 9-10 August 1999. It builds on an earlier paper prepared for the Brookings Trade Policy Forum (Bordo, Eichengreen and Irwin 1999); we thank Doug Irwin for his collaboration and support. Chris Meissner and Antu Murshid provided exceptionally patient research assistance.

<sup>2</sup> The European exchange-rate crisis of 1992-3, for example.

different about the recent wave of crises. We consider banking crises, currency crises and twin crises (where banking and currency crises coincide). The core comparison is with the earlier age of globalization from 1880 to 1914. Interpretations of recent decades emphasize the role of economic and financial globalization and high international capital mobility in particular in creating a crisis-prone environment.<sup>3</sup> The three decades preceding World War I were similarly marked by high levels of economic and financial integration. If capital mobility is the culprit, we would consequently expect to see a similar incidence of crises prior to 1914. In addition, we consider the interwar period, which is dominated by what is unquestionably the most serious international financial crisis of all, and the post-World War II quarter century, a period of relatively limited capital mobility. The broader comparison allows us to consider not just capital mobility but also the role of other institutional arrangements like the exchange rate regime and financial regulation.

We ask questions like the following. What was the frequency of currency and banking crises? How does their severity compare? How long delayed was recovery? What was the impact on ancillary variables like the current account, money supply and interest rates? What was the response of the authorities?

Inherently, the results are no more reliable than the data. Readers who have worked with historical statistics will be aware that the findings reported here should be regarded as fragile. Their appetite for analysis may be affected much as by the proverbial trip to the sausage factory. In addition, there are many more countries now than a century ago with their own currencies and banking systems, and historical statistics for the earlier period are available mainly for the then

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<sup>3</sup> See for example World Bank (1999).

high-income countries at a relatively advanced stage of economic development. This raises questions about the appropriate reference group.

## **2. Overview**

The classic case with resonance for today is Latin America's experience with lending booms and busts prior to 1914 (Marichal 1989). The first wave of British capital flows to the new states of the region to finance infrastructure and gold and silver mines ended with the crisis of 1825. British investors had purchased Latin American stocks and bonds, some of which were in nonexistent companies and even countries, with gay abandon (Neal 1992). The boom ended with a stock market crash and a banking panic. The new countries defaulted on their debts and lost access to international capital markets for decades, until they renegotiated terms and began paying into arrears (Cole, Dow and English 1995).

The second wave of foreign lending to Latin America in the 1850's and 1860's was used to finance railroadization and ended in the 1873 financial crisis. Faced with deteriorating terms of trade and a dearth of external finance, countries defaulted on their debts. The third wave in the 1880's involved massive flows from Britain and Europe generally to finance the interior development of Argentina and Uruguay; it ended with the crash of 1890, leading to the insolvency of Baring's, the famous London merchant bank. Argentine state bonds went into default, a moratorium was declared, and flows to the region dried up for half a decade. In the wake of the Baring Crisis, financial distress in London and heightened awareness of the risks of foreign lending worsened the capital-market access of other "emerging markets" like Australia and New Zealand. The next wave of capital flows to emerging markets started up only after the

turn of the century, once this wreckage had been cleared away.

Latin experience may be the classic, but the United States also experienced lending booms and busts. The first wave of British capital in the 1820's and 1830's went to finance canals and the cotton boom. It ended in the depression of 1837-1843 with defaults by eight states, causing British investors to shun U.S. investments for the rest of the decade. The second wave followed the U.S. Civil War and was used to finance westward expansion. The threat that the country would abandon gold for silver precipitated capital flight in the mid-1890's but, unlike the Latin case, did not lead to the suspension of convertibility or an extended reversal of capital flows.<sup>4</sup>

Financial crises in this period were precipitated by events in both lending and the borrowing countries. A number of crises began in Europe due to harvest failures. On several such occasions (1837, 1847, 1857) the Bank of England raised its discount rate in response to an external drain of gold reserves. This had serious consequences for capital flows to the New World. Thus, the 1837 crisis spread to North America via British intermediaries that financed the export of cotton from New Orleans to Liverpool, leading to the suspension of specie convertibility by the United States and to bank failures across the country.

Not all crises originated in the Old World. Some emanated from Latin America, where they were precipitated by supply shocks that made it impossible for commodity-exporting

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<sup>4</sup> Australia, the third of the four big recipients of British capital (the fourth being Canada), also experienced a significant boom-bust cycle. A land boom in the 1880's, heavily financed by British capital, turned to bust with the deterioration in the terms of trade in 1890. This led to massive bank insolvencies in 1893, because Australian banks (unlike their counterparts in Canada) had lent against the collateral of land. British depositors, burned by their losses, remained wary of Australia for a decade. See Appendix II for a more detailed account.

countries to service their debts, and by expansionary monetary and fiscal policies adopted in the effort to protect the economy from the consequences. Some were triggered by financial instability, especially in the United States, a country hobbled by a fragile unit banking system and lacking a lender of last resort. These crises in the periphery in turn infected the European core. Classic examples include the Argentine crisis of 1889-90 and the U.S. crises of 1893 and 1907.

A fourth wave of flows to emerging markets (and to the "re-emerging markets" of Europe) occurred in the 1920's after leadership in international financial affairs shifted from London to New York. (Bordo, Edelstein and Rockoff 1999). It ended at the end of the decade with the collapse of commodity prices and the Great Depression. Virtually all countries, with the principal exception of Argentina, defaulted on their debts. Private portfolio capital did not return to the region for four decades.

These interwar crises were greater in both severity and scope. They were tied up with the flaws of the gold-exchange standard. These included the fragility of a system in which foreign exchange reserves loomed increasingly large relative to monetary gold, combined with an official commitment to peg the relative price of these two assets; deflationary pressure emanating from an undervalued real price of gold; and the sterilization of reserve flows by the Federal Reserve and the Bank of France. Compared to the pre-war gold standard, the credibility of the commitment to gold convertibility was weak, and capital flows were not as stabilizing. This fragile system came under early strain from changes in the pattern of international settlements, reflecting the persistent weakness of primary commodity prices and the impact on the current account of reparations and war-debt payments.

Hence, when the Great Depression hit, banking panics spread via the fixed exchange rates of the gold-exchange standard. Countries were only spared the ravages of depression when they cut the link with gold, devaluing their currencies and adopting reflationary policies.

The Bretton Woods System established in reaction to the problems of the interwar period placed limits on capital mobility. In response to the interwar experience with banking crises, governments created elaborate systems of regulation to reduce risk-taking in the domestic financial sector and constructed a financial safety net in the form of deposit insurance and lenders of last resort. As we shall see, the result was virtually no banking crises for the better part of four decades. Crises under Bretton Woods were strictly currency crises, in which speculators attacked countries that attempted to defend exchange rates inconsistent with their domestic macroeconomic and financial policies. These attacks ended either in devaluation or, on occasion, in a successful rescue mounted by international authorities (the IMF and the G-10). This contrasts with the Victorian Era, when there were fewer "pure currency crises" (unaccompanied by banking crises) except at the outbreak of wars.

### **3. Hypotheses**

While there are similarities between the "emerging-market crises" of the Victorian Age and recent events, a key difference is the monetary regime. Pre-1914 crises occurred under the gold standard, while the recent crises have occurred under a regime of managed flexibility.<sup>5</sup>

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<sup>5</sup> To be sure, this last label covers a multitude of different exchange-rate regimes (some would say a multitude of sins), but the essential point is that, Hong Kong and Argentina to the contrary notwithstanding, exchange rates were less firmly pegged during the recent crisis than they had been at the periphery of the international gold standard a century earlier.

This has several potential consequences. First, whereas the gold standard quickly transmitted crises between peripheral and core countries, the advanced countries today are likely to be better insulated from shocks at the periphery. Central banks and governments in the advanced-industrial countries now have more room for maneuver, not being constrained by a commitment to defend the nominal price of gold. One might say that Alan Greenspan in 1998 should have been thankful that policy makers had not bought into an earlier Alan Greenspan's arguments favoring the gold standard!

Second, and working in the other direction, credible adherence to the gold standard -- in the sense that maintaining the gold parity was the primary policy goal and, if it had to be abandoned in the face of a war or other emergency, it would be restored at the pre-existing parity -- encouraged stabilizing capital flows once resolution was in train (Miller 1996, 1998).<sup>6</sup>

Because investors expected the pre-crisis exchange rate to be restored once the crisis had passed, capital and gold could have been quick to return in anticipation of subsequent capital gains. This leads us to expect relatively quick resolution of currency crises prior to 1914 at the core of the gold standard system. The credibility of this commitment to resumption was greatest in the

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<sup>6</sup>The roots of this credibility is something we have both discussed elsewhere (viz. Eichengreen 1992, Eichengreen and Temin 1997, Bordo and Kydland 1996) and lack the space to rehearse here. Briefly, the commitment to the gold standard (and to its early resumption) was rooted in ideology, experience and politics. The ideology of *laissez faire*, the absence of a redistributive state, and the fact that there had not yet developed a theory of the countercyclical role for monetary or fiscal policy all supported a passive, rules-based approach to determining the external value of the currency -- and to the early reinstatement of that approach when suspending it was necessary. Experience militated in favor of early restoration of the gold standard, insofar as countries that had done so saw a visible improvement in their international credit-market access. And politics worked in the same direction insofar as the limited extent of the franchise and low levels of union density meant that the overarching commitment to defense of the exchange rate was rarely threatened by groups with other priorities such as the reduction of unemployment.

relatively advanced economies of Western Europe, the United States (with the notable exception of the free-silver era in the 1880's and 1890's), and the British Dominions.<sup>7</sup> It was least in countries with poor records of fiscal probity and dubious credibility, including most of those of Latin America, Eastern Europe and the Near East. Other things equal, this would lead us to expect earlier recovery from crises at the center of the gold standard system than at its periphery.

This was also the period in which core countries developed domestic lenders of last resort (Bordo and Schwartz 1998), lifeboat operations on the part of the banks themselves (Gorton 1985), and an ad hoc system of international rescue loans (Eichengreen 1992). None of these arrangements was prevalent at the periphery, however. This contrast would thus lead us to expect to see differences in the frequency and severity of banking crises in the core and the peripheral countries.<sup>8</sup>

Today the vast majority of countries have put in place lenders of last resort and financial safety nets, limiting scope for the kind of wholesale banking collapses seen in the interwar years. Instead, banking panics are transformed into situations where the liabilities of an insolvent banking system are taken over by the government. This can, however, convert a banking crisis into a currency crisis (Dooley 1998). It suggests that while there may be factors at work limiting the macroeconomic effects of banking crises, we should also observe a greater incidence today of "twin crises" (when banking and currency crises come together).<sup>9</sup> It also suggests that

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<sup>7</sup> Eichengreen (1992) *defines* the core countries of the gold standard as those where the commitment to the maintenance of gold convertibility was credible, and the peripheral countries of the system as those where it was not. See also footnote 17 below.

<sup>8</sup> As we in fact find below.

<sup>9</sup> Again, our results turn out to be broadly consistent with this hypothesis, though there were in fact a substantial number of twin crises prior to 1914.



recovery from banking crises may be quicker today, reflecting concerted intervention by the authorities. But regulatory intervention has not always been early, and the authorities in many emerging markets are hamstrung by the fact that many of the external liabilities of the banking and corporate sectors are denominated in foreign currency. Thus, the validity of this last hypothesis

-- like the others -- remains to be established.

#### **4. Data and Methods**

To compare the depth and duration of crises, we focus on changes in the rate of growth. We examine the growth of real GDP before, during and after crises for 15 capital-importing "emerging markets" in the period 1880-1914.<sup>10</sup> We also consider six mature markets -- read "capital exporters."<sup>11</sup> We then make similar calculations for ten emerging markets experiencing crises in the past 25 years.<sup>12</sup>

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<sup>10</sup> The countries, whose selection is driven by data availability, are Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, Greece, Italy, Japan, Norway, Portugal, Spain, Sweden, United States. Our criteria for classifying a country as emerging are (i) whether it was primarily a recipient of capital flows and (ii) its level of per capita income. Thus, in the pre-1914 era a number of the 20th century's most advanced countries (the U.S., Japan, and the Scandinavians) are classified as emerging markets on the first of these two ground. A similar comparison is made by DeLargy and Goodhart (1999). Their empirical base is more limited, however; they concentrate on a number of famous crisis episodes in the pre 1914 era in five countries (the U.S., Australia, Argentina, Italy and Austria). An alternative metric would measure the wealth losses associated with the resolution of the crises. This is the approach taken by Caprio and Klingbiel (1996). By this metric the losses associated with banking crises in the 1980's and 1990's is likely to be considerably larger than before 1914 (Calomiris 1999).

<sup>11</sup> They are Belgium, France, Germany, the Netherlands, Switzerland, and Great Britain.

<sup>12</sup> These are Argentina, Brazil, Chile, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore and Thailand.

We identify currency and banking crises from a survey of the historical literature. The resulting chronology is reproduced in Appendix 1. (Appendix 2 provides capsule histories of the most important pre-1914 episodes.) For an episode to qualify as a banking crisis, we must observe either bank runs, bank failures and the suspension of convertibility of deposits into currency (a banking panic), or else significant banking-sector problems (including failures) that are resolved by a fiscally-underwritten bank restructuring.<sup>13</sup> For an episode to qualify as a currency crisis, we must observe a forced change in parity, the abandonment of a pegged exchange rate, or an international rescue. An alternative measure of currency crises that we also use is an index of exchange market pressure, calculated as a weighted average of the percentage change in the exchange rate with respect to the core country (the UK before 1914, the U.S. thereafter), the change in the short-term interest rate differential with respect to the core country, and the difference of the percentage change in reserves of a given country and the percentage change in reserves of the core country.<sup>14</sup> We count an episode as a currency crisis when it shows up according to either of these indicators.

For each country we calculate the growth rate in the crisis year relative to its trend over the five years preceding the crisis; crisis-year growth relative to its three-year trend preceding

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<sup>13</sup> This allows us to distinguish between liquidity crises before 1914 in which lender-of-last-resort intervention was either absent or unsuccessful, and events (like those typical of more recent years) where a lender of last resort or deposit insurance is in place and the main problem has been bank insolvency. In fact, however, a number of banking crises which occurred in Europe before 1914 did not involve panics and in this respect were not dissimilar from episodes occurring more recently.

<sup>14</sup> This builds on the exchange-market-pressure model of Girton and Roper (1977), following the methodology in Eichengreen, Rose and Wyplosz (1995, 1996).

the crisis; the difference between crisis-year growth and the preceding year's growth rate; the difference between growth the year following the crisis and the crisis-year growth rate; the difference between the three-year trend growth rate following the crisis and the crisis-year growth rate; and finally the difference between the five-year trend growth rate following the crisis and the crisis-year growth rate.<sup>15</sup>

## 5. Depth and Duration of Crises: Pre-1914 and Post-1972

Table 1 presents summary statistics of cross-countries averages for the pre-1914 and post-1972 periods (the two ages of financial globalization). Our discussion focuses on the emerging markets (columns 1 and 3) We identify 22 crises in emerging markets and 7 in their advanced-industrial counterparts prior to 1914.<sup>16</sup>

**The Recessionary Phase.** A key fact is that the output effects of banking and financial crises in emerging markets were roughly the same before 1914 as today. Whereas growth declined by 3 percentage points relative to trend in the typical post-1972 crisis, the comparable number for emerging markets in the pre-1914 period was 2 percentage points. The contrast is sharpest for twin crises (with both banking and currency components), which have been exceptionally disruptive since 1972 (when the average decline in the growth rate was 5 per cent)

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<sup>15</sup> Assuming that the economy is roughly at its trend growth rate for five years before the crisis, this gives a rough measure of the extent to which growth deviated from trend and then recovered.

<sup>16</sup> Given 510 country years, these occur at a rate of 4.3 per cent. The comparable incidence for our ten post-1972 emerging markets is higher: 11.5 per cent. Note, however, that the post-1972 sample is not selected randomly; the ten countries considered are selected as well-known crises cases.

but were less so prior to 1914 (when the average drop was again "only" 2 per cent). Whatever the contrast, however, these differences are not large. While crises may have been somewhat less severe on average before 1914 than today, t-tests of the difference of means do not permit us to reject the null that the severity of downturns was the same across periods.<sup>17</sup>

By these measures, the fall in output in the recent Asian crises was especially steep: Korea's growth rate declined 7 percentage points below its pre-crisis five-year-average growth rate, 8 percentage points below its three year pre-crisis average and 7 percentage points from the year preceding the crisis. Indonesia's performance was similar, while Thailand's was the worst (at minus 13, 13, 11 percentage points respectively). The severity of these countries' crises in 1997-87 is well known; the point here is that their recessions were dramatic relative to the typical crisis in emerging markets prior to 1914.

Turning from typical to exceptional, how does recent Asian experience compare with the worst of the pre-1914 era? The two most infamous pre-World War I crises in emerging markets, the U.S. in 1893 and Argentina in 1890, were even worse than Asia in recent years.<sup>18</sup> For the U.S., growth during the crisis years declined by 9 percentage points relative to its previous five-

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<sup>17</sup> The likely direction of bias in the cyclical behavior of historical national income statistics would tend to exaggerate the severity of recessions prior to 1913 (since these numbers are heavily constructed on the basis of commodity production, which is more volatility than other components of GNP). To the extent that this bias is present, it would tend to work against the conclusion in the text. It suggests that, if anything, we are understating the contrast between then and now.

<sup>18</sup> Categorizing the United States as an emerging market is likely to be controversial. Our categorization follows Eichengreen (1992), which classes the U.S. as a "peripheral" country prior to 1913 on the grounds that it was dependent on capital imports for much of the period, lacked a lender of last resort to backstop domestic financial markets, and was incompletely committed to the maintenance of gold convertibility and was thus not the recipient of stabilizing capital flows. A contrasting interpretation is Bordo and Schwartz (1996a).

year trend, 12 percentage points below its three-year pre-crisis trend, and 14 percentage points from the pre-crisis year. For Argentina the numbers are even more dramatic if the conventional statistics are to be believed: minus 17%, 20%, 24%, with recovery in growth not complete after 5 years. The exceptional severity of these episodes should serve as a warning that generalizations about the pre-1914 period must be drawn cautiously, since that period appears to have featured a small number of extraordinarily severe crises along with numerous milder episodes.<sup>19</sup> This is another way of understanding why it is difficult to reject the null that the severity of crises was the same across periods: the standard deviation of the fall in output was large, reflecting the aforementioned heterogeneity, relative to the mean, both before 1914 and after 1972.<sup>20</sup>

That Argentina in 1890 and the U.S. in 1893 were both "emerging-market" crises might appear to imply that pre-World War I financial crises were most severe outside the more advanced industrial countries. While the small size of our advanced-country sample renders the drawing of strong conclusions problematic, our results do not obviously support this generalization. The two pure currency crises in our advanced-country sample (Germany in 1903 and 1907) led to sharp drops in growth relative to trend. Pure banking crises, on the other hand,

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<sup>19</sup> Another reason for caution is that the results change when we include the crises that erupted in 1914 due to the outbreak of World War I. These are numerous; including them increases the size of our sample by about half. They are also relatively severe, since the disruption to international financial relations due to the outbreak of the war was extensive. Including these episodes in the averages makes the immediate post-crisis drop in output slightly *more* severe prior to 1915 than after 1972. While there is good reason to regard these wartime shocks as special (and for therefore not including them in the comparison with our day), this is another reminder of the difficulty of generalizing about financial stability in the last age of globalization.

<sup>20</sup>For better or for worse, this is a characteristic of all our intertemporal comparisons, making standard t-tests blunt instruments for assessing differences.

seem to have had milder recessionary effects at the core than the periphery. But the recessionary effects of the one twin crisis we identified, France in 1889, were unusually severe.<sup>21</sup>

**The Recovery Phase.** Generalizations about the aftermath of crises are even more difficult to draw. There is a sense in which emerging markets recovered more quickly from currency crises before 1914 than after 1972, although once again the data do not speak loudly. Before 1914, the growth rate rose by 2 percentage points between the crisis year and the three years following; after 1972, it failed to rise at all.<sup>22</sup> DeLargy and Goodhart find a similar pattern and interpret it in terms of the resumption rule. Prior to 1913, countries driven off the gold standard generally intended to restore convertibility at the previously-prevailing exchange rate once the crisis passed. While investors who held domestic-currency-denominated assets suffered losses when the currency collapsed, they anticipated gains as the currency recovered to its traditional parity. To put the point another way, there was little reason to fear that abandoning the currency peg would unleash uncontrolled inflation insofar as the authorities were committed to reestablishing the previous rate of exchange. Hence, devaluation did not unleash persistent capital flight. Rather, gold and capital began flowing back in at a relatively early date, stabilizing the economy and stimulating recovery.

In contrast, the recovery from banking crises starts earlier in the modern period, in the first post-crisis year as opposed to the second or third. This is true whether or not banking crises

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<sup>21</sup> See Appendix 2 for details.

<sup>22</sup> We hesitate to place too much emphasis on these patterns, given the small sample size. The same conclusion does not carry over to the one- and five-year post-crisis comparisons. Note that the pattern is not evident in the two advanced-industrial country currency crises in our sample (Germany in 1903 and 1907), where there were mounting doubts about the sustainability of fiscal policy and the monetary regime (Ferguson 1999).

are accompanied by currency crises. A likely explanation is the absence before 1914 of effective lenders of last resort capable of restoring depositor confidence, stabilizing supplies of money and credit, and sustaining the provision of financial services to the economy. The U.S. crises of 1893 and 1907, which were greatly aggravated by the absence of last-resort lending (leading in turn to the establishment of the Fed), make this point.<sup>23</sup> One can argue that regulatory forbearance and central bank bailouts have adverse long-term effects by weakening market discipline and leading to a less efficient allocation of capital. Indeed, there is some suggestion of this in the data: while recovery from banking crises is initiated earlier in the post-1972 period, the subsequent expansion accelerates less dramatically and is sustained less successfully, as if market discipline and the efficiency with which credit is allocated are less (than in comparable episodes a hundred years ago).

Automatic stabilizers were also absent prior to 1914. Some recent commentators have noted that the Asian crisis countries (and other emerging markets) found their use of automatic stabilizers constrained by a lack of confidence and the existence of high capital mobility. That may be true, but the comparison suggests that they may still have been able to adopt a more concerted response than their counterparts a century ago. Other commentators have been critical of regulators for failing to force through an earlier resolution of banking problems. They have a point, but the striking fact is that recovery from banking crises has tended to begin earlier in the recent period than in the typical crisis episode a hundred years ago.

**Summary.** Thus, while the crisis problem is not new, recent crises have some new and

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<sup>23</sup> So too does the fact that recovery from banking crises and twin crises was on average initiated earlier in the advanced countries than the prewar emerging markets, given the fact that lender-of-last-resort capacity was more highly developed at the center.

distinctive features. The drop in output following their outbreak would seem to be larger. And for currency crises, the subsequent recovery appears to be slower.

## 6. The Behavior of Ancillary Variables: Pre-1914 and Post-1972

The behavior of other variables should help us to flesh out these interpretations. We plot their behavior for five years leading up to each crisis and five years following, again focusing on emerging markets, particularly before 1913.<sup>24</sup>

**Net Exports.** Figure 1, for emerging markets under the gold standard, shows how crises were preceded by capital inflows (read "lending booms") that peaked on average at about 2 per cent of GDP, before narrowing sharply in the crisis year.<sup>25</sup> Aggregating all emerging-market crises, capital flows never dry up entirely; all we see is the current account deficit narrowing in the crisis year to half its previous amount, and narrowing somewhat further the year following the crisis.<sup>26</sup> The trade deficit then begins widening toward earlier levels, confirming that capital inflows were relatively quick to resume. Indeed, the comparison with the analogous chart for the post-1972 period (Figure 2) suggests that the behavior of capital flows is not so stabilizing:

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<sup>24</sup>Data sources for these variables are the same as indicated at the foot of Tables 1-2.

<sup>25</sup> Sticking with convention, a negative balance denotes a deficit. In what follows we discuss the current account and the inverse of the capital account interchangeably, which is not strictly correct in a world where central banks accumulate and de-accumulate reserves. As is well known, however, reserve movements under the classical gold standard were small (Bloomfield 1959). We approximate the current account using net exports because those are the only estimates available for the entire 120 year time span. For a smaller subset of countries we have shown elsewhere patterns of movement in the current account which are very similar to those shown here (Bordo, Eichengreen and Kim 1998).

<sup>26</sup> To the extent that our trade-based measure imperfectly captures the current account, the fact that the countries in our sample were net foreign debtors only reinforces the point.



there, the swing is larger, capital flows dry up entirely, and inflows are slower to resume.

The accompanying panels for the different types of crises indicate that this behavior is heavily driven by currency crises, as suggested by our earlier interpretation emphasizing the resumption rule. While inflows fall sharply in the currency-crisis year, they pick up the year after, presumably reflecting stabilizing expectations. In the typical post-1972 currency crisis, in contrast, it takes as much as three years for capital inflows to resume.

19<sup>th</sup> century banking crises, in contrast, do not seem to be driven or to drive large swings in the current account. Twin crises show the opposite. Persistent current account deficits typically preceded these crises, while the current-account swing around the outbreak of crisis is large. Importantly, there is little sign of resumption of capital inflows even five years following the eruption of the crisis. The coincidence of a banking crisis, it would appear, undermined the credibility of the resumption rule and hence the power of stabilizing capital flows. This is not something what would surprise a historian of the U.S. in the 1870s or Argentina in the 1890s.

**Money Growth.** These patterns are reflected in the behavior of domestic financial variables. The capital inflow fuels a rise in the rate of domestic money growth (Figure 3 -- we use M2 wherever possible), particularly in the run-up to twin crises. The rate of growth of the money stock then falls sharply for several years following the event and recovers only slowly thereafter. The pattern is similar after 1972 (Figure 4). Note, however, the differences in the scale on the vertical axis, reflecting the shift from commodity to fiat money.

The pattern is different when either banking or currency crises come alone. For pre-1914 currency crises, the dip in the rate of money growth precedes the crisis, as reserves are run down and credit creation slows. In the year of the crisis, when the exchange rate is typically let go,

domestic credit creation recovers to previous levels and even makes up ground lost previously, before falling to sustainable levels consistent with the resumption rule. Again, the post-1972 pattern is similar, though the post-crisis spike in money growth is larger and longer delayed.

When pre-1914 banking crises come alone, money growth rates are less volatile: money supplies fall gradually through the crisis and recover gradually thereafter.<sup>27</sup>

**Real Interest Rates.** Prior to 1914, real interest rates were stable or slightly falling in the run-up to emerging-market crises (Figure 5) but rose sharply coincident with the event.<sup>28</sup> Interest rates had fallen back to pre-crisis levels by the second post-crisis year (in the cases of both banking and currency crises). It would be particularly interesting to be able to argue that interest rates came down more quickly following 19<sup>th</sup> century crises, reflecting the operation of the resumption rule. But this is not clear from the data. For one thing, the fall in interest rates is slowest for pure currency crises, where the resumption rule should have operated most powerfully. For another, it is hard to detect a strong contrast in the post-crisis behavior of interest rates between the pre-1914 era and post-1972 period (Figure 6), other than the sharper fall in ex-post rates in the modern era owing to the more dramatic acceleration of inflation. We are still inclined toward the resumption-rule interpretation, but the data may be too fragile to lend it strong support.

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<sup>27</sup> The growth of international reserves (not shown) echoes the pattern for money growth, rising well before the crisis, then falling in the crisis year and recovering thereafter. The pattern is evident in particularly accentuated form during twin crises.

<sup>28</sup> We consider ex post real rates measured as the difference between the nominal interest rates (short-term market rates where available) and the inflation rate.

## 7. Interwar and Bretton Woods Comparisons

Crises in the interwar and Bretton Woods periods are different, as shown in Table 2.<sup>29</sup>

**Interwar Years.** The interwar years were notoriously crisis prone: the incidence of crises per country-year was ten per cent. As is to be expected, the drop in output following crises was exceptionally sharp. Note that this was not due to a different mix of crises from the pre-World War I period: the ratio of currency crises to banking crises, and the ratio of twin crises to pure banking and currency crises, remained unchanged from before World War I. The difference is attributable instead to the exceptional severity of the banking and twin crises of the 1930s. This was of course Friedman and Schwartz's (1963) explanation for the severity of the Great Depression in the United States, which they attribute to the failure of the Federal Reserve to act as a lender of last resort, in conjunction with the disappearance of the private lifeboat operations that were so important before the war. The twin-crisis version is the explanation for the exceptional depth of the global slump elaborated by Bernanke and James (1991).<sup>30</sup>

Twin crises, currency crises and banking crises were of roughly comparable severity in the 1930s. One noticeable contrast is between the recessionary impact of currency crises in emerging and advanced economies: the unusual severity of the former is plausibly attributable to the impact of devaluation on the cost of servicing foreign-currency denominated debts.

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<sup>29</sup> Here our six emerging markets are Argentina, Brazil, Chile, Greece, Portugal and Spain. The advanced countries, in addition to the six from the pre-1914 period, now include Australia, Canada, Denmark, Finland, Italy, Japan, Norway, Sweden and the United States.

<sup>30</sup> Note also that the four pure currency crises affecting emerging markets in our sample for the 1930s had unusually severe recessionary effects. But the recovery from those crises is also unusually dramatic, reflecting the effectiveness of reflationary monetary policies (Campa 1990).

Under Bretton Woods, crises were mild. There were no banking crises in our sample, reflecting the restrictions imposed on banking systems in response to the disasters of the 1930s. While currency crises continued to occur despite the adoption of restrictions on capital mobility, their output effects were mild by the standards of the pre-1914 and interwar periods. This plausibly reflects the more limited scope for capital flight in the controlled financial environment of the 1950s and 1960s and the greater scope for central banks to continue pursuing policies to sustain output and demand behind the shelter of controls (a la Malaysia in the late 1990s). Those recessionary effects were more pronounced in emerging markets than advanced economies, but the contrast is less than in either of the preceding periods, plausibly reflecting the prevalence of capital controls and the quiescence of international financial markets.

We will be brief on the ancillary variables between the wars and under Bretton Woods, since they bear out previously-mentioned patterns, with a few notable exceptions. The behavior of the current account differed in the run-up to the crises of the 1930s (Figure 7), in that capital inflows had already dried up (generally in 1928), and emerging markets were carrying out net resource transfers to their creditors for several years before their crises broke out (generally in 1931). Those reverse transfers continued in the crises, reflecting the collapse of new lending and international capital markets generally in the 1930s.

Money supplies fluctuate as usual around the crises of the 1930s (Figure 8); the main difference from earlier (pre-1914) crises is the collapse of money growth following the interwar banking crises (a fact that is, to repeat, duly emphasized in the historical literature).

**Bretton Woods.** The Bretton Woods period, to repeat, featured only currency crises in our emerging-market sample and one twin crisis (Brazil in 1963). The drop in output associated

with these currency crises was limited by the standards of the immediately preceding and succeeding periods. The most notable difference from the other periods is probably the decline in real interest rates (Figure 10) following the crisis, which is more pronounced than in either the pre-1914 or interwar periods. This presumably reflects policies of financial repression (the maintenance of binding interest-rate ceilings in conjunction with accelerating inflation, itself evident in the post-crisis acceleration in the rate of money growth).

## **8. Summary and Implications**

Our review of 120 years of currency and banking crises has pinpointed a number of striking regularities and some obvious differences. Both have policy implications.

We have provided more evidence that the gold standard was different. At its center, currency crises were relatively few. This is attributable to the credibility of the commitment to the maintenance of the exchange-rate peg in the countries at the center of the system, a credibility rooted in politics and ideology. The limited extent of the franchise and low levels of union density meant that the overarching commitment to defense of the exchange rate was rarely threatened by groups with other priorities such as unemployment, while the ideology of *laissez faire* and hard money reined supreme. Readers will be reminded of the argument that the only crisis-resilient currency peg in a world of high capital mobility is a permanently fixed peg rooted in an overarching political commitment to convertibility. It is no coincidence, from this point of view, that Argentines refer to their pegged-rate regime as "convertibility."

Those currency crises that occurred at the periphery of the gold standard were short. By and large, countries recovered quickly. This is attributable to the commitment to resume

convertibility at the pre-crisis parity where events made temporary suspension unavoidable.<sup>31</sup> The pattern can be interpreted, controversially, as support for the advice that crisis countries push their currencies back up to pre-crisis levels to punish the speculators, reassure investors, and restore the credibility of their hard-currency policies.<sup>32</sup> The caveat is that the deflation required for resumption not destabilize the banking system and transform the currency crisis into a twin crisis. Twin crises, we have seen, were serious under the gold standard.

The interwar gold-exchange standard was a different animal. Due to declining credibility and rising financial fragility, it was notoriously crisis prone. This finds reflection in the unusual incidence of crises in our interwar sample. The drop in output is sharp for twin crises, banking crises and currency crises alike.

The one surprise is how countries bounced back relatively quickly. We show this for the four regimes, for all crises, in Figure 11. There we compare emerging markets prior to 1914 and after 1972 but advanced as well as emerging markets for the interwar period and Bretton Woods. We do this because crises in the earliest and most recent periods were largely emerging-market events, while those occurring in the intervening half century were centered on the advanced-industrial countries. The typical pattern was a crisis followed in short order by devaluation and then the adoption of a more expansionary monetary policy, initiating recovery (Eichengreen and

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<sup>31</sup> Although this strategy was only successfully followed by some pre-1914 emerging markets (e.g. the U.S., Canada, Australia and the Scandinavians) and not others (e.g. the Latin American and Southern European countries); again, see Bordo and Schwartz (1996a) and Eichengreen (1992).

<sup>32</sup> Thus, it was argued by critics of IMF advice in Asia (and advocates of the currency-board solution in particular) that countries like Indonesia attempt to push their currencies back up to their pre-devaluation levels before re-pegging them.

Sachs 1985).<sup>33</sup> Readers will be reminded of the debate over economic policy in today's Japan and the argument that monetary policy should have been used more aggressively to jumpstart the economy.

Under Bretton Woods, banking crises were essentially nonexistent, and the effects of currency crises were mild. This is more evidence, as if Chinese or Malaysian policy makers needed it, that strict controls on domestic and international financial transactions can suppress the symptoms of financial instability. Whether there are costs, in terms of slower growth than would have obtained otherwise, is, of course, the question of the day. The speed of growth in this period provides no obvious support for those who would emphasize the negative side effects.

What then is distinctive about our period? Not the fact of currency and banking crises in emerging markets; both have been seen before. Perhaps the consequences, though the differences in macroeconomic effects are not large. If one thing is distinctive, it is the coincidence of banking and currency crises — the twin-crisis problem — and the severity of the associated effects. This is more evidence, if more is needed, of the importance of preventing and containing this particularly virulent strain of the virus.

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<sup>33</sup> The textbook picture of the United States becalmed in a decade-long recession would appear to be the exception, not the rule.

**Table 1**

**Fluctuations in Annual Growth Rates Around the Time of Crises:  
Summary Statistics 1880-1913, 1973-1998: Emerging and Advanced Countries**

**All Crises: mean (number of crises)**

	<b>15 Emerging Countries</b>	<b>6 Advanced Countries</b>	<b>10 Emerging Countries</b>
	1880-1913 (22)	1880-1913 (7)	1973-1998 (30)
$g_{crisis} - g_{(-5)}$	-0.01	0.00	-0.03
$g_{crisis} - g_{(-3)}$	0.00	0.01	-0.03
$g_{crisis} - g_{(-1)}$	-0.02	-0.05	-0.03
$g_{(+1)} - g_{crisis}$	0.00	0.00	0.02
$g_{(+3)} - g_{crisis}$	0.01	0.00	0.02
$g_{(+5)} - g_{crisis}$	0.01	0.01	0.03

**Twin Crises: means (number of crises)**

	<b>15 Emerging Countries</b>	<b>6 Advanced Countries</b>	<b>10 Emerging Countries</b>
	1880-1913 (9)	1880-1913 (1)	1973-1998 (14)
$g_{crisis} - g_{(-5)}$	-0.02	-0.01	-0.05
$g_{crisis} - g_{(-3)}$	-0.02	0.00	-0.05
$g_{crisis} - g_{(-1)}$	-0.02	-0.14	-0.05
$g_{(+1)} - g_{crisis}$	0.00	0.06	0.03
$g_{(+3)} - g_{crisis}$	0.01	0.04	0.05
$g_{(+5)} - g_{crisis}$	0.02	0.04	0.05



**Table 1 Continued**

**Banking Crises: means (number of crises)**

	<b>15 Emerging Countries</b>	<b>6 Advanced Countries</b>	<b>10 Emerging Countries</b>
	1880-1913 (8)	1880-1913 (4)	1973-1998 (5)
$g_{crisis} - g_{(-5)}$	-0.02	-0.01	-0.03
$g_{crisis} - g_{(-3)}$	-0.02	-0.01	-0.03
$g_{crisis} - g_{(-1)}$	-0.03	-0.02	-0.02
$g_{(+1)} - g_{crisis}$	-0.03	0.01	0.02
$g_{(+3)} - g_{crisis}$	0.00	0.01	0.02
$g_{(+5)} - g_{crisis}$	0.05	0.01	0.01

**Currency Crises: means (number of crises)**

	<b>15 Emerging Countries</b>	<b>6 Advanced Countries</b>	<b>10 Emerging Countries</b>
	1880-1913 (5)	1880-1913 (2)	1973-1998 (11)
$g_{crisis} - g_{(-5)}$	0.00	0.03	-0.02
$g_{crisis} - g_{(-3)}$	0.03	0.03	-0.01
$g_{crisis} - g_{(-1)}$	-0.01	0.02	0.00
$g_{(+1)} - g_{crisis}$	-0.03	-0.07	0.01
$g_{(+3)} - g_{crisis}$	0.02	-0.04	0.00
$g_{(+5)} - g_{crisis}$	0.00	-0.03	0.01

Note:  $g_{crisis}$  is the annual growth rate of real GDP at the crisis year.  $g_{(N)}$  is the average annual growth rate of real GDP N years before (-) or after (+) the crisis.

Data Sources: Bordo and Schwartz (1996a) data base, IFS CD-ROM (1999).

**Table 2**

**Fluctuations in Annual Growth Rates Around the Time of Crises:  
Summary Statistics 1919-1939, 1945-1971: Emerging and Advanced Countries**

**All Crises: means (number of crises)**

	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>
	1919-1939 (14)	1919-1939 (28)	1945-1971 (14)	1945-1971 (13)
$g_{crisis} - g_{(-5)}$	-0.04	-0.04	-0.02	0.01
$g_{crisis} - g_{(-3)}$	-0.05	-0.04	-0.04	0.00
$g_{crisis} - g_{(-1)}$	-0.06	-0.05	-0.03	-0.01
$g_{(+1)} - g_{crisis}$	0.02	0.03	0.04	0.01
$g_{(+3)} - g_{crisis}$	0.06	0.04	0.03	0.00
$g_{(+5)} - g_{crisis}$	0.06	0.04	0.02	0.00

**Twin Crises: means (number of crises)**

	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>
	1919-1939 (3)	1919-1939 (10)	1945-1971 (1)	1945-1971 (0)
$g_{crisis} - g_{(-5)}$	-0.04	-0.06		
$g_{crisis} - g_{(-3)}$	-0.04	-0.05		
$g_{crisis} - g_{(-1)}$	-0.04	-0.05	-0.13	
$g_{(+1)} - g_{crisis}$	0.01	0.05	0.17	
$g_{(+3)} - g_{crisis}$	0.02	0.07	0.06	
$g_{(+5)} - g_{crisis}$	0.02	0.07	0.06	

**Table 2 Continued**

**Banking Crises: means (number of crises)**

	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>
	1919-1939 (7)	1919-1939 (8)	1945-1971 (0)	1945-1971 (0)
$g_{\text{crisis}} - g_{(-5)}$	0.00	-0.03		
$g_{\text{crisis}} - g_{(-3)}$	0.00	-0.04		
$g_{\text{crisis}} - g_{(-1)}$	-0.06	-0.06		
$g_{(+1)} - g_{\text{crisis}}$	-0.01	0.02		
$g_{(+3)} - g_{\text{crisis}}$	0.01	0.02		
$g_{(+5)} - g_{\text{crisis}}$	0.01	0.03		

**Currency Crises: means (number of crises)**

	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>	<b>6 Emerging Countries</b>	<b>15 Advanced Countries</b>
	1919-1939 (4)	1919-1939 (10)	1945-1971 (13)	1945-1971 (13)
$g_{\text{crisis}} - g_{(-5)}$	-0.11	-0.03	-0.02	0.01
$g_{\text{crisis}} - g_{(-3)}$	-0.13	-0.02	-0.04	0.00
$g_{\text{crisis}} - g_{(-1)}$	-0.06	-0.03	-0.02	-0.01
$g_{(+1)} - g_{\text{crisis}}$	0.07	0.02	0.03	0.01
$g_{(+3)} - g_{\text{crisis}}$	0.18	0.02	0.03	0.00
$g_{(+5)} - g_{\text{crisis}}$	0.18	0.02	0.02	0.00

Note:  $g_{\text{crisis}}$  is the annual growth rate of real GDP at the crisis year.  $g_{(N)}$  is the average annual growth rate of real GDP N years before (-) or after (+) the crisis.

*Data Source: Bordo and Schwartz (1996a) data base.*

## Appendix I

**Table 1**  
**Chronology of Banking and Currency Crises 1880-1971: 21 Countries**

### Classical Gold Standard: 1880-1914

#### 1. Emerging Countries

Year	Argentina		Australia		Brazil		Canada		Chile		Denmark		Greece		Italy		Japan		Finland		Norway		Portugal		Spain		Sweden		United States	
	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.		
1883																													*	
1885		✓									✓		✓																	
1887										✓																				
1889						✓																								
1890	✓	✓			✓																									
1891	*				✓			#							*								✓	✓					#	
1892																												*	#	
1893			*					#							*															

### 1. Emerging Countries

Year	Argentina		Australia		Brazil		Canada		Chile		Denmark		Greece		Italy		Japan		Finland		Norway		Portugal		Spain		Sweden		United States	
	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.		
1894															✓ #														✓	
1897					*						✓																✓			
1898						✓			*	✓	✓																			
1900					*												#	✓												
1901					✓											✓														
1904																	#													
1907										✓					*		*										*		*	
1908		#						#							#		#													
1914	*	✓			✓	✓		✓	*		*	✓		✓	*					✓		✓					✓	✓		
1915				✓																										
1917																✓	✓													

## 2. Advanced Countries

Year	Belgium		France		Germany		Netherlands		Switzerland		United Kingdom	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1882			*									
1888				#								
1889			*									
1890											✓	
1893						#						
1894												
1897							✓					
1901					*							
1907			✓			#						
1914	*	✓		✓		✓	*	✓		✓		✓

**Interwar 1919-1939**

**1. Emerging Countries**

Year	Argentina		Brazil		Chile		Greece		Portugal		Spain	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1920									✓		✓	
1922											✓	
1923			✓						✓		✓	
1925					✓							
1929		✓										
1930		#		✓#								
1931	✓	#		#		✓	✓	✓	✓	✓		#
1932		#						✓	✓			
1934	✓			#								
1937				#								

**2. Advanced Countries**

Year	Australia		Belgium		Canada		Denmark		France		Germany		Italy		Japan		Finland		Nether-lands		Norway		Sweden		Switzer-land		United Kingdom		United States	
	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.		
1921		.				#	✓	#					*		#	✓	✓	✓	✓	#	✓	✓								
1922								#														✓	✓							
1923					✓					✓										#	✓									
1924				#																										
1925			✓																											
1926			✓						#																					
1927															*															
1929						✓																								
1930									*				✓														*			
1931			✓				✓	#	✓		*	✓	✓		#	✓	✓	✓	✓	#	✓	✓	✓	✓			✓	#	*	



Year	B. C.	C . C .	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	
1932		#					#	✓						#								✓	#					*	
1933		#																					✓				*	✓	
1934			✓							#																			
1935				✓							✓	#										✓	#						
1936								✓				✓												✓					
1937									#																				
1938				#																									
1939			✓												*			#						#					

**Bretton Woods: 1945-1971**

**1. Emerging Countries**

Year	Argentina		Brazil		Chile		Greece		Portugal		Spain	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1950		✓						#				
1953						✓						
1956												
1958												#
1959		✓		#								
1962		✓		✓#		✓						
1963			✓	#								
1965				#								
1967		✓										✓
1968						✓						
1970		✓										
1971								✓		✓		✓

**2. Advanced Countries**

Year	Australia		Belgium		Canada		Denmark		France		Germany		Italy		Japan		Finland		Netherlands		Norway		Sweden		Switzerland		United Kingdom		United States					
	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.	B.	C.						
1947																													✓					
1948									✓																									
1949		✓ #				✓							✓																✓ #					
1950							✓																											
1957									✓ #																									
1960																																	✓	
1961																														✓				
1962											✓																							
1964														✓																✓				

Year	B. C.	C. C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	B. C.	C. C.	
1965																													
1966																													
1967																													
1968									✓																				
1971		✓		✓				✓								✓		✓		✓		✓		✓					✓

B.C. defined as banking panics (\*) and or banking crisis (significant bank failures) (✓).

C.C. defined as forced change in parity, abandonment of peg or successful rescue, chronology derived from historical narratives (✓); defined based on an annual currency crisis indicator as developed in Eichengreen, Rose and Wyplosz (1995) with U.K. as base country 1880-1914 and the U.S. thereafter (#).

Sources:

Banking crises: Bernanke and James (1991), Bonelli (1982), Bordo (1986), Bordo and Schwartz (1996a), Caprio and Klingbiel (1996), Dartilis and Costis (1995), DeLanghe (1999), Hansen (1999), Herrala (1998), Kindleberger (1989), Klovland (1999), Llona (1990), Macedo (1999), Martin Acena (1995), Nordvik (1995), Reis (1995), Thorp (1926), Triner (1999).

We were unable to find evidence on banking crises in Greece or Spain before 1914.

Currency crises: Bordo and Eichengreen (1998), Bordo and Schwartz (1996b), *International Financial Statistics* (Various years)

Table 2

Chronology of Banking and Currency Crises: Emerging Countries: 1973-1998

Year	Argentina		Brazil		Chile		Korea		Indonesia		Malaysia		Mexico		Phillippines	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1976		*	✓													
1978										✓*						
1979				✓												
1980	✓			✓				✓								
1981	✓	✓*			✓										✓	
1982		*	✓	✓	✓	✓*							✓	✓	✓	
1983		✓*		✓	✓					✓*					✓	✓*
1984		*													✓	✓*
1985		*		✓							✓	✓			✓	
1986		✓*		✓*						✓*	✓				✓	✓*
1987		*		✓							✓				✓	
1988		*		✓							✓					
1989	✓			✓						✓						
1990	✓			✓						✓				✓		
1991				✓												
1992				✓					✓				✓			
1993																
1994									✓				✓	✓		
1995	✓												✓			
1997							✓	✓	✓	✓	✓	✓			✓	✓
1998							✓	✓	✓	✓	✓	✓			✓	

Year	Singapore		Thailand	
	B.C.	C.C.	B.C.	C.C.
1976				
1978				✓*
1979			✓	
1980		✓		
1981				✓*
1982	✓		✓	
1983			✓	
1984			✓	✓*
1985			✓	
1986			✓	
1987			✓	
1988				
1989				
1990				
1991				
1992				
1993				
1994				
1995				
1997		✓	✓	✓
1998		✓	✓	✓

Sources: Banking crises: (✓) Caprio and Klingbiel (1996), Kaminsky (1998), Schwartz (1998)

Currency Crises: (\*), Kaminsky (1998), Calvo and Vegh (1998)

Currency Crisis Index: (✓) International Financial Statistics (CD-ROM)

## Appendix 2: Pre-1914 Crisis Histories

### Argentina: 1885 Currency Crisis

Foreign journalists cited the cause of this crisis as Argentina's "continual desire to advance its prosperity artificially" by making use of foreign loans. There was a burst of new issues on London between 1880 and 1885, the foreign debt rising by 105 million pesos. Predictably, the supply of domestic credit and the volume of imports rose concurrently.

Reserve losses accelerated in 1885. The government attempted to defend parity initially but failed. Upon suspending convertibility, it then sought to restrain note issue (although a handful of banks was still allowed to issue inconvertible currency). The peso fell by about 27 per cent during the crisis, having been pegged at 47 pence prior to the events but falling to 37 in mid-1885. It hit a low of 29 in 1886.

Williams (1920) describes the crisis as brief and having relatively little impact on industrial production. The following table shows the percentage change in growth relative to the pre-crisis year, relative to the pre-crisis three- and five-year trends, and for comparable post-crisis periods. (Subsequent tables in this appendix are to be read similarly.)

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1885	----	----	----	-6.0	1.0	0.5

Source (for this and subsequent tables): see Table 1 in the text and accompanying discussion.

In 1886 a new president was elected and attempted to reflate the economy by authorizing additional note issues. This was followed by a move to free banking and a loosely-regulated financial system that paved the way for the 1890 crisis.

### Argentina: Twin Crisis of 1890

The years leading up to this crisis were ones of notable excess, according to Conant (1915). Banks made extensive loans without requiring much in the way of collateral. Real estate prices soared as banks issued notes in excess of the legal limit.

When land prices fell by 50 per cent between 1889 and 1890, the Banco de la Nacion found itself unable to pay its dividend, triggering a run. The peso fell by 36 per cent against sterling in 1890 and by 37 per cent in 1891.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1890	-24.0	-17.0	-20.0	17	15	14

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 surrender their specie and bonds and declared a three-year moratorium on interest payments.

In January 1891 Argentina secured a L15 million funding loan in London at 6%. As conditions, investors demanded 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%. Though this loan provided breathing space, by 1892 it was clear the plan would not sustain the public finances. The "Romero fix" (*arreglo Romero*) of 1893 rescheduled Argentina's debt repayment plan. Under this agreement, Argentina was obligated to pay only half its contractual until 1901, when the amortization of principal resumed.

#### Australia: 1893 Banking Crisis

This crisis reflected a domestic lending boom, as a result of which the quality of bank assets deteriorated significantly, and stringency on global credit markets reflecting the fallout from the Baring Crisis. Scholars disagree on the relative importance of the two factors — with Australian specialists like Merrett (1989) emphasizing the former, comparativists like Kindleberger (1984b) emphasizing the latter — but there seems little question that both were at work.

The run-up to the crisis saw a frenzied land boom involving both pastoral and urban real estate. The period was one of rapid entry into the financial system by new intermediaries into an essentially unregulated banking system. New banks with weak internal controls and high costs were most inclined to commit to speculative, illiquid investments, but older banks may have succumbed to the same temptation under growing pressure of competition and declining spreads. In addition, the banking system increasingly funded itself by taking English and Scottish deposits from overseas investors who committed their savings on the assumption that such deposits were safe but were quick to liquidate them when they discovered otherwise.

The immediate lead-up to the crisis saw falling export prices, which made it hard for the pastoral sector to repay its loans (in turn undermining real-estate speculation based upon pastoral expansion). The trigger was the closure of the Mercantile Bank of Australia and the Federal Bank of Australia, two of the new institutions, followed by the Commercial Bank of Australia. British deposits ran off, and residents moved theirs from smaller to larger banks. Cork (1894) puts deposits lost in the crisis at 7.5 per cent.



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 bank holiday. Some banks never reopened their doors. Tens of thousands of depositors had their claims extended -- for four years and more — before any withdrawals could be made, and in some cases claims were converted into stock and preference shares. Bank share prices fell heavily. The banks retrenched, withdrawing from the business of long-term lending. The "depression" of the 1890s followed.

Dowd challenges the conventional wisdom about this crisis, noting that the fall in the loans to capital ratio from 20 per cent in 1880 to 12.5 per cent in 1892 was not representative of the condition of most banks. He dismisses a domestic credit crunch on the grounds that advanced did not actually decline in the period of failures. He argues that the big banks had already adjusted their portfolios by holding less speculative assets by 1890. In conclusion he argues that the crisis was mainly caused by inadvisable government intervention in the financial sector. The bank holiday, he concludes, was unnecessary and damaged confidence. Consistent with his view, the standard historical statistics do not show much of an output decline.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1893	8.0	0.0	2.0	0.0	1.0	4.0

#### Brazil: Twin Crisis of 1889-1891

In Brazilian history, this period of frantic expansion is known as the "encilhamento." Brazil experienced an expansion of commerce so large, according to Subercaseaux (1922), that there was a shortage of names for new companies in 1890.

Wileman (1896) cites governmental borrowing as the motive force. Much of this was financed through note issue, milreis in circulation rising by 60 per cent in the year leading up to the crisis. Brazil had a paper currency regime up to 1889, though the milreis had strongly appreciated just prior to 1889. The crisis broke this streak, the milreis falling by 16 per cent in 1890.

Currency speculation set in once a new government assumed power, the transfer of responsibilities and revenues from the old administration to the new being disorganized. The government continued running large budget deficits in the face of a deteriorating balance of payments. It proposed further note issues to meet obligations. Goldsmith (1986) estimates the money supply, having equaled 200 million milreis in 1889, had shot up to one billion milreis by 1891.

As banks came under pressure in 1890, the government allowed the Banco Nacional de Brasil and the Banco do Brasil to issue 100 million milreis to solve liquidity problems. While these notes were to have a 50 per cent metallic backing, convertibility was only to take place after the milreis had been at par for at least a year. As the milreis was an inconvertible paper currency and had suffered a massive depreciation in 1890, the law effectively allowed an increase in unbacked circulation.

In December of 1890 the government consolidated the banking sector. The Banco Nacional de Brasil and the Banco do Brasil were merged to form the Banco de la Republica do Estados Unidos do Brasil, which enjoyed a note-issuing monopoly. The note issue continued to increase rapidly from 515 million milreis in 1891 to 781 million in 1895.

Output declined sharply in the face of the financial-sector turmoil.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1889-1891	2.0	-5.0	-8.0	-6.0	-3.0	-4.0

Brazil: Twin Crisis of 1897-8

Conant notes that Brazil was in civil war and that the government had "sponsored extravagance at home." The milreis depreciated by 16 per cent against the dollar in 1897 and 7 per cent in 1898. From parity (at 27 pence) in 1889, it fell to under 10 pence in 1898. One adverse effect was to increase the milreis value of Brazil's sterling-denominated external debt.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1897	-6.0	-8.0	-6.0	5.0	14.0	17.0
1898	5.0	-2.0	0.0	6.0	15.0	14.0

The crisis was ameliorated by a Funding Loan from Rothschild's in London, whose terms stipulated that the federal government could, Argentine-style, suspend its payments on its foreign debts, interior gold loans, and its gold railway guarantees until July 1901. Creditors were issued coupons or gold funding bonds at 5 per cent, secured by the customs revenues of Rio De Janeiro. The government was to deposit, with three Rio banks, securities which would back new note issues up to an equal amount. Eventually these securities would be retired, destroyed or used to buy drafts on Rothschild's; the money would thus constitute a fund for resuming payment on the interest of the outstanding debt. Finally, provision was made for constituting an

emergency gold fund to be held in London. In the case of a future confidence crisis in Brazil, this fund would be used to meet demands of British creditors.

### Brazil: 1900-1 Banking Crisis

Murtinho is alleged to have held the value of the currency in an over-valued position in the run-up to the crisis. Manuel Pelaez argues that the crisis was then aggravated by the failure of inelastically-supplied coffee exports to respond to the declining value of the milreis. Murtinho's deflationary policy was meant to expel inefficient coffee producers from the industry. The net effect was to concentrate the industry and limit competition. Manuel Pelaez and Wilson (1976) claim this stifled coffee exports that normally would have accompanied depreciation and hastened recovery.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1900	17.0	22.0	22.0	-7.0	-9.0	-9.0
1901	-7.0	11.0	6.0	-1.0	-3.0	-1.5

1900 brought a new round of reforms, as Murtinho attempted to usurp the Bank of Brazil's and commercial bankers' right of note emission. Congress authorized L1 million for the Bank of Brazil in order to help calm the money market and the banking system. But deposits nonetheless continued to run off, and loans were recalled.

### Canada: 1893 Currency Crisis

As financial difficulties mounted south of the U.S.-Canadian border, panic was communicated to Canada's financial system. Conant argues that Canada nonetheless remained an island of calm in a sea of financial turbulence, which he attributes to the custom of the Canadian banking houses of dealing in call rather than time bills of exchange in New York, assets that could be brought home in the case of a shock to the Canadian system. When crisis hit in 1893, Canadian banks recalled \$8 million from New York. In addition they raised their discount rates, sacrificed high profits, and protected their customers.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1894	0.0	----	----	0.0	0.0	0.0

Although the rise in interest rates justifies the classification of this episode as a currency crisis, no impact on the country's growth rate is apparent.

### Canada: 1908 Currency Crisis

Canada in 1907 was running a current account deficit which it financed out of foreign capital inflows. It then experienced a crop failure and encountered international financial turbulence. The combination rendered eastern banks unwilling to ship funds west to move crops to market. The banks raised loan rates, cut lending to all but the most creditworthy borrowers, and limited credit to farmers.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1908	-5.0	-10.0	-10.0	15.0	10.0	10.0

The subsequent recession was sharp but short. In response to credit stringency, the government authorized an increase in the Dominion Note issue to finance crop moving. Between November 1907 and May 1908, Canadian banks borrowed \$5 million in Dominion Notes. Further relief appeared in 1908 when the banks were allowed to increase their note issue to 115 per cent of their paid-in capital plus reserves. The increase was legal only during the crop moving season (i.e. October to January).

### Chile: 1887 Currency Crisis

The Chilean peso depreciated by 37 percent between January 1881 and February 1887 (from 36 to 23 pence per peso). The country had just finished fighting a war with Bolivia. Commercially it seems to have been in fine shape, especially since valuable nitrate fields had been won in the war. It carried a current account surplus from 1884 through to 1886, although imports surpassed exports in 1887.

The fiscal house was in disarray, however. Chile ran a budget deficit in each year from 1884 to 1887.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1887	-4.0	9.0	16.0	1.0	4.0	4.0

After falling victim to a run on the peso, the government established a multi-part plan to establish convertibility. It retired 100,000 pesos of Treasury notes a month until the level reached 18 million (starting from a circulation of 25 million). It increased customs duties by up to 15 per cent to raise additional revenues. It aimed to establish a silver fund of 1.2 million pesos in the first year and 1.5 million pesos in each year thereafter. It imposed a limit on domestic note issue

and required a 50 per cent backing of note emissions with bonds and or gold to be held by the government.

### Chile: Twin Crisis of 1898

The years leading up to this crisis have two histories. One is that there was no trouble on the horizon. There was an ample gold fund, and the bond-secured notes of the banks were on an even keel. Subercaseaux (1922) advances a more negative view, insisting that financial difficulties were already evident in 1895, when the mortgage market collapsed and interest rates rose.

During the crisis, 4 of the 7 Chilean incorporated banks closed their doors. The peso had been freely convertible into gold since 1895; the crisis ended this attempt at maintaining the gold standard. In July Chile declared a 30-day moratorium and moved to a paper currency regime.

By the end of 1899, the exchange rate had begun to recover, and by 1902 the economy had done the same. This can be attributed in part to the rise in nitrate and copper prices that occurred in first years of the new century and in part to the government's reforms. The reform of July 31, 1898 had two essential elements. First, the government authorized the printing of 50 million pesos in notes with legal tender status, while cancelling all outstanding bank notes. Second, it set January 1902 as the date for the return to (gold) convertibility.

Inconvertibility and the injection of domestic credit quelled the banking panics, according to Subercaseaux. Suspension of convertibility was the only feasible option because physical gold imports would have had to come over the snowy Andean range from Argentina, taking a minimum of 15 days.

The macroeconomic data needed to judge the severity of the ensuing recession are not available. (This also means that this crisis is not included in our empirical work.)

### Chile: 1907 Currency Crisis

The period 1904 to 1907 was witness to an enormous commercial expansion. The capitalization of firms increased by 400 per cent between 1900 and 1906. The crisis was foreshadowed in 1905, when the Chilean stock market crashed. The government's response was inflationary: the period 1904-07 saw a 200% increase in government notes outstanding.

The peso fell by some 30 per cent in the crisis. To contain the financial consequences and prevent the currency crisis from precipitating a banking crisis, the government loaned treasury notes to banks that requested them. The policy obliged bankers to secure these

borrowings with bonds from the mortgage banks and charged interest at 6%.

Again, the macroeconomic data needed to judge the severity of the ensuing recession are not available. (Once more this also means that this crisis is not included in our empirical work.)

#### Denmark: 1908 Banking Panic

The main culprit in this crisis was turbulence on world markets. Conant (1915) attributes the crisis specifically to financial problems in neighboring Germany (see below). In addition, banks such as the Freeholders Bank were known to possess nonperforming assets, whose existence undermined confidence in the banking sector.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1908	-8.0	-8.0	-7.8	5.0	7.0	8.0

The conventional explanation for the speedy recovery is that Denmark's financial difficulties took place against a generally favorable economic backdrop. In addition, the Ministry of Finance and the Treasury orchestrated a consortium of five leading banks to assist and guarantee the liabilities of weak banks (notably the Grundegerbank and the *Detailhandlersbank*). This consortium created a fund that guaranteed all liabilities of the suspended banks and those of the Retailer's Bank, which also looked to be in a precarious state. This commitment by the banks secured the full payment to domestic and foreign creditors.

#### Finland: 1900 Banking Crisis

Frederiksen (1902) implicates the crisis in Russia and the Balkans and a drop in iron and steel prices in Finland's difficulties in this period, which placed much of its banking system at risk.

In response to the crisis, the Bank of Finland extended loans and rediscounts to other banks against their pledge of securities. It increased its note issue from 35 to 40 million markka without a corresponding increase in specie reserves. Banks were authorized to use foreign bills as legal cover for their own note issues, which permitted the latter to be increased by an additional five million.

Output effects of this crisis were noticeable, with the growth rate of real GDP growth falling by 4 per cent in the crisis year.

### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1900	-4.0	1.0	2.0	-4.0	-3.0	-3.0

### France: 1882 Banking Panic

France seems to have passed through a speculative period prior to 1882. The Credit Foncier increased its loans from 50 million francs in 1879 to 278 million in 1881, while other banks enjoyed huge increases in their stock prices. There was evidently a shift occurring in savings behavior, as this was the period in which French citizens began to place their savings in financial assets.

Conant emphasizes the over-use of negotiable securities afforded by the payment of the war indemnity to Germany and blames the financial innovations of the period, combined with speculation, for the crisis. Foreign influences include events in the United States, which was attracting gold due to its rapid growth and current account surplus. These pressures forced the Bank of France to adopt a more restrictive monetary policy to stem gold outflows.

Although treasury receipts rose in the years leading up to 1882, spending rose even faster. Historians have complained that most of the government's projects had little economic value (Conant 1915).

In response to problems among the banks, the Bank of France loaned 80 million Fr. in Paris to banks in distress and accepted nearly 100 million francs worth of securities in Lyon. Notwithstanding these actions, the Bank has been criticized (by, inter alia, Levy-Leboyer (1990) for not doing more. It kept interest rates high; as many firms were financing on a short-term basis, this policy had a deleterious effect on the economy.

Resolution was also expedited by international cooperation. The Bank of France borrowed L924,000 from the Bank of England on 30 January 1882, and an additional 2 million the following week, which it used to replenish its reserves and augment domestic credit.

Growth fell by five percentage points between 1882 and 1883 and failed to recover to the previous trend for sometime thereafter.

### Fluctuations in Real GNP Growth Rates

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
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1882	-5.0	----	----	-1.0	-3.0	-3.0
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### France: 1888-9 Twin Crisis

In 1888 a French financier attempted to corner the copper market, and the Comptoir d'Escompte discounted copper warrants in conjunction with scheme. In the event, production limits broke down, copper prices fell, and the Comptoir suffered heavy losses. Its head committed suicide, prompting a run. Though its assets seemed to be generally sound, they were not sufficiently liquid to satisfy the demands of depositors.

The Comptoir appealed to the Bank of France for assistance, and the latter advanced it 200 million francs on the guarantee of several Parisian banks. This enabled the Comptoir to meet the demands of its depositors and creditors, and even to repay a portion of the capital subscribed to its shareholders.

Conditions imposed on the Comptoir included paying a sum of 1.7 million francs to the government annually, creating a credit line of 180 million francs for the government with no interest charge, rendering services to place consols at no charge, and opening new branches. These obligations depended on approval by parliament, however, and in the end they were not enacted because the bill containing them became embroiled in parliamentary debate.

If the standard statistics are to be believed, growth fell by 14 percentage points in the crisis.

### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1888-1889	-14.0	-1.0	0.0	6.0	4.0	4.0

### France: 1907 Banking Panic

According to Conant, the main cause of this crisis was trouble in the United States, which raised demands for gold and money worldwide. France seems to have been in a strong position as far as reserves and the banking system were concerned. The governor of the Bank of France claimed that the majority of losses during 1907 were in silver and that these went to colonies and members of the Latin Union, all of whom France had an interest in protecting. In this light it is not surprising that the visible impact on GDP growth was mild.

### Fluctuations in Real GNP Growth Rates (in percentage points)



Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1907	0.0	0.0	0.0	-2.0	-1.0	1.0

#### Germany: 1893 Currency Crisis

In 1892 and 1893, the Reichsbank lost 18 per cent of its gold reserves. The literature points to several factors behind this pressure. One was the crisis in the United States, which led to a loss of confidence in German investments in that country. In addition, Italy's financial sector, in which Germany also had considerable investments, was undergoing a shakeout. The upcoming federal elections were unsettling; according to *The Economist*, it was possible that agricultural (bimetallist and protectionist) interests would make large gains. The federal finances were a cause for concern, as Germany had run chronic budget deficits in preceding years. And Russia raised tariffs on German goods early in 1893, creating fears of a trade war.

The government responded quickly. Increases in import duties were announced to make up deficiencies in revenues. The trade war with Russia was neutralized as officials pursued trade-treaty negotiations in 1894. And once problems abroad subsided toward the end of the year, the discount rate was reduced. By December gold began to flow back in.

The growth effects of this crisis seem to have been significant once they set in a year following its outbreak.

#### Fluctuations in Real GNP Growth Rates

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1893	2.0	5.0	5.0	-9.0	-5.0	-4.0

#### Germany: 1901 Banking Crisis

Russia had just experienced a crisis, and German banks with large investments there found their balance-sheet positions impaired. Stock prices in Berlin fell by 61 per cent during the crisis, electrical and tramway companies being hardest hit. Distress surfaced first among mortgage banks like the Bank of Pomerania and the Mortgage Bank of Mecklenburg Strelitz, which were then rescued by the big discount banks. The discount banks also provided liquidity to other banks coming under pressure. Notwithstanding these efforts, the *Dresdner Creditanstalt* and the Bank of Leipzig were both forced to close their doors, and the Leipzig Bank was allowed to fail.

Visible output effects were a modest slowdown in the rate of growth in the crisis year.

### Fluctuations in Real GNP Growth Rates

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1901	0.0	-3.0	-2.0	3.0	6.0	5.0

### Germany: 1907 Currency Crisis

U.S. interest rates were high in 1905-6, placing German capital markets under strain. Raffalovich (1907) notes in addition evidence of fiscal excesses associated with the arms race with France and Britain. As evidence of the weakening state of German finances, *The Banker's Magazine* cites the Prussian loan issued on London in 1907, which aimed to raise L20 million but succeeded in attracting just L9 million.

Germany lost some 13 per cent of its gold reserves in the two years leading up to this crisis, forcing the Reichsbank to tighten. The tightness of monetary policy is the natural explanation for the slow recovery that followed.

### Fluctuations in Real GNP Growth Rates

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1907	2.0	0.0	1.0	-4.0	-3.0	-2.0

### Great Britain: 1890 Banking Crisis

This was the famous episode when the failure of the Buenos Aires Water Supply and Drainage Company loan threatened to bring down the House of Baring. Argentina enjoyed a massive influx of European capital. Baring's was the largest single creditor. Three-quarters of Baring's portfolio was in the securities of Argentina and Uruguay despite mounting evidence of financial excesses on the part of the recipients.

In 1889, international markets were disturbed by an increase in the Bank of England's discount rate. Political unrest and increases in tariffs then fed pessimism about the Argentine market and brought about an end to the boom in Argentine securities issues.

The Bank of England increased its note issue during the crisis, but only for notes held in the Banking Department. (There was no increase in the fiduciary issue, in other words.) The Governor of the Bank of England also organized a rescue fund for Barings on the order of L17

million to help meet current interest obligations. These funds came from the Bank of England and leading merchant banks. Bank rate was meanwhile raised to 6 per cent.

International cooperation played a role in resolving this crisis. The Bank of England was assisted by the Bank of France and the Bank of Russia. From the former it borrowed nearly L3 million, while from the latter the government obtained a pledge of L1.5 million.

Capie argues that the impact in the British banking sector was not large, noting that there was no change in the reserve-deposit ratio. Nor is there evidence of a serious recession; the downturn that followed was both short and mild.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1890	-2.0	-1.0	-2.0	3.0	0.0	1.0

#### Greece 1885 Currency Crisis

The drachma had been inconvertible since 1877. Between 1884 and 1895, the exchange rate on Paris fell by 16 per cent. The popular explanations for this Greek tragedy are a bad harvest and, more importantly, fiscal excesses. Deficits had led to the accumulation of a large debt which Greece was trying to augment with yet more loans to finance military and public works spending. While government outlays doubled between 1884 and 1885, tax increases were negligible. The currency suffered the consequences.

Since the relevant macroeconomic data are not available, this crisis is not included in our empirical analysis.

#### Italy: 1891-4 Twin Crisis

The 1880's seem to have been a decade of strong demand for Italian securities, securities issued by manufacturing concerns in particular. In addition, the period saw a real estate boom funded by short-term credit from the banks of issue. The government did its part: the deficit reached five per cent of GNP by 1888-1889. When failures broke out in real estate companies, those companies brought their banks down with them.

Kindleberger (1984a) cites as one of the triggers of this crisis the tariff war between Italy and France. Raising the tariff in 1887 curtailed capital inflows and depressed the price of Italian government bonds. The rise in interest rates in turn pricked the land bubble.

One indication of the magnitude of the crisis was that the price of Bank of Tiberin stock fell from 600 in 1887 to 35 in 1891. Growth slowed significantly and remained depressed for the better part of five years (although the 1894 banking crisis, discussed below, had something to do with this).

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1891	-6.0	-8.0	-9.0	-15	-10	-9.2

In June and July of 1891, the government allowed banks of issue to increase their note issues from three to four times capital. Arguably, this limited the immediate severity of the crisis but without purging the underlying sources of financial weakness. In 1893 it came to light through that nearly 200 million lire in loans by the banks of issue were bad. In particular, one large bank, the Banca Romana, had issued excessive notes and duplicate notes.

The government overhauled the banking system by merging various banks and authorized an expansion of the note issue to address problems of credit stringency. In January of 1894 it authorized a further expansion of credit, which appears to have provided the immediate trigger for the currency crisis.

The recessionary impact of this second crisis was relatively mild. Not so its financial effects: the lira depreciated from 104 to more than 115 to the franc over the course of 1893. Italy lost 63 million lire in monetary gold in 1893 and 5 million lire in 1894.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1893	5.0	-1.0	-2.0	3.0	0.0	-2.0
1894	3.0	-4.0	-6.0	-8.0	-7.0	-4.8

Italy: 1907-8 Twin Crisis

The years before 1907 were ones of rapid economic expansion. Italy was the recipient of large immigrant remittances, fueling an increase in liquidity. The period was also marked by a frothy stock market. Kindleberger (1984a) argues that the mania spilled over to the banking system, as banks extended loans to individuals engaged in financial speculation and engaged in such speculation themselves.

With mounting financial difficulties in New York, London and Paris in 1906, pressure was placed on interest rates, and air was let out of the Italian financial bubble. The crash was

followed by a sharp drop in output.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1907-1908	8.0	8.0	7.0	-11.0	-10.0	-8.0

This was the period when the Bank of Italy began to assume its role as lender of last resort. Bonelli (1982) concludes that the subsequent recession was milder than would have been the case otherwise as a result of its intervention, although the standard statistics suggest that recovery was slow in coming.

Japan: Twin Crisis of 1900

Japan ran trade deficits in the period leading up to this crisis, fueling persistent reserve losses. In addition, the gold stock of the Bank of Japan was the equivalent of only about \$1 per person, which seemed to many as inadequate to support convertibility (which had only been established in 1897) and may have contributed to speculation on the yen.

Japan exported nearly 45 million yen in gold and silver in 1900. The currency depreciated by 2 per cent in 1897 and another two per cent in 1898, but recovered (by one per cent) in 1899, before giving back that ground in 1900. Between 1897 and 1900, the country exported nearly 42.8 million yen in gold. The gold stock in the country fell to a low of 53 million yen (\$26 million) in 1900.

The output effects of the crisis were substantial: growth fell by 6 percentage points between 1900 and 1901.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1900-1901	-6.0	-2.0	-2.0	-3.0	2.0	0.0

Japan: 1904 Currency Crisis

The crisis of 1904 is conventionally portrayed as the result of reckless government spending and a monetary policy gone awry. Tamaki (1995) refers to Japanese colonial

possessions in Taiwan and Korea as sinks for government funds. Advances from the central bank to the government were used to underwrite the country's colonial operations there.

One consequence of these fiscal excesses was large current account deficits, reaching 130 million yen in 1904 (compared to a level of reserves on the order of 90 million yen at year's end). Gold losses ran at nearly 14 million yen per month for four straight months. Cumulatively, this was a 50 per cent fall in reserves.

During the crisis, the government called upon the public to bring gold to the central bank for deposit. In addition, a loan from the London market of L10 million eased reserve constraints. Finance Minister Takahashi reported he was able to maintain order by taking loans on London and on New York. Conant cites Takahashi's vigorous work, Japan's renewed access to foreign capital, and public support in a period of diplomatic crisis the reasons for the dissipation of the crisis, although it took some time for growth to recover to pre-crisis levels.

A serious recession ensued.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1904	10.0	8.4	9.0	-15.0	-10.0	-9.0

Japan: Twin Crisis of 1907-1908

The Tokyo stock market crashed in early 1907. This was followed by a brief recovery, but news of instability in the United States then sent financial markets into a tailspin. The weakness of silver prices and the consequent depreciation of China's currency then undermined the market position of Japanese producers further.

*The Oriental Economist* reports a loss of 10 million yen in gold and silver in 1907. The Bank of Japan intervened to rescue a number of distressed banks, while at the same time allowing others to fail. The recession that followed was severe.

Fluctuations in Real GNP Growth Rates (in percentage points)

<u>Year</u>	<u>Crisis-(-1)</u>	<u>(Crisis)- Avg (-5)</u>	<u>(Crisis)- Avg(-3)</u>	<u>Avg (+1)- (Crisis)</u>	<u>Avg (+3)- (Crisis)</u>	<u>Avg (+5)- (Crisis)</u>
1907-1908	-9.0	-3.0	-4.0	-10.0	0.0	1.0

Portugal: 1891 Twin Crisis

Portugal ran large budget deficits in the period leading up to this crisis. It was then hit

by the Baring Crisis, and by the revolution in Brazil where it had substantial investments.

Corruption is frequently cited in connection with the fiscal problem. The Public Works and Navy Ministries were spending extravagantly. Poor colonial administration was a further drain on Portugal's resources. Raffalovich (1892) points in addition to the close relationship between the Treasury and various public works companies.

The Milreis fell about 21 per cent from 53 13/16 in January of 1891 to 43 and 1/8 in December. The government addressed the crisis by attempting to sell French investors a five per cent interest in the national tobacco company, authorizing a general moratorium for the Banco Nacional de Portugal and the Banco Lusitano, and passing a law allowing note emissions up to three times the paid-in capital of the banks. In 1892 the troubles had not yet been sorted out, and the government threatened holders of foreign debt with the same treatment given domestic debtors (i.e. a thirty per cent tax on coupon payments ) if they did not renegotiate. Negotiations were then successfully concluded; the debt consolidation reduced interest payments on the foreign debt substantially.

This crisis appears to have had a fairly large impact on Portuguese growth.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1891	0.0	-7.0	-6.0	4.0	3.0	6.0

#### Sweden: 1907 Banking Crisis

The period up to 1907 was one of steady expansion. Following reorganization in 1897, the banking industry prospered. Between 1900 and 1907, branches of the non-note issuing (enskilda) banks rose from 157 to 261, branches of the Riksbank from 330 to 579. Their competition fueled a lending boom. When loans and advances increased by 29% in the 22 months prior to October 1907, confidence in the stability of the banking system began to weaken. The markets were then further disturbed by turbulence abroad, triggering bank runs.

The banks lost 6 million crowns from a reserve of 76 million, mainly in the last week of November. In response to gold losses, the Riksbank raised its discount rate, holding it at higher levels through January 1908. The exchange rate was successfully held.

The Riksbank helped national banks by lending when their foreign creditors called in loans. The government also arranged a loan 65 million franc loan from France, which it used to help distressed banks and to replenish the resources of the Riksbank. The Riksbank itself contracted abroad for a \$5 million loan in foreign exchange on three month drafts.

Output effects of this crisis were substantial, although the economy bounced back quickly.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)-Avg (-5)	(Crisis)-Avg(-3)	Avg (+1)-(Crisis)	Avg (+3)-(Crisis)	Avg (+5)-(Crisis)
1907	-11.0	-4.0	-5.0	1.0	3.0	2.0

United States: 1884 Banking Panic

Friedman and Schwartz (1963) point to several causes of this crisis. Britain had raised Bank rate in 1883. The American commitment to the gold standard fell under a cloud due to bimetallist agitation. Commodity prices were weak; steel rail, for example, fell from \$71 in 1880 to \$35 in 1883. In May 1884, a series of brokerage firms failed, leading the public to grow suspicious of the position of others.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)-Avg (-5)	(Crisis)-Avg(-3)	Avg (+1)-(Crisis)	Avg (+3)-(Crisis)	Avg (+5)-(Crisis)
1884	4.0	----	1.0	-2.0	0.0	-1.0

Conant (1915) estimates that national bank deposits declined in this crisis by some eight percent. A number of important banks were forced to suspend payments in a panic that was largely confined to the New York region. The New York Clearinghouse played a key role in containing it, issuing \$22 million of clearinghouse certificates.

The output effects of this crisis were mild.

United States: 1891 Currency Crisis

Friedman and Schwartz cite international turbulence (fallout from the Baring crisis) as precipitating this crisis. In addition, some commentators emphasize increasing expenditure on government pensions as worsening the fiscal outlook and intensifying the pressure of demand. Large gold outflows occurred in the spring of 1891, stripping the U.S. of about ten per cent of its monetary gold stock in the first half of the year.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)-Avg (-5)	(Crisis)-Avg(-3)	Avg (+1)-(Crisis)	Avg (+3)-(Crisis)	Avg (+5)-(Crisis)
1891	-3.0	1.0	1.0	5.0	-4.0	-2.0



A short recession ensued. Treasury open-market purchases, which helped to calm the markets, may have been part of the explanation for its brevity. In addition, the Treasury imposed a tax of 40 cents per \$1,000 on gold bars for export to discourage gold outflows (although the main effect of this was to cause gold to be exported instead in the form of coins). It charged 60 cents per \$1,000 less than normal rates on sales of western legal tender exchange under the condition of being paid in gold (taking a page from the book of the Bank of France).

### United States: Twin Crisis of 1893

Few observers noted signs of business trouble at the beginning of 1893, although some expressed uneasiness over the debate on the monetary standard. Conditions changed in February with the stock market crash, which was widely attributed to monetary uncertainty. That the Treasury reported only having about \$108 million in gold reserves, down from over 200 million in 1888, did not boost confidence. Redemption of Treasury notes for gold became widespread in the spring of 1893. Many banks were called to ship reserves to the West where money and specie were in high demand. From 2 June to 24 June New York banks lost more than \$30 million in reserves, pushing them dangerously close to their minimum legally required reserve.

The crisis was resolved through political and financial action. The President made clear his disdain for the Silver Purchase Act. The Senate then voted on 30 October to repeal the Sherman Act, and the House followed on 1 November; this endorsement of the gold standard provided a boost to confidence. Meanwhile, Belmont purchased \$62 million of government bonds, providing the Treasury with nearly \$35 million ounces of gold. Belmont, Morgan and Rothschild restricted access to foreign exchange, imposing heavy costs on those wishing to purchase foreign bills.

The crisis occasioned a severe decline in output, according to the standard statistics, although the economy bounced back quickly.

#### Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)-Avg (-5)	(Crisis)-Avg(-3)	Avg (+1)-(Crisis)	Avg (+3)-(Crisis)	Avg (+5)-(Crisis)
1893	-14.0	-9.0	-12.0	2.0	7.0	8.0

### United States: 1907 Banking Panic

Global credit stringency and domestic financial excesses helped to set the stage for the 1907 panic. Britain had required funds for its war in South Africa, and now Japan and Russia similarly raised funding for their war. The price of British consols dropped from 114 in 1896 to near 80 in 1907.

In the U.S., meanwhile, the number of state banks had been on the rise, from 9,500 in 1900 to near 13,000 in 1907. While their liabilities had risen by \$5 billion, their cash reserves had only increased by \$171 million. Friedman and Schwartz note that the ratio of deposits to cash reserves rose from 2:1 in 1897 to 6:1 in 1907. In addition, there was speculation in the stock and real estate markets.

The crisis began in New York but soon spread nationwide. A national restriction of payments of currency for deposits went into effect.

Between 1907 and 1908, the growth rate fell by 9 per cent.

Fluctuations in Real GNP Growth Rates (in percentage points)

Year	Crisis-(-1)	(Crisis)- Avg (-5)	(Crisis)- Avg(-3)	Avg (+1)- (Crisis)	Avg (+3)- (Crisis)	Avg (+5)- (Crisis)
1907	-9.0	-3.0	-4.0	-10.0	0.0	1.0

Both domestic and foreign intervention helped to limit the consequences. J.P. Morgan, in cooperation with the New York Clearinghouse Syndicate and the Treasury, placed deposits with national banks with the goal of replenishing their liquidity. In the west, goods could not be transported due to difficulties in the conversion of bills of exchange; the Bank of Montreal promptly deposited gold at the Treasury of New York to grease these wheels. The French loaned nearly \$16 million in silver eagles on the security of French commercial paper.

## References

- Adams, T.F.M. (1964), *A Financial History of Modern Japan*, Tokyo: Research Ltd.
- Bankers' Magazine* (various issues), London: Waterlow and Sons Ltd.
- Batchelor, Roy A. (1986), "The Avoidance of Catastrophe: Two Nineteenth Century Banking Crises," in Forrest Capie and Geoffrey Woods (eds), *Financial Crises and the World Banking System*, New York: St. Martin's Press.
- Bauer, Hans and Warren J. Blackman (1998), *Swiss Banking: An Analytical History*, New York: St. Martin's Press.
- Bernanke, Ben and Harold James (1991), "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison," in R. Glenn Hubbard (ed.), *Financial Markets and Financial Crises*, Chicago: University of Chicago Press, pp.33-68.
- Bonnelli, Franco (1978), "The 1907 Financial Crisis in Italy: A Peculiar Case of the Lender of Last Resort in Action" in C.P. Kindleberge and J.P. Lafforque (eds), *Financial Crises: History and Policy*, New York: Cambridge University Press, pp. 51-65.
- Bordo, Michael (1986), "Financial Crisis, Banking Crisis, Stock Market Crashes and the Money Supply: Some International Evidence, 1870-1933" in Geoffrey E. Wood and Forrest Capie (eds), *Financial Crises and the World Banking System*, London: Macmillan, pp. 190-248.
- Bordo, Michael, Michael Edelstein, and Hugh Rockoff (1999), "Was Adherence to the Gold Standard a 'Good Housekeeping Seal of Approval' During the Interwar Period?" unpublished manuscript, Rutgers University.
- Bordo, Michael, Barry Eichengreen and Douglas A. Irwin (1999), "Is Globalization Today Really Different Than Globalization a Hundred Years Ago?" *Brookings Trade Policy Forum* (forthcoming).
- Bordo, Michael and Barry Eichengreen (1988), "The Rise and fall of a Barbarous relic: The role of Gold in the International Monetary System," *NBER Working Paper* No. 6436 (March).
- Bordo, Michael and Finn Kydland (1996), "The Gold Standard as a Commitment Mechanism," in Tamim Bayoumi, Barry Eichengreen and Mark Taylor (eds), *Modern Perspectives on the Gold Standard*, Cambridge: Cambridge University Press.

Bordo, Michael and Anna Schwartz (1996a), "The Operation of the Specie Standard: Evidence for Core and Peripheral Countries," in Jorge Braga de Macedo, Barry Eichengreen and Jaime Reis (eds), *Currency Convertibility: The Gold Standard and Beyond*, London: Routledge, pp.11-83.

Bordo, Michael and Anna Schwartz (1996b), "Why Clashes Between Internal and External Stability Goods End in Currency Crises, 1797-1994," *Open Economies Review* 7, pp. 439-468.

Calomiris, Charles (1999), "Victorian Perspectives on the Banking Collapse of the 1980's and 1990's," unpublished manuscript, Columbia University.

Calvo, Guillermo and Carlos Vegh (1999), "Inflation Stabilization and Balance of Payments Crises in Developing Countries," *NBER Working Paper* No. 6925 (February).

Campa, Jose M. (1990), "Exchange Rates and Economic Recovery in the 1930s: An Extension to Latin America," *Journal of Economic History* 50, pp.677-682.

Canovi, Tito (1911), *The Banks of Issue in Italy*, National Monetary Commission, Senate Doc. 575, Washington, D.C.: Government Printing Office.

Capie, Forrest and Webber Alan (1985), *A Monetary History of the United Kingdom, 1870-1982: Volume I, Data, Sources, Methods*, Boston: George Allen & Unwin.

Capie, Forrest (1992), "British Economic Fluctuations in the Nineteenth Century: Is There a Role for Money?" in S.N. Broadberry and N.F.R. Crafts (eds), *Britain in the International Economy*, New York: Cambridge University Press.

Caprio, Gerald, Jr. and Daniela Klingebiel (1996), "Bank Insolvencies: Cross-Country Experience," Policy Working Paper no. 1620, Washington, D.C.: The World Bank.

Clough, Shepard Bancroft (1939), *France: A History of National Economics 1789-1939*, New York: Charles Scribner's Sons.

Cohn, Einar (1930) "Denmark in the Great War," in James T. Shotwell (ed.), *Economic and Social History of the World War*, New Haven: Yale University Press.

Cole, Harold L., James Dow and William B. English (1995), "Default, Settlement, and Signaling: Lending Resumption in a Reputational Model of Sovereign Debt," *International Economic Review* 36, pp. 365-385.

Conant, Charles A. (1915), *A History of Modern Banks of Issue*, New York, G.P. Putnam's Sons.

Cork, Nathaniel (1894), "The Late Australian Banking Crisis," *Journal of the Institute of Bankers* 15 (Part. 4), pp.175-261.

Davis, Lance and Robert Gallman (1999), "Waves, Tides, and Sandcastles: The Impact of Foreign Capital Flows on Evolving Financial Markets in the New World, 1865-1914," unpublished manuscript, Caltech and University of North Carolina, Chapel Hill.

DeLonghe, D. (1999), "Chronology of Belgian Banking Crises," unpublished manuscript, Kathelieke Universiteit Leuven.

Dertilis, George B. and Constantine Costis (1995), "Banking, Public Finance, and the Economy: Greece, 1919-1933," in Charles Feinstein (ed.), *Banking, Currency, and Finance in Europe Between the Wars*, New York: Oxford University Press, pp. 458-471.

Des Essars, Pierre (1896), "A History of Banking in the Latin Nations," in *A History of Banking in all the Leading Nations*, New York: Journal of Commerce and Commercial Bulletin.

Dowd, Kevin (1992), "Free Banking in Australia," in Dowd, Kevin (ed.), *The Experience of Free Banking*, New York: Routledge.

Dooley, Michael (1998), "A Model of Currency Crises in Emerging Countries," NBER Working Paper.

Eichengreen, Barry (1992), *Golden Fetters: The Gold Standard and the Great Depression 1919-1939*, New York: Oxford University Press.

Eichengreen, Barry, Andrew Rose and Charles Wyplosz (1995), "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks," *Economic Policy* 21, pp. 249-312.

Eichengreen, Barry, Andrew Rose and Charles Wyplosz (1996), "Speculative Attacks on Pegged Exchange Rates: An Empirical Exploration with Special Reference to the European Monetary System" in Matthew Canzoneri, Wilfred Ethier and Vittorio Grilli (eds.), *The New Transatlantic Economy*, New York: Cambridge University Press.

Eichengreen, Barry and Jeffrey Sachs (1985), "Exchange Rates and Economic Recovery in the 1930s," *Journal of Economic History* 49, pp.925-945.

Eichengreen, Barry and Peter Temin (1997), "The Gold Standard and the Great Depression,"

NBER Working Paper no. 6060.

Eulambio, M.S. (1924), *The National Bank of Greece*, Athens: S.C. Vlastos.

Ferguson, Niall (1999), *The Pity of War*, New York: Knopf.

Fishlow, Albert (1985), "Lessons from the Past: Capital Markets During the 19<sup>th</sup> Century and the Interwar Period," in Miles Kahler, *The Politics of International Debt*, Ithaca, NY: Cornell University Press, pp.37-94.

Flux, A.W. (1910), *The Swedish Banking System*, Washington, D.C.: Government Printing Office.

Ford, A.G. (1962), *The Gold Standard 1880-1914 Britain and Argentina*, Oxford: Clarendon Press.

Fratianni, Michele and Franco Spinelli (1997), *A Monetary History of Italy*, New York: Cambridge University Press.

Frederiksen, N.C. (1902), *Finland: Its Public and Private Economy*, London: Edward Arnold.

Friedman, Milton and Anna J. Schwartz (1963), *A Monetary History of the United States 1867-1960*, Princeton: Princeton University Press.

Girton, Lance and Donald Roper (1997), "A Monetary Model of Exchange Market Pressure Applied to Postwar Canadian Experience," *American Economic Review* 67, pp. 537-48.

Goldsmith, Raymond W. (1986), *Brasil 1850-1984: Desenvolvimento Financeiro sob um Seculo de Inflacao*, Sao Paulo: Harper and Row.

Goodhart, Charles and P.J.R. DeLargy (1999), "Financial Crises: Plus ça change, plus c'est la meme chose," LSE Financial Markets Group Special Paper No. 108.

Gorton, Gary (1985), "Clearing Houses and the Origins of Central Banking in the U.S.," *Journal of Economic History* 45, pp.277-283.

Hansen, Per (1999), "Chronology of Danish Banking Crisis," unpublished manuscript, Odense University.

Herrala, Risto (1998), "Banking Crises vs. Depositor Crises: the Era of the Finnish Mark, 1865-1998," unpublished manuscript, Bank of Finland.

Hyndman, H.M. (1892), *Commercial Crises of the Nineteenth Century*, New York: Charles Scribner's Sons.

Ishibashi, Tanzan ed. (1935), *The Foreign Trade of Japan: A Statistical Review*, Tokyo: Oriental Economist.

Jones, Matthew T. and Maurice Obstfeld (1999), "Historical Data on Investment and Savings," unpublished manuscript, University of California, Berkeley.

Kaminsky, Graciela (1998), "Currency and Banking Crises: The Early Warnings of Distress," unpublished manuscript, George Washington University.

Kauch, P. (1950), *La Banque National de Belgique*, Brussels: Banque National de Belgique.

Kindleberger, Charles P. (1989), *Manias, Panics and Crashes: A History of Financial Crises*, Revised Edition, New York: Basic Books.

Kindleberger, Charles P. (1984a), *A Financial History of Western Europe*, Boston: George Allen & Unwin.

Kindleberger, Charles P. (1984b), "International propagation of Financial Crises: The Experience of 1888-93," in Wolfram Engels, Armin Gutowski and Henry Wallich (eds), *International Capital Movements, Debt and Monetary System*, Mainz: v. Hase and Koehler.

Kostelenos, George C. (1995), *Money and Output in Modern Greece: 1858-1938*, Athens: S.C. Vlastos.

Levy-Leboyer, Maurice and Francois Bourignon (1990), *The French Economy in the Nineteenth Century*, New York: Cambridge University Press.

Llona, Augustin (1990), *Chilean Monetary Policy: 1860-1925*, unpublished PhD. Dissertation, Boston University.

Macedo, Jorge Braga de (1999) "Chronology of Portuguese Banking Crises," unpublished manuscript, Nova University, Lisbon.

Maddison, Angus (1991), *Dynamic Forces in Capitalist Development A Long-Run Comparative View*, New York: Oxford University Press.

Manuel Pelaez, Carlos and Wilson Suzigan (1976), *Historia Monetaria do Brasil*, Brasilia: Editora Universidade de Brasilia.

Marichal, Carlos (1989), *A Century of Latin American Debt Crises*, Princeton: Princeton University Press.

McIvor, R. Craig (1958), *Canadian Monetary, Banking and Fiscal Development*, Toronto: Macmillan Co.

Merrett, D.T. (1989), "Australian Banking Practice and the Crisis of 1893," *Australian Economic History Review* 29, pp.66-85.

Miller, Victoria (1996), "Exchange Rate Crises with Domestic Bank Runs: Evidence from the 1890's," *Journal of International Money and Finance* 15, p. 4.

Miller, Victoria (1998), "Domestic Bank Runs and Speculative Attacks on Foreign Currencies," *Journal of International Money and Finance* 17, p. 2.

Neal, Larry (1992), *The Rise of Financial Capitalism: International Capital Markets in the Age of Reason*, Cambridge: Cambridge University Press.

Nordvik, Helge (1995), "Norwegian Banking in the Inter-War Period: A Scandinavian Perspective," in Charles Feinstein (ed.), *Banking, Currency, and Finance in Europe Between the Wars*, New York: Oxford University Press, pp.434-457.

Patat, Jean Pierre and Michel Lutfalla (1990), *A Monetary History of France in the Twentieth Century*, New York: St. Martin's Press.

Quintero Ramos, Angel M. (1965), *A History of Money and Banking in Argentina*, Piedras, P.R.: University of Puerto Rico Rio.

Raffalovich, Arthur (various years), *L'Marche Financier*, Paris: Gui Llaumin and Co.

Reis, Jaime (1995), "Portuguese Banking in the Inter-War Period," in Charles Feinstein (ed.), *Banking, Currency, and Finance in Europe Between the Wars*, New York: Oxford University Press, pp. 472-501.



Schwartz, Anna J. (1986), "Real and Pseudo Financial Crises." in Forrest Capie and Geoffrey E. Wood, eds, *Financial Crises and the World Banking System*, New York: Macmillan, pp.11-31.

Schwartz, Anna J. (1998), "Asian Banking Crises in the 1990's: All Alike?" unpublished manuscript, National Bureau of Economic Research.

Shepherd Henry L. (1936), *The Monetary Experience of Belgium, 1914-1936*, Princeton: Princeton University Press.

Sprague, O.M.W. (1910), *History of Crises Under the National Banking System*, Washington, D.C.: Government Printing Office.

Sprague, O.M.W. (1911), *The Banking System in Japan*, Washington, D.C.: Government Printing Office.

Subercaseaux, Guillermo (1922), *Monetary and Banking Policy of Chile*, Oxford: Clarendon Press.

'T Hart Marjolein, Joost Jonker and Jan Luiten van Zanden (1997), *A Financial History of the Netherlands*, New York: Cambridge University Press.

Tamakai, Norio (1995), *Japanese Banking: A History 1859-1959*, New York: Cambridge University Press.

Thorp, Willard (1926), *Business Annals*, New York: NBER Publishing.

Tore Klovland, Jan (1999), "Chronology of Norwegian Banking Crises," unpublished manuscript, Oslo, Norway.

Triner, Gail (1999), "Chronology of Brazilian Banking Crises," unpublished manuscript, Rutgers University.

Tudeer , A.E. (1940), *The Bank of Finland, 1912-1936*, Helsinki: Government Printing Office.

Vissering, G. and Holstijn J Westerman (1928), *The Netherlands and the World War: Studies in the War: History of a Neutral Volume IV: The Effect of the War upon Banking and Currency*, New Haven: Yale University Press.

Wileman, J.P. (1896), *Brazilian Exchange: The Study of an Inconvertible Currency*. Buenos Aires: Galli Bros.

Williams, J.H. (1920), *Argentine International Trade Under Inconvertible Paper Money 1880-1890*, Cambridge: Harvard University Press.

World Bank (1999), *Global Economic Prospects and the Development Countries, 1998/99: Beyond Financial Crisis*, Washington, D.C.: The World Bank.