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## Systemic Banking Crises: A New Database

*Luc Laeven and Fabian Valencia*



## **IMF Working Paper**

Research Department

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#### **Abstract**

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This paper presents a new database on the timing of systemic banking crises and policy responses to resolve them. The database covers the universe of systemic banking crises for the period 1970-2007, with detailed data on crisis containment and resolution policies for 42 crisis episodes, and also includes data on the timing of currency crises and sovereign debt crises. The database extends and builds on the Caprio, Klingebiel, Laeven, and Noguera (2005) banking crisis database, and is the most complete and detailed database on banking crises to date.

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## I. INTRODUCTION

Financial crises can be damaging and contagious, prompting calls for swift policy responses. The financial crises of the past have led affected economies into deep recessions and sharp current account reversals. Some crises turned out to be contagious, rapidly spreading to countries with no apparent vulnerabilities. Among the many causes of financial crises have been a combination of unsustainable macroeconomic policies (including large current account deficits and unsustainable public debt), excessive credit booms, large capital inflows, and balance sheet fragilities, combined with policy paralysis due to a variety of political and economic constraints. In many financial crises currency and maturity mismatches were a salient feature, while in others off-balance sheet operations of the banking sector were prominent.<sup>2</sup>

Choosing the best way of resolving a financial crisis and accelerating economic recovery is far from unproblematic. There has been little agreement on what constitutes best practice or even good practice. Many approaches have been proposed and tried to resolve systemic crises more efficiently. Part of these differences may arise because objectives of the policy advice have varied. Some have focused on reducing the fiscal costs of financial crises, others on limiting the economic costs in terms of lost output and on accelerating restructuring, whereas again others have focused on achieving long-term, structural reforms. Trade-offs are likely to arise between these objectives.<sup>3</sup> Governments may, for example, through certain policies consciously incur large fiscal outlays in resolving a banking crisis, with the objective to accelerate recovery. Or structural reforms may only be politically feasible in the context of a severe crisis with large output losses and high fiscal costs.

This paper introduces and describes a new dataset on banking crises, with detailed information about the type of policy responses employed to resolve crises in different countries. The emphasis is on policy responses to restore the banking system to health. The dataset expands the Caprio, Klingebiel, Laeven, and Noguera (2005) banking crisis database by including recent banking crises, information on currency and debt crises, and information on crisis containment and resolution measures. The database covers all systemically important banking crises for the period 1970 to 2007, and has detailed information on crisis management strategies for 42 systemic banking crises from 37 countries.

Governments have employed a broad range of policies to deal with financial crises. Central to identifying sound policy approaches to financial crises is the recognition that policy responses that reallocate wealth toward banks and debtors and away from taxpayers face a key trade-off. Such reallocations of wealth can help to restart productive investment, but they have large costs. These costs include taxpayers' wealth that is spent on financial assistance and indirect costs from misallocations of capital and distortions to incentives that may result

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<sup>2</sup> For a review of the literature on macro origins of banking crisis, see Lindgren et al. (1996), Dooley and Frankel (2003), and Collins and Kincaid (2003).

<sup>3</sup> For an overview of existing literature on how crisis resolution policies have been used and the tradeoffs involved, see Claessens et al. (2003), Hoelscher and Quintyn (2003), and Honohan and Laeven (2005).

from encouraging banks and firms to abuse government protections. Those distortions may worsen capital allocation and risk management after the resolution of the crisis.

Institutional weaknesses typically aggravate the crisis and complicate crisis resolution. Bankruptcy and restructuring frameworks are often deficient. Disclosure and accounting rules for financial institutions and corporations may be weak. Equity and creditor rights may be poorly defined or weakly enforced. And the judiciary system is often inefficient.

Many financial crises, especially those in countries with fixed exchange rates, turn out to be twin crises with currency depreciation exacerbating banking sector problems through foreign currency exposures of borrowers or banks themselves. In such cases, another complicating factor is the conflicting objectives of the desire to maintain currency pegs and the need to provide liquidity support to the banking system.

Existing empirical research has shown that providing assistance to banks and their borrowers can be counterproductive, resulting in increased losses to banks, which often abuse forbearance to take unproductive risks at government expense. The typical result of forbearance is a deeper hole in the net worth of banks, crippling tax burdens to finance bank bailouts, and even more severe credit supply contraction and economic decline than would have occurred in the absence of forbearance.<sup>4</sup>

Cross-country analysis to date also shows that accommodative policy measures (such as substantial liquidity support, explicit government guarantee on financial institutions' liabilities and forbearance from prudential regulations) tend to be fiscally costly and that these particular policies do not necessarily accelerate the speed of economic recovery.<sup>5</sup> Of course, the caveat to these findings is that a counterfactual to the crisis resolution cannot be observed and therefore it is difficult to speculate how a crisis would unfold in absence of such policies. Better institutions are, however, uniformly positively associated with faster recovery.

The remainder of the paper is organized as follows. Section 2 presents new data on the timing of banking crises, currency crises, and sovereign debt crises. Section 3 presents variable definitions of the data collected on crisis management techniques for a subset of systemic banking crises. Section 4 presents descriptive statistics of data on containment and resolution policies, fiscal costs, and output losses. Section 5 discusses the ongoing global liquidity crisis originated with the U.S. subprime crisis. Section 6 concludes.

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<sup>4</sup> For empirical evidence on this, see Demirguc-Kunt and Detragiache (2002), Honohan and Klingebiel (2003), and Claessens, Klingebiel, and Laeven (2003).

<sup>5</sup> See the analyses in Honohan and Klingebiel (2003), Claessens, Klingebiel, and Laeven (2005), and Laeven and Valencia (2008).

## II. CRISIS DATES

### A. Banking Crises

We start with a definition of a systemic banking crisis. Under our definition, in a systemic banking crisis, a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted. This situation may be accompanied by depressed asset prices (such as equity and real estate prices) on the heels of run-ups before the crisis, sharp increases in real interest rates, and a slowdown or reversal in capital flows. In some cases, the crisis is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress.

Using this broad definition of a systemic banking crisis that combines quantitative data with some subjective assessment of the situation, we identify the starting year of systemic banking crises around the world since the year 1970. Unlike prior work (Caprio and Klingebiel, 1996, and Caprio, Klingebiel, Laeven, and Noguera, 2005), we exclude banking system distress events that affected isolated banks but were not systemic in nature. As a cross-check on the timing of each crisis, we examine whether the crisis year coincides with deposit runs, the introduction of a deposit freeze or blanket guarantee, or extensive liquidity support or bank interventions.<sup>6</sup> This way we are able to confirm about two-thirds of the crisis dates.

Alternatively, we require that it becomes apparent that the banking system has a large proportion of nonperforming loans and that most of its capital has been exhausted.<sup>7</sup> This additional requirement applies to the remainder of crisis dates.

In sum, we identify 124 systemic banking crises over the period 1970 to 2007. This list is an updated, corrected, and expanded version of the Caprio and Klingebiel (1996) and Caprio, Klingebiel, Laeven, and Noguera (2005) banking crisis databases. Table 1 lists the starting year of each banking crisis, as well as some background information on each crisis, including peak nonperforming loans (percent of total loans), gross fiscal costs (percent of GDP), output loss (percent of GDP), and minimum real GDP growth rate (in percent). Peak nonperforming loans is the highest level of nonperforming loans as percentage of total loans during the first

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<sup>6</sup> We define bank runs as a monthly percentage decline in deposits in excess of 5%. We add up demand deposits (IFS line 24) and time, savings and foreign currency deposits (IFS line 25) for total deposits in national currencies (except for UK, Sweden and Vietnam, we use IFS 25L for total deposits). We define extensive liquidity support as claims from monetary authorities on deposit money banks (IFS line 12E) to total deposits of at least 5% and at least double the ratio compared to the previous year.

<sup>7</sup> In some cases, nonperforming loans are built up slowly over time and financial sector problems arise gradually rather than suddenly. Japan in the 1990's is a case in point. While nonperforming loans had been increasing since the early 1990's, they reached crisis proportions only in 1997. Also, initial shocks to the financial sector are often followed by additional shocks, further aggravating the crisis. In such cases, these additional shocks can sometimes be considered as being part of the same crisis. Latvia is a case in point. Latvia experienced a systemic banking crisis in 1995, which was followed by another stress episode in 1998 related to the Russian financial crisis.

five years of the crisis. Gross fiscal costs are computed over the first five years following the start of the crisis using data from Hoelscher and Quintyn (2003), Honohan and Laeven (2003), IMF Staff reports, and publications from national authorities and institutions. Output losses are computed by extrapolating trend real GDP, based on the trend in real GDP growth up to the year preceding the crisis, and taking the sum of the differences between actual real GDP and trend real GDP expressed as a percentage of trend real GDP for the first four years of the crisis (including the crisis year).<sup>8</sup> Minimum real GDP growth rate is the lowest real GDP growth rate during the first three years of the crisis.

## **B. Currency Crises**

Building on the approach in Frankel and Rose (1996), we define a “currency crisis” as a nominal depreciation of the currency of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation compared to the year before. In terms of measurement of the exchange rate depreciation, we use the percent change of the end-of-period official nominal bilateral dollar exchange rate from the World Economic Outlook (WEO) database of the IMF. For countries that meet the criteria for several continuous years, we use the first year of each 5-year window to identify the crisis. This definition yields 208 currency crises during the period 1970-2007. It should be noted that this list also includes large devaluations by countries that adopt fixed exchange rate regimes.

## **C. Sovereign Debt Crises**

We identify and date episodes of sovereign debt default and restructuring by relying on information from Beim and Calomiris (2001), World Bank (2002), Sturzenegger and Zettelmeyer (2006), and IMF Staff reports. The information compiled include year of sovereign defaults to private lending and year of debt rescheduling. Using this approach, we identify 63 episodes of sovereign debt defaults and restructurings since 1970.

Table 2 list the complete list of starting years of systemic banking crises, currency crises, and sovereign debt crises.

## **D. Frequency of Crises and Occurrence of Twin Crises**

Table 3 reports the frequency of different types of crises (banking, currency, and sovereign debt), as well as the occurrence of twin (banking and currency) crises or triple (banking, currency, and debt) crises. We define a twin crisis in year  $t$  as a banking crisis in year  $t$ , combined with a currency crisis during the period  $[t-1, t+1]$ , and we define a triple crisis in year  $t$  as a banking crisis in year  $t$ , combined with a currency crisis during the period  $[t-1, t+1]$  and a sovereign debt crisis during the period  $[t-1, t+1]$ .

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<sup>8</sup> Note that estimates of output losses are highly dependent on the method chosen and the time period considered. In particular, our measure tends to overstate output losses when there has been a growth boom before the banking crisis. Also, if the banking crisis reflects unsustainable economic developments, output losses need not be attributed to the banking crisis per se.



We find that banking crises were most frequent during the early 1990's, with a maximum of 13 systemic banking crises starting in the year 1995. Currency crises were also common during the first-half of the 1990's but the early 1980's also represented a high mark for currency crises, with a peak in 1981 of 45 episodes. Sovereign debt crises were also relatively common during the early 1980's, with a peak of 10 debt crises in 1983. In total, we count 124 banking crises, 208 currency crises, and 63 sovereign debt crises over the period 1970 to 2007. Note that several countries experienced multiple crises. Of these 124 banking crises, 42 are considered twin crises and 10 can be classified as triple crises, using our definition.

### **III. CRISIS CONTAINMENT AND RESOLUTION**

In reviewing crisis policy responses it is useful to differentiate between the containment and resolution phases of systemic restructuring (see Honohan and Laeven, 2003; and Hoelscher and Quintyn, 2003, for further details). During the containment phase, the financial crisis is still unfolding. During this phase, governments tend to implement policies aimed at restoring public confidence to minimize the repercussions on the real sector of the loss of confidence by depositors and other investors in the financial system. The resolution phase involves the actual financial, and to a lesser extent operational, restructuring of financial institutions and corporations. While policy responses to crises naturally divide into immediate reactions during the containment phase of the crisis, and long-term responses towards resolution of the crisis, immediate responses often remain part of the long-run policy response. Poorly chosen containment policies undermine the potential for successful long-term resolution. It is thus useful to recognize the context in which policy responses to financial crises occur.

For a subset of 42 systemic banking crises episodes (in 37 countries) that are well documented, we have collected detailed data on crisis containment and resolution policies using a variety of sources, including IMF Staff reports, World Bank documents, and working papers from central bank staff and academics. This section explains in detail the type of data collected, and defines variables in the process, organized by the following categories: initial conditions, containment policies, resolution policies, macroeconomic policies, and outcome variables.

#### **A. Overview and Initial Conditions**

We start with information on initial conditions of the crisis, including whether or not banking distress coincided with exchange rate pressures and sovereign debt repayment problems, initial macroeconomic conditions, the state of the banking system, and institutional development of the country.

- **CRISIS DATE** is the starting date of the banking crisis, including year and month, when available. The timing of the banking crisis follows the approach described in section II.
- **CURRENCY CRISIS** indicates whether or not a currency crisis occurred during the period  $[t-1, t+1]$ , where  $t$  denotes the starting year of the banking crisis. The timing of a currency crisis follows the approach described in section II, except that we do not

impose the restriction that we only keep the first year of each 5-year window for observations that meet the criteria for several continuous years. For example, if the currency experiences a nominal depreciation of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation in both years  $t-2$  and  $t-1$ , with  $t$  the starting year of the banking crisis, we treat year  $t-1$  as the year of the currency crisis for the purposes of creating this variable. We also list the year of the currency crisis, denoted as YEAR OF CURRENCY CRISIS.

- SOVEREIGN DEBT CRISIS indicates whether or not a sovereign debt crisis occurred during the period  $[t-1, t+1]$ , where  $t$  denotes the starting year of the banking crisis. The timing of a sovereign debt crisis follows the approach described in section II. We also list the year of the sovereign debt crisis, denoted as YEAR OF SOVEREIGN DEBT CRISIS.
- This is followed by a brief description of the crisis, denoted as BRIEF DESCRIPTION OF CRISIS.

In terms of initial macroeconomic conditions, we have collected information on the following variables. Each of these variables are computed at time  $t-1$ , where  $t$  denotes the starting year of the banking crisis, using data from the IMF's IFS and World Economic Outlook (WEO).

- FISCAL BALANCE/GDP is the ratio of the General Government balance to GDP for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.<sup>9</sup>
- PUBLIC DEBT/GDP is the ratio of the General Government gross debt to GDP for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.
- INFLATION is the percentage increase in the CPI index during the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.
- NET FOREIGN ASSETS (CENTRAL BANK) is the net foreign assets of the Central Bank in millions of US dollars for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.
- NET FOREIGN ASSETS/M2 is the ratio of net foreign assets (Central Bank) to M2 for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.
- DEPOSITS/GDP is the ratio of total deposits at deposit taking institutions to GDP for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.

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<sup>9</sup> Whenever General Government data was not available, Central Government data was used.

- GDP GROWTH is real growth in GDP during the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.
- CURRENT ACCOUNT/GDP is the ratio of current account to GDP for the pre-crisis year  $t-1$ , where  $t$  denotes the starting year of the banking crisis.

We have collected the following information on the state of the banking system.

- PEAK NPL is the peak ratio of nonperforming loans to total loans (in percent) during the years  $[t, t+5]$ , where  $t$  is the starting year of the crisis. This is an estimate using data from Honohan and Laeven (2003) and IMF staff reports. In all cases, we use the country's definition of nonperforming loans.
- GOVERNMENT OWNED is the share of banking system assets that is government-owned (in percent) in year  $t-1$ , where  $t$  denoted the starting year of the banking crisis. Data are from La Porta et al. (2002) and refer to the year 1980 or 1995, whichever is closer to the starting date of the crisis,  $t$ . When more recent data is available from IMF staff reports, such data is used instead.
- SIGNIFICANT BANK RUNS indicates whether or not the country's banking system experiences a depositors' run, defined as a one-month percentage drop in total outstanding deposits in excess of 5 percent during the period  $[t, t+1]$ , where  $t$  denotes the starting year of the banking crisis. This variable is constructed using data from IFS.
- CREDIT BOOM indicates whether or not the country has experienced a credit boom leading up to the crisis, defined as three-year pre-crisis average growth in private credit to GDP in excess of 10 percent per annum, computed over the period  $(t-4, t-1]$ , where  $t$  denotes the starting year of the banking crisis. This variable is constructed using data from IFS.

As proxy for institutional development, we collect data on the degree of protection of credit rights in the country.

- CREDITOR RIGHTS is an index of protection of creditors' rights from Djankov et al. (2007). The index ranges from 0 to 4 and higher scores denotes better protection of creditor rights. We use the score in the year  $t$ , where  $t$  denotes the starting year of the banking crisis.

## **B. Crisis Containment Policies**

Initially, the government's policy options are limited to those policies that do not rely on the formation of new institutions or complex new mechanisms. Immediate policy responses

include (a) suspension of convertibility of deposits, which prevents bank depositors from seeking repayment from banks, (b) regulatory capital forbearance<sup>10</sup>, which allows banks to avoid the cost of regulatory compliance (for example by allowing banks to overstate their equity capital in order to avoid the costs of contractions in loan supply), (c) emergency liquidity support to banks, or (d) a government guarantee of depositors. Each of these immediate policy actions are motivated by adverse changes in the condition of banks.

Banks suffering severe losses tend not only to see rising costs but also to experience liability rationing, either because they must contract deposits to satisfy their regulatory equity capital requirement, or because depositors at risk of loss prefer to place funds in more stable intermediaries. Banks, in turn, will transmit those difficulties to their borrowers in the form of a contraction of credit supply. Credit will become more costly and financial distress of borrowers and banks more likely.

The appropriate policy response will depend on whether the trigger for the crisis is a loss of depositor confidence (triggering a deposit run), regulatory recognition of bank insolvency, or the knock-on effects of financial asset market disturbances outside the banking system, including exchange rate and wider macroeconomic pressures.

Deposit withdrawals can be addressed by emergency liquidity loans, usually from the central bank when market sources are insufficient, by an extension of government guarantees of depositors and other bank creditors, or by a temporary suspension of depositor rights in what is often called a “bank holiday”. Each of these techniques is designed to buy time, and in the case of the first two, that depositor confidence can soon be restored. The success of each technique will crucially depend on the credibility and creditworthiness of the government.

Preventing looting of an insolvent or near insolvent bank requires a different set of containment tools, which may include administrative intervention including the temporary assumption of management powers by a regulatory official, or closure, which may for example include the subsidized compulsory sale of a bank’s good assets to a sound bank, together with the assumption by that bank of all or most of the failed entity’s banking liabilities; or more simply an assisted merger. Here the prior availability of the necessary legal powers is critical, given the incentive for bank insiders to hang on, as well as the customary cognitive gaps causing insiders to deny the failure of their bank.

Most complex of all are the cases where disruption of banking is part of a wider financial and macroeconomic turbulence. In this case, the bankers may be innocent victims of external circumstances, and it is now that special care is needed to ensure that regulations do not become part of the problem. Regulatory forbearance on capital and liquid reserve requirements may prove to be appropriate in these conditions. Regulatory capital forbearance allows banks to avoid the cost of regulatory compliance, for example, by allowing banks to overstate their equity capital in order to avoid the costs of contractions in loan supply.

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<sup>10</sup> Regulatory forbearance often continues into the resolution phase, though it is generally viewed as a crisis containment policy.

Adopting the correct approach to an emerging financial crisis calls for a clear understanding of what the underlying cause of the crisis is, as well as a quick judgment as to the likely effectiveness of the alternative tools that are available. The actions taken at this time will have a possibly irreversible impact on the ultimate allocation of losses in the system. In addition, the longer term implications in the form of moral hazard for the future also need to be taken into account.

All too often, central banks privilege stability over cost in the heat of the containment phase: if so, they may too liberally extend loans to an illiquid bank which is almost certain to prove insolvent anyway. Also, closure of a nonviable bank is often delayed for too long, even when there are clear signs of insolvency (Lindgren, 2003). Since bank closures face many obstacles, there is a tendency to rely instead on blanket government guarantees which, if the government's fiscal and political position makes them credible, can work albeit at the cost of placing the burden on the budget, typically squeezing future provision of needed public services.

We collect information on the following crisis containment policies.

First, we collect information on whether the authorities impose deposit freezes, bank holidays, or blanket guarantee to stop or prevent bank runs.

- DEPOSIT FREEZE indicates whether or not the authorities imposed a freeze on deposits. If a freeze on deposits is implemented, we collect information on the duration of the deposit freeze (in months), and the type of deposits affected.
- BANK HOLIDAY indicates whether or not the authorities installed a bank holiday. In case a bank holiday is introduced, we collect information on the duration of bank holiday (in days).
- BLANKET GUARANTEE indicates whether or not the authorities introduced a blanket guarantee on deposits (and possibly other liabilities). In case a blanket guarantee is introduced, we collect information on the date of introduction and the date of removal of the blanket guarantee and compute the duration that the guarantee is in place (in months). We also collect information on whether or not a previous explicit deposit insurance arrangement was in place at the time of the introduction of the blanket guarantee, the name of the administering agency of the blanket guarantee, and the coverage of the guarantee (deposits or also other liabilities).
- TIMING OF FIRST BANK INTERVENTION indicates the date (month and year) that the authorities intervened for the first time in a bank.
- TIMING OF FIRST LIQUIDITY ASSISTANCE indicates the date (month and year) that the first loan under liquidity assistance was granted to a financial institution.

Next, we collect information on the timing and scope of emergency liquidity support to financial institutions.

- LIQUIDITY SUPPORT indicates whether or not emergency liquidity support, measured as claims from monetary authorities on deposit money banks (IFS line 12E) to total deposits, is at least 5 percent and at least doubled with respect to the previous year during the period  $[t, t+3]$ , where  $t$  is the starting year of the banking crisis.

In terms of liquidity support, we also collect information on whether or not liquidity support was different across banks, or whether or not emergency lending was remunerated. If liquidity support was remunerated, we collect information on whether or not interest was at market rates.

We also collect information on the peak of liquidity support (in percent of deposits), computed as the maximum value (in percent) of the ratio of claims from monetary authorities on deposit money banks (IFS line 12E) to total deposits during the period  $[t, t+3]$ , where  $t$  is the starting year of the banking crisis.

- LOWERING OF RESERVE REQUIREMENTS denotes whether or not authorities lowered reserve requirements in response to the crisis.

### **C. Crisis Resolution Policies**

Once emergency measures have been put in place to contain the crisis, the government faces the long-run challenge of crisis resolution, which entails the resumption of a normally functioning credit system and legal system, and the rebuilding of banks' and borrowers' balance sheets.

At this point, the crisis has left banks and nonfinancial firms insolvent and many are in government ownership or under court or regulatory administration. Economic growth is unlikely to resume on a secure basis until productive assets and banking franchises are back in the hands of solvent private entities.

The financial and organizational restructuring of financial and non-financial firms during the crisis resolution phase is thus a large task, typically entailing much detailed implementation work in the bankruptcy courts, as well as the use of informal or ad hoc work-out procedures. There are also important trade-offs such as that between speed and durability of the subsequent economic recovery on the one hand, and the fiscal costs on the other.

Crisis resolution involves inherently complicated coordination problems between debtors and creditors. The fate of an individual corporation or financial institution and the best course of action for its owners and managers will depend on the actions of many others and the general economic outlook. Because of these coordination problems, as well as a lack of capital and the importance of the financial system to economic growth, governments often take the lead in systemic restructuring, especially of the banking system. In the process, governments often incur large fiscal costs, presumably with the objective to accelerate the recovery from the crisis.

The most recurrent question arising at this time is: should an overindebted corporate entity be somehow subsidized or forgiven some of its debt, or should its assets be transferred to a new

corporate structure and new management? This question applies to undercapitalized banks and to overindebted nonbank corporations alike. The feasibility of making such decisions on a case-by-case basis becomes problematic during a systemic crisis resulting in thousands of insolvencies and it becomes necessary to establish a systematic approach. General principles have proved elusive and, as well as depending on the scale of the crisis and the quality of existing legal and other governance institutions, to an extent the best answer is likely to depend on the source of the crisis.

Where the problem results from an economy-wide crash, the best prospect for future performance of banks and their borrowing customers may be with their existing owners and managers, given the information and other intangible forms of firm or relationship-specific capital they possess. On the other hand, where bank insolvency has been the result of incompetent, reckless or corrupt banking, or the use of government-controlled banks as quasi-fiscal vehicles or for political purposes, the relevant stock of information and relationship capital is unlikely to be of much social value. Therefore, separating the good assets from their current managers and owners offers better prospects in such circumstances as well as establishing a better precedent for avoiding moral hazard. Information capital is also likely to be relatively unimportant for real estate ventures, which have been central to many recent banking crises.

The main policy approaches employed in the resolution phase of recent crises include: (a) conditional government-subsidized, but decentralized, workouts of distressed loans; (b) debt forgiveness; (c) the establishment of a government-owned asset management company to buy and resolve distressed loans; (d) government-assisted sales of financial institutions to new owners, typically foreign; and (e) government-assisted recapitalization of financial institutions through injection of funds. We focus on the latter three that deal with bank insolvency.

In an attempt to let the market determine which firms are capable of surviving given some modest assistance, some official schemes have offered loan subsidies to distressed borrowers conditional on the borrower's shareholders injecting some new capital. Likewise there have been schemes offering injection of government capital funds for insolvent banks whose shareholders were willing to provide matching funds.

To the extent that they are discretionary, schemes of debt relief for bank borrowers carry the risk of moral hazard as debtors stop trying to repay in the hope of being added to the list of scheme beneficiaries.

Generalized forms of debt relief, such as is effectively provided by inflation and currency depreciation, can be regarded as relationship-friendly in the sense introduced above. Inflation is also a solution that reduces the budgetary burden. After all, if the crisis is big enough, the government's choices may be limited by what it can afford. Its capacity to subsidize borrowers or inject capital into banks is constrained by its ability over time to raise taxes or cut expenditure. It is for these reasons that inflationary solutions or currency devaluation have been a feature of the resolution of many crises in the past. This amounts to generalized debt relief and a transfer of the costs of the crisis to money holders and other nominal creditors. In this case the banks as well as the nonbank debtors receive relief,

without a climate of debtor delinquency being created. Of course these are questions of monetary and macroeconomic policy as much as banking policy and need to be considered in the light of the need to preserve an environment of macroeconomic stability into the future.

In contrast, the carving-out of an insolvent bank's bad loan portfolio, and its organizational restructuring under new management and ownership, represents the alternative pole, appropriate where large parts of the bank's information capital was dysfunctional. The bad loan portfolio may be sold back into the market, or disposed of by a government-owned asset management company. The effectiveness of government-run AMCs has been quite mixed: better where the assets to be disposed have been primarily real estate, less good where loans to large politically-connected firms dominated (Klingebiel, 2000).

Government itself often retains control and ownership of troubled banks for much of the duration of the resolution phase. Whether or not control of the bank passes into public hands, it should eventually emerge, and at this point it must be adequately capitalized. Depending on how earlier loss allocation decisions have been taken, the sums of money that are involved in the recapitalization of the bank so that it can safely be sold into private hands may be huge. Many governments have felt constrained by fiscal and monetary policy considerations from doing the financial restructuring properly. Putting the bank on a sound financial footing should be the priority. Without this, banks will be undercapitalized, whatever the accounts state, and will have an incentive to resume reckless behavior.

Countries typically apply a combination of resolution strategies, including both government-managed programs and market-based mechanisms (Calomiris, Klingebiel and Laeven, 2003). Both prove to depend for their success on efficient and effective legal, regulatory, supervisory, and political institutions. Further, a lack of attention to incentive problems when designing specific rules governing financial assistance can aggravate moral hazard problems, especially in environments where these institutions are weak, unnecessarily raising the costs of resolution. Policymakers in economies with weak institutions should, accordingly, not expect to achieve the same level of success in financial restructuring as in more developed countries, and they should design resolution mechanisms accordingly.

We collect information on the following crisis resolution policies.

- **FORBEARANCE** indicates whether or not there is regulatory forbearance during the years  $[t, t+3]$ , where  $t$  denotes the starting year of the crisis. This variable is based on a qualitative assessment of information contained in IMF Staff reports. As part of this assessment, we also collect information on whether or not banks were permitted to continue functioning despite being technically insolvent, and whether or not prudential regulations (such as for loan classification and loan loss provisioning) were suspended or not fully applied during the first three years of the crisis.

In terms of actual bank restructuring, we collect information on nationalizations, closures, mergers, sales, and recapitalizations.



- **LARGE-SCALE GOVERNMENT INTERVENTION** indicates whether or not there was large-scale government intervention in banks, such as nationalizations, closures, mergers, sales, and recapitalizations of large banks, during the years  $[t, t+3]$ , where  $t$  denotes the starting year of the crisis.
- **INSTITUTIONS CLOSED** indicates the share of bank assets (in percent) liquidated or closed during the years  $[t, t+3]$ , where  $t$  is starting year of crisis. We also collect information on the number of banks in year  $t$  and the number of banks in  $t+3$ , where  $t$  is the starting year of the crisis.
- **BANK CLOSURES** indicates whether or not banks were closed during the period  $t$  to  $t+3$ , where  $t$  is the starting year of the crisis. We also collect information on the number of banks closed or liquidated during the period  $t$  to  $t+3$ , where  $t$  is starting year of crisis.

We separately collect information on whether or not financial institutions other than banks were closed (**OTHER FI CLOSURES**), and on whether or not shareholders of closed institutions were made whole (**SHAREHOLDER PROTECTION**).

We also collect information on whether or not banks were nationalized (**NATIONALIZATIONS**), merged (**MERGERS**), or sold to foreigners (**SALES TO FOREIGNERS**) during the period  $t$  to  $t+5$ , where  $t$  is starting year of crisis. For mergers, we also collect information on whether or not private shareholders/owners of banks injected, and for sales to foreigners we collect information on the number of banks sold to foreigners during period  $t$  to  $t+5$ , where  $t$  is the starting year of crisis.

Next, we collect information on whether or not a bank restructuring agency (**BANK RESTRUCTURING AGENCY**) was set up to deal with bank restructuring, and whether or not an asset management company (**ASSET MANAGEMENT COMPANY**) was set up to take over and manage distressed assets. In case an asset management company was set up, we collect information on whether it was centralized or decentralized, the entity in charge, its funding, and the type of assets transferred.

As part of crisis resolution, systemically important (or government-owned) banks are often recapitalized by the government.

- **RECAPITALIZATION** denotes whether or not banks were recapitalized by the government during the period  $t$  to  $t+3$ , where  $t$  is the starting year of the crisis.

Banks can be recapitalized using a variety of measures. In terms of recapitalization methods, we collect information on whether or not recapitalization occurred in the form of (1) cash, (2) government bonds (3) subordinated debt (4) preferred shares (5) purchase of bad loans (6) credit lines (7) assumption of bank liabilities (8) ordinary shares or (9) other means.

We also collect information, when available, on the targeted recapitalization level of banks (expressed as a percentage of assets) and an estimate of the gross recapitalization cost (as a percent of GDP) to the government during the period  $t$  to  $t+5$ , where  $t$  is the starting year of the crisis. The latter variable is denoted as RECAP COST (GROSS).

Next, we collect information on the recovery of recapitalization costs.

- RECOVERY denotes whether or not the government was able to recover part of the recapitalization cost.
- RECOVERY PROCEEDS denotes the recovery proceeds (as percent of GDP) during the period  $t$  to  $t+5$ , where  $t$  is the starting year of the crisis.
- RECAP COST (NET) denotes the net recapitalization cost to the government, expressed as a percentage of GDP, computed as the difference between the gross recapitalization cost and recovery proceeds.

On deposit insurance and depositor compensation, we collect the following information from Demirguc-Kunt, Kane, and Laeven (2008) and IMF Staff reports.

- DEPOSIT INSURANCE indicates whether or not an explicit deposit insurance scheme is in place at the start of the banking crisis. Note that we ignore deposit insurance arrangements put in place after the first year of the crisis.
- FORMATION reports the year that the deposit insurance scheme was introduced.
- COVERAGE LIMIT denotes the coverage limit (in local currency) of insured deposits at the start of the banking crisis. This variable is set to zero if there is no explicit deposit insurance.
- COVERAGE RATIO is the ratio of the coverage limit to per capita GDP at the start of the banking crisis. This variable is set to zero if there is no explicit deposit insurance.
- WERE LOSSES IMPOSED ON DEPOSITORS? denotes whether or not losses were imposed on depositors of failed banks, and if so, we report whether these losses were severe (implying large discounts and a substantial number of people affected) or not.

#### **D. Macroeconomic Policies**

Governments also tend to change macroeconomic policy to manage banking crises and reduce its negative impact on the real sector. In addition to crisis containment and resolution policies, we therefore also collect information on monetary policy and fiscal stance during the first three years of the crisis. While these measures are somewhat crude, they serve the purpose of providing some sense about the policy stance.

- **MONETARY POLICY INDEX** is an index of monetary policy stance during the years  $[t, t+3]$ , where  $t$  denotes the starting year of the crisis. The index indicates whether monetary policy is (a) expansive (+1), if the average percentage change in reserve money during the years  $[t, t+3]$  is between 1 to 5 percent higher than during the years  $[t-4, t-1]$ ; (b) contractive (-1), if the average percentage change in reserve money during the years  $[t, t+3]$  is between 1 to 5 percent lower than during the years  $[t-4, t-1]$ ; or neither (0).

We also report the average change in reserve money (in percent) during the years  $[t, t+3]$ , here  $t$  denotes the starting year of the banking crisis.

- **FISCAL POLICY INDEX** is an index of fiscal policy stance during the years  $[t, t+3]$ , where  $t$  denotes the starting year of the crisis. The index indicates whether fiscal policy is (a) expansive (+1), if the average fiscal balance during the years  $[t, t+3]$  is less than -1.5 percent of GDP (b) contractive (-1), if the average fiscal balance during the years  $[t, t+3]$  is greater than 1.5 percent of GDP or neither (0).

We also report the average fiscal balance (in percent of GDP) during the years  $[t, t+3]$ , where  $t$  denotes the starting year of the banking crisis.

Finally, we report whether or not an IMF program was put in place around the time of the banking crisis (IMF PROGRAM), including the year the program was put in place.

### **E. Outcome Variables**

In terms of outcome variables, we collect information on fiscal costs and output losses.

- **FISCAL COST (NET)** denotes the net fiscal cost, expressed as a percentage of GDP, over the period  $[t, t+5]$ , where  $t$  denotes the starting year of the crisis. We also report the gross fiscal costs, and the recovery proceeds over the period  $[t, t+5]$ , which is the difference between the two. Fiscal cost estimates are from Hoelscher and Quintyn (2003), Honohan and Laeven (2003), IMF Staff reports, and publications from national authorities and institutions.
- **OUTPUT LOSS** is computed by extrapolating trend real GDP, based on the trend in real GDP growth up to the year preceding the crisis, and taking the sum of the differences between actual real GDP and trend real GDP expressed as a percentage of trend real GDP for the period  $[t, t+3]$ , where  $t$  is the starting year of the crisis. We require a minimum of three pre-crisis real GDP growth observations to compute the trend real GDP numbers.<sup>11</sup>

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<sup>11</sup> As a result, we do not have output loss estimates for many transition economies that experienced crises in the early 1990's.

#### IV. DESCRIPTIVE STATISTICS

Table 4 summarizes the data collected on crisis containment and resolution policies for a subset of 42 systemic banking crises. The list of crisis countries consists of: Argentina (four times), Bolivia, Brazil (two times), Bulgaria, Chile, Colombia (two times), Cote d'Ivoire, Croatia, Czech Republic, Dominican Republic, Ecuador, Estonia, Finland, Ghana, Indonesia, Jamaica, Japan, Korea, Latvia, Lithuania, Malaysia, Mexico, Nicaragua, Norway, Paraguay, Philippines, Russia, Sri Lanka, Sweden, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay, Venezuela, and Vietnam. Note that the financial crisis in the United Kingdom and United States is still ongoing at the time of writing of this paper, so the analysis of crisis containment and resolution policies for these two countries is preliminary and incomplete.

The selection of crisis episodes is determined by the availability of detailed information on such policies. We rely on a variety of sources, including IMF Staff reports and working papers, World Bank documents, and central bank and academic publications. We refer to the electronic version of the database for the exact sources of the data.<sup>12</sup> The electronic version of the database also contains a slightly larger set of variables than that reported here, including a brief description of each crisis, the name of the administering agency of the blanket guarantee (if introduced) and the coverage of the guarantee, and the name of the entity in charge of the asset management company (if set up), its funding, and the type of assets transferred to the asset management company.

##### A. Initial Conditions

Table 5 reports summary statistics for the initial conditions variables. We find that the banking crises selected tend to coincide with currency crisis, while they rarely coincide with sovereign debt crises. In 55 percent of cases, the banking crisis coincides with a currency crisis, but in only 7 percent of cases the banking crisis coincides with a debt crisis.

Macroeconomic conditions are often weak prior to a banking crisis. Fiscal balances tend to be negative (-2.1 percent on average), current accounts tend to be in deficit (-3.9 percent), and inflation often runs high (137 percent on average) at the onset of the crisis. However, the role of macroeconomic fundamentals has evolved across generations of crisis. While crises such as Russia in 1998, Argentina in 2001, and most crises of the 1980's were precipitated by large macroeconomic imbalances, and in particular unsustainable fiscal policies, the nature of the East Asian crises had more to do with the maturity composition of debt and foreign exchange risk exposures, rather than the level of public debt and fiscal deficit.

Nonperforming loans tend to be high during the onset of a banking crisis, running as high as 75 percent of total loans and averaging about 25 percent of loans. It is not always clear though to what extent the sharp rise of non-performing loans was caused by the crisis itself or whether it reflects the effects of tightening of prudential requirements during the aftermath of

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<sup>12</sup> The electronic version of the banking crisis database is available at <http://www.luclaeven.com/Data.htm>.

the crisis. In the case of Chile, for instance, non-performing loans peaked at 36 percent of total loans only in 1986, several years after the start of the crisis. However, part of the unsound banking practices that led to the Chilean banking crisis was the existence of substantial connected loans, which ranged across banks from 12 to 45 percent of the total loan portfolio (Sanhueza, 2001).

Government ownership of banks is common in crisis countries, with the government owning about 31 percent of banking assets on average. In many cases, government ownership may have become a vulnerability as problems at state-owned banks have been major contributors to the cost and unfolding of the crisis, with many exhibiting low asset quality prior to the onset of a crisis. In Uruguay, for instance, state-owned banks Republica and Hipotecario—accounting for 40 percent of the system's assets—exhibited non-performing loans of 39 percent of total loans as of 2001, compared to 5.6 percent at private banks (IMF, 2003). In Turkey, duty losses at state-owned banks were estimated at 12 percent of GNP as early as in 1999 (IMF, 2000), and state-owned bank Bapindo in Indonesia had experienced important losses as early as in 1994, three years prior to the onset of the crisis (Enoch et al., 2001).

Bank runs are a common feature of banking crises, with 62 percent of crises experiencing momentary sharp reductions in total deposits. The largest one-month drop in the ratio of deposits to GDP averages about 11.2 percent for countries experiencing bank runs, and is as high as 26.7 percent in one case. Severe runs are often system-wide, but it is also common to observe a flight to quality effect within the system from unsound banks to sound banks that implies no or moderate systemic outflows. During the Indonesian crisis in 1997, for instance, private national banks lost 35 trillion Rupiah in deposits between October and December 2007, while state-owned banks and foreign and joint-venture banks gained 12 and 2 trillion respectively (Batunanggar, 2002). A similar situation occurred in Paraguay following the intervention of the third and fourth largest banks and the uncovering of unrecorded deposits. Depositors migrated from these banks to those perceived as more solid.

Banking crises are also often preceded by credit booms, with pre-crisis rapid credit growth in about 30 percent of crises. Average annual growth in private credit to GDP prior to the crisis is about 8.3 percent across crisis countries, and is as high as 34.1 percent in the case of Chile. Credit booms have often been preceded by processes of financial liberalization, such as the one that led to the crisis in the Nordic countries in the 1990s (see Drees and Pazarbasioglu, 1998).

Crisis-affected countries often suffer from weak legal institutions, rendering a speedy resolution of distressed assets hard to accomplish. Creditor rights in the selected crisis countries averages about 1.8, ranging from a low of 0 to a high of 4 (the maximum possible score).

In summary, initial conditions are important because they may shape the market's and policymaker's response during the containment phase. If macroeconomic conditions are weak, then policymakers have limited buffers to cushion the impact of the crisis and the burden falls on the shoulders of containment and resolution policies. Moreover, sudden changes in market expectations may gather strength rapidly depending on how weak initial

conditions of the country are, in particular the macroeconomic setting, the institutional environment, and the banking sector. Take, for instance, the case of Turkey in 2000. The trigger of the crisis was the collapse of interbank loans from large banks to a few small banks on November 20<sup>th</sup>, in particular to DemirBank which depended greatly on overnight funding. Turkey was widely known to exhibit macroeconomic vulnerabilities, with inflation hovering around 80 percent per annum during the nineties, high fiscal deficits, large public debt, high current account deficits, and a weak financial system. Banks had high exposure to the government through large holdings of public securities, and sizeable maturities and exchange rate risk mismatches, making them highly vulnerable to market risk. When credit lines to DemirBank were cut, several small banks were forced to sell their government securities. This caused a sharp drop in the price of government securities and triggered panic among foreign investors, a reversal in capital flows, sharp increases in interest rates, and declines in the value of the Turkish lira. Within a few weeks of these developments, the Turkish Government announced a blanket guarantee. An opposite example is Argentina in 1995, where the contagion from the Tequila crisis was weathered successfully with a substantial consolidation of the banking sector and small fiscal costs, in large part due to the robust macroeconomic performance during the preceding years.

## **B. Crisis Containment**

Table 6 reports summary statistics for the crisis containment and resolution policies of the 42 selected banking crisis episodes.

The data show that emergency liquidity support and blanket guarantees are two commonly used containment measures. Extensive liquidity support is used in 71 percent of crises considered and blanket guarantees are used in 29 percent of crisis episodes. Deposit freezes and bank holidays to deal with bank runs are less frequently used. In our sample, only 5 cases (or 12 percent of episodes) used deposit freezes: Argentina in 1989 and 2001, Brazil in 1990, Ecuador in 1999, and Uruguay in 2002. In all but one case—Brazil 1990—the deposit freeze was preceded by a bank holiday. Bank holidays were used in only 10 percent of crises and only in the cases mentioned above. In all episodes where holidays and deposit freezes were used, bank runs occurred. Bank holidays typically do not last long, about 5 days on average. However, deposit freezes can be in existence for a much longer period, up to 10 years in one case, and about 41 months on average. The longest freeze recorded corresponded to the Bonex plan implemented in Argentina in 1989.<sup>13</sup> After the conversion, the bonds traded with a discount of almost two-thirds and recovered to about 50 percent within a few months. Similarly, in the case of Ecuador, depositors received certificates of reprogrammed deposits, which traded at significant discounts depending on the perceived solvency of the issuing bank. Moreover, bank runs resumed as soon as the unfreezing began (Jacome, 2004). It seems that at least in these cases, deposit freezes were highly disruptive, imposing severe

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<sup>13</sup> The freeze converted time deposits—except for the first US\$ 500 and especial accounts such as charitable foundations, and funds that could be proven were meant to be used in tax or salary payments—into dollar-denominated bonds at the exchange rate prevailing on December 28, 1989. The measure was announced on January 1, 1990, after the exchange rate dropped from 1,800 australs per dollar to over 3,000 between December 28 and 31, 1989.

losses to depositors, and therefore should be considered only in extreme circumstances. Bank holidays, on the other hand, may be used to buy time until a clear strategy is laid out; they were also used in the United States during the Great Depression in the 1930's.

Unlike the Bonex plan in Argentina in 1989, and the deposit freeze in Uruguay in 2002—which covered dollar-denominated time deposits at public banks—the other episodes in which this instrument was used, covered also deposits other than time deposits. The 2001 freeze in Argentina, for example, began with the Corralito, which limited withdrawals up to US\$250 a week, prohibited transfers abroad unless trade-related, introduced marginal reserve requirements, and limited transactions that could reduce deposits. However, soon after the Corralito, the Corralon was implemented which reprogrammed time deposits over a 5-year horizon. Similarly, in Brazil in 1990, the freeze included M2 plus federal securities in the hands of the public, except balances below NCZ\$50,000 for checking accounts and NCZ\$25000 for savings accounts or 20 percent of the balance (whichever larger) for deposits in the overnight domestic debt market, and 20 percent of the balance for mutual funds. The broadest freeze recorded in our sample was implemented by Ecuador, and included savings deposits up to US\$500, half of checking account balances, repurchase agreements, and all time deposits.

In the case of blanket guarantees, they tend to be in place for a long period as well, about 53 months on average. Blanket guarantee is another policy tool that—if successful—may buy some time for policymakers to implement a credible policy package. Using the dataset presented in this paper, Laeven and Valencia (2008) examine the effectiveness of blanket guarantees in restoring depositors confidence and find that they are often successful in the sense that they restore depositor confidence. However, they also find that outflows by foreign creditors are virtually unresponsive to the announcement of such guarantees, despite of being covered in most cases. Regarding the fiscal cost of using guarantees, they find that such guarantees tend to be costly, confirming earlier results by Honohan and Klingebiel (2003), but argue that this correlation is driven mainly by the fact that guarantees are usually adopted in conjunction with extensive liquidity support and when crisis are severe.

Peak liquidity support tends to be sizeable and averages about 28 percent of total deposits across the 42 crisis episodes considered. Liquidity support is clearly the most common first line of response in systemic crises episodes, even in the case of Argentina in 1995 when a currency board was in place. This was possible through an amendment of the charter of the Central Bank of Argentina in February 1995, allowing it to lengthen the maturities of its swap and rediscount facilities, with the possibility of monthly renewal, and in amounts exceeding the net worth of the borrowing bank.

In severe crises, there has been a positive correlation of about 30 percent between the provision of extensive liquidity support and the use of blanket guarantees. Blanket guarantees are often introduced to restore confidence even when previous explicit deposit insurance arrangements are already in place (this is the case in about 52 percent of crises where blanket guarantees are introduced). It is worth noting that in some cases, guarantees have been introduced to cover only a segment of the market, not all banks. Some examples of such partial guarantees are provided in Table 7.

### C. Crisis Resolution

Table 6 reports summary statistics for the crisis resolution policies of the 42 selected banking crisis episodes.

Regulatory forbearance is a common feature of crisis management. The policy objective aims at a gradual recovery of the banking system over time, or a gradual transitioning towards stricter prudential requirements. The latter is a common outcome whenever modifications to the regulatory framework are introduced. In Ecuador for instance, banks were given 2 years to fully comply with new loan classification rules, among other requirements. In the 2001 crisis episode in Argentina, the authorities granted regulatory forbearance which included a new valuation mechanism for government bonds and loans, allowing for a gradual convergence to market value. Banks were also allowed to temporarily decrease their capital charge on interest rate risk and losses stemming from court injunctions<sup>14</sup> could be booked as assets to be amortized over a period of 60 months. Prolonged forbearance occurs in about 67 percent of crisis episodes. In 35 percent of cases, forbearance takes the form of banks not being intervened despite being technically insolvent, and in 73 percent of cases prudential regulations are suspended or not fully applied.

Forbearance, however, does not really solve the problems and therefore a key component of almost every systemic banking crisis is a bank restructuring plan. In 86 percent of cases, large-scale government intervention in banks takes place in the form of bank closures, nationalizations, or assisted mergers. In only a handful of episodes the system survived a crisis without having at least significant bank closures. For instance, in the case of Latvia, banks holding 40 percent of assets were closed, but no further intervention of the government was implemented. In Argentina, in the 1995 episode, 15 institutions ran into problems: 5 of them were liquidated (with 0.6 percent of system's assets), 6 were resolved under a purchase and assumption scheme (with 1.9 percent of system's assets), and 4 were absorbed by healthier institutions. However, in addition to that, a significant consolidation process took place through 14 mergers, involving 47 financial institutions. Regarding the treatment of shareholders, they often lose money when banks are closed and are often forced to inject new capital in the banks they own.

Closures have not been limited to banks and have also included non-bank financial institutions. In Thailand, for instance, the problem started with liquidity problems at finance companies as early as March 1997, and 56 of them (accounting for 11 percent of the financial system's assets) were closed. In Jamaica, a large component of the financial problems was in the insurance sector, whose restructuring cost reached 11 percent of GDP.

Sales to foreigners are often seen as a last resort to bank restructuring, though it has become quite common in recent crises. On average, 51 percent of crisis episodes have experienced sales of banks to foreigners.

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<sup>14</sup> In 2002, the Argentinean government introduced an asymmetric pesification of assets and liabilities of banks. However, the exchange rate used for deposits—ARG\$ 1.4 per US\$ 1—was substantially below market rates. Depositors initiated legal processes and some obtained additional compensation through court injunctions.



Bank closures seem to be associated with larger fiscal costs, there is a positive correlation between those two variables of about 20 percent. However, it is negatively associated with the issuance of a blanket guarantee, with a correlation of about -20 percent. Since the guarantee entails a sizable fiscal contingency, once in place governments may try to avoid closing banks to not materialize the guarantee. Bank closures seem also positively associated with peak non-performing loans, with a correlation of about 25 percent. One potential contributing factor to this correlation is that once a bank is closed, its asset quality may deteriorates because in the process any value attached to bank relationships with customers may be destroyed. Borrowers may delay payments or the collection of loans becomes less effective than before, which may also contribute to higher fiscal costs.

Special bank restructuring agencies are often set up to restructure distressed banks (in 48 percent of crises) and asset management companies (AMC) have been set up in 60 percent of crises to manage distressed assets. Asset management companies tend to be centralized rather than decentralized. Examining the cases where AMCs were used, we find that the use of AMCs is positively correlated with peak non-performing loans and fiscal costs, with correlation coefficients of about 15 percent in both cases. These correlations may suggest some degree of ineffectiveness in AMC's, at least in those episodes where asset management companies were established. In line with these simple correlations we find Klingebiel (2000) who studies 7 crises where asset management companies were used and concludes that they were largely ineffective.

Another important policy used in the resolution phase of banking crises is recapitalization of banks. In 32 out of the 42 selected crisis episodes, banks were recapitalized by the government. Recapitalization costs constitute the largest fraction of fiscal costs of banking crises and takes many forms. In 12 crises, recapitalization took place in the form of cash; in 14 crises, in the form of government bonds; in 11 episodes subordinated debt was used; in 6 crises, preferred shares were used; in 7 crises, it took place through the purchase of bad loans; in 2 crises, a government credit line was extended to banks; in 3 crises, the government assumed bank liabilities; and in 4 crises, the government purchased ordinary shares of banks. In some cases, a combination of these methods was used. Recapitalization usually entails writing off losses against shareholders' equity and injecting either Tier 1 or Tier 2 capital or both. Recapitalization programs go usually accompanied with some conditionality. For instance, in the case of Chile, a nonperforming loans purchase program was implemented, and during this period banks could not distribute dividends and all profits and recoveries had to be used to repurchase the loans. In Mexico, PROCAPTE (a temporary recapitalization program) would have FOBAPROA (deposit insurance fund) purchase subordinated debt from qualifying banks, but the resources had to be deposited at the Central Bank, bearing the same interest rate than the subordinated bonds. Banks could redeem the bonds if their capital adequacy ratio went above 9 percent, but FOBAPROA had the option to convert the bonds into stocks after 5 years or if banks' Tier 1 capital ratio fell below 2 percent.

Similar conditionalities were applied to recapitalization programs in Turkey in 2000 and Thailand in 1997. In the former, SDIF (the Turkish deposit insurance fund) would match owners' contribution to bring banks' Tier 1 capital to 5 percent, but only for banks with a market share of at least 1 percent. SDIF could also contribute to Tier 2 capital through

subordinated debt, to all banks with Tier 1 capital greater or equal to 5 percent. Similar to the case of Mexico, if Tier 1 capital fell below 4 percent, the subordinated debt would convert into stocks. In the case of Thailand, the recapitalization plan involved Tier 1 capital injections, with the government matching private contributions and the requirement that the financial institution made full provisions upfront, in line with new regulations. Additionally, the government and the new investors had the right to change the board of directors and management of each participating financial institution. The government had also the right to appoint at least one Board member to each financial institution. The program also included Tier 2 capital injections equal to a minimum of (a) the total writedown exceeding previous provisioning or (b) 20 percent of the net increase in lending to the private sector, among other criteria.

On average, the net recapitalization cost to the government (after deducting recovery proceeds from the sale of assets) amounts to 6.0 percent of GDP across crisis countries in the sample, though in the case of Indonesia it reaches as high as 37.3 percent of GDP. Recapitalizations seem to be associated with lower output losses. The correlation between recapitalizations and output losses is about -15 percent. A rationale behind this correlation is presented in Valencia (2008), who shows—in a rational expectations bank model—how a persistent credit crunch can generate significant output losses, following a shock to bank capital. Therefore, by replenishing banks' capital, the supply of credit returns to normal sooner and the output losses become smaller. While intuitive, a challenging task is to determine the extent to which this measure is intertemporally efficient from a general equilibrium perspective.

Another interesting aspect that is worth mentioning is the fact that about half the countries experiencing a systemic banking crisis have an explicit deposit insurance scheme in place at the outbreak of the crisis (and several countries adopt deposit insurance throughout the crisis). Losses are imposed on depositors in a minority of cases. Table 8 shows a brief description of those circumstances in which depositors faced losses. Simple correlations show that episodes where losses were imposed to depositors faced higher output losses, with a correlation of about 25 percent.

Regarding monetary and fiscal policies, monetary policy tends to be fairly neutral during crisis episodes, while the fiscal stance tends to be expansive, arguably to support the financial and real sectors, and to accommodate bank restructuring and debt restructuring programs. On average, the fiscal balance is about -3.6 percent of GDP during the initial years of a banking crisis.

The IMF has participated through programs in about 52 percent of the episodes considered.

#### **D. Fiscal Costs and Real Effects of Banking Crises**

Fiscal costs, net of recoveries, associated with crisis management can be substantial, averaging about 13.3 percent of GDP on average, and can be as high as 55.1 percent of GDP. Recoveries of fiscal outlays vary widely as well, with the average recovery rate reaching 18 percent of gross fiscal costs. While countries that used asset management companies seem to achieve slightly higher recovery rates, the correlation is very small, at about 7 percent.

Finally, output losses (measured as deviations from trend GDP) of systemic banking crises can be large, averaging about 20 percent of GDP on average during the first four years of the crisis, and ranging from a low of 0 percent to a high of 98 percent of GDP. There appears to be a negative correlation between output losses and fiscal costs, suggesting that the cost of a crisis is paid either through fiscal costs or larger output losses. Furthermore, if this correlation is proven robust, it suggests that even in the absence of significant government intervention, fiscal losses may be large due to tax revenues forgone because of higher output losses.

## **V. GLOBAL LIQUIDITY CRISIS OF 2007-2008**

During the course of 2007, U.S. subprime mortgage markets melted down and global money markets were under pressure. The U.S. subprime mortgage crisis manifested itself first through liquidity issues in the banking system owing to a sharp decline in demand for asset-backed securities. Hard-to-value structured products and other instruments created during a boom of financial innovation had to be severely marked down due to the newly implemented fair value accounting and credit rating downgrades. Credit losses and asset writedowns got worse with declining housing prices and accelerating mortgage foreclosures which increased in late 2006 and worsened further in 2007 and 2008. Profits at U.S. banks declined from \$35.2 to \$5.8 billion (83.5 percent) during the fourth quarter of 2007 versus the prior year, due to provisions for loan losses. As of August 2008 subprime-related and other credit losses or writedowns by global financial institutions stood at about 500 billion dollars.

In this section, we briefly compare the ongoing global liquidity crisis and its policy responses to the other crises included in our database. Given that the global liquidity crisis is still very much unfolding at the time of this writing, this analysis is obviously preliminary and incomplete.

### **A. Initial Conditions**

At the time of writing of this paper, the underlying causes of the global 2007-2008 financial crisis are still being debated, and most likely can be attributed to a combination of factors. However, from the perspective of describing its initial conditions, it is useful to classify the underlying factors in two groups: macroeconomic and microeconomic factors.

The macroeconomic context is characterized by a prolonged period of excess global liquidity induced in part by relatively low interest rates set by the Federal Reserve Bank and other Central Banks following the 2001 recession in the United States. The excess liquidity fueled domestic demand and in particular residential investment, triggering a significant rise in housing prices which more than doubled in nominal terms between the year 2000 and mid-2006.<sup>15</sup> During this period, the economy faced high current account deficits, reaching 7 percent of GDP in the last quarter of 2005, induced primarily by household expenditure but also by sizable fiscal deficits. However, microeconomic factors related to financial regulation

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<sup>15</sup> Measured as the percent change in the Case-Shiller 20-city composite index between January 2000 and its peak on July 2006.

(and lack thereof) and industry practices by financial institutions also appear to have played a crucial role in the build up of the bubble. The “*originate-and-distribute*” lending model (see Bhatia 2007 for a description) adopted by many financial institutions during this period seems to have exacerbated the problem. Under this approach, banks made loans primarily to sell them on to other financial institutions who in turn would pool them to issue asset-backed securities. The underlying rationale for these loan sales was a transfer of risk to the ultimate buyer of the security, backed by the underlying mortgage loans. These securities could then be pooled again and new instruments would be created and so forth. A mispricing of risk of mortgage-backed securities linked to subprime loans led the market to believe that there was an arbitrage opportunity. Such market perception fueled demand for these instruments and contributed to a deterioration in underwriting standards by banks in an attempt to increase the supply of loans to meet the demand for securitized instruments. Regulatory oversight missed the build-up of vulnerabilities induced by this process on the account that risks were being transferred to the unregulated segment of the market. The premise was that heavily regulated banks would only be originators and the ultimate holders of securities were beyond the scope of regulation. In this process, however, spillover effects and systemic risks seem to have been neglected by regulators, and the regulated segment ended up being significantly affected. The crisis reached a global dimension as it became apparent that foreign banks, mainly European, had also played a significant role in the demand for mortgage-related (and in particular subprime mortgages-linked) securities. For U.K. banks, this shock coincided with a homegrown housing price bubble.

In addition to a move toward the “*originate-and-distribute*” lending model, many banks, particularly in the U.K., increasingly relied on wholesale funding. As the crisis unfolded, banks that relied heavily on wholesale markets for their funding, such as Northern Rock in the U.K., were hit particularly badly, causing stress in global money markets. Given ongoing concerns with counterparty risk, notably regarding adequacy of banks’ capital, money market strains have continued.

At first glance, the buildup of this crisis episode in the U.S. and U.K. does not seem to differ significantly from the traditional boom-bust cycles observed in the other crisis countries in our database. Many of these historical crisis episodes experienced buildups of asset price bubbles, and in particular of real estate bubbles, often originating from financial liberalization. In many cases, deregulation of financial systems led to rapid expansion of credit, but with deficiencies in risk management and pricing as the financial system was evolving and prone to abuse. In the case of the United States, it was not financial liberalization in the conventional sense, but financial innovation of financial instruments which the market and regulators did not fully understand. Supported by these new financial products and asset securitization, mortgage credit markets expanded rapidly to virtually collapse in some segments as the financial crisis unfolded. In 30 percent of the episodes included in our database, the crisis was preceded by a credit boom. In the cases of United States and United Kingdom, however, while credit rose rapidly—mortgage lending in particular—the pace of expansion did not satisfy our criteria to be labeled as a credit boom.

What is different from many previous financial crises, especially in developing countries, is that the U.S. and U.K. have thus far not suffered from a sudden stop of capital flows, which has caused major economic stress in other countries. The dollar did depreciate against the

Euro in the years preceding the 2007 turmoil, but demand for U.S. assets did not contract sharply, possibly because of the dollar's use as a reserve currency. Also, the speed and breath with which stress in U.S. mortgage markets have spread to other continents, financial institutions (notably securities firms), and financial markets (notably money markets) seems to have been fueled by uncertainty about the unfolding of the subprime crisis, as it became more clear that risk had been mispriced and exposures had not been transparent.

## **B. Containment**

Average house prices in the United States reached a peak around mid-2006 and began to decline after the initial signs that a financial crisis may be around the corner. Losses at financial institutions began to appear as early as February 2007 with HSBC Finance, the U.S. mortgage unit of HSCB, reporting over US\$10 billion in losses from its US mortgage lending business. Bad news continued in April 2007 with the bankruptcy filing of New Century Financial, one of the biggest subprime lenders in the U.S., followed by the rescue of two Bear Stern hedge funds in June 2007. Problems further intensified when on August 16, 2007, Countrywide Financial, the largest mortgage lender in the U.S., ran into liquidity problems because of the decline in value of securitized mortgage obligations, triggering a deposit run on the bank. The Federal Reserve Bank "intervened" by lowering the discount rate by 0.5 percent and by accepting \$17.2 billion in repurchase agreements for mortgage backed securities to aid in liquidity. On January 11, 2008, Bank of America bought Countrywide for US\$4 billion. Up to this point, containment policy in the U.S. was limited to alleviating liquidity pressures through the use of existing tools.

During this time the United Kingdom experienced its own banking sector problems, in light of tight conditions in money markets. On September 14, 2007, Northern Rock, a mid-sized U.K. mortgage lender, received a liquidity support facility from the Bank of England, following funding problems related to turmoil in the credit markets caused by the U.S. subprime mortgage financial crisis. Starting on September 14, 2007, Northern Rock experienced a bank run, until a government blanket guarantee—covering only Northern Rock—was issued on September 17, 2007. The run on Northern Rock highlighted weaknesses in the U.K. financial sector framework, including the maintenance of adequate capital by financial institutions, bank resolution procedures, and deposit insurance (IMF, 2008). Commercial banks in the U.S. did not seem to have experienced runs among retail customers, but as mentioned earlier, many institutions faced significant stress in wholesale markets. The blanket guarantee issued on Northern Rock was perhaps the first significant step away from the usual tools employed to resolve liquidity problems. However, unlike in other episodes where a blanket guarantee was used, this time it was introduced at an early stage. In our sample, 29 percent of episodes used a blanket guarantee. However, in the majority of them, they were put in place in the midst of a financial meltdown.<sup>16</sup> In the Asian countries for instance, blanket guarantees were announced when markets were under

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<sup>16</sup> Mexico is one example in which an implicit blanket guarantee was already in place before the crisis, namely since end-1993. However, the guarantee was reaffirmed in end-1994, during the burst of the Tequila crisis.

significant stress and the crisis was already of systemic proportions with widespread runs throughout the financial system.

The next significant policy measure adopted by authorities in both countries was an increase in the range of tools available to provide liquidity. The Federal Reserve introduced the Term Securities Lending facility in March 2008 by which it could lend up to \$200 billion of Treasury securities to primary dealers secured for a term of 28 days (rather than overnight, as in the program in place) by a pledge of other securities, including federal agency debt, federal agency residential-mortgage-backed securities (MBS), and non-agency AAA/Aaa-rated private-label residential MBS. Similarly, it increased its currency swap lines with other Central Banks as an attempt to reestablish calm in money markets. The Bank of England took similar steps on April 21, 2008, when it announced it would accept a broad range of mortgage backed securities under the new Special Liquidity Scheme and swap those for government paper for a period of 1 year to aid banks in liquidity problems. The new scheme enabled banks to temporarily swap high quality but illiquid mortgage-backed assets and other securities. These steps are common measures in other episodes documented. Central banks usually increase the tools to provide the system with additional liquidity at both longer and more flexible terms.

Following the Fed's announcement of the expansion of liquidity facilities, a major event took place: the collapse of Bear Sterns, the fifth largest investment bank at the time. Mounting losses due to its mortgage exposure triggered a run on the bank requiring an emergency financial assistance from the government to be purchased by JP Morgan Chase with federal guarantees on its liabilities in March 2008. It was a rather controversial measure since Bear Sterns was not subject to regulation by the Fed, yet the Fed's guarantee on its liabilities was crucial to avoid the bankruptcy of Bear Sterns. The case is to some extent similar to the failures of Sanyo Securities and Yamaichi Securities in the Japanese crises (see Nakaso 2001). Both did not fall under the scope of the deposit insurance system but were supervised by the Ministry of Finance. However, the collapse of Sanyo caused the first default ever in the Japanese interbank market, resulting in a sharp deterioration in market sentiment. Yamaichi, on the other hand, was unwound gradually. Because of large counterparty risk, it was believed that an intervention was justified in the case of Bear Sterns, perhaps to avoid a disruption similar to the one that followed the collapse of Sanyo. While there was no explicit blanket guarantee announced on Bear Sterns, there was a de facto protection of all its creditors. Shareholders of Bear Sterns, however, did suffer significant losses.

The containment measures employed thus far by U.S. and U.K. authorities to deal with the ongoing financial turmoil are not that different from those employed in previous crisis episodes. Almost all crises have used generous liquidity support to deal with illiquid banks. What is different in the current episode is that such liquidity support is extended not only to commercial banks but also to investment banks. Blanket guarantees are also not uncommon, though thus far have mainly been used in developing countries to deal with systemic financial crises where depositors have lost confidence in the ability of banks to repay depositors.

### C. Resolution

As of the time of this writing, it is too early to discuss how exactly the crisis will be resolved since it is still ongoing and its consequences have not fully materialized. However, some insights can be extracted from what events that took place so far.

During the first nine months of 2008, only 9 commercial bank failures have been observed in the U.S. and each of these bank failures has been handled through traditional purchase and assumption schemes with a de facto protection of all depositors. This of course is no different from what has been done in the case of bank failures in the past. A large fraction of failures included in our database was handled in such way, with only 31 percent of episodes imposing losses on depositors. However, the Federal Deposit Insurance Corporation (FDIC)'s watch list of troubled banks has grown to 117 banks by the end of August 2008, and is expected to increase further. The largest commercial bank failure thus far is that of IndiMac, a commercial bank with US\$19 billion in deposits and taken over by the FDIC in July 2008.

The most notable failures so far, however, have been those of three major U.S. investment banks: Bear Stearns, Lehman Brothers, and Merrill Lynch. Bear Stearns collapsed on March 16, 2007, after facing major liquidity problems, and was sold to JP Morgan after Federal Reserve Bank of New York agreed to take over Bear Stearns' US\$ 30 billion portfolio of mortgage-back securities. Lehman Brothers files for Chapter 11 bankruptcy protection on September 14<sup>th</sup>, 2008, after failed attempts to sell the bank to private parties. Merrill Lynch was acquired by Bank of America on September 15<sup>th</sup>, 2008.

Another significant event has been the placement under conservatorship of Fannie Mae and Freddie Mac, the two largest US housing government sponsored entities (GSEs). As part of the plan announced on September 7, 2008, the Federal Housing Finance Authority (FHFA) was granted direct oversight of the GSEs, the U.S. Treasury was given authority to inject capital into the GSEs in the form of senior preferred shares and warrants (while dividends on existing common and preferred stock have been suspended), and senior management and the boards of directors at both enterprises were dismissed. Effectively, this entails a nationalization of the two entities. The Treasury was also granted temporary authority to purchase agency-backed MBS, and a short-term credit facility was established for the housing GSEs. The rescue of Fannie and Freddie came shortly after legislation approved late July 2008 that gave the U.S. Treasury the power to use public funds to recapitalize them. The bill also contained a tax break of as much as \$7,500 for first-time homebuyers, created a new regulator to oversee Fannie Mae and Freddie Mac, and allowed the Federal government to insure up to \$300 billion in refinanced mortgages. These measures came after severe declines on stock prices of Fannie and Freddie following market perceptions of a significant capital shortfall.

Recapitalization measures have been widely used, with 76 percent of episodes covered implementing them, but in most cases such measures were implemented only after major insolvency problems at banks. It is too early to tell what will be the amount of US taxpayer money involved in the rescue of Fannie Mae and Freddie Mac. In the U.K., recapitalization costs of the mortgage lender Northern Rock absorbed by the government amount to 0.20 percent of GDP, as of the writing of this paper.

The crisis at Northern Rock, which was triggered by illiquidity, but where solvency concerns led to a loss of depositor confidence, was contained at first through a government guarantee on deposits but when a private sector solution on acceptable terms was not identified by the government, the bank was nationalized on February 22, 2008. Nationalizations are last resort measures commonly used in previous crises, with 57 percent of episodes in the sample using them. However, they have been more common in developing countries where it may be hard to find new owners for failed banks. In developed economies such as the U.K., where capital is abundant, nationalizations are rare and generally considered to be avoided. Other U.K. banks that have reported major losses have sought private sector solutions to restore bank capital, mostly by attracting new capital from existing shareholders through rights issues, but also through asset sales and a reduction in dividends. Another mortgage lender experiencing stress, Alliance & Leicester, was bought in July 2008 by Spanish bank Banco Santander.

A noteworthy difference with previous crisis episodes is the role that sovereign wealth funds have played in this crisis in terms of providing new capital to restore bank's capital positions to health. Globalization in conjunction with asset securitization has provided an international dimension to this crisis, by allowing many investors around the world to take a piece of the U.S. mortgage pie. Sovereign wealth funds have injected capital in major banks in both the U.S. and U.K. as part of their recapitalization efforts.

In summary, while failures of U.K. and U.S. financial institutions has not been widespread thus far, the approach taken to deal with those failures that have occurred does not differ substantially from the methods employed in the past, perhaps with the exception of the nationalization of Northern Rock. Similar to almost all previous crises, banking system health is being restored through a combination of bank recapitalizations, mergers and acquisitions, and asset sales.

## **VI. CONCLUDING REMARKS**

This paper presents a new database on the timing and resolution of banking crises. The data show that fiscal costs associated with banking crises can be substantial and that output losses are large. While countries have adopted a variety of crisis management strategies, we observe that emergency liquidity support and blanket guarantees have frequently been used to contain crises and restore confidence, though not always with success.

Policy responses to financial crises normally depend on the nature of the crises and some unsettled issues remain. First, fiscal tightening may be needed when unsustainable fiscal policies are the trigger of the crises, though crises are typically attacked with expansionary fiscal policies. Second, tight monetary policy could help contain financial market pressures. However, in crisis characterized by liquidity and solvency problems, the central bank should stand ready to provide liquidity support to illiquid banks. In the event of systemic bank runs, liquidity support may need to be complemented with depositor protection (including through a blanket government guarantee) to restore depositor confidence, although such accommodative policies tend to be very costly and need not necessarily speed up economic recovery. All too often, intervention is delayed because regulatory capital forbearance and liquidity support are used for too long to deal with insolvent financial institutions in the hope



that they will recover, ultimately increasing the stress on the financial system and the real economy.

Our preliminary analysis based on partial correlations indicates that some resolution measures are more effective than others in restoring the banking system to health and containing the fallout on the real economy. Above all, speed appears of the essence. As soon as a large part of the financial system is deemed insolvent and has reached systemic crisis proportions, bank losses should be recognized, the scale of the problem should be established, and steps should be taken to ensure that financial institutions are adequately capitalized. A successful bank recapitalization program tends to be selective in its financial assistance to banks, specifies clear quantifiable rules that limit access to preferred stock assistance, and enacts capital regulation that establishes meaningful standards for risk-based capital. Government-owned asset management companies appear largely ineffective in resolving distressed assets, largely due to political and legal constraints. Next, the adverse impact of the stress on the real economy need to be contained. To relief indebted corporates and households from financial stress and restore their balance sheets to health, intervention in the form of targeted debt relief programs to distressed borrowers and corporate restructuring programs appear most successful. Such programs will typically require public funds, and tend to be most successful when they are well-targeted with adequate safeguards attached.

Future research based on this dataset needs to discuss in more detail how policy makers should respond to financial system stress in a way that ensures that the financial system is restored to health while containing the fallout on the economy. Such research should establish to what extent fiscal costs incurred by accommodative policy measures (such as substantial liquidity support, explicit government guarantees, and forbearance from prudential regulations) help to reduce output losses and to accelerate the speed of economic recovery, and identify crisis resolution policies that mitigate moral hazard problems going forward.

Future research should also review and draw lessons going forward from policy responses to the current financial turmoil in the U.S. and U.K. Our preliminary assessment is that these policy responses have much in common which those employed in previous crisis episodes, though it is too early to draw any conclusions on the effectiveness of these responses given that the crisis is still ongoing.

Table 1. Timing of Systemic Banking Crises

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Albania	1994	26.8			-7.2	Rapid growth in nonperforming loans, reaching 26.8% of total loans in 1994, following the creation of a two-tier commercial banking system in 1992.
Algeria	1990	30		6.7	-2.1	In 1989, five government-owned banks were granted managerial and financial autonomy from the central government. In the transition to a market economy, nonperforming loans (about 30% of total loans) created problems for some banks in 1990, and the Central bank had to provide discount financing to these banks.
Argentina	1980	9	55.1	10.8	-5.7	In March 1980 a number of financial institutions were forced to rely heavily on Central Bank financial assistance when faced with deposit withdrawals. Failed institutions included the largest investment bank and the second largest private commercial bank. More than 70 institutions (accounting for 16% of commercial bank assets and 35% of finance company assets) were liquidated or subjected to intervention between 1980 and 1982.
Argentina	1989	27	6	10.7	-7.0	During the 1980s, a decline in the availability of external resources led to an increased recourse to domestic financing. To fund its credit operations the Central Bank imposed reserve and investment requirements on deposits. They were replaced by frozen deposits at the Central Bank in August 1988. Central bank debt grew through the issuance of short-term paper (CEDEPS) to financial entities for purposes of monetary control. The Central Bank accelerated its placement of CEDEPS which by midyear were being issued to finance interest payments on the Central Bank's own debt. By mid-1989 the quasi-fiscal deficit of the Central Bank reached almost 30% of GDP, although most of it was reversed by end-year. On January 1, 1990, the Government announced the bond conversion of time deposits and public sector debt coming due in 1990 (BONEX 89). The Central Bank kept liquidity tight and by end-February interest rates reached over 1000% a month for 7-day term deposits.
Argentina	1995	17	2	7.1	-2.8	After the Mexican devaluation, a small bond trader experienced a liquidity squeeze pushing it to closure by mid-January 1995. This development persuaded most banks to cut credit to bond traders, which in turn affected banks with large bond and open trading positions. Furthermore, provincial banks were having difficulties in raising funds and people started moving funds towards larger banks, in particularly foreign, perceived as more solvent, and by March 1995 capital flights intensified. Several measures were implemented at alleviating liquidity pressures. Eight banks were suspended and three banks collapsed. Out of the 205 banks in existence as of end of 1994, 63 exited the market through mergers, absorptions, or liquidation by end 1997.

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Argentina	2001	20.1	9.6	42.7	-10.9	In March 2001, a bank run started due to increasing doubts about the sustainability of the currency board, strong opposition from the public to the new fiscal austerity package sent to the Congress, the resignation of president of the Central Bank, and the amendment to the convertibility law (change in parity from being pegged to the dollar, to being pegged to a basket composed of the US dollar and Euro). During the second half of 2001, bank runs intensified. On December 3, 2001, as several banks were at the verge of collapsing, partial withdrawal restrictions (corralito) were imposed to transactional accounts while fixed-term deposits (CDs) were reprogrammed (corralon) in order to stop outflows from banks. On February 4, 2002, bank assets were asymmetrically pesified adversely affecting the solvency of the banking system. In 2002, two voluntary swaps of deposits for government bonds were offered but received little interest by the public. In December 2002, the corralito was lifted. By August 2003, one bank has been closed, three banks nationalized, and many other have reduced their staff and branches.
Armenia	1994				3.3	Starting in August 1994, the Central Bank closed half of active banks. Large banks continued to suffer from high nonperforming loans. The savings bank was financially weak.
Azerbaijan	1995				-13.0	Twelve private banks closed; three large state-owned banks deemed insolvent; one large state-owned bank faced serious liquidity problems.
Bangladesh	1987	20		34.7	2.4	In 1987 four banks accounting for 70% of credit had nonperforming loans of 20%. From the late 1980s the entire private and public banking system was technically insolvent.
Belarus	1995				-11.3	Many banks undercapitalized; forced mergers burdened some banks with poor loan portfolios.
Benin	1988	80	17	1.9	-2.8	All three commercial banks collapsed.
Bolivia	1986	30		0.0	-2.6	Five banks were liquidated. Banking system nonperforming loans reached 30% in 1987; in mid-1988 reported arrears stood at 92% of commercial banks' net worth.
Bolivia	1994	6.2	6	0.0	4.4	Two banks with 11% of banking system assets were closed in 1994. In 1995, 4 of 15 domestic banks, accounting for 30% of banking system assets, experienced liquidity problems and suffered high nonperforming loans.
Bosnia and Herzegovina	1992				-6.4	Banking system suffers from high nonperforming loans due to the breakup of the former Yugoslavia and the civil war.
Brazil	1990		0	12.2	-4.2	Deposits were converted to bonds. Liquidity assistance to public financial institutions.
Brazil	1994	16	13.2	0.0	2.1	The Brazilian economy entered a new phase with the implementation of the "Plan Real" in July 1994. The plan triggered a major process of structural changes, which

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
						aimed primarily at lowering inflation. With this process, a remonetization of the economy took place and with it, liabilities and assets of banks expanded rapidly—loans to private sector grew by 60% during the first year of the plan--despite higher reserve requirements. At the same time a sharp deterioration in the trade account took place, to which the central bank responded by raising interest rates and imposed credit restrictions. The financial situation of banks weakened as bad loans increased noticeably and also because they lost their inflation revenues. The problems were particularly more acute at public banks. For federal banks, the ratio of loans in arrears and in liquidation to total loans increased from 15.4 percent in June 1994 to 22.4 percent at end-1995, and to slightly more than 30 percent in October 1996. For state-owned banks the ratio increased from 8 percent to almost 12 percent and more than 14 percent for the same dates. For private banks, the ratio increased from 5 percent in June 1994 to 9 percent in December 1995. The problems in the banking sector triggered a restructuring of public banks and the resolution of private institutions. Most of the closures were medium to small-sized banks, while large banks were resolved under a “good bank/bad bank” approach.
Bulgaria	1996	75	14	1.3	-8.0	The 1996 banking crisis had its roots in bad loans made during 1991-1995, but the deepening insolvency of the system was not reflected in sustained liquidity problems until the second half of 1994. Two ailing state banks required ongoing refinancing from the Bulgarian National Bank (BNB) and the State Savings Bank (SSB) until they were bailed out in mid-1995. The public began to lose confidence in banks after the collapse of pyramid schemes in some cities, and in response to reports on the ill health of other banks. In late 1995 withdrawals of deposits, especially from First Private Bank (the largest private bank), were reflected in substantial BNB refinancing and falling foreign reserves. By early 1996 the sector had a negative net worth equal to 13% of GDP. The banking system experienced a run in early 1996. The government then stopped providing bailouts, prompting the closure of 19 banks accounting for one-third of sector assets. Surviving banks were recapitalized by 1997. In 1989, the system of sectoral credit ratios was abolished, and deposit and lending rates were partially liberalized. During 1990, the financial condition of the banking sector deteriorated sharply. Nonperforming loans increased to 23 percent of total credit, and commercial banks' deposits in the money market declined sharply. Three major commercial banks urgently needed restructuring, while two other large banks continued to experience liquidity problems. In 1991, the government merged these three major commercial banks into one bank with minority government participation and rehabilitated the two other banks, while assuming nonperforming assets.
Burkina Faso	1990	16		45.2	-0.6	

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Burundi	1994	25		66.3	-8.0	In 1995 one bank was liquidated.
Cameroon	1987	65		118.1	-7.9	Five commercial banks were closed and three banks were restructured.
Cameroon	1995	30		0.0	3.3	Three banks were restructured and two were closed.
Cape Verde	1993	30		0.0	6.7	In 1993, the former monobank was split into a Central Bank and a commercial bank, with 90 percent of banking system deposits. The commercial bank had accumulated a large fraction of nonperforming assets and was recapitalized by the government in 1994 by converting its portfolio of nonperforming loans into interest-bearing notes to the equivalent of 17.5 percent of GDP. All commercial banking interest rates were liberalized in 1994, with the exception of one benchmark interest rate on time deposits.
Central African Rep.	1976			0.0	2.5	Four banks were liquidated.
Central African Rep.	1995	40		1.1	-8.1	The two largest banks, accounting for 90% of assets, were restructured.
Chad	1983			0.0	5.3	All banking offices closed in 1979 and 1980 when N'Djamena was the scene of heavy fighting. Banking sector experienced solvency problems. With the collapse of world cotton prices in 1985, Cotontchad's revenues dropped, and foreign exchange flowing into Chad declined. As a result, the BEAC's exchange reserves dropped precipitously in 1986. Operations in the banking sector ground to a halt as Cotontchad fell into arrears on repayments of its shortterm debt. In late 1986, the BEAC negotiated a rescheduling of some three-fourths of the short-term debt, allowing a ten-year maturity, including a five-year grace period with an interest rate of 6%. In 1983 the government imposed a five-year moratorium that froze all deposits and outstanding credits before 1980. The moratorium's purpose was to prevent a run on banks and to staunch capital flight when banks restored operations in early 1983 under the new government.
Chad	1992	35		37.2	-2.1	The Chadian banking system came close to collapse in 1992, owing mainly to the vulnerable state of the economy and an expansionary credit policy. To avoid a major financial crisis, the monetary authorities embarked on a comprehensive rehabilitation program of the banking system, involving enhancement of central bank supervision through the COBAC, and the liberalization of banking activity. In addition, they eased the liquidity crisis of the commercial banks in 1993 by consolidating into a long-term loan to the Government the rediscounted commercial bank loans that had been extended mainly to public enterprises. Credit policy was tightened; the amount of direct advances to the Treasury by the Central Bank was stabilized; and the Banque Internationale pour le Commerce et l'Industrie du Tchad was liquidated. As a result, the net foreign assets position of the banking system was strengthened and the

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Chile	1976			0.0	3.5	liquidity position of the banks was gradually restored.
Chile	1981	35.6	42.9	92.4	-13.6	Entire mortgage system insolvent. By the end of 1981, a 6-year expansionary period ended abruptly. High international interest rates, a world recession, lower copper prices, and an abrupt cut of voluntary foreign credit to Latin America pushed Chile into a costly economic crisis. The problems were aggravated by unsound financial practices among banks, which included substantial connected lending ranging from 12 to 45% of the total loans portfolio. The financial system was affected in two waves. The first one in 1981-82 including 11 liquidations (banks and finance companies), where all depositors were protected. The second one in 1983, involved liquidations and rehabilitations and in the liquidation cases, domestic depositors were compensated only partially. While foreign creditors were offered the same compensation, they threatened by cutting trade credit lines and were ultimately restructured under the external debt restructuring plan.
China, P.R.	1998	20	18	36.8	7.6	At the end of 1998 China's four large state-owned commercial banks, accounting for 68% of banking system assets, were deemed insolvent. Banking system NPL's in 2002 and 2003 were 20 % and 15% respectively of total loans. The restructuring cost to date is around RMB1.8 trillion based on estimates of capital injections and loans to AMCs to purchase assets, or 18% of 2002 GDP.
Colombia	1982	4.1	5	15.1	0.9	During the early 1980s, an economic downturn affected the profitability of the banks. They came under pressure as the 1981 recession intensified. This, in turn, caused a sharp deterioration in asset quality through an increase in defaults. Colombia began experiencing capital outflows. Subsequent bank failures and nationalizations generated widespread decline in public confidence which led to a massive government intervention. The Central Bank intervened in six banks accounting for 25% of banking system assets, and in 8 finance companies.
Colombia	1998	14	6.3	33.5	-4.2	Capital account reversal during the first half of 1998 triggered by pressures in emerging markets led to a response from the Central Bank oriented towards defending the currency. As a result, interest rates increased in real terms, harming the quality of banks' loan portfolios and putting a downward pressure on asset prices and hence on the value of collateral, especially real estate. The already weak large public banks faced a severe asset quality deterioration which spread to private banks and other financial entities.
Congo, Dem. Rep. of	1983			0.0	0.5	Banking sector experienced solvency problems.
Congo, Dem. Rep. of	1991			81.0	-13.5	Four state-owned banks were insolvent; a fifth bank was to be recapitalized with

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Congo, Dem. Rep. of	1994	75		0.0	-5.4	private participation. Two state-owned banks have been liquidated and two other state banks privatized. In 1997, 12 banks were having serious financial difficulties.
Congo, Rep. of	1992			63.2	-5.5	Between 2001 and 2002, two large banks were restructured and privatized. The remaining insolvent bank is in the process of being liquidated. Situation aggravated by the civil war.
Costa Rica	1987			0.0	3.4	In 1987, public banks accounting for 90% of total banking system loans in financial distress as 32% of their loans considered uncollectible. Implied losses of at least twice the capital plus reserves. Pressure on banks to negotiate a "Brady" settlement of foreign debt; settlement reached 11/89 at 16 cents/dollar. Budgetary relief to government enables restructuring of state bank debts.
Costa Rica	1994	32		1.6	0.9	One large state-owned commercial bank with 17% of deposits was closed in December 1994. The ratio of overdue loans (net of provisions) to net worth in state commercial banks exceeded 100% in June 1995. Implied losses of at least twice the capital plus reserves.
Côte d'Ivoire	1988	50	25	0.0	-1.1	The recession of 1987 and problems with the cocoa and coffee markets (main exports) substantially increased private sector's non-performing loans. These problems were aggravated by a large amount of nonperforming loans in the public enterprise sectors, the large accumulation of government payment arrears, the substantial decline in public and private deposits in the banking system, reduction in credit lines from abroad, and poor management in some banks. Four large banks affected, accounting for 90% of banking system loans; three definitely and one possibly insolvent. Six government banks closed.
Croatia	1998	10.5	6.9	0.0	-0.9	The introduction of a market-oriented legal framework in the early 1990s, led to significant progress in establishing a modern banking system. The banking sector expanded vigorously until end-1997. Meanwhile, the incentives for sound bank behavior had not yet been fully established, coupled with bad debt problems inherited from the old regime. These weaknesses were in part addressed with the Bank rehabilitation plan (Law of 1994) implemented in 1996-1997. Four state-owned banks, accounting for 46 percent of total bank assets (as of 1995) entered rehabilitation, with an overall cost of 6.1% of GDP. However, a new wave of problems began in March 1998 with the failure of the 5th largest bank, Dubrovacka (5% of total assets). Problems at this bank triggered political turmoil, which in turn induced runs at other banks, perceived indirectly related to Dubrovacka. In July 1998, the sixth largest bank ran into problems and several medium- and small-sized institutions experienced liquidity difficulties in the fall of 1998 and early 1999 as

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Czech Republic	1996	18	6.8		-0.8	well. In 1994, a small bank failed (Banka Bohemia), due to fraud. While all depositors were covered, a partial deposit insurance coverage was introduced shortly after this first failure. The likelihood of facing material losses triggered runs at other small banks, until by the end of 1995, 2 small banks failed (Ceska and AB Banka), which triggered a second phase of bank restructuring starting in 1996, aimed at 18 small banks (9% of industry's assets). Two of six commercial banks ceased operations in 1991–92; other banks experienced difficulties.
Djibouti	1991			22.6	-6.7	
Dominican Republic	2003	9	22	15.5	-1.9	In April 2003 Central bank took over Baninter (Banco Intercontinental) which declared bankruptcy in May and dissolved in July. Baninter's liabilities exceeded its assets by 55 billion pesos (\$2.2 billion) and 15% of GDP. The central bank had been providing liquidity support to Baninter since September 2002. Two other banks Bancredito and Banco Mercantil were also given liquidity support from the Central Bank to deal with deposit withdrawals. Program exchanging domestic for foreign debt implemented to bail out banking system.
Ecuador	1982			13.6	-2.8	
Ecuador	1998	40	21.7	6.5	-6.3	Seven financial institutions, accounting for 25–30% of commercial banking assets, were closed in 1998–99. In March 1999 bank deposits were frozen for 6 months. By January 2000, 16 financial institutions accounting for 65% of the assets had either been closed (12) or taken over (4) by the government. All deposits were unfrozen by March 2000. In 2002 the blanket guarantee was lifted. The government closed several large investment companies.
Egypt	1980			38.1	2.2	
El Salvador	1989	37		0.0	1.0	
Equatorial Guinea	1983			0.0	-2.3	
Eritrea	1993				2.3	
Estonia	1992	7	1.9		-21.6	Most of the banking system was insolvent. Banking problems surfaced in November 1992 when the state-owned North Estonian Bank (NEB), the Union Baltic Bank (UBB), and the Tartu Commercial Bank (TCB) exhibited serious liquidity problems and delayed payments by three weeks. A second episode of stress took place in early 1994, when the government reduced the level of its deposits from the Social Bank. The Social Bank, which controlled 10% of financial system assets, failed. Five banks' licenses were revoked, and two major banks were merged and nationalized. Two other large banks were merged and converted to a loan recovery agency.



Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Finland	1991	13	12.8	59.1	-6.2	The three Nordic countries went through a financial liberalization process that led to a lending boom. However, they also suffered the adverse consequences of higher German interest rates. In the case of Finland, the problems were exacerbated by the collapse of exports to the Soviet Union. The first bank in trouble was Skopbank, which was taken over by the Central Bank in September 1991. Savings banks badly affected; government took control of three banks that together accounted for 31% of system deposits.
Georgia	1991	33			-44.9	Largest banks virtually insolvent.
Ghana	1982	35	6	15.8	-6.9	During most of the 80's Ghana suffered severe structural imbalances related to the cumulative impact of large budgetary deficits, rapid increase in domestic bank credit, a fixed exchange rate, high inflation, which authorities aimed controlling through price controls. These policies were exacerbated by a deterioration of capital equipment and inadequate prices incentives in agricultural and export sectors. As a result, real output in 1981 was 15 percent lower than its 1974 level. The situation deteriorated further towards the second half of the 1980's due to high fiscal deficits, financed primarily through domestic credit, directed credit policies (since 1981 banks were obliged to lend at least 20% of their portfolio to the agricultural sector), a deterioration in cocoa exports, and a large depreciation of the currency (a 1173% depreciation took place in 1983). Banks experienced liquidity pressures, but in addition to that, there were deficiencies in banking supervision and regulation. As a result, 7 out of the 11 banks were insolvent and the problems were addressed by capitalization and purchase of NPL's.
Guinea	1985		3	0.0	3.1	Six banks—accounting for 99% of system deposits—deemed insolvent. Repayment of deposits amounted to 3% of 1986 GDP.
Guinea	1993	45		0.0	4.0	Two banks deemed insolvent; one other bank had serious financial difficulties.
Guinea-Bissau	1995	45		22.8	-27.2	At end-1996, the Central Bank's had a negative capital position and Guinea-Bissau's two commercial banks had substantial nonperforming loans. In March-April 1997, the treasury recapitalized the Central Bank.
Guyana	1993			0.0	5.1	Prior to financial reforms starting in 1989, directed credit programs had resulted in investments with low rates of return and large nonperforming loans for the banks. State-owned banks were merged in May 1995 and a state-owned loan-recovery institution was subsequently established to recover the nonperforming loans of the merged bank.
Haiti	1994			9.3	-11.6	The Central Bank registered considerable losses as the majority of its assets, represented by credit to the government, were nonperforming.

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Hungary	1991	23	10		-11.9	In the second half of 1993, 8 banks (25% of financial system assets) deemed insolvent.
India	1993	20		3.1	4.9	Nonperforming assets reached 11% in 1993-94. Nonperforming assets of the 27 public banks estimated at 20% in 1995. At the end of 1998 nonperforming loans estimated at 16% and at the end of 2001 they decreased to 12.4%.
Indonesia	1997	32.5	56.8	67.9	-13.1	Through May 2002, Bank Indonesia had closed 70 banks and nationalized 13, of a total of 237. Official nonperforming loans for the banking system were estimated at 32.5% of total loans at the peak of crisis.
Israel	1977		30	0.0	1.0	Almost the entire banking sector was affected, representing 60% of stock market capitalization. The stock exchange closed for 18 days, and bank share prices fell more than 40%.
Jamaica	1996	28.9	43.9	30.1	-1.2	In 1994 a merchant banking group (Blaise Group) was closed. In 1996, FINSAC, a government resolution agency, provided assistance to 5 banks, 5 life insurance companies, 2 building societies, and 9 merchant banks. Government recapitalized 21 troubled institutions via non-tradable government guaranteed bonds. By June 30, 2000 outstanding recap bonds estimated to account for 44% of GDP.
Japan	1997	35	24	17.6	-2.0	Banks suffered from sharp decline in stock market and real estate prices. In 1995 the official estimate of nonperforming loans was 40 trillion yen (\$469 billion, or 10% of GDP). An unofficial estimate put nonperforming loans at \$1 trillion, equivalent to 25% of GDP. Banks made provisions for some bad loans. At the end of 1998 banking system nonperforming loans were estimated at 88 trillion yen (\$725 billion, or 18% of GDP). In 1999 Hokkaido Takushoku bank was closed, the Long Term Credit Bank was nationalized, Yatsuda Trust was merged with Fuji Bank, and Mitsui Trust was merged with Chuo Trust. In 2002 nonperforming loans were 35% of total loans; with a total of 7 banks nationalized, 61 financial institutions closed and 28 institutions merged. In 1996 rescue costs were estimated at more than \$100 billion. In 1998 the government announced the Obuchi Plan, which provided 60 trillion yen (\$500 billion, or 12% of GDP) in public funds for loan losses, bank recapitalizations, and depositor protection. By 2002 fiscal cost estimates rose to 24% of GDP.
Jordan	1989		10	66.6	-10.7	The third largest bank failed in August 1989. The central bank provided overdrafts equivalent to 10% of GDP to meet a run on deposits and allowed banks to settle foreign obligations.
Kenya	1985			0.0	4.1	Four banks and twenty-four nonbank financial institutions—accounting for 15% of financial system liabilities—faced liquidity and solvency problems.
Kenya	1992			23.0	-1.1	Intervention in two local banks.

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Korea	1997	35	31.2	50.1	-6.9	The devaluation of the Thai baht in July 1997, the subsequent regional contagion, and the crash of the Hong Kong stock market sent shock waves to the Korean financial system. Korea's exchange rate remained broadly stable through October 1997. However, the high level of short-term debt and the low level of usable international reserves made the economy increasingly vulnerable to shifts in market sentiment. While macroeconomic fundamentals continued to be favorable, the growing awareness of problems in the financial sector and in industrial groups (chaebols) increasingly led to the difficulties for the banks in rolling over their short-term borrowing. Through May 2002, 5 banks were forced to exit the market through "purchase and assumption" and 303 financial institutions shutdown (215 were credit unions); another 4 banks were nationalized.
Kuwait	1982	40		0.0	-9.5	Share dealings using postdated checks created a huge unregulated expansion of credit. The crash of the unofficial stock market finally came in 1982, when a dealer presented a postdated check for payment and it bounced. A house of cards collapsed. Official investigation revealed that total outstanding checks amounted to the equivalent of US\$94 billion from about 6,000 investors. Kuwait's financial sector was badly shaken by the crash, as was the entire economy. The crash prompted a recession that rippled through society as individual families were disrupted by the investment risks of particular members made on family credit. The debts from the crash left all but one bank in Kuwait technically insolvent, held up only by support from the Central Bank. Only the National Bank of Kuwait, the largest commercial bank, survived the crisis intact. In the end, the government stepped in, devising a complicated set of policies, embodied in the Difficult Credit Facilities Resettlement Program. The implementation of the program was still incomplete in 1990 when the Iraqi invasion changed the entire financial picture.
Kyrgyz Republic	1995	85			-5.8	In 1995, over half of the commercial banks had a negative net worth. The public lost confidence in the banking system, and many people withdrew their funds, leading many of the banks to go out of business. License of five small banks were withdrawn in 1994-95. 2 banks were closed in 1999, following the Russian crisis.
Latvia	1995	20	3		-2.1	Between 1994 and 1999, 35 banks saw their license revoked, were closed, or ceased operations. In 1995 the negative net worth of the banking system was estimated at \$320 million, or 7% of 1995 GDP. Aggregate banking system losses in 1998 estimated at 100 million lats (\$172 million), about 3% of GDP.
Lebanon	1990			4.2	-13.4	Four small and medium-size banks became insolvent. Eleven had to resort to significant Central Bank lending. Bank of Lebanon claims on commercial banks reached LL 145 billion in September 1990 (equivalent to 31% of reserve money).

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Liberia	1991				0.0	Seven of eleven banks not operational; in mid-1995 their assets accounted for 64% of bank assets.
Lithuania	1995	32.2	3.1		1.2	In 1995, of 25 banks, 12 small banks were liquidated, 3 private banks (accounting for 29% of banking system deposits) failed, and 3 state-owned banks were deemed insolvent.
Macedonia	1993	70	32		-7.5	The government took over banks' foreign debt and closed the second largest bank. Costs of banking system rehabilitation, obligations from assumption of external debt, liabilities regarding frozen foreign exchange, and contingent liabilities in banks together estimated at 32% of GDP.
Madagascar	1988	25		0.0	-6.3	After the formal abandonment in 1985 of the previous policy of bank specialization and the appointment in 1986 of separate boards of directors to replace the single board that was share by all commercial banks, the rehabilitation of the banking system gained speed with the enactment in 1988 of a new banking law, which opened the system to private capital, and the decision in 1989 to write off most of the nonperforming loans of the existing banks.
Malaysia	1997	30	16.4	50.0	-7.4	The persistent pace of credit expansion at an annual rate of nearly 30 percent to the private sector, in particular to the property sector and for the purchase of stocks and shares, exposed the financial system to potential risks from price declines in property and other assets that occurred in 1997. In the wake of market turbulence and contagion effects in the second half of 1997, concerns among market participants about the true condition and resilience of the financial system increasingly became a central issue, highlighted by the known fragilities among finance companies. Finance company sector was restructured, and number of finance was reduced from 39 to 10 through mergers. Two finance companies were taken over by the Central Bank, including the largest independent finance company. Two banks deemed insolvent—accounting for 14% of financial system assets—will be merged with other banks. Nonperforming loans peaked between 25–35% of banking system assets and fell to 10.8% by March 2002.
Mali	1987	75		5.7	-0.3	Mali's economic and financial prospects for 1986 and the medium term changed significantly due to the collapse in late 1985 of the world market price of cotton, Mali's major export commodity. In 1987, although the Government undertook some corrective measures, the economic and financial situation deteriorated rapidly. The expansion of credit was significantly higher than programmed, and as a result, nonperforming loans at banks increased rapidly. Owing primarily to the overexposure of the largest commercial bank in terms of its loans and guaranteed letters of credit, a liquidity crunch emerged in the banking system. The financial situation of the largest

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Mauritania	1984	70	15	0.0	2.0	commercial bank deteriorated further in 1987, reflecting the heavy losses of the public enterprise sector that it had financed over the years, defaults by the private sector on unsecured loans, and inappropriate management. By mid-November 1997, the bank had become virtually illiquid and ceased functioning normally. Its nonperforming loans amounted to some 70 percent of its outstanding credit. In 1984 five major banks had nonperforming assets ranging from 45–70% of their portfolios.
Mexico	1981			51.3	-3.5	Government took over troubled banking system.
Mexico	1994	18.9	19.3	4.2	-6.2	Of 34 commercial banks in 1994, 9 were intervened and 11 participated in the loan/purchase recapitalization program. The 9 intervened banks accounted for 19% of financial system assets and were deemed insolvent. By 2000, 50% of bank assets were held by foreign banks.
Morocco	1980			29.8	-2.8	Banking sector experienced solvency problems. Debt crisis 1980-83
Mozambique	1987			0.0	1.0	Main commercial bank experienced solvency problems that became apparent after 1992.
Nepal	1988	29		0.0	4.3	Nonperforming loans increased sharply during 1988-89 at the two largest commercial banks. Both banks are majority government-owned and together account for more than 90 percent of bank assets and deposits. In 1989, loan recovery programs were put in place for these two commercial banks.
Nicaragua	1990	50		0.0	-0.4	During the 1980's, lending rates were subsidized and often set below deposit rates. Deposit rates were for the most part negative in real terms and contributed to a severe contraction of the banks' deposit base. The Central Bank provided much of the funding for commercial banks, mainly by intermediating foreign loans and donations. Lack of bank supervision and prudential controls resulted in risky lending and contributed to the large percentage of nonperforming loans in banks' portfolios. In 1990, financial sector problems were acknowledged by a new government. In 1992, a financial reform package was announced to confront these problems. The state banking system was recapitalized and reorganized starting in 1992.
Nicaragua	2000	12.7	13.6	0.0	0.8	The largest bank in Nicaragua, Interbank, was found to have committed fraud and therefore was intervened in August 2000. Following the intervention, full protection for its depositors was announced. However, withdrawals continued until the bank was finally resolved in Oct. 2000 through a P&A. Another institution ran into problems soon after the resolution of Interbank. Runs against other banks occurred in part because the authorities announced limited coverage of its depositors. However, in its resolution a few days later, all depositors were protected. Two institutions more were

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Niger	1983	50		122.7	-16.8	resolved a few months later. All banks were resolved under P&A's and a blanket guarantee was passed by law after the first two failures. In the mid-1980s banking system nonperforming loans reached 50%. Four banks were liquidated and three restructured in the late 1980s. In 2002, a new round of bank restructuring was launched. Four banks were experiencing serious difficulties. Two of them were to be restructured and the other two might be liquidated. In 1993 insolvent banks accounted for 20% of banking system assets and 22% of deposits. In 1995 almost half the banks reported being in financial distress.
Nigeria	1991	77		0.4	-0.6	Financial deregulation undertaken during 1984-1987 led to a credit boom (with real rates of credit growth of 20% y-y), accompanied by a boom in both residential and non-residential real estate. In 1985 oil prices fell sharply, turning a 4.8 percent surplus in the current account into a 6.2% deficit in 1986 with ensuing pressures on the exchange rate. Meanwhile, rate increases by the Bundesbank following the reunification of Germany, forced Norway to keep interest rates high throughout the economic recession, which started in 1988. Problems at small banks that began in 1988 were addressed via mergers and assistance from the guarantee fund, funded by banks. However, by 1990 the fund had been depleted and the financial condition at large banks began to deteriorate. The turmoil reached systemic proportions by October 1991, when the second and fourth largest banks had lost a considerable amount of equity.
Norway	1991	16.4	2.7	0.0	2.8	As a result of severe US-led economic sanctions, including the freezing of Panamanian assets in U.S. banks, a nine-week banking holiday was declared beginning in March 1988. As a result of these developments, the financial position of most state-owned and private commercial banks was substantially weakened and 15 banks ceased operations. During the early nineties, the banking system remained undercapitalized and non-performing loans rose sharply, coupled together with insider lending practices. Already in 1989, an assessment by the superintendency revealed that about one third of the banking system was insolvent. The crisis began in May 1995 when the third and fourth largest banks could not meet clearing obligations and were intervened. The first line of response was liquidity support. However, as the crisis unfolded, an important amount of unrecorded deposits were discovered. A blanket guarantee covering intervened banks was announced, but pressures remained because at first, the guarantee covered only legitimate deposits, although later, all deposits were protected. Through a series of interventions, closures and substantial liquidity support, the distress period lasted until 1999. In the end, between 1995-1999, 15 out
Panama	1988			37.8	-13.4	
Paraguay	1995	8.1	12.9	0.0	0.4	

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Peru	1983			25.5	-9.3	of the 19 locally-owned banks were either closed or absorbed by stronger institutions. By 1999 banks were predominantly foreign owned. Two large banks failed. The rest of the system suffered from high nonperforming loans and financial disintermediation following the nationalization of the banking system in 1987.
Philippines	1983	19	3	60.1	-7.3	Problems in two public banks accounting for 50% of banking system assets, six private banks accounting for 12% of banking system assets, 32 thrifts accounting for 53% of thrift banking assets, and 128 rural banks.
Philippines	1997	20	13.2	0.0	-0.6	Since January 1998 one commercial bank, 7 of 88 thrifts, and 40 of 750 rural banks have been placed under receivership. Banking system nonperforming loans reached 12% by November 1998, and were expected to reach 20% in 1999.
Poland	1992	24	3.5		2.0	In 1991 seven of nine treasury-owned commercial banks—accounting for 90% of credit—the Bank for Food Economy, and the cooperative banking sector experienced solvency problems.
Romania	1990	30	0.6		-12.9	In 1998 nonperforming loans reached 25–30% in the six main state-owned banks. The Agricultural Bank was recapitalized on a flow basis. In 1998 the Central Bank injected \$210 million in Bancorex (0.6% of GDP), the largest state bank, and in 1999 another \$60 million.
Russia	1998	40	6	0.0	-5.3	From mid-1997 to April 1998, the Central Bank of Russia (CBR) was relatively successful in defending the fixed exchange rate policy through a significant tightening of credit. However, the situation became increasingly untenable when significant political turmoil in Russia-starting with the President's dismissal of the government of Prime Minister Chernomyrdin and prolonged by a stalemate over the formation of a new cabinet-cast increasing doubt on the political resolve to come to grips with Russia's fiscal problems. From mid-July, when the Duma refused to pass key fiscal measures, the situation deteriorated rapidly, leading to a unilateral restructuring of ruble-denominated treasury bills and bonds on August 17, 1998. The ruble was allowed to float three days later despite previous announcements that it wouldn't be devalued. A large devaluation in real effective terms (over 300% in nominal terms), loss of access to international capital markets, and massive losses to the banking system ensued. However, well before the crisis, there was widespread recognition that the banking system had a series of weaknesses. In particular, bank reporting and bank supervision were weak, there was an excessive exposure to foreign exchange rate risk, connected lending, and poor management. Two key measures implemented were a 90-day moratorium on foreign liabilities of banks and the transfer of a large fraction of deposits from insolvent banks to Sberbank. Nearly

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São Tomé and Príncipe	1992	90		25.4	-0.7	720 banks, or half of those now operating, were deemed insolvent. These banks accounted for 4% of sector assets and 32% of retail deposits. At the end of 1992, 90% of the monobank's loans were nonperforming. In 1993 the commercial and development departments of the former monobank were liquidated, as was the only financial institution. At the same time, two new banks were licensed that took over many of the assets of their predecessors. The credit operations of one new bank have been suspended since late 1994.
Senegal	1988	50	17	32.6	-9.6	In 1988, 50% of banking system loans were nonperforming. Six commercial banks and one development bank closed, accounting for 20–30% of financial system assets.
Sierra Leone	1990	45		0.0	0.0	One bank's license was suspended in 1994. Bank recapitalization and restructuring are ongoing.
Slovak Republic	1998	35		1.0	-5.5	In 1998, nonperforming loans reached 35% of total loans and a bank restructuring program was put in place involving the major state-owned banks.
Slovenia	1992		14.6		0.2	Three banks—accounting for two-thirds of banking system assets—were restructured.
Spain	1977		5.6	2.2	2.3	In 1978–83, 24 institutions were rescued, 4 were liquidated, 4 were merged, and 20 small and medium-size banks were nationalized. These 52 banks (of 110), representing 20% of banking system deposits, were experiencing solvency problems.
Sri Lanka	1989	35	5	21.6	2.7	State-owned banks comprising 70% of banking system estimated to have nonperforming loans of about 35%. The government recapitalized two large state owned banks, Bank of Ceylon and the People's Bank in 1993 (representing two-thirds of banking system assets) to solve their solvency problem due to high nonperforming assets.
Swaziland	1995			30.6	-1.2	Meridien BIAO Swaziland was taken over by the Central Bank. The Central Bank also took over the Swaziland Development and Savings Bank, which faced severe portfolio problems.
Sweden	1991	13	3.6	0.0	0.7	Nordbanken and Gota Bank, accounting for 22% of banking system assets, were insolvent. Sparbanken Foresta, accounting for 24% of banking system assets, intervened. Overall, 5 of the 6 largest banks, with more than 70% of banking system assets, experienced difficulties.
Tanzania	1987	70	10	0.0	3.8	In 1987 the main financial institutions had arrears amounting to half their portfolios. In 1995 it was determined that the National Bank of Commerce, which accounted for 95% of banking system assets, has been insolvent since at least 1990.
Thailand	1983		0.7	9.4	4.6	Authorities intervened in 50 finance and security firms and 5 commercial banks (25% of financial system assets); 3 commercial banks deemed insolvent (accounting for 14% of commercial bank assets). Fiscal cost for 50 finance companies estimated at



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Thailand	1997	33	43.8	97.7	-10.5	0.5% of GDP; fiscal cost for subsidized loans amounted to about 0.2% of GDP a year. Under the framework of a pegged exchange rate regime, Thailand had enjoyed a decade of robust growth performance, but by late 1996 pressures on the baht emerged. Pressure increased through the first half of 1997 amidst an unsustainable current account deficit, a significant appreciation of the real effective exchange rate, rising short-term foreign debt, a deteriorating fiscal balance, and increasingly visible financial sector weaknesses, including large exposure to the real estate sector, exchange rate risk and liquidity risk. Finance companies had disproportionately the largest exposure to the property sector and were the first institutions affected by the economic downturn. Following mounting exchange rate pressures and ineffective interventions to alleviate these pressures, the baht was floated on July 2, 1997. In light of weak supportive policies, the baht depreciated by 20 percent against the U.S. dollar in July. By May 2002, the Bank of Thailand had closed 59 (of 91) financial companies that in total accounted for 13% of financial system assets and 72% of finance company assets. It closed 1 (out of 15) domestic bank and nationalized 4 banks. A publicly owned asset management company held 29.7% of financial system assets as of March 2002. Nonperforming loans peaked at 33% of total loans and were reduced to 10.3% of total loans in February 2002. Banking sector experienced solvency problems.
Togo	1993			27.7	-16.3	
Tunisia	1991		3	0.0	2.2	In 1991 most commercial banks were undercapitalized. During 1991-94, the banking system raised equity equivalent to 1.5% of GDP and made provisions equivalent to another 1.5%.
Turkey	1982		2.5	0.0	3.4	Three banks were merged with the state-owned Agriculture Bank and then liquidated; two large banks were restructured.
Turkey	2000	27.6	32	5.4	-5.7	Banks had a high exposure to the government through large holdings of public securities, sizeable maturities and exchange rate risk mismatches, making them highly vulnerable to market risk. In Nov 2000, interbank credits to some banks holding long term government paper were cut, forcing them to liquidate the paper, which caused a sharp drop in the price of such securities, triggering a reversal in capital flows, a sharp increases in interest rates, and decline in the value of the currency. Two banks closed and 19 banks have been taken over by the Savings Deposit Insurance Fund.
Uganda	1994			0.0	5.5	Between 1994 and 1998, half of the banking system faced solvency problems. In 1998, two banks were closed and one recapitalized and privatized. In 1999, two banks were closed. In 2002, one small bank was intervened and two other banks

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Ukraine	1998	62.4	0	0.0	-1.9	were experiencing difficulties. Between 1995 and 1997, 32 of 195 banks were liquidated, while 25 others were undergoing financial rehabilitation. Bad loans accounted for 50–65% of assets even in some leading banks. In 1998 banks were further hit by the government's decision to restructure government debt following the Russian debt crisis.
United Kingdom	2007					On September 14, 2007, Northern Rock, a mid-sized UK mortgage lender, received a liquidity support facility from the Bank of England, following funding problems related to global turmoil in credit markets caused by the US subprime mortgage financial crisis. Starting on September 14, 2007, Northern Rock experienced a bank run, until a government blanket guarantee—covering only Northern Rock—was issued on September 17, 2007. On February 22, 2008, the bank was nationalized, following two unsuccessful bids to take it over. On April 21, 2008, the Bank of England announced it would accept a broad range of mortgage backed securities and swap those for government paper for a period of 1 year to aid banks in liquidity problems. The scheme enabled banks to temporarily swap high quality but illiquid mortgage backed assets and other securities with Treasury bills for a period of one year.
United States	1988	4.1	3.7	4.1	-0.2	More than 1,400 savings and loan institutions and 1,300 banks failed. Cleaning up savings and loan institutions cost \$180 billion, or 3% of GDP.
United States	2007					During the course of 2007, US subprime mortgage markets melted down and global money markets were under pressure. The US subprime mortgage crisis manifested itself first through liquidity issues in the banking system owing to a sharp decline in demand for asset-backed securities. Hard-to-value structured products and other instruments created during a boom of financial innovation had to be severely marked down due to the newly implemented fair value accounting. Credit losses and asset writedowns got worse with accelerating mortgage foreclosures which increased in late 2006 and worsened further in 2007 and 2008. On August 16, 2007, Countrywide Financial ran into liquidity problems because of the decline in value of securitized mortgage obligations, triggering a deposit run on the bank. The Federal Reserve Bank "intervened" by lowering the discount rate by 0.5% and by accepting \$17.2 billion in repurchase agreements for mortgage backed securities to aid in liquidity. On January 11, 2008, Bank of America bought Countrywide for US\$4 billion. Bear Stearns, the fifth largest investment bank at the time, required an emergency government bailout and was purchased by JP Morgan Chase with federal guarantees on its liabilities in March 2008. Profits at U.S. banks declined from \$35.2 to \$5.8 billion (83.5%) during the fourth quarter of 2007 versus the prior year, due to provisions for loan losses. By

Country	Systemic banking crisis (starting date)	Share of NPLs at peak (%)	Gross fiscal cost (% of GDP)	Output loss (% of GDP)	Minimum real GDP growth rate (%)	Comments
Uruguay	1981		31.2	87.5	-9.3	June 2008, subprime-related and other credit losses or writedowns by global financial institutions hovered around \$400 billion. The Fed introduced the Term Securities Lending facility to swap a broad range of mortgage backed securities for Treasury notes for a period of 1 month. On September 7, 2008, mortgage giants Fannie Mae and Freddie Mac were placed under conservatorship.
Uruguay	2002	36.3	20	28.8	-11.0	Affected institutions accounted for 30% of financial system assets; insolvent banks accounted for 20% of financial system deposits. Introduction of capital controls and deposit freezes in Argentina in Dec. 2001 triggered liquidity problems at the two largest private banks Banco Galicia Uruguay (BGU) and Banco Comercial (BC) (with combined assets of 20% of the total) as a result of their high level of exposure to Argentina. In January 2002 alone, BGU lost 15% of deposits. BGU was intervened in February and later suspended. A second wave of deposit withdrawals ensued in April 2002, following Uruguay's downgrade from investment grade status. By May, the runs expanded to the public banks (Republica and Hipotecario), accounting for 40% of the system's assets, which were in a weak condition with NPL's of 39% as of 2001 (compared to 6% at private banks).
Venezuela	1994	24	15	9.6	-2.3	Insolvent banks accounted for 35% of financial system deposits. In 1994 the authorities intervened in 17 of 47 banks that held 50% of deposits and nationalized 9 banks and closed 7 others. The government intervened in another 5 banks in 1995.
Vietnam	1997	35	10	19.7	4.8	Two of four large state-owned commercial banks—accounting for 51% of banking system loans—deemed insolvent; the other two experience significant solvency problems. Several joint stocks banks are in severe financial distress. Banking system nonperforming loans reached 18% in late 1998.
Yemen	1996			2.4	3.8	Banks suffered from extensive nonperforming loans and heavy foreign currency exposure, leaving many banks technically insolvent. The 1994 civil war drained Yemen's economy leading up to financial crisis in 1996.
Zambia	1995		1.4	0.5	-2.8	Meridian Bank, accounting for 13% of commercial bank assets, became insolvent.
Zimbabwe	1995			2.4	0.1	Two of five commercial banks have high nonperforming loans.

Table 2. Timing of Financial Crises

Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Albania	1994	1997	1990	1992
Algeria	1990	1988, 1994		
Angola		1991, 1996	1988	1992
Argentina	1980, 1989, 1995, 2001	1975, 1981, 1987, 2002	1982, 2001	1993, 2005
Armenia	1994	1994		
Australia				
Austria				
Azerbaijan	1995	1994		
Bangladesh	1987	1976		
Barbados				
Belarus	1995	1994, 1999		
Belgium				
Belize				
Benin	1988	1994		
Bhutan				
Bolivia	1986, 1994	1973, 1981	1980	1992
Bosnia and Herzegovina	1992			
Botswana		1984		
Brazil	1990, 1994	1976, 1982, 1987, 1992, 1999	1983	1994
Brunei				
Bulgaria	1996	1996	1990	1994
Burkina Faso	1990	1994		
Burundi	1994			
Cambodia		1971, 1992		
Cameroon	1987, 1995	1994	1989	1992
Canada				
Cape Verde	1993			

Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Central African Rep.	1976, 1995	1994		
Chad	1983, 1992	1994		
Chile	1976, 1981	1972, 1982	1983	1990
China, P.R.	1998			
Colombia	1982, 1998	1985		
Comoros		1994		
Congo, Dem. Rep. of	1983, 1991, 1994	1976, 1983, 1989, 1994, 1999	1976	1989
Congo, Rep. of	1992	1994	1986	1992
Costa Rica	1987, 1994	1981, 1991	1981	1990
Côte d'Ivoire	1988	1994	1984, 2001	1997, n.a.
Croatia	1998			
Czech Republic	1996			
Denmark				
Djibouti	1991			
Dominica			2002	n.a.
Dominican Republic	2003	1985, 1990, 2003	1982, 2003	1994, 2005
Ecuador	1982, 1998	1982, 1999	1982, 1999	1995, 2000
Egypt	1980	1979, 1990	1984	1992
El Salvador	1989	1986		
Equatorial Guinea	1983	1980, 1994		
Eritrea	1993			
Estonia	1992	1992		
Ethiopia		1993		
Fiji		1998		
Finland		1993		
France	1991			
Gabon		1994	1986, 2002	1994
Gambia, The		1985, 2003	1986	1988
Georgia	1991	1992, 1999		

Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Germany				
Ghana	1982	1978, 1983, 1993, 2000		
Greece		1983		
Grenada			2004	2005
Guatemala		1986		
Guinea	1985, 1993	1982, 2005	1985	1992
Guinea-Bissau	1995	1980, 1994		
Guyana	1993	1987	1982	1992
Haiti	1994	1992, 2003		
Honduras		1990	1981	1992
China, P.R.: Hong Kong				
Hungary	1991			
Iceland		1975, 1981, 1989		
India	1993			
Indonesia	1997	1979, 1998	1999	2002
Iran, I.R. of		1985, 1993, 2000	1992	1994
Ireland				
Israel	1977	1975, 1980, 1985		
Italy		1981		
Jamaica	1996	1978, 1983, 1991	1978	1990
Japan	1997			
Jordan	1989	1989	1989	1993
Kazakhstan		1999		
Kenya	1985, 1992	1993		
Korea	1997	1998		
Kuwait	1982			
Kyrgyz Republic	1995	1997		
Lao People's Dem. Rep.		1972, 1978, 1986, 1997		
Latvia	1995	1992		

Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Lebanon	1990	1984, 1990		
Lesotho		1985		
Liberia	1991		1980	n.a.
Libya		2002		
Lithuania	1995	1992		
Luxembourg				
Macedonia	1993			
Madagascar	1988	1984, 1994, 2004	1981	1992
Malawi		1994	1982	1988
Malaysia	1997	1998		
Maldives		1975		
Mali	1987	1994		
Mauritania	1984	1993		
Mauritius				
Mexico	1981, 1994	1977, 1982, 1995	1982	1990
Moldova		1999	2002	2002
Mongolia		1990, 1997		
Morocco	1980	1981	1983	1990
Mozambique	1987	1987	1984	1991
Myanmar		1975, 1990, 1996, 2001, 2007		
Namibia		1984		
Nepal	1988	1984, 1992		
Netherlands				
New Caledonia		1981		
New Zealand		1975, 1984		
Nicaragua	1990, 2000	1979, 1985, 1990	1980	1995
Niger	1983	1994	1983	1991
Nigeria	1991	1983, 1989, 1997	1983	1992
Norway	1991			

Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Pakistan		1972		
Panama	1988		1983	1996
Papua New Guinea		1995		
Paraguay	1995	1984, 1989, 2002	1982	1992
Peru	1983	1976, 1981, 1988	1978	1996
Philippines	1983, 1997	1983, 1998	1983	1992
Poland	1992		1981	1994
Portugal		1983		
Romania	1990	1996	1982	1987
Russia	1998	1998	1998	2000
Rwanda		1991		
São Tomé and Príncipe	1992	1987, 1992, 1997		
Senegal	1988	1994	1981	1996
Serbia, Republic of		2000		
Sierra Leone	1990	1983, 1989, 1998	1977	1995
Singapore				
Slovak Republic	1998			
Slovenia	1992			
South Africa		1984	1985	1993
Spain	1977	1983		
Sri Lanka	1989	1978		
Sudan		1981, 1988, 1994	1979	1985
Suriname		1990, 1995, 2001		
Swaziland	1995	1985		
Sweden	1991	1993		
Syrian Arab Republic		1988		
Switzerland				
Tajikistan		1999		
Tanzania	1987	1985, 1990	1984	1992



Country	Systemic Banking Crisis (starting date)	Currency Crisis (year)	Debt Crisis (default date)	Debt Restructuring (year)
Thailand	1983, 1997	1998		
Togo	1993	1994	1979	1997
Trinidad and Tobago		1986	1989	1989
Tunisia	1991			
Turkey	1982, 2000	1978, 1984, 1991, 1996, 2001	1978	1982
Turkmenistan		1993		
Uganda	1994	1980, 1988	1981	1993
Ukraine	1998	1998	1998	1999
United Kingdom	2007			
United States	1988, 2007			
Uruguay	1981, 2002	1972, 1983, 1990, 2002	1983, 2002	1991, 2003
Uzbekistan		1994, 2000		
Venezuela	1994	1984, 1989, 1994, 2002	1982	1990
Vietnam	1997	1972, 1981, 1987	1985	1997
Yemen	1996	1985, 1995		
Yugoslavia, SFR			1983	1988
Zambia	1995	1983, 1989, 1996	1983	1994
Zimbabwe	1995	1983, 1991, 1998, 2003		

**Table 3. Frequency of Financial Crises 1/**

Year	Banking crisis (number)	Currency crisis (number)	Sovereign debt crisis (number)	Twin crisis (number)	Triple crisis (number)
1970			3		
1971			4		
1972			6		
1973			1		
1974			3		
1975		12			
1976	2	6	1		
1977	2	3	1		
1978		7	3		
1979		6	2		
1980	3	2	3	3	
1981	3	45	6	2	1
1982	5	11	9	2	1
1983	7	14	10	2	1
1984	1	9	4		
1985	2	9	3		
1986	1	8	3		
1987	6	13		1	
1988	7	8	1		
1989	4	8	3	1	1
1990	7	10	2	3	
1991	10	14		1	
1992	8	15	1	3	
1993	7	3		1	
1994	11	23		4	
1995	13	8		5	
1996	4	15		2	
1997	7	15		5	
1998	7	6	2	3	3
1999		11	2		
2000	2	7		1	
2001	1	5	2	1	1
2002	1	7	4	1	1
2003	1	3	1	1	1
2004		2	1		
2005		2			
2006		1			
2007	2	1			
Total	124	208	63	42	10

1/ Twin crisis indicates banking crisis in year t and currency crisis during [t-1, t+1]. Triple crisis indicates banking crisis in year t and currency crisis during [t-1, t+1] and debt crisis during [t-1, t+1]).

**Table 4. Crisis Containment and Resolution Policies for Selected Banking Crises**

Country name	Argentina	Argentina	Argentina	Argentina	Bolivia	Brazil	Brazil	Bulgaria
<b>Crisis date (year and month)</b>	Mar-80	Dec-89	Jan-95	Dec-01	Nov-94	Feb-90	Dec-94	Jan-96
<b>Currency crisis (Y/N) (t-1, t+1)</b>	Y	Y	N	Y	N	Y	Y	Y
Year of currency crisis	1981	1988		2002		1989	1993	1996
<b>Sovereign debt crisis (Y/N) (t-1, t+1)</b>	N	N	N	Y	N	N	N	N
Year of sovereign debt crisis				2001				
<b>Initial conditions</b>								
Fiscal balance/GDP at t-1	-2.65%	-4.42%	0.03%	-3.61%	-3.00%	0.00%	0.27%	-5.63%
Public sector Debt/GDP at t-1	10.20%	89.80%	33.70%	50.80%	76.00%	22.20%	23.00%	106.40%
Inflation at t-1	139.74%	387.81%	3.85%	-0.73%	8.52%	1972.91%	2477.15%	32.66%
Net Foreign Assets/M2 at t-1	34.21%	-16.99%	25.90%	24.16%	7.89%	0.01%	22.69%	9.66%
Deposits/GDP at t-1	22.24%	21.25%	14.96%	28.22%	34.87%	133.25%	101.43%	59.81%
GDP growth at t-1	7.10%	-1.96%	6.25%	-0.79%	4.67%	3.20%	4.93%	-1.60%
Current Account/GDP at t-1	0.55%	-1.23%	-2.83%	-3.15%	-3.99%	0.21%	-0.12%	-0.20%
Peak NPLs (as % of total loans)	9.00%	27.00%	17.00%	20.10%	6.20%		16.00%	75.00%
Government-owned bank (% of assets) at t-1	71.94%	60.50%	41.00%	30.00%	0.00%	31.70%	31.70%	85.68%
Significant bank runs (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y
Largest one-month % drop in deposits (>5%), [t, t+1]	13.76%	26.65%	8.36%	6.84%	7.01%	14.63%	9.25%	9.44%
Credit boom (Y/N)	Y	N	Y	N	Y		N	
Annual growth in private credit to GDP (t-4, t-1) (in %)	23.62%	-1.70%	18.90%	6.10%	22.50%		5.80%	
Creditor rights in year t	1	1	1	1	2	1	1	1
<b>Containment phase</b>								
<b>Deposit freeze (Y/N)</b>	N	Y	N	Y	N	Y	N	N
Introduction of deposit freeze		1989		2001		1990		
Duration of deposit freeze (in months)		120		12		29		
Coverage of deposit freeze (time deposits only ? Y/N)		Y		N		N		
<b>Bank holiday (Y/N)</b>	N	Y	N	Y	N	N	N	N
Introduction of bank holiday		1990		2001				
Duration of bank holiday (in days)		4		5				
<b>Blanket guarantee (Y/N)</b>	N	N	N	N	N	N	N	N
Date of introduction								

Date of removal
Duration of guarantee (in months)
Previous explicit deposit insurance arrangement (Y/N)
Timing of first bank intervention
Timing of first liquidity assistance
Liquidity support/emergency lending (Y/N)
Support different across banks? (Y/N)
Collateral required
Remunerated (Y/N)
If remunerated, interest at market rates (Y/N)
Peak support (in % of deposits)
Lowering of reserve requirements (Y/N)
Resolution phase
Forbearance(Y/N)
Banks not intervened despite being technically insolvent
Prudential regulations suspended or not fully applied
Large-scale government intervention (Y/N)
Institutions closed (% of banks assets)
Number of banks in t
Number of banks in t+3
Bank closures (Y/N)
Number of bank closures during the period t to t+3
Other FI closures (Y/N)
Shareholder protection (shareholders made whole? Y/N)
Nationalizations (Y/N)
Mergers (Y/N)
Did bank shareholders inject new capital? (Y/N)
Sales to foreigners (Y/N)
Number of banks sold to foreigners during t to t+5
Bank restructuring agency(Y/N)
Asset management company(Y/N)
Centralized (Y) / Decentralized (N)
Recapitalization (Y/N)

Recap measures									
Cash								Y	
Government bonds									
Subordinated debt			Y						Y
Preferred shares									
Purchase of bad loans								Y	
Credit line									
Assumption of bank liabilities									
Ordinary shares									
Recap level (%)									4.00%
Recap cost (gross) (as % of GDP)									2.31%
Recovery (Y/N)									N
Recovery proceeds during period t to t+5									0.00
Recap cost (net) (as % of GDP)									2.31%
<b>Deposit insurance(Y/N)</b>									
Formation	Y	Y	Y	Y	Y	N	N	Y	Y
Coverage limit (in local currency) at t	1979	1979	1979	1979	1979				1996
Coverage ratio (coverage limit to GDP per capita) at t	Full	Full	30000	30000	30000	0	0	0	5000
Were losses imposed on depositors? (Y/N)	N	Y	N	Y	Y	Y	N	N	N
If yes, severe=1 and moderate=2		1		1		2			
<b>Macro Policies</b>									
<b>Monetary policy index</b>									
Average change in reserve money during [t, t+3] (in %)	1	1	0	-1		0	1	-1	1
<b>Fiscal policy index</b>									
Average fiscal balance during [t, t+3] (in %)	324.16%	2046.85%	1	1	1	18.80%	1673.69%	939.63%	245.13%
IMF program (Y/N)	1	1	1	1	1	1	-1	1	1
IMF program put in place (year)	-6.82%	-3.86%	-2.24%	-7.23%		-3.02%	0.27%	-5.14%	-3.09%
	Y	Y	Y	Y		N	Y	N	Y
	1983	1990	1995	2000			1989		1996
<b>Outcome variables</b>									
<b>Fiscal cost net (%GDP)</b>									
Gross	55.10%	6.00%	2.00%	9.58%		2.65%	0.00%	10.20%	13.90%
Recovery during period t to t+5	55.10%	6.00%	2.00%	9.58%		6.03%	0.00%	13.20%	14.00%
<b>Output loss</b>									
Output loss during period t to t+3	0	0	0	0		3.37%	0.00%	3.00%	0.10%
	10.81%	10.70%	7.13%	42.65%		0.00%	12.23%	0.00%	1.30%

<b>Country name</b>	Chile	Colombia	Colombia	Colombia	Cote d'Ivoire	Croatia	Czech Republic	Dominican Republic	Ecuador
<b>Crisis date (year and month)</b>	Nov-81	Jul-82	Jun-98	1988	Mar-98	1996	Apr-03	Aug-98	
<b>Currency crisis (Y/N) (t-1, t+1)</b>	Y	N	N	N	N	N	Y	Y	
Year of currency crisis	1982						2003	1999	
<b>Sovereign debt crisis (Y/N) (t-1, t+1)</b>	N	N	N	N	N	N	Y	Y	
Year of sovereign debt crisis							2003	1999	
<b>Initial conditions</b>									
Fiscal balance/GDP at t-1	4.99%	-2.26%	-3.95%	-7.19%	-2.01%	-1.29%	-1.37%	-3.02%	
Public sector Debt/GDP at t-1			30.19%		26.70%	12.47%	26.80%	61.75%	
Inflation at t-1	31.24%	26.33%	17.68%	7.48%	5.01%	107.86%	10.51%	30.67%	
Net Foreign Assets/M2 at t-1	42.17%	45.95%	31.12%	-35.05%	28.67%	32.51%	-1.03%	8.35%	
Deposits/GDP at t-1	26.62%	24.78%	36.14%	20.57%	41.42%	62.24%	34.80%	23.25%	
GDP growth at t-1	7.94%	2.28%	3.43%	-0.50%	6.80%	6.36%	4.43%	4.05%	
Current Account/GDP at t-1	-6.35%	-4.06%	-5.39%	-14.93%	-12.61%	-0.09%	-3.69%	-3.02%	
Peak NPLs (as % of total loans)	35.60%	4.10%	14.00%	50.00%	10.50%	18.00%	9.00%	40.00%	
Government-owned bank (% of assets) at t-1	19.72%	57.67%	53.62%	20.60%	1.04%	52.00%	15.50%	9.00%	
Significant bank runs (Y/N)	Y	N	N	N	Y	Y	N	Y	
Largest one-month % drop in deposits (>5%), [t, t+1]	8.48%				6.11%	5.67%		11.09%	
Credit boom (Y/N)	Y	N	N	N	N		N	N	
Annual growth in private credit to GDP (t-4, t-1) (in %)	34.10%	5.40%	7.00%	0.00%	7.60%		7.70%	9.40%	
Creditor rights in year t	2	0	0	0	3	3	2	0	
<b>Containment phase</b>									
<b>Deposit freeze (Y/N)</b>	N	N	N	N	N	N	N	Y	
Introduction of deposit freeze								1999	
Duration of deposit freeze (in months)								6	
Coverage of deposit freeze (time deposits only ? Y/N)								N	
<b>Bank holiday (Y/N)</b>	N	N	N	N	N	N	N	Y	
Introduction of bank holiday								1999	
Duration of bank holiday (in days)								5	
<b>Blanket guarantee (Y/N)</b>	N	N	N	N	N	N	N	Y	
Date of introduction								Dec-98	
Date of removal								Jan-98	

[illegible]

Government bonds	Y				Y				Y
Subordinated debt									
Preferred shares									
Purchase of bad loans								Y	
Credit line									
Assumption of bank liabilities	Y								
Ordinary shares									
Recap level (%)				10.00%					9.00%
Recap cost (gross) (as % of GDP)	34.33%	1.87%	4.26%		3.20%	0.98%			1.90%
Recovery (Y/N)	Y	N	Y		N	N			Y
Recovery proceeds during period t to t+5	27.87%	0	1.56%		0	0			0.30%
Recap cost (net) (as % of GDP)	6.46%	1.87%	2.70%		3.20%	0.98%			1.60%
<b>Deposit insurance(Y/N)</b>	N	N	Y		Y	Y	N		Y
Formation			1988		1997	1994			1998
Coverage limit (in local currency) at t	0	0	10000000		50000	100000	0		7416
Coverage ratio (coverage limit to GDP per capita) at t	0	0	3.29		1.8	0.75	0		3.81
<b>Were losses imposed on depositors? (Y/N)</b>	Y	N	N		N	N	N		Y
If yes, severe=1 and moderate=2	2								1

## Macro Policies

<b>Monetary policy index</b>	-1	0	0		-1	-1	1		1
Average change in reserve money during [t, t+3] (in %)	9.97%	21.00%	11.97%		23.19%	7.99%	45.95%		
<b>Fiscal policy index</b>	-1	1	1		1	1	1		0
Average fiscal balance during [t, t+3] (in %)	0.81%	-3.93%	-4.28%		-5.19%	-3.35%	-6.45%		-0.66%
IMF program (Y/N)	Y	N	N		N	N	Y		Y
IMF program put in place (year)	1983						2004		2000

## Outcome variables

<b>Fiscal cost net (%GDP)</b>	16.80%	5.00%	2.54%		6.90%	5.80%	20.80%		16.26%
Gross	42.90%	5.00%	6.28%		6.90%	6.80%	22.00%		21.70%
Recovery during period t to t+5	26.10%	0	3.74%		0.00%	1.00%	1.20%		5.44%
<b>Output loss</b>									
Output loss during period t to t+3	92.35%	15.11%	33.52%		0.00%		15.51%		6.49%



<b>Country name</b>	Estonia	Finland	Ghana	Indonesia	Jamaica	Japan	Korea	Latvia
<b>Crisis date (year and month)</b>	Nov-92	Sep-91	1982	Nov-97	Dec-96	Nov-97	Aug-97	Apr-95
<b>Currency crisis (Y/N) (t-1, t+1)</b>	Y	N	Y	Y	Y	N	Y	N
Year of currency crisis	1991		1983	1998	1995		1998	
<b>Sovereign debt crisis (Y/N) (t-1, t+1)</b>	N	N	N	N	N	N	N	N
Year of sovereign debt crisis								
<b>Initial conditions</b>								
Fiscal balance/GDP at t-1	5.25%	5.56%	-0.12%	-1.13%	1.99%	-5.13%	0.24%	-3.86%
Public sector Debt/GDP at t-1		14.04%		26.40%	90.89%	100.48%	8.80%	14.89%
Inflation at t-1		4.88%	16.79%	6.04%	25.55%	0.60%	4.93%	26.27%
Net Foreign Assets/M2 at t-1	57.63%	12.73%	-0.06%	21.58%	19.07%	1.62%	15.62%	36.32%
Deposits/GDP at t-1	72.33%	52.28%	6.20%	44.74%	40.73%	252.41%	36.55%	21.15%
GDP growth at t-1	-7.91%	0.08%	-6.91%	7.82%	1.01%	2.75%	7.00%	2.20%
Current Account/GDP at t-1	59.70%	-4.91%	-0.32%	-2.91%	-4.37%	1.42%	-4.14%	-3.61%
Peak NPLs (as % of total loans)	7.00%	13.00%	35.00%	32.50%	28.90%	35.00%	35.00%	20.00%
Government-owned bank (% of assets) at t-1	25.70%	13.40%	60.00%	42.30%	0.00%	0.00%	23.41%	9.90%
Significant bank runs (Y/N)	Y	N	Y	Y	N	N	Y	Y
Largest one-month % drop in deposits (>5%), [t, t+1]	19.94%		11.74%	22.60%			12.00%	5.81%
Credit boom (Y/N)		N	N	N	N	N	N	
Annual growth in private credit to GDP (t-4, t-1] (in %)		8.00%	-19.90%	4.50%	-3.10%	0.10%	1.10%	
Creditor rights in year t		3	1	3	2	3	3	3
<b>Containment phase</b>								
<b>Deposit freeze (Y/N)</b>	N	N	N	N	N	N	N	N
Introduction of deposit freeze								
Duration of deposit freeze (in months)								
Coverage of deposit freeze (time deposits only ? Y/N)								
<b>Bank holiday (Y/N)</b>	N	N	N	N	N	N	N	N
Introduction of bank holiday								
Duration of bank holiday (in days)								
<b>Blanket guarantee (Y/N)</b>	N	Y	N	Y	Y	Y	Y	N
Date of introduction		Feb-93		Jan-98	Feb-97	Nov-97	Nov-97	
Date of removal		Dec-98		Jul-05	Mar-98	Apr-05	Dec-00	
Duration of guarantee (in months)		70		78	11	89	37	



[illegible]

<b>Country name</b>	Lithuania	Malaysia	Mexico	Nicaragua	Norway	Paraguay	Philippines	Russia
<b>Crisis date (year and month)</b>	Dec-95	Jul-97	Dec-94	Aug-00	Oct-91	May-95	Jul-97	Aug-98
<b>Currency crisis (Y/N) (t-1, t+1)</b>	N	Y	Y	N	N	N	Y	Y
Year of currency crisis		1998	1995				1998	1998
<b>Sovereign debt crisis (Y/N) (t-1, t+1)</b>	N	N	N	N	N	N	N	Y
Year of sovereign debt crisis								1998
<b>Initial conditions</b>								
Fiscal balance/GDP at t-1	-4.22%	1.98%	-2.46%	-3.30%	2.54%	2.73%	-0.18%	-16.96%
Public sector Debt/GDP at t-1	8.00%	35.16%	27.34%	191.31%	28.92%	15.80%		52.49%
Inflation at t-1	45.10%	3.34%	8.01%	9.28%	4.36%	18.31%	7.14%	11.05%
Net Foreign Assets/M2 at t-1	39.63%	23.20%	18.12%	-14.10%	10.34%	38.86%	19.03%	9.47%
Deposits/GDP at t-1	17.43%	119.51%	26.82%	37.02%	54.44%	27.68%	48.61%	14.59%
GDP growth at t-1	-9.77%	10.00%	1.95%	7.00%	1.93%	3.73%	5.85%	1.40%
Current Account/GDP at t-1	-3.86%	-4.36%	-5.80%	-24.90%	2.50%	-2.02%	-0.18%	0.00%
Peak NPLs (as % of total loans)	32.20%	30.00%	18.90%	12.70%	16.36%	8.10%	20.00%	40.00%
Government-owned bank (% of assets) at t-1	48.00%	9.93%	28.16%	0.00%	43.68%	48.02%	27.23%	32.98%
Significant bank runs (Y/N)	Y	Y	Y	N	N	Y	N	Y
Largest one-month % drop in deposits (>5%), [t, t+1]		6.03%	14.00%			7.68%		21%
Credit boom (Y/N)	6.26%	N	Y		N	Y	Y	N
Annual growth in private credit to GDP (t-4, t-1) (in %)		7.10%	22.50%		2.90%	17.60%	17.70%	9.50%
Creditor rights in year t	1	3	0	4	2	1	1	1
<b>Containment phase</b>								
<b>Deposit freeze (Y/N)</b>	N	N	N	N	N	N	N	N
Introduction of deposit freeze								
Duration of deposit freeze (in months)								
Coverage of deposit freeze (time deposits only ? Y/N)								
<b>Bank holiday (Y/N)</b>	N	N	N	N	N	N	N	N
Introduction of bank holiday								
Duration of bank holiday (in days)								
<b>Blanket guarantee (Y/N)</b>	N	Y	Y	Y	N	N	N	N
Date of introduction		Jan-98	Dec-93	Jan-01				
Date of removal		Aug-05	Jan-03	Jul-02		Jul-95		
Duration of guarantee (in months)		91	109	14		11		

Previous explicit deposit insurance arrangement (Y/N)	N	None	Y	Aug-00	Fall 1988	May-95	Sep-97	Sep-98
Timing of first bank intervention								
Timing of first liquidity assistance								
<b>Liquidity support/emergency lending (Y/N)</b>								
Support different across banks? (Y/N)	N	Y	Y	Y	Y	Y	N	Y
Collateral required	N			N	Y	N		Y
Remunerated (Y/N)				Y				Y
If remunerated, interest at market rates (Y/N)				Y				N
Peak support (in % of deposits)	4.60%	12.20%	67.60%	9.60%	6.20%	20.80%	2.50%	31.50%
Lowering of reserve requirements (Y/N)	Y	N	N	N	N	Y	N	Y
<b>Resolution phase</b>								
<b>Forbearance(Y/N)</b>								
Banks not intervened despite being technically insolvent	Y	Y	Y	N	Y	Y	N	Y
Prudential regulations suspended or not fully applied	Y	N	N		N	N	N	Y
<b>Large-scale government intervention (Y/N)</b>								
Institutions closed (% of banks assets)	15.00%	0.00%	0%	Y	Y	Y	N	Y
Number of banks in t	28	47	52	12	164	34	1003	1476
Number of banks in t+3	14	43	37	6	153	22	925	1318
<b>Bank closures (Y/N)</b>								
Number of bank closures during the period t to t+3	14	0	0	0	2	9	26	399
Other FI closures (Y/N)		N	N	Y	N	Y		
Shareholder protection (shareholders made whole? Y/N)	N	N			N	N		N
<b>Nationalizations (Y/N)</b>	Y	Y	Y	N	Y	N	N	Y
<b>Mergers (Y/N)</b>	N	Y	Y	N	Y	N	N	Y
Did bank shareholders inject new capital? (Y/N)			Y		Y			Y
<b>Sales to foreigners (Y/N)</b>	N	N	Y	N		Y	N	N
Number of banks sold to foreigners during t to t+5	0	0	4	0			0	0
<b>Bank restructuring agency(Y/N)</b>	0	Y	Y	N	Y	N	N	Y
<b>Asset management company(Y/N)</b>	Y	Y	N	Y	N	N	N	Y
Centralized (Y) / Decentralized (N)	Y	Y		N	Y	Y		Y
<b>Recapitalization (Y/N)</b>	Y	Y	Y	N		Y	N	N
Recap measures								
Cash	Y							
Government bonds	Y							

[illegible]

<b>Country name</b>	Sri Lanka	Sweden	Thailand	Turkey	Ukraine	United Kingdom	United States	Uruguay	Venezuela	Vietnam
<b>Crisis date (year and month)</b>	1989	Sep-91	Jul-97	Nov-00	1998	Aug-07	Aug-07	Jan-02	Jan-94	fall 1997
<b>Currency crisis (Y/N) (t-1, t+1)</b>	N	Y	N	Y	Y	N	N	Y	Y	N
Year of currency crisis		1992		2001	1998			2002	1993	
<b>Sovereign debt crisis (Y/N) (t-1, t+1)</b>	N	N	N	N	N	N	N	Y	N	N
Year of sovereign debt crisis								2002		
<b>Initial conditions</b>										
Fiscal balance/GDP at t-1	-8.59%	3.39%	2.40%	-14.97%	-5.56%	-2.56%	-2.61%	-0.22%	-2.92%	-2.36%
Public sector Debt/GDP at t-1	108.72%		14.15%	51.31%	29.88%	43.04%	60.10%	39.05%		
Inflation at t-1	15.10%	10.94%	4.77%	68.79%	10.12%	2.78%	2.57%	3.59%	45.94%	4.59%
Net Foreign Assets/M2 at t-1	5.80%	4.79%	25.13%	17.84%	-1.68%	1.40%	0.98%	27.15%	55.29%	24.66%
Deposits/GDP at t-1	22.01%	40.62%	76.91%	37.28%	6.81%	139.66%	72.01%	75.00%		8.33%
GDP growth at t-1	2.30%	1.01%	5.90%	-3.37%	-2.99%	2.91%	2.87%	-3.38%	0.28%	9.34%
Current Account/GDP at t-1	-0.23%	-2.57%	-7.89%	-0.55%	-2.66%	-3.62%	-6.15%	-2.87%	-3.33%	-9.86%
Peak NPLs (as % of total loans)	35.00%	13.00%	33.00%	27.60%	62.40%		4.80%	36.30%	24.00%	35.00%
Government-owned bank (% of assets) at t-1	71.39%	23.20%	17.09%	35.00%	12.23%	0.00%	0.00%	40.90%	9.80%	92.00%
Significant bank runs (Y/N)	Y	Y	N	N	N	N	N	Y	Y	N
Largest one-month % drop in deposits (>5%), [t, t+1]	7.51%	5.56%						9.12%	14.06%	
Credit boom (Y/N)	N		Y	N	Y	N	N	Y	N	
Annual growth in private credit to GDP (t-4, t-1] (in %)	1.60%		10.60%	6.10%	15.00%	6.06%	5.22%	13.10%	0.50%	
Creditor rights in year t	2	2	3	2	3	4	1	2	3	1
<b>Containment phase</b>										
<b>Deposit freeze (Y/N)</b>	N	N	N	N	N	N	N	Y	N	N
Introduction of deposit freeze								2002		
Duration of deposit freeze (in months)								36		
Coverage of deposit freeze (time)								Y		

deposits only ?  $Y/N$ )

## Bank holiday (Y/N)

## Introduction of bank holiday

Duration of bank holiday (in days)

### Blanket guarantee (Y/N)

Date of introduction

Date of removal

Duration of guarantee (in months)

Previous explicit deposit

insurance arrangement (Y/N)

### Timing of first bank

intervention

## Timing of first liquidity

assistance

## Liquidity support/emergency

lending ( $Y/N$ )

## Support different across banks?

$$(Y/N)$$

Collateral required

Remunerated (Y/N)

If remunerated, interest at

market rates (Y/N)

Peak support (in % of deposits)

## Lowering of reserve requirements

$$(Y/N)$$

## Resolution phase

**Forbearance(Y/N)**

### Banks not intervened despite

being technically insolvent

Prudential regulations suspended

or not fully applied

## Large-scale government

**intervention (Y/N)**



Institutions closed (% of banks assets)	0%	0%	2.00%	8.00%	2.00%	0%	0%	18.83%	23.00%	2.00%
Number of banks in t		118	41	80	230			31	51	83
Number of banks in t+3	23	103	40	54	178			21	39	
<b>Bank closures (Y/N)</b>	N	N	Y	Y	Y	N	N	Y	Y	Y
Number of bank closures during the period t to t+3	0	0	1	12	48			5	12	5
Other FI closures (Y/N)	Y		Y	N		Y	Y	N	Y	
Shareholder protection (shareholders made whole? Y/N)		Y		N		N	N	N	N	N
<b>Nationalizations (Y/N)</b>	N	Y	Y	Y	N	Y	N	Y	Y	N
<b>Mergers (Y/N)</b>	N	Y	Y	Y	N	Y	Y	N	N	Y
Did bank shareholders inject new capital? (Y/N)	N		Y	Y		Y	Y			
<b>Sales to foreigners (Y/N)</b>	N		Y	Y	N	N	N	Y	Y	
Number of banks sold to foreigners during t to t+5	0		3	2	0			2	5	
<b>Bank restructuring agency(Y/N)</b>	N	Y	Y	N	Y	N	N	N	Y	N
<b>Asset management company(Y/N)</b>	N	Y	Y	Y	N		Y	Y	N	Y
Centralized (Y)		Y	Y	Y			N	Y		Y
<b>Recapitalization (Y/N)</b>	Y		Y	Y	N	Y	Y	Y	N	Y
Recap measures										
Cash								Y		Y
Government bonds	Y		Y	Y					Y	Y
Subordinated debt										
Preferred shares							Y			
Purchase of bad loans										
Credit line										
Assumption of bank liabilities		Y					Y			
Ordinary shares										
Recap level (%)	8.00%		8.50%	8.00%						10%
Recap cost (gross) (as % of GDP)	3.60%	1.85%	18.80%	24.50%		0.20%		6.18%	5.59%	5.00%
Recovery (Y/N)	N	Y		N				Y	N	N
Recovery proceeds during t to t+5	0	0.36%		0.00%				1.16%	0.00%	0.00%
Recap cost (net) (as % of GDP)	3.60%	1.49%	18.80%	24.50%		0.20%		5.02%	5.59%	5.00%

<b>Deposit insurance(Y/N)</b>											
Formation	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N
Coverage limit (in local currency) at t	1987 100000	0	0	1983 Full	1998 1200	2001 35000	1933 100000	2002 100000	1985 250000		0
Coverage ratio (coverage limit to GDP per capita) at t	7.18	0	0		0.59	1.9	2.26	1.4	0.96		0
<b>Were losses imposed on depositors? (Y/N)</b>	N	N	Y	N	Y	N	N	N	Y		N
If yes, severe=1 and moderate=2											
<b>Macro Policies</b>											
<b>Monetary policy index</b>											
Average change in reserve money during [t, t+3] (in %)	0	1	0	-1	-1			-1	1		1
	15.39%	21.63%	12.95%	33.99%	33.26%			17.37%	79.32%		24.17%
<b>Fiscal policy index</b>											
Average fiscal balance during [t, t+3] (in %)	1	1	1	1	1			-1	1		1
	-7.67%	-7.33%	-2.51%	-10.55%	-2.00%			0.04%	-1.64%		-2.74%
IMF program (Y/N)	N	N	Y	Y	Y			Y	Y		N
IMF program put in place (year)			1998	2000	1995			1996	1996		
<b>Outcome variables</b>											
<b>Fiscal cost net (%GDP)</b>											
Gross	5.00%	0.20%	34.80%	30.70%	0.00%			10.83%	12.50%		10.00%
	5.00%	3.60%	43.80%	32.00%	0.00%			20.00%	15.00%		10.00%
Recovery during period t to t+5	0%	3.40%	9.00%	1.30%	0%			9.17%	2.50%		0.00%
<b>Output loss</b>											
Output loss during period t to t+3	21.60%	0.00%	97.66%	5.35%	0.00%			28.79%	9.62%		19.72%

Note: t denoted the starting year of the crisis

**Table 5. Descriptive Statistics of Initial Conditions of Selected Banking Crises**

Variable	Number of crises	Mean	Std. Dev.	Minimum	Maximum
Start year of banking crisis	42	1995	6.100	1980	2007
Currency crisis (Y/N)	42	0.548	0.504	0.000	1.000
Sovereign debt crisis (Y/N)	42	0.071	0.261	0.000	1.000
Fiscal balance/GDP	42	-0.021	0.045	-0.170	0.056
Debt/GDP	33	0.464	0.395	0.080	1.913
Inflation	41	1.371	4.862	-0.007	24.772
Net Foreign Assets/M2	42	0.174	0.189	-0.351	0.576
Deposits/GDP	42	0.491	0.454	0.062	2.524
GDP growth	42	0.024	0.045	-0.098	0.100
Current Account/GDP	41	-0.039	0.049	-0.249	0.025
Peak NPLs (fraction of total loans)	40	0.252	0.155	0.040	0.750
Government-owned banks (fraction of total assets)	42	0.309	0.245	0.000	0.920
Bank runs (Y/N)	42	0.619	0.491	0.000	1.000
Largest 1-month drop in deposits-to-GDP	26	0.112	0.058	0.056	0.267
Credit boom (Y/N)	33	0.303	0.467	0.000	1.000
Annual growth in private credit to GDP prior to crisis	33	0.083	0.098	-0.199	0.341
Creditor rights	41	1.780	1.129	0.000	4.000

**Table 6. Descriptive Statistics of Crisis Policies of Selected Banking Crisis Episodes**

Variable	Number of crises	Mean	Std. Dev.	Minimum	Maximum
Deposit freeze (Y/N)	42	0.119	0.328	0	1
Duration of deposit freeze (in months)	5	40.600	46.030	6	120
Coverage of deposit freeze: time deposits only? (Y/N)	5	0.400	0.548	0	1
Bank holiday (Y/N)	42	0.095	0.297	0	1
Duration of bank holiday (in days)	4	4.750	0.500	4	5
Blanket guarantee (Y/N)	42	0.286	0.457	0	1
Duration of guarantee (in months)	14	53.071	33.992	11	109
Previous explicit deposit insurance arrangement (Y/N)	42	0.524	0.505	0	1
Liquidity support/emergency lending (Y/N)	42	0.714	0.457	0	1
Liquidity support different across banks ? (Y/N)	18	0.500	0.514	0	1
Collateral required for liquidity provision	15	0.467	0.516	0	1
Collateral provided is remunerated (Y/N)	13	0.846	0.376	0	1
If remunerated, interest at market rates (Y/N)	11	0.636	0.505	0	1
Peak liquidity support (fraction of deposits)	41	0.277	0.497	0	3
Lowering of reserve requirements (Y/N)	41	0.366	0.488	0	1
Forbearance (Y/N)	42	0.667	0.477	0	1
Banks not intervened despite being technically insolvent	37	0.351	0.484	0	1
Prudential regulations suspended or not fully applied	37	0.730	0.450	0	1
Large-scale government intervention in banks (Y/N)	42	0.857	0.354	0	1
Fraction of financial institutions closed	39	0.083	0.117	0	0.500
Bank closures (Y/N)	42	0.667	0.477	0	1
Other financial institutions closures (Y/N)	34	0.500	0.508	0	1
Were shareholders made whole? (Y/N)	30	0.067	0.254	0	1
Nationalizations (Y/N)	42	0.571	0.501	0	1
Mergers (Y/N)	41	0.610	0.494	0	1
Did private bank shareholders inject fresh capital? (Y/N)	24	0.667	0.482	0	1
Sales to foreigners (Y/N)	37	0.514	0.507	0	1
Bank restructuring agency (Y/N)	40	0.475	0.506	0	1
Asset management company (Y/N)	42	0.595	0.497	0	1
Centralized asset management company (Y/N)	25	0.840	0.374	0	1
Recapitalization (Y/N) of banks	42	0.762	0.431	0	1
Recap level (%)	13	0.078	0.020	0.040	0.100
Recap cost to government (gross) (fraction of GDP)	32	0.078	0.096	0.002	0.373
Recovery of recap expense (Y/N)	31	0.516	0.508	0	1
Recovery proceeds (fraction of GDP)	31	0.019	0.053	0	0.279
Recap cost to government (net) (fraction of GDP)	32	0.060	0.079	0	0.373
Deposit insurance (Y/N)	42	0.524	0.505	0	1
Coverage limit to per capita GDP	35	1.142	1.730	0	7.180
Were losses imposed on depositors? (Y/N)	42	0.310	0.468	0	1
Monetary policy index	40	-0.050	0.815	-1	1
Change in reserve money (rate)	35	1.681	4.562	-0.070	20.47
Fiscal index	40	0.600	0.709	-1	1
Fiscal balance (share of GDP)	40	-0.036	0.030	-0.127	0.008
IMF program put in place (Y/N)	42	0.524	0.505	0	1
Fiscal cost net (share of GDP)	40	0.133	0.134	0	0.551
Gross fiscal cost (share of GDP)	40	0.160	0.150	0	0.568
Recovery of fiscal expense	40	0.027	0.048	0	0.261
Output loss (share of GDP)	40	0.201	0.260	0	0.977

**Table 7. Selected Bank-Specific Guarantee Announcements**

Country	Date	Coverage
Chile	Jan 1983	Explicit guarantee announced to depositors of intervened banks.
Czech Republic	Jun 1996	Deposit insurance coverage was raised substantially (from CZK 100,000 to 4,000,000) for 18 banks that had entered a restructuring program.
Dominican Republic	Apr 2003	When intervened, the authorities announced that all legitimate deposits of Baninter would be honored with Central Bank certificates. Later on, the same treatment was applied in the resolution of other two banks.
Lithuania	Dec 1995	The Government passed a law extending full coverage to 2 closed banks.
Paraguay	Jul 1995	All recorded deposits in intervened banks (unrecorded deposits were initially excluded, though in May 1996 a law was passed to compensate these too).
United Kingdom	Sept 2007	All liabilities of Northern Rock outstanding as of Sept 16, 2007.

**Table 8. Episodes with Losses Imposed on Depositors**

Country	Crisis Year	Loss Severity	Description
Argentina	1989	Large	BONEX plan converted time deposits into long-term bonds at an exchange rate below the prevailing on the market.
Argentina	2001	Large	Dollar deposits were converted into domestic currency at ARG\$1.4, which was below the prevailing market rate.
Bolivia	1994	Minor to Moderate	Large depositors of the 2 closed banks received as a compensation non-interest bearing bonds.
Chile	1981	Minor to Moderate	In 1983, depositors at banks forced into liquidation were paid only 70 percent of face value.
Cote d'Ivoire	1988	Large	In the liquidation of BDN, only 85 percent of depositors were compensated fully.
Ecuador	1998	Large	Frozen deposits were significantly eroded by accelerating inflation and depreciation of the currency and some payments to depositors are still pending (despite the blanket guarantee)
Estonia	1992	Large	Depositors of Tartu commercial bank were only partially paid
Latvia	1995	Large	With the collapse of Baltija Bank the government compensated depositors for LVL 500 (\$1000) per depositor (LVL 200 in 1995 and LVL 100 over next 3 years).
Lithuania	1995	Minor to Moderate	Depositors of Litimpex Bank had their deposits turned into equity. Furthermore, depositors of Innovation Bank received some cash (Lt.4000 in 1997 and Lt.4000 in 1998 per person) and the difference in 5-year, non-interest-bearing government bonds; legal entities received 10-year, non-tradable, non-interest bearing notes for the entire claim; certain public organizations, embassies, charities, etc received cash during 1998; other creditors received their pari-passu share of residual funds left from collection of Innovation Bank's assets; Public sector deposits were written off.
Russia	1998	Minor To Moderate	Some depositors (those whose savings were not transferred to Sberbank) sustained losses at insolvent banks. Even those who benefited from the transfer faced some losses since the exchange rate used in the transaction was less than half of the market exchange rate prevailing at the time.
Thailand	1997	Minor To Moderate	Depositors of the closed finance companies received certificates yielding below market interest rates.
Ukraine	1998	Large	Depositors were not fully compensated.
Venezuela	1994	Minor to Moderate	Depositors at Banco Latino with more than 10m Bolivars received long-term non-negotiable bonds with interest rate below market, for the amount exceeding the 10m.

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