

Resolving Systemic Crises: Policies and Institutions

by

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Abstract

We analyze the role of policy and institutions in resolving a systemic crisis for a broad sample of countries. As others have documented before, we find that extensive liquidity support, (unlimited) government guarantees on financial institutions' liabilities and forbearance from prudential regulations add to the fiscal costs of resolution. Although these accommodative policies are costly, they do not accelerate the recovery from a crisis. Better institutions—lower corruption, greater law and order, better legal system, and a better bureaucracy—do, however, lower costs and accelerate economic recovery. We find these results using both country and industry level data and to be relatively robust to estimation techniques and samples. They suggest that countries best use strict policies to resolve a crisis and focus on structural reforms, which, as has been shown elsewhere, will also help avoid future systemic crises.

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1. Introduction

A systemic crisis is a situation where an economy faces large-scale banking and corporate distress within a short period. It is typically characterized by large-scale defaults, sharp increases in nonperforming loans, and often a general economic slowdown. Importantly, large fiscal costs are often incurred to resolve the crisis. There have been many systemic financial crises: Caprio and Klingebiel (2003) identify 93 countries that experienced a systemic financial crisis between 1980 and 2002. Crises also appear to have become more common and deeper in the 1990s and early 2000s relative to earlier periods (Bordo et al. 2001). Country examples during the 1990s include the Nordic countries in the early 1990s, Mexico in 1994–95, East Asian countries after 1997, Argentina in 2001, Turkey in 2001/2, and some transition economies.

A systemic crisis involves complicated coordination problems. 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. A complicating factor is that a crisis is typically aggravated by institutional weaknesses, many of which likely contributed to the emergence of the crisis in the first place. 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. The government itself

may face credibility problems as it may be partly to blame for the crisis, and, in general, faces time consistency problems.

This short discussion already shows that resolving systemic crises is not easy. Opinions differ widely on what constitutes best or even good practice. Many approaches have been proposed and tried to resolve systemic crises more efficiently. Sometimes, contradictory policy recommendations have been made in the midst of a crisis, as happened notably in case of East Asia, but also elsewhere. 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 the economic costs and on accelerating restructuring, while again others have focused on achieving long term structural reforms. But trade-offs may arise between these objectives. Although the fiscal cost of resolving the banking crisis through certain policies may be high, these policies can be worth pursuing if they lead to a faster recovery.

Empirical research supporting particular policy views or the role of institutional factors remains limited. Most research has focused on individual cases, making it difficult to generalize recommendations. Cross-country analysis to date has often focused on measuring the impact of policies aimed at one of three different objectives, to limit the fiscal costs of crises, to speed up recovery, or to achieve structural reform. This does not help prioritize policies as a policy employed to reduce financial or corporate distress may at the same time increase the fiscal cost of a crisis but accelerate the economic recovery. There has been limited analysis on how effective these policy measures are in achieving more than one, let alone all of these objectives at the same time. The exception to date is Honohan and Klingebiel (2003). They, however, focus

mostly on the particular policies that help explain the fiscal costs and the speed of recovery, and less on the institutional frameworks within which these policies take place. It might well be that the effectiveness of policies depend on the institutional environment, or even that the importance of the institutional environment dominates the effectiveness of any policies.

In this paper, we are interested in examining what combination of policy instruments and institutional frameworks have proven to be the most effective in terms of resolving a systemic crisis, analyzing in particular any trade-offs between different objectives. Specifically, we want to explain the policy and institutional determinants of both the size of the fiscal costs associated with the resolution of systemic crises, and of the economic output losses, value added growth rates, and length of the recovery time. We try to answer these questions using two different datasets and methodologies. First, we use a country-level database on fiscal costs and output losses in order to draw conclusions at an aggregate level. Second, we do an analysis using industry-level data on value-added growth.

We find that policy measures such as extensive liquidity support, (unlimited) government guarantee on financial institutions' liabilities and forbearance from prudential regulations tend to be fiscally costly, as already documented by Honohan and Klingebiel (2003). But when examining which of these accommodative policy measures produce faster recovery, we find that output losses are not reduced by any of these accommodative policy measures. Rather the opposite, we find that some of these policy measures in fact appear to slow down economic recovery. On the other hand, we find that better institutional development—less corruption, better law and order, higher quality

of the bureaucracy, and a more efficient judicial system—is uniformly positively associated with lower fiscal costs of crisis and faster recovery. The degree of institutional development does not, however, displace the importance of policy as a determinant of fiscal costs and speed of recovery. We find these results when both investigating country level data for some 35 countries and sectoral data on manufacturing industries for a smaller set of 15 countries. The results suggest that countries better use strict policies to resolve a crisis and focus on structural reforms, which, as other literature has shown, will also help avoid future systemic crises. The analysis also provides the starting point to disentangle what elements of the institutional framework are most important to help reduce the costs of a financial crisis and improve the recovery from a crisis. Calculating such “returns” from institutional improvements may help guide policy makers in setting priorities for reform.

The paper itself is structured as follows. Section 2 briefly reviews related literature, describes some of the main debates regarding systemic crisis resolution, and develops the main hypotheses. Section 3 reviews the key policy measures for resolving a financial crisis. Section 4 provides a description of the data and the empirical methodology used. Section 5 provides the results of the regressions that try to explain the fiscal costs, the depth of the crisis, and the speed of recovery. Section 6 concludes.

2. Literature Review

We start with a definition of a systemic crisis. Under our definition, in a systemic 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, nonperforming 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 countries with longer-term structural problems—such as was the case early on in many transition economies—a systemic crisis may not be accompanied by such changes in asset prices and capital flows, partly because run-ups in prices and capital flows may not have occurred.¹

In reviewing the literature on systemic crises, especially for emerging markets, it is useful to differentiate between three phases of systemic restructuring. During the first phase, which can be called 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 second phase involves the actual financial, and to a lesser extent operational, restructuring of financial institutions and corporations. The third phase involves structural reforms, including changes in laws

¹ Note that this definition of a systemic crisis excludes situations of systemic stress or heightened risks, such as the 1987 stock markets crash, the Y2K turnover, or September 11, 2001. During these periods, central banks in many countries were involved in large-scale liquidity support as the banking systems were under (expected) stress, but the stress situations were short-lived and largely limited to the financial sectors.

and regulations, privatization of any nationalized financial institutions and corporations, and so on. Here we discuss mainly the containment phase, and somewhat the restructuring phase. We leave the third phase out of our analysis and refer the reader to the more general literature on financial sector development (e.g., Levine 2004).

During the late 1980s and early 1990s most research on systemic crisis resolution focused on single crises making it difficult to generalize lessons. Sheng (1996) was the first attempt to distill lessons from several banking crises. He stated that a comprehensive and credible plan could avoid a systemic crisis, minimize adverse effects, and limit overall losses. Caprio and Klingebiel (1996) expanded on those lessons using 26 crises and Dziobek and Pazarbasioglu (1998) analyzed the experiences of 24 countries that faced crises in the 1980s and early 1990s. Lindgren, Garcia and Saal (1997) analyzed in particular the linkages between macroeconomic policy and bank soundness, reviewing the causes and consequences of banking sector problems and discussing how the banking system can be strengthened, nationally and internationally. The main lesson from these efforts is that managing a financial crisis is much different in industrial countries than in emerging markets because emerging markets have weaker institutions, crises are often larger, and other initial circumstances differ. As a result, best practices from industrial countries do not easily transfer to developing countries. Another key lesson is that tradeoffs appear to exist between various policies, both in terms of individual objectives as well as between objectives (containing fiscal costs, speeding recovery, and preventing a recurrence of a crisis).

There are also some multiple country studies investigating specific policies. One study, Baer and Klingebiel (1995), analyzes the exceptions to the model of governments

guaranteeing all liabilities in an effort to restore confidence. They show that in some crises—notably the United States (1933), Japan (1946), Argentina (1980–82), and Estonia (1992)—governments imposed losses on depositors with little or no adverse macroeconomic consequences or flight to cash or foreign currency. Economic recovery was relatively rapid and financial intermediation, including household deposits, was soon restored. Thus allocating losses to creditors or depositors will not necessarily lead to runs on banks or end in contraction of aggregate money, credit, and output. Baer and Klingebiel also suggest that intermittent regulatory intervention and forbearance makes depositors more nervous and undermines regulatory credibility—especially if regulators had previously argued that the institutions involved were solvent.

Cross-country research efforts focusing on the speed and shape of general economic recovery is more plentiful, but most often does not distinguish or analyze specific (financial sector) policies, beyond the provision of international liquidity support or the presence of a (structural) adjustment program. It also often does not focus specifically on banking crises, but also includes currency and other crises.² Eichengreen and Rose (2003) and Lee and Park (2003) find a V-shaped recovery to be the norm in currency crises and find no discernable impact of crises on longer term growth. Others do find, however, a more protracted recovery and some long-term costs in terms of output growth, particularly for crises in emerging markets and for the more recent crises.³ In terms of adjustment programs, Lee and Park (2003) find that an IMF-program was associated with much sharper V-recovery but not with better post-crisis recovery,

² Most banking crises are twin crises, i.e., also currency crises, but not most currency crises are not also banking crises.

³ For a review of the evidence on the effects of currency crises see Goldstein, Kaminsky and Reinhart (2000). They also summarize the findings of eight other studies (in their Table 7.4).

suggesting that liquidity issues are paramount in crises, whereas structural reforms, as presumably encouraged by the IMF, mattered less. Analyzing the impact of IMF and World Bank programs in both crisis and non-crisis situations, Easterly (2003) finds no effects of structural adjustment on the average rate of growth of countries. Hutchinson (2003) even finds that, in general, participation in IMF programs is associated with a reduction in GDP growth, which may, however, reflect reverse causality. He does find that participation in IMF programs associated with balance-of-payments crises does not mitigate the output losses, concluding that “the cure of an IMF program may be worse than the disease.”

From these analyses, one could conclude that crises are typically liquidity crises and that policy (choices), as reflected in the presence of an IMF or World Bank-program, matter little in crises resolution or may even make matters worse. One caveat is that these analyses did not investigate banking crises specifically. For banking crises only, the literature on the speed of recovery is more limited. Goldstein, Kaminsky and Reinhart (2000) document the more protracted nature of the recovery from a banking crises compared to a currency crisis. For their sample of 76 currency crises and 26 banking crises, output takes on average almost twice as long to recover from a banking crisis than from a currency crisis (18 versus 10 months). Imports recover only after 29 months for a banking crisis compared to after 18 months for a currency crisis. Banking crises appear thus more deleterious than currency crises, and do not seem to fit the V-shaped recovery pattern. Rojas-Suarez and Weisbrod (1996) examine the resolution of several banking crises in Latin America. They highlight the sluggishness of the banking resolution process in many episodes. Still these studies, as most of the ones on currency

and other financial crises, do not study the effects of specific policy measures, and as such do not allow one to determine what measures may work or not, and in which institutional environments.

In terms of cross-country studies investigating specific financial sector restructuring policies, the main effort to date has been Honohan and Klingebiel (2003). They show that much of the variation in the fiscal cost of 40 crises in industrial and developing economies in 1980–97 can be explained by government approaches to resolving crises. They find that governments that provided open-ended liquidity support and blanket deposit guarantees and engaged in repeated, incomplete recapitalizations tended to incur much higher costs in resolving financial crises.⁴ They also find no obvious trade-off between fiscal costs and subsequent economic growth (or overall output losses). Countries that used policies such as open-ended liquidity support, blanket guarantees, and forbearance did not recover faster. Rather, liquidity support appeared to make recovery from a crisis longer and output losses larger—a finding confirmed by Bordo et al. (2001). Their finding seems to suggest that the two most important policies during the containment phase are to limit liquidity support and not to extend blanket guarantees.

Another effort to distinguish the impact of policy on recovery, but using individual firm level data, is Claessens, Klingebiel, and Laeven (2003). They study 687 corporations from eight crisis countries. When analyzing the impact of policies on firms, they find that a package of specific resolution measures can help accelerate the recovery from a crisis. These policies, however, did not necessarily lead to more sustainable,

longer run debt situations, suggesting that they induce some moral hazard on the part of financial institutions and corporations. Klingebiel, Kroszner, and Laeven (2002) investigate how financial crises affect the growth of sectors dependent on external sources of finance. They use industry level data on real growth in value added and external financial dependence from 19 countries over 30 years and find that sectors highly dependent on external finance tend to experience a greater contraction of value added during a crisis in deeper financial systems than in countries with shallower financial systems. Finally, the International Monetary Fund (2003) has recently developed lessons from financial crises, although not in an empirical manner.

3. Key Policy Measures and Institutional Factors for Resolving a Financial Crisis

Countries use many policies to address systemic crises. Countries also differ in many ways, including as to their institutional framework and general level of development. To empirically analyze the role of policy choices and institutional factors requires us to choose a set of core policies and institutional features. In this section, we motivate the policies and institutional features we have chosen to analyze.

Countries have pursued many policies in trying to contain and resolve a systemic crisis, but three policies in the containment and restructuring phase are in many ways key: extensive liquidity support, (unlimited) guarantees, and forbearance from prudential regulation. These three main policies have received much attention in the debates and are also easily identifiable for our empirical analysis. The policies are indicative of an

⁴ This view is challenged by another study, Hoggarth, Reis and Saporta (2002), which do not find a statistically significant relationship between fiscal costs and lender of last resort use when controlling for a number of other factors, including whether there was also a currency crisis at the same time.

accommodative or strict “model” to crisis resolution being followed. Countries applying extensive (limited) liquidity support, (limited) guarantees and (no) forbearance from prudential regulation tend to follow an accommodative (strict) policy approach to crisis resolution.

Liquidity support to illiquid, but solvent banks is a well-accepted role of a central bank. While continuously being debated and refined in some details, the main modalities for providing support during normal times are well known and derive from the century-old Bagehot principles. (This is not to say that many central banks, especially in developing countries, do not have difficulty applying these principles in normal times.) This consensus of what constitutes acceptable liquidity support is largely absent, however, during a systemic bank crisis. There are two schools of thoughts on whether to use liquidity support during the containment phase. One argument is that systemic crisis conditions make it almost impossible to distinguish between solvent and insolvent institutions, leaving the authorities with little choice but to extend liquidity support on a wide scale. Under this argument such liquidity support is necessary as it preserves the payments system and helps stabilize institutions’ financial claims while restructuring is being organized and carried out. As a consequence, liquidity support can reduce the overall costs of a crisis and speed up recovery. The other argument is that open-ended liquidity support provides more time for insolvent institutions to gamble (unsuccessfully) on resurrection, facilitates continued financing of loss-making borrowers, and allows owners and managers to engage in looting. It thus merely increases the (fiscal) costs, and does not accelerate the recovery. This view argues that liquidity support should be very restricted during a systemic crisis.

A similar debate exists on (unlimited) guarantees. To minimize moral hazard and strengthen financial discipline, typically bankruptcy systems (for corporations and banks) allocate losses not only to shareholders but also to creditors and large depositors who should have been monitoring the banks anyhow. In a systemic crisis, however, governments often assume all losses (beyond those of shareholders) through a (unlimited) guarantee on banks' liabilities (and sometimes those of other financial institutions as well). As with liquidity support, it is argued that a guarantee on financial institutions' liabilities preserves the payments system and helps stabilize the financial system. This would reduce the crisis costs and speed up recovery. Opposite to this view is the argument that a government guarantee reduces large creditors' incentives to monitor financial institutions, allowing bank managers and shareholders to continue gambling on their insolvent banks and increasing fiscal costs, with little effects on economic recovery. It is further pointed out that extensive guarantees limit government maneuverability in allocating losses, often with the end result that the government incurs most of the cost of the systemic crisis.

A third policy dimension often used, but mainly after a crisis has erupted, is forbearance from normal prudential regulations for banks and other financial institutions. Policymakers may provide relief from capital adequacy, loan classification and provisioning requirements when faced with a (small) banking crisis, hoping that banks and corporations will grow out of their problems. The argument is that a temporary shock, presumed to be largely outside of the doing of most individual banks, should not unduly affect the whole banking system and lead banks to try to restore their capital adequacy through higher margins and reduced risky lending. Such attempts, it is argued,

will only lead to an excessive curtailment of credit, a credit crunch, with adverse impact on growth, thereby further worsening the crisis and delaying the recovery. Opponents of forbearance argue that the effective response to a banking crisis is not to forbear but to intervene promptly, with public support if necessary, in all banks not meeting normal capital adequacy requirements. They reason that predictions about the speed of recovery and the ability of financial institutions to self-recapitalize often fail to materialize as losses are underestimated. Furthermore, and more importantly, forbearance breeds moral hazard and encourages gambling for resurrection, undermines the authority of the supervisory agencies, and limits financial institutions' ability and incentives to engage in more than cosmetic loan restructuring as their ability to withstand losses is limited, ultimately increasing the cost of a crisis and prolonging the recovery. To pursue forbearance because governments do not have sufficient immediate public funds to resolve the crisis is also argued to be a short sighted policy.

Related to the issue of forbearance is how the recapitalization of banks best proceeds. In a systemic crisis, capital will often be scarce, tempting governments to allow or engage in incomplete recapitalizations. Some argue that this is unavoidable and that repeated recapitalizations like forbearance are not more costly. But others argue that marginally capitalized banks have little incentives to fully restore capital adequacy and face poor incentives to restructure loans. Financial institutions with insufficient loss absorption capacity tend to engage in cosmetic corporate restructuring—such as maturity extensions or new loans to nonviable corporations—rather than restructure debts in a sustainable fashion. In addition, undercapitalized banks tend to engage in more risk taking.

Besides these particular three policy choices (as well as other policy choices), systemic restructuring will depend on the country's institutional framework—that is, the laws, regulations, and institutions—under which banks and corporations, including their management and owners, operate. The first best institutional framework is easy to state. The country's insolvency system should enable financial institutions to enforce their claims on corporations, allow for speedy financial restructuring of viable corporations, and provide for the efficient liquidation of enterprises that have no prospects of economic value-added and cannot be rehabilitated. The proper prudential framework for banks includes accounting, classification, and provisioning rules that force a realistically marking of assets to market. Regulations and laws should ensure that undercapitalized financial institutions are properly disciplined and closed if necessary. Institutions involved in these areas should be properly governed, accountable, and staffed with well-trained people facing the right incentives and having no conflicts of interest.

But, this first best institutional framework is most often not what countries with a systemic crisis face, especially not in developing countries. The country will often be facing a systemic crisis exactly because of its institutional deficiencies. Insolvency procedures for corporations and financial institutions may be poorly designed and/or the judicial system poorly equipped to handle large-scale financial distress. The transparency of decision-making processes may be limited and corruption prevalent. Ownership links between banks and corporations may be extensive, making restructuring more complex as

the same party could end up being both debtor and creditor. Political economy factors will typically complicate the resolution.⁵

These institutional deficiencies ought to be taken into account when designing the appropriate policy mix during the containment and restructuring process of a crisis. How to modify policy advice given institutional deficiencies can be obvious in some cases. It will, for example, not be productive to let the supervisory agency also be the agency to take the lead in restructuring when it may be partly to blame for the crisis, as it did not enforce current regulations. Neither can one expect a market-based approach, where banks have to take the lead in the restructuring of insolvent corporations, to work when the bankruptcy system is not functioning and/or ownership links exist between banks and corporations. In these and many other circumstances it is unclear, however, how policies and policy mixes can best be adjusted. If institutions and institutional frameworks are weak, one could argue that governments may need to use simple methods in dealing with weak banks, but these methods may carry the risk of a further loss of confidence and result in higher fiscal costs. Similarly, one can argue that the government should be more involved when institutions are weak as the private sector is unlikely to be able to resolve the crisis. What is the empirical evidence on the role of these institutional factors and what are the trade-offs between policies, do some result in higher fiscal costs, but accelerate the recovery when institutions are weak? So far, no analysis has attempted to shed light on these questions.

4. Data and Empirical Methodology

⁵ There are some that argue that the various policies chosen are purely the outcome of political economy circumstances that also triggered the crisis, and the whole loss-allocation is therefore a foregone conclusion. See Dooley and Verma (2003).

We are interested in examining what institutional frameworks, legal environments, and policy instruments have proven to be effective in terms of resolving a banking crisis. Specifically, we want to explain the effect of accommodating policies—unlimited deposit guarantees, open-ended liquidity support, and regulatory forbearance—and the role of countries’ institutional frameworks on fiscal costs, economic output losses, and value added growth rates. We try to answer these questions in two ways. First, we use a country-level database in order to draw conclusions at an aggregate level on fiscal costs and economic recovery. Second, we use industry-level data to analyze the effects of various accommodative policies on economic recovery and explore the interaction of policies with the industry’s dependence on external finance. In this section, we first describe the data (for a detailed description of the variables and sources see Appendix Table 1) and then the methodologies we use.

For data on fiscal costs we use Honohan and Klingebiel (2003), and update the data for recent crises using Kane and Klingebiel (2002), Caprio and Klingebiel (2003), and IMF (2003). Data are collected for 35 banking crisis episodes from 1977 to the present. The fiscal cost figure includes both fiscal and quasi-fiscal outlays for financial system restructuring, including the recapitalization costs for banks, bailout costs related to covering depositors and creditors, and debt relief schemes for bank borrowers. We scale the fiscal cost estimates by gross domestic product (GDP). The variable, FISCAL COST / GDP, thus represents the ex-post fiscal cost estimate of financial distress as a percentage of GDP.

For the aggregate economic recovery, we construct proxies for economic output losses suffered due to a crisis. We use two approaches here. One way is comparing, in real terms, the pre-crisis GDP level of a certain country with the GDP level during the following years until the pre-crisis level is reached. This approach considers pre-crisis GDP growth rates to be the trend or a country's potential growth rates. The pre-crisis GDP growth is calculated as the average of GDP growth rates from year $t-3$ to $t-1$, where year t is the start of the crisis. Then, each GDP growth rate from year t onwards is compared to the trend until the trend growth is reached. The output loss is defined as the sum of the difference between the actual and the trend growth rate over all the years until the trend growth is reached again. This approach follows the methodology used in IMF World Economic Outlook (1998), although we update the data to include some recent crises. We call this variable OUTPUT LOSS (IMF). We also count the number of years a country needs to get to the same GDP level as prior to the crisis. We call this variable RECOVERY TIME.

The second version of the output loss variable results from using the Barro (1991) growth model to estimate GDP growth trends. We refer to this variable as OUTPUT LOSS (BARRO). Instead of using pre-crisis data to estimate the trend growth rate, we obtain the predicted values of per capita GDP growth from equation (2) in Barro (1991, p. 410). The exact equation is: Average GDP per capita growth from 1960 to 1980 = $0.0302 - 0.0111 * \text{GDP per capita in 1960} + 0.00051 * (\text{GDP per capita in 1960})^2 + 0.0323 * \text{Secondary school enrollment rate} + 0.0270 * \text{Primary school enrollment rate} - 0.122 * \text{Government consumption/GDP} - 0.0200 * \text{Number of revolutions} - 0.0309 * \text{Number of assassinations} - 0.0148 * \text{Deviation from the PPP in 1960}$. For simplicity, the

last three regressors are considered to be zero. We collect data for the other variables using the Barro-Lee and Summers-Heston databases. We use GDP per capita and the enrollment rates to primary and secondary school for three years before the start of the crisis. For government consumption scaled by GDP, we take the average ratio for the period between eight years and three years before the start of the crisis. The quadratic form in the model of GDP per capita implies a positive relation between GDP per capita level and growth for values of GDP per capita above \$10,800.⁶ We therefore restrict the realizations of the GDP per capita level variable to be no larger than \$10,800. For each country, we plug the realizations of the variables at three years before the start of the crisis into the Barro equation to the predicted growth rates. Finally, we compare this predicted rate with the actual growth rates during the crisis and follow the IMF methodology to summarize the differential growth rates into an output loss variable. For those countries where GDP growth rates only started to slow down after the first year of the crisis, we adjust the starting dates of the crises to $t+1$. This is the case for six countries: Chile, Indonesia, Japan, New Zealand, Paraguay, Senegal, South Korea, and Turkey.⁷

⁶ The quadratic form can be viewed as an approximation to a functional form that asymptotically approaches a zero relation between growth and level of per capita GDP, with the relation coming close to zero when real GDP is above \$ 10,800 (Barro 1991).

⁷ There are also a number of other measures that can be used to estimate the output loss. These differ in terms of the assumptions made about trend growth and the timing of the pre-crisis and post-crisis period. Generally, we got similar results for the policy and institutional variables. Still, it is worthy to note there are many other factors determining the potential GDP level of a certain country at a certain time. Since it is not possible to isolate the effect of the banking crisis on GDP from other shocks, none of these output loss measures correctly captures the effect of the banking crisis on GDP and the full economic costs of a banking crisis. This caveat is the more important as there can be large differences between the measures. In his discussion of the analysis of Hoggarth, Reis and Saporta (2002), Honohan (2002) shows that their lost cumulative loss in output has a correlation of only 33% with the IMF-loss of growth measure. Hoggarth et al. also show that using a lost cumulative output—instead off the lost cumulative growth measure, output losses during crises in developed countries are as high, or higher, on average than those in emerging economies, in contrast to previous research.

As a second way to look at economic recovery, we look at industries within each country that suffered a banking crisis to learn what other evidence can be found using a different approach. We use the UNIDO database of industrial statistics published by United Nations. As their data coverage is more limited, we have overlap for 15 countries including 27 manufacturing industries in each one. Since three countries experienced more than one banking crisis episode, we end up having a database with 18 crises. Then, we construct the dependent variable, which is the difference in the average real value added growth rates during the crisis period with that during the pre-crisis period. As pre-crisis period we use $t-3$ to t , and as crisis period we use t to $t+2$, where t is the year of the start of the crisis. The variable is calculated at industry level comprising 27 sectors classified by the International Standard Industrial Classification (ISIC). We investigate the change in real value added for these industries in relationship to policy measures and institutional factors, using the intra-country differences to explore the interactions between policy measures and institutional factors.

As explanatory variables we use a set of regressors: policy measures, world GDP growth, and institutional measures (corruption, law and order, quality of the bureaucracy, and the efficiency of the judicial system). For the policy responses, we use the data from Honohan and Klingebiel (2003), updated for recent crises by Kane and Klingebiel (2002), Caprio and Klingebiel (2003), and IMF (2003). As noted, we focus on three policies: extensive liquidity support, unlimited guarantee, and regulatory forbearance.

In addition to policy instruments, we want to study what other factors affect fiscal costs. We use world GDP real growth (IMF World Economic Outlook, WEO 2002) to control for the economic environment in the rest of the world in the year of the start of

the crisis. Everything else being equal, we would expect countries to be able to recover faster and limit fiscal cost in an environment where the rest of the world is experiencing sound GDP growth and export demand can substitute for weaker internal demand.

For the country's institutional and legal environment, several variables are used. A corruption index, law and order tradition, and the quality of the bureaucracy (all from ICRG) are used to measure the level of corruption in the government, the quality of the legal system, and the level of government bureaucracy. An efficiency of the judicial system index (from La Porta et al. 1998) is used to measure how efficient the judicial system is.

As explanatory variables for the industry level data, we use the same set as for the country-level regression, but add the share in value added of the different industries to evaluate the impact of their relative size in each country. This variable is measured three years before the start of the crisis. In some regressions, we also include the size of the financial system and the interaction between the external financial dependence and the institutional measures as we expect the impact of the level of institutional development to vary by the level of external financial dependence.

The econometric method used for the cross-section of 35 crises is ordinary least squares with robust standard errors. As data for some variables are not available in some crises, the sample size is reduced to between 24 and 34 crises. For the industry level regressions, the methodology used is generalized least squares with random country effects. We also include 27 industry dummies in the regressions. The same coverage limitation of the explanatory variables applies. See Appendix Table 2 for statistics and

detailed information on each crisis and Appendix Table 3 for a list of crises and industries covered.

5. Estimation results

The econometric results are presented in Tables 1-7. Table 1 shows the results for the fiscal cost regressions using the country-level database. We find that all three accommodative policy measures—extensive liquidity support, (unlimited) guarantees and regulatory forbearance—tend to increase the fiscal costs, with the regulatory forbearance variable entering as the policy variable with the most significant (and robust) result (columns 1-3). This finding is consistent with Honohan and Klingebiel (2003) who find that these policy variables add to fiscal costs.

Furthermore we find that countries that have more corrupt governments, lower law and order, weaker quality of bureaucratic institutions and less efficient judicial systems tend to experience banking crises that are fiscally more costly to resolve (columns 4-7). The positive correlation between fiscal costs and corruption may be indicating that more corrupt governments may be providing assistance to banks not based on the financial soundness and compliance with regulations of the institution, but rather based on government ties with certain dominant shareholders, business sectors and even political objectives. Assistance may be provided to institutions, whether state-owned or politically well connected, that have limited franchise value, requiring further fiscal support. In addition, in this environment, supervisory authorities may have limited ability and credibility with financial institutions to enforce regulations and intervene in

institutions that do not comply with prudential regulation. As such, the fiscal resolution costs of crises can be expected to be higher in these countries.

The results also suggest that the resolution of a crisis takes longer and is therefore more costly in countries with weaker law and order, worse quality of bureaucratic institutions and an inefficient judiciary. Good law and order and an efficient judicial system are crucial in resolving the debt overhang in the financial system and allowing bank balance sheets to be restored. Better quality of bureaucratic institutions may lead to better policy-making and better implementation of policies chosen. A more efficient judicial system may be better able to resolve the coordination problems between creditors and debtors as the credible threat of bankruptcy may provide an instrument for creditors to bring debtors to the negotiating table.

Most of these results are robust and hold across specifications. When adding both policy and one of the institutional variables, the results for the policy variables are generally maintained (Table 1 continued, columns 1-12). We find the most robust results for the forbearance policy, followed by the unlimited guarantee and the liquidity support variables. We cannot include more than one institutional variable since the correlation among the institutional variables is too high. It appears nevertheless that the corruption index and the efficiency of the judicial system are the most important indicators of the institutional environment as they are most consistently statistically significant.⁸

Tables 2 and 3 show the regression results for the IMF and Barro-based output losses using also the country-level database and the same setup of the regression as for

the fiscal costs regressions. Accommodative resolution policies do not seem to be effective in reducing the output losses (Tables 2 and 3, columns 1-3). In fact, we find evidence that output losses are greater when unlimited liquidity support is provided and forbearance is practiced (all the coefficients are positive, but not significant for unlimited guarantee). The results are the strongest for the unlimited liquidity support as the coefficients remain most often significant when including one of the institutional variables (Tables 2 and 3 continued, columns 1-12). These results suggest that accommodative policy instruments not only add to fiscal cost, but also are not effective in terms of helping the country's economy to recover faster and minimize output losses.

In terms of institutional variables, we find that countries with higher corruption, lower quality of bureaucratic institutions and less efficient judicial systems tend to have larger output losses (Tables 2 and 3, columns 4-7). The efficiency of the judicial system followed by the quality of bureaucratic institutions and corruption seem most important as those remain more often statistically significant when considering both policy and institutional variables (Tables 2 and 3 continued, columns 1-12). One channel can be that in such countries the government and creditors may have greater difficulty to resolve weak financial institutions and the corporate sector debt overhang, dragging down output.

For output losses, we find similar results for the industry-level database, as shown in Tables 4 and 5. We find that, during banking crises, larger industries perform better than in normal times and have higher value added growth rates. This result is contrary to the conventional convergence hypothesis where we expect smaller business sectors to experience higher growth rates until they reach a long-term lower rate similar to the ones

⁸ We also explored interaction effects between policies and institutional variables, but did not find any consistent significant relationships of interaction variables with either the fiscal cost of output loss

that larger industries experience. This difference during crises could be because smaller business sectors may find it more difficult to roll over bank loans or get new loans in order to fund their operations because the limited credit available may be directed to larger companies or companies with better credit standing.

The coefficients for the accommodative policy variables have negative signs in many specifications, meaning that the implementation of these resolution strategies tends to lower the real value added growth rate during the crisis. Forbearance is most consistently associated with slower recovery. As to the role of institutional variables, we find similar results for the country-level data: less corruption and better quality of the bureaucratic institutions tend to improve the speed of recovery. These results, together with the evidence found for the country-level database, provide substantial empirical support for the view that accommodative policy instruments used to resolve banking crises are not only fiscally costly, but are also not successful in accelerating economic recovery.

In Table 5, we interact the policy and institutional variables with a measure of industrial dependence on external finance. We do this to explore whether the effects of these policy and institutions vary with the degree to which the sector depends on external financing: arguably, sectors which are more dependent on external financing will be more affected by the way in which the financial crisis is tried to be resolved. We find some evidence that the growth of industries that depend more on external finance is disproportionately higher during a crisis in countries with an efficient judicial system, suggesting that an efficient judicial system can reduce the negative impact of a crisis on the growth of firms, particularly for firms that depend more on external financing.

variables, and using both country and industry level output data.

Otherwise, there is little evidence that the effects of policy and institutions vary by the degree of external financing dependence. The other effects remains similar to before, with forbearance, more corruption and worse quality bureaucratic institutions slowing down the recovery in a statistically significant way.

Our empirical findings reveal that accommodating policies and poor institutions add significantly and sizably to costs and slow the recovery. As Honohan and Klingebiel (2003) did, we can take the regression results and simulate the effects of strict versus accommodating policies. We do so in Table 6 where we show the effects of not having a blanket deposit guarantee, open-ended liquidity support or forbearance on costs. We also show the effects of having an improvement in institutions, where we simulate corruption, law and order, quality of the bureaucracy or the efficiency of the judicial system to improve by the equivalent of one standard deviation of each index. For these simulations we use the regression results of Table 3, columns 1-7. We find that a policy of implementing a blanket guarantee, open-ended liquidity support, or regulatory forbearance would add to the predicted fiscal cost respectively 10.5, 8.8 and 13.1 per cent of GDP. This compares in magnitude to the results of Honohan and Klingebiel (2003) that find effects for each of these policies on the order of 6 percentage points of GDP. In terms of institutional development, a country that improved its institutions by one standard deviation would have its predicted fiscal cost reduced by between 3.1 per cent of GDP (law and order) and 6.6 per cent of GDP (judicial efficiency). The table also shows the effects of a policy change or improvement in institutions on output losses, using both output loss measures. For these simulations we use the regression results of Tables 4 and 5, using for both columns 1-7. We find that the contribution of having a strict policy to

lowering the output losses according to the IMF definition is between 1 and 1.8 per cent of GDP and according to the Barro definition between 6.8 and 9.5 per cent of GDP. In terms of institutional development, a country that improved its institutions by one standard deviation would have its predicted output losses using the IMF definition reduced by between 0.1 per cent of GDP (law and order) and 1.3 per cent of GDP (judicial efficiency) and using the Barro definition between 2.1 per cent of GDP (law and order) and 3.6 per cent of GDP (quality of bureaucracy, closely followed by 3.4 percent of GDP for judicial efficiency).

Inasmuch as these calculations are based on regression results that only include one policy or institutional variable at a time, and also taking into account the general sensitivity of the regression results to the specifications, these simulations should not be taken too literally. Nevertheless, the results of Table 6 show not only sizable effects, but also suggest some rank order of the estimated individual impact of each individual policy measure and institutional improvement (while the results differ in magnitude, the rank order for the policy and institutional variables is largely maintained between the two output losses measures). They indicate that among the different accommodating measures, forbearance seems to be the costliest measure fiscally and open-ended liquidity support the worst for recovery. In terms of institutional improvements, it suggests that the judicial system is crucial, as improvements in the judicial system could contribute the most in terms of reducing the fiscal costs and accelerating the recovery.

6. Conclusions

We have examined the impact of accommodative policy instruments and the quality of the institutional frameworks on the effectiveness of crisis resolutions as measured by the size of the fiscal costs associated with the resolution of systemic crises, economic output losses, and differential value added growth rates. We use both country- and industry-data to draw conclusions at both aggregate and disaggregate levels.

Using both approaches, we find more accommodative policy measures to be fiscally costly, as already documented by Honohan and Klingebiel (2003). Moreover, when examining the question of whether these accommodative policy measures do produce faster recovery, and thus represent a trade-off between fiscal cost and recovery, we find that output losses are not reduced by any of these accommodative policy measures. Indeed, we find more evidence that applying accommodative policies, such as liquidity support, slows down the economic recovery. We also find that better institutional development—less corruption, better law and order, higher quality of the bureaucracy, and a more efficient judicial system—is uniformly positively associated with lower fiscal costs, lower output loss, and faster recovery. The degree of institutional development does not, however, displace the importance of policy as a determinant of fiscal costs and speed of recovery.

These results suggest that accommodative policy measures to support the financial sector—such as extensive liquidity support, unlimited guarantees and regulatory forbearance—are not only fiscally costly but also do not speed up recovery and often even slow down the economic recovery. At the same time, the results suggest that sound legal and other institutions are important components for a crisis resolution that is not

only cost-effective but also speedy. The best approach for a country to resolve a systemic crisis appears to be to implement strict resolution policies and improve its institutional framework. The importance of institutions may not surprise, as institutional development has often been found to be important for country's growth, productivity and stability. Our analysis, however, provides the starting point to disentangle what elements of the institutional framework are most important to help reduce the costs of a financial crisis and improve the recovery from a crisis and what the "returns" of such improvements might be. Such an analysis may in turn help guide policy makers in setting priorities for reform.

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Table 1. Explaining Fiscal Cost / GDP

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 34 countries for columns 1-3 is described in the Appendix Table 1. The sample for column 7 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
World GDP growth	0.638*	0.312	-0.066	0.108	0.361	0.265	-0.908
	[0.334]	[0.313]	[0.353]	[0.440]	[0.358]	[0.403]	[0.682]
Unlimited guarantee	1.076**						
	[0.524]						
Unlimited liquidity support		0.904*					
		[0.471]					
Forbearance			1.457***				
			[0.423]				
Corruption index				-0.363**			
				[0.154]			
Law and Order					-0.174		
					[0.112]		
Quality of the bureaucracy						-0.434*	
						[0.221]	
Efficiency of the judicial system							-0.380***
							[0.080]
Observations	34	34	34	34	34	34	24
R-squared	0.20	0.15	0.36	0.24	0.09	0.17	0.45

Table 1 (continued). Explaining Fiscal Cost / GDP

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 34 countries for columns 1-9 is described in the Appendix Table 1. The sample for columns 10-12 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
World GDP growth	0.448 [0.442]	0.695* [0.385]	0.563 [0.410]	-0.456 [0.733]	0.172 [0.431]	0.423 [0.343]	0.312 [0.385]	-0.736 [0.711]	-0.064 [0.389]	-0.042 [0.362]	-0.025 [0.370]	-1.177** [0.440]
Unlimited guarantee	0.895* [0.439]	0.993** [0.479]	0.840* [0.473]	0.803 [0.491]								
Unlimited liquidity support					0.685 [0.408]	0.909** [0.428]	0.742* [0.426]	0.677 [0.523]				
Forbearance									1.157** [0.451]	1.416*** [0.443]	1.289** [0.488]	1.383*** [0.410]
Corruption index	-0.315** [0.115]				-0.316* [0.158]				-0.160 [0.146]			
Law and Order		-0.138 [0.099]				-0.176* [0.094]				-0.024 [0.092]		
Quality of the bureaucracy			-0.315* [0.176]				-0.369 [0.221]				-0.142 [0.222]	
Efficiency of the judicial system				-0.323*** [0.077]				-0.332*** [0.102]				-0.250*** [0.073]
Observations	34	34	34	24	34	34	34	24	34	34	34	24
R-squared	0.37	0.25	0.27	0.53	0.32	0.23	0.26	0.51	0.39	0.36	0.37	0.68

Table 2. Explaining Output Loss (IMF)

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 35 countries for columns 1-3 is described in the Appendix Table 1. The sample for column 7 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
World GDP growth	-2.360**	-2.625**	-3.373***	-3.109**	-2.795***	-2.802**	-5.428***
	[1.150]	[1.028]	[1.068]	[1.199]	[1.010]	[1.141]	[1.720]
Unlimited guarantee	1.347						
	[1.377]						
Unlimited liquidity support		3.015**					
		[1.169]					
Forbearance			2.504**				
			[1.089]				
Corruption index				-0.721**			
				[0.331]			
Law and Order					-0.063		
					[0.334]		
Quality of the bureaucracy						-0.706	
						[0.471]	
Efficiency of the judicial system							-0.809***
							[0.273]
Observations	35	35	35	35	35	35	24
R-squared	0.14	0.25	0.21	0.20	0.12	0.16	0.40

Table 2 (continued). Explaining Output Loss (IMF)

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 35 countries for columns 1-9 is described in the Appendix Table 1. The sample for columns 10-12 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
World GDP growth	-2.703*	-2.355*	-2.442*	-4.260*	-2.856**	-2.581**	-2.620**	-4.947**	-3.358***	-3.617***	-3.308***	-6.120***
	[1.362]	[1.155]	[1.302]	[2.130]	[1.200]	[1.105]	[1.132]	[1.888]	[1.171]	[1.017]	[1.137]	[1.161]
Unlimited guarantee	1.112	1.340	1.035	2.072								
	[1.235]	[1.438]	[1.356]	[1.757]								
Unlimited liquidity support					2.612**	3.018**	2.793**	1.890				
					[1.251]	[1.185]	[1.264]	[1.453]				
Forbearance									1.678	2.924**	2.247	3.563***
									[1.423]	[1.228]	[1.411]	[1.127]
Corruption index	-0.685*				-0.536				-0.429			
	[0.341]				[0.386]				[0.442]			
Law and Order		-0.013				-0.070				0.247		
		[0.352]				[0.300]				[0.351]		
Quality of the bureaucracy			-0.605				-0.446					-0.208
			[0.482]				[0.486]					[0.582]
Efficiency of the judicial system				-0.661*				-0.674*				-0.472
				[0.332]				[0.331]				[0.308]
Observations	35	35	35	24	35	35	35	24	35	35	35	24
R-squared	0.22	0.14	0.17	0.46	0.30	0.25	0.27	0.45	0.23	0.22	0.21	0.56

Table 3. Explaining Output Loss (BARRO)

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 35 countries for columns 1-9 is described in the Appendix Table 1. The sample for columns 10-12 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
World GDP growth	-0.187	-0.471	-0.876*	-0.778	-0.476	-0.571	-1.818**
	[0.404]	[0.348]	[0.516]	[0.548]	[0.496]	[0.515]	[0.817]
Unlimited guarantee	1.183						
	[0.726]						
Unlimited liquidity support		1.916**					
		[0.743]					
Forbearance			1.263				
			[0.746]				
Corruption index				-0.459**			
				[0.169]			
Law and Order					-0.205		
					[0.172]		
Quality of the bureaucracy						-0.729***	
						[0.260]	
Efficiency of the judicial system							-0.524***
							[0.167]
Observations	35	35	35	35	35	35	24
R-squared	0.12	0.27	0.13	0.18	0.07	0.22	0.37

Table 3 (continued). Explaining Output Loss (BARRO)

This table shows country-level regressions estimated through ordinary least squares with robust standard errors. The sample of 35 countries for columns 1-9 is described in the Appendix Table 1. The sample for columns 10-12 is reduced to 24 countries primarily because the variable efficiency of the judicial system does not cover transition economies nor African countries. The variable world GDP growth represents the real growth rate of world's GDP in the year of the start of the banking crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
World GDP growth	-0.400 [0.471]	-0.118 [0.446]	-0.275 [0.477]	-1.502 [0.924]	-0.618 [0.431]	-0.339 [0.409]	-0.464 [0.418]	-1.345* [0.694]	-0.863 [0.554]	-0.789 [0.513]	-0.683 [0.515]	-1.825** [0.834]
Unlimited guarantee	1.037 [0.673]	1.089 [0.739]	0.850 [0.655]	0.560 [0.920]								
Unlimited liquidity support					1.659** [0.758]	1.924** [0.727]	1.628** [0.673]	1.860** [0.882]				
Forbearance									0.571 [0.805]	1.114 [0.776]	0.498 [0.829]	0.035 [0.731]
Corruption index	-0.425** [0.182]				-0.341* [0.184]				-0.359** [0.169]			
Law and Order		-0.165 [0.183]				-0.210 [0.143]				-0.088 [0.166]		
Quality of the bureaucracy			-0.646** [0.240]				-0.577** [0.241]				-0.618* [0.303]	
Efficiency of the judicial system				-0.484** [0.202]				-0.392** [0.179]				-0.520*** [0.168]
Observations	35	35	35	24	35	35	35	24	35	35	35	24
R-squared	0.25	0.15	0.26	0.39	0.35	0.32	0.39	0.55	0.19	0.13	0.23	0.37

Table 4. Difference in real value added growth

This table shows industry-level regressions estimated through random effects generalized least squares. Dependent variable is the difference in real value added growth during the crisis period and the pre-crisis period. The sample of 15 countries is described in the Appendix Table 2. World GDP growth is real growth rate of world's GDP in the year of the start of the banking crisis. Real GDP per capita is measured in t-3. Value added share in t-3 is the industry share in total value added measured three years before the start of the crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. Industry dummies are used but not reported. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
World GDP growth	0.000 [0.014]	-0.007 [0.012]	0.019 [0.014]	-0.013 [0.012]	-0.014 [0.014]	-0.019 [0.013]	-0.003 [0.013]
GDP per capita	0.022 [0.020]	0.019 [0.018]	0.013 [0.018]	-0.030 [0.025]	-0.007 [0.031]	-0.017 [0.022]	-0.017 [0.033]
Value added share in t-3	0.687** [0.273]	0.691** [0.273]	0.699*** [0.270]	0.696*** [0.270]	0.692** [0.273]	0.704*** [0.272]	0.689** [0.272]
Unlimited guarantee	-0.031 [0.030]						
Unlimited liquidity support		0.006 [0.039]					
Forbearance			-0.101*** [0.032]				
Corruption index				0.064*** [0.021]			
Law and Order					0.027 [0.026]		
Quality of the bureaucracy						0.056** [0.022]	
Efficiency of the judicial system							0.021 [0.016]
Observations	454	454	454	454	454	454	454
Number of countries	15	15	15	15	15	15	15
R-squared	0.11	0.12	0.17	0.15	0.11	0.16	0.11

Table 4 (continued). Difference in real value added growth

This table shows industry-level regressions estimated through random effects generalized least squares. Dependent variable is the difference in real value added growth during the crisis period and the pre-crisis period. The sample of 15 countries is described in the Appendix Table 2. World GDP growth is real growth rate of world's GDP in the year of the start of the banking crisis. Real GDP per capita is measured in t-3. Value added share in t-3 is the industry share in total value added measured three years before the start of the crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. Industry dummies are used but not reported. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
World GDP growth	-0.011 [0.015]	-0.006 [0.020]	-0.015 [0.011]	0.003 [0.015]	-0.013 [0.013]	-0.016 [0.015]	-0.016 [0.011]	-0.003 [0.013]	0.007 [0.019]	0.027 [0.020]	0.006 [0.017]	0.021 [0.015]
GDP per capita	-0.029 [0.027]	0.001 [0.039]	-0.011 [0.018]	-0.011 [0.041]	-0.032 [0.025]	-0.013 [0.032]	-0.013 [0.018]	-0.014 [0.032]	-0.014 [0.028]	0.023 [0.033]	-0.008 [0.023]	0.021 [0.035]
Value added share in t-3	0.694** [0.270]	0.689** [0.272]	0.707** [0.276]	0.686** [0.272]	0.693** [0.270]	0.695** [0.272]	0.706** [0.275]	0.689** [0.273]	0.699*** [0.269]	0.699*** [0.270]	0.706*** [0.270]	0.700*** [0.270]
Unlimited guarantee	-0.013 [0.032]	-0.025 [0.036]	-0.006 [0.023]	-0.024 [0.035]								
Unlimited liquidity support					-0.016 [0.042]	0.020 [0.043]	-0.017 [0.030]	-0.002 [0.040]				
Forbearance									-0.065 [0.045]	-0.111*** [0.038]	-0.083** [0.034]	-0.108*** [0.038]
Corruption index	0.064*** [0.022]				0.066*** [0.022]				0.038 [0.029]			
Law and Order		0.020 [0.032]				0.032 [0.028]				-0.013 [0.030]		
Quality of the bureaucracy			0.052*** [0.018]				0.054*** [0.018]				0.033 [0.025]	
Efficiency of the judicial system				0.018 [0.020]				0.020 [0.016]				-0.005 [0.019]
Observations	454	454	454	454	454	454	454	454	454	454	454	454
Number of countries	15	15	15	15	15	15	15	15	15	15	15	15
R-squared	0.14	0.10	0.16	0.10	0.15	0.10	0.17	0.11	0.17	0.17	0.19	0.17

Table 5. Difference in real value added growth

This table shows industry-level regressions estimated through random effects generalized least squares. Dependent variable is the difference in real value added growth during the crisis period and the pre-crisis period. The sample of 15 countries is described in the Appendix Table 2. World GDP growth is real growth rate of world's GDP in the year of the start of the banking crisis. Real GDP per capita is measured in t-3. Value added share in t-3 is the industry share in total value added measured three years before the start of the crisis. The policy variables unlimited guarantee, unlimited liquidity support, and forbearance are zero-one dummies where a one is assigned when the country implemented the policy instrument. Corruption index, law and order, and quality of the bureaucracy are components of the Political Risk Rating constructed by ICRG and take higher values when lower levels of risk are perceived. Efficiency of the judicial system takes higher values for countries with more efficiency and integrity of the legal environment. The institutional and policy variables are interacted with the index of external financial dependence. Industry dummies are used but not reported. A constant is calculated but not reported. Standard errors are in brackets. *, **, and *** mean significance at 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
World GDP growth	0.003	-0.006	0.021	-0.015	-0.015	-0.020	-0.002
	[0.015]	[0.012]	[0.015]	[0.013]	[0.015]	[0.013]	[0.013]
GDP per capita	0.021	0.019	0.012	-0.033	-0.015	-0.020	-0.023
	[0.022]	[0.018]	[0.019]	[0.026]	[0.033]	[0.024]	[0.035]
Value added share in t-3	0.713***	0.705***	0.707***	0.730***	0.731***	0.713***	0.786***
	[0.272]	[0.273]	[0.269]	[0.272]	[0.276]	[0.277]	[0.276]
Unlimited guarantee	-0.020						
	[0.034]						
Unlimited guarantee * External financial dependence	-0.061						
	[0.044]						
Unlimited liquidity support		0.028					
		[0.042]					
Unlimited liquidity support * External financial dependence		-0.074					
		[0.046]					
Forbearance			-0.086**				
			[0.035]				
Forbearance * External financial dependence			-0.064				
			[0.043]				
Corruption index				0.071***			
				[0.023]			
Corruption index * External financial dependence				-0.016			
				[0.018]			

Law and Order					0.036		
					[0.029]		
Law and Order * External financial dependence					-0.012		
					[0.015]		
Quality of the bureaucracy						0.058**	
						[0.024]	
Quality of the bureaucracy * External financial dependence						-0.004	
						[0.020]	
Efficiency of the judicial system							0.028
							[0.018]
Efficiency of the judicial system * External financial dependence							-0.015*
							[0.009]
Observations	454	454	454	454	454	454	454
Number of countries	15	15	15	15	15	15	15
R-squared	0.11	0.13	0.17	0.15	0.11	0.16	0.11

Table 6: Estimated change in fiscal costs and output losses depending on the adoption of policy instruments and improvements of the institutional framework

This Table shows simulations for changes in fiscal costs and output losses. The results for the changes in fiscal costs are based on regression results from Table 3, columns 1-7; for the changes in output loss IMF on the regression results from Table 4, columns 1-7, and for changes in output loss, Barro on the regression results from Table 5, columns 1-7. The simulations calculate the effects on the outcome variables of the particular policy were not adopted or if the respective institutional index were to be one standard deviation better than its mean.

	Change in fiscal cost (as % of GDP)	Change in output loss (IMF) (as % of GDP)	Change in output loss (BARRO) (as % of GDP)
Policy alternatives			
Unlimited guarantee	10.52	1.01	6.83
Liquidity support	8.79	1.84	9.47
Forbearance	13.14	1.56	6.74
Institutional framework			
Corruption index	-4.81	-0.58	-3.29
Law and order	-3.11	-0.09	-2.06
Quality of the bureaucracy	-4.18	-0.46	-3.56
Efficiency of the judicial system	-6.55	-1.25	-3.39

Appendix Table 1. Description of variables

Variable Name	Description	Source
Fiscal cost / GDP	The ex-post fiscal cost estimate of financial distress as a percentage of GDP. Data are collected for 35 banking crisis episodes from 1977 to the present. The fiscal cost figure includes both fiscal and quasi-fiscal outlays for financial system restructuring, including the recapitalization costs for banks, bailout costs related to covering depositors and creditors, and debt relief schemes for bank borrowers.	Honohan and Klingebiel (2003), Kane and Klingebiel (2002), Caprio and Klingebiel (2003), and IMF (2003)
Output loss (IMF)	Output loss, calculated as the sum of the differences between the actual and trend growth rates for the period t until the year in which the trend growth is reached, where trend GDP growth is calculated as the average of GDP growth rates from t-3 to t-1, and t is the starting year of the crisis. The approach follows IMF World Economic Outlook (1998) and the data are updated to include some recent crises.	IMF World Economic Outlook database (2002)
Output loss (BARRO)	Output loss variable. Same as output loss (IMF), but the trend growth is estimated as the predicted value from equation (2) in Barro (1991). The equation is: Average GDP per capita growth from 1960 to 1980 = $0.0302 - 0.0111 * \text{GDP per capita in 1960} + 0.00051 * (\text{GDP per capita in 1960})^2 + 0.0323 * \text{Secondary school enrollment rate} + 0.0270 * \text{Primary school enrollment rate} - 0.122 * \text{Government consumption/GDP} - 0.0200 * \text{Number of revolutions} - 0.0309 * \text{Number of assassinations} - 0.0148 * \text{Deviation from the PPP in 1960}$. The last three regressors are considered to be zero. We collect data for the other variables using the Barro-Lee and Summers-Heston databases. We value GDP per capita and the enrollment rates to primary and secondary school at three years before the start of the crisis. For government consumption scaled by GDP, we take the average between eight years and three years before the start of the crisis. We put an upper cap of \$ 10,800 on the GDP per capita level variable. larger than \$10,800.	Barro (1991), Barro-Lee database, Summers-Heston database, IMF World Economic Outlook database
Difference of real value added growth between crisis years and pre-crisis years	Difference between the average pre-crisis value added growth rates (from t-3 to t) and the average value added growth rates during the crisis (from t to t+2), where t is the year of the start of the crisis. The variable is calculated at industry level comprising 27 sectors classified by the International Standard Industrial Classification (ISIC).	UNIDO Database of Industrial Statistics
Unlimited guarantee	This variable takes a value of one when the government issues an explicit guarantee to depositors in private banks and/or when the market participants are implicitly protected as deposits of state-owned institutions account for more than 75 percent of total banking deposits.	Honohan and Klingebiel (2003) and Kane and Klingebiel (2002)

Unlimited liquidity support	This variable takes a value of one when the government provide substantial liquidity support to insolvent institutions and zero otherwise. (Substantial is defined as liquidity support surpassing total aggregate financial system capital).	Honohan and Klingebiel (2003) and Kane and Klingebiel (2002)
Forbearance	This variable takes a value of one when the government gives forbearance in the sense that regulations (in particular loan classification and loan loss provisioning) are relaxed or the current regulatory framework is not enforced for at least a twelve months period to allow banks to recapitalize on a flow basis; or competition is restricted.	Honohan and Klingebiel (2003)
World GDP growth	Real growth rate of gross domestic product of the world, PPP-weighted. This variable is measured in the year of the crisis.	IMF World Economic Outlook database (2002)
Corruption index	Corruption is component of the political risk rating produced by the ICRG. It is a qualitative variable with range 1 to 6, where a lower number indicates higher corruption. This is a measure of corruption within the political system. The highest risk ratings tend to signify an accountable democracy whose government has been in office for less than five years. An intermediate rating often indicates a country whose government has been in office for more than ten years and where a large number of officials are appointed rather than elected. The lowest ratings are usually given to one-party states and autarchies. This variable is valued in December of the year prior to the start of the crisis.	Political Risk Services: International Country Risk Guide
Law and order	Law and order is a qualitative variable with range 1 to 6, where a higher number indicates higher "levels" of law and order. Law and Order are assessed separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law. Thus, a country can enjoy a high rating (3) in terms of its judicial system, but a low rating (1) if the law is ignored for a political aim, e.g. widespread strikes involving illegal practices. This variable is valued in December of the year prior to the start of the crisis.	Political Risk Services: International Country Risk Guide
Quality of the bureaucracy	This is a component of the political risk rating produced by the ICRG. It ranges from 1 to 4, where higher values represent lower risk. Higher points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training. The variable is valued in December of the year prior to the start of the crisis.	Political Risk Services: International Country Risk Guide

Efficiency of the judiciary system	Assessment of the "efficiency and integrity of the legal environment as it affects business, particularly foreign firms" produced by the country-risk agency Business International Corporation. Average between 1980 and 1983. Scale from 0 to 10, lower scores represent lower efficiency levels.	La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). The original source is Business International Company.
Value added share in t-3	Industry share in total value added measured three years before the start of the crisis.	UNIDO Database of Industrial Statistics
External financial dependence	The fraction of capital expenditures not financed with cash flow from operations for a particular industry. This variable measures the median level of external financing for U.S. industries in the 1980s.	Rajan and Zingales (1998)
GDP per capita in t-3	GDP per capita is gross domestic product divided by mid-year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars and valued three years before the start of the crisis.	World Bank's World Development Indicators.

Appendix Table 2. Country-level database

Country	Crisis period	Fiscal cost / GDP	Unlimited guarantee	Unlimited liquidity support	Forbearance	Output loss (IMF) (as % of GDP)	Output loss (BARRO) (as % of GDP)	Private credit / GDP
1 Argentina	1980-1982	55.1	yes	no	yes	17	13	21.0
2 Australia	1989-1992	2.0	no	no	no	0	0	40.4
3 Brazil	1994-1996	13.2	no	no	yes	0	0	68.7
4 Bulgaria	1996-1997	13.0	yes	yes	yes	8	22	9.5
5 Chile	1981-1983	42.0	no	yes	yes	46	23	37.4
6 Colombia	1982-1987	5.0	yes	yes	no	7	9	30.2
7 Cote d'Ivoire	1988-1991	25.0	no	yes	yes	1	18	35.3
8 Czech Republic	1989-1991	12.0	yes	no	yes	0	36	59.7
9 Ecuador	1998-2001	20.0	yes	yes	no	12	18	28.71
10 Finland	1991-1994	11.2	yes	yes	no	21	19	82.8
11 France	1994-1995	0.7	no	no	no	0	2	95.7
12 Ghana	1982-1989	6.0	yes	yes	yes	7	18	2.3
13 Hungary	1991-1995	10.0	yes	yes	yes	14	34	46.8
14 Indonesia	1997-2002	55.0	yes	yes	yes	39	22	53.6
15 Jamaica	1996-2000	43.9	yes	yes	yes	7	20	26.6
16 Japan	1991-ongoing	24.0	yes	yes	yes	48	5	189.3
17 Malaysia	1997-2001	16.4	yes	yes	yes	33	11	125.1
18 Mexico	1995	19.3	yes	yes	yes	10	11	32.9
19 New Zealand	1987-1990	1.0	no	yes	no	0	7	25.3
20 Norway	1990-1993	8.0	yes	yes	no	0	0	81.4
21 Paraguay	1995-ongoing	13.0	yes	yes	yes	0	20	24.5
22 Philippines	1983-1987	13.2	no	yes	yes	26	28	44.9
23 Poland	1992-1995	3.5	yes	yes	yes	0	7	5.3
24 Russia	1998-1999		no	yes	yes	3	9	8.5
25 Senegal	1988-1991	17.0	yes	yes	yes	0	3	31.2
26 Slovenia	1992-1994	14.6	yes	no	yes	0	7	34.9

27	South Korea	1997-2002	28.0	yes	yes	yes	17	10	66.6
28	Spain	1977-1985	5.6	no	yes	no	0	15	73.7
29	Sri Lanka	1989-1993	5.0	yes	no	yes	1	3	20.8
30	Sweden	1991-1994	4.0	yes	no	no	11	3	108.8
31	Thailand	1997-2002	34.8	yes	yes	yes	40	20	138.0
32	Turkey	2000-ongoing	30.5	yes	yes	yes	0	11	24.0
33	United States	1988-1991	3.2	no	no	yes	0	0	91.2
34	Uruguay	1981-1984	31.2	yes	yes	yes	41	27	33.5
35	Venezuela	1994-1995	22.0	no	yes	yes	14	5	25.5

Notes: Private credit / GDP is the average of private credit over GDP of the three years prior to the start of the crisis.

Sources: Fiscal cost and policy variables from Honohan and Klingebiel (2003), Kane and Klingebiel (2002), IMF (2002) and Caprio and Klingebiel (2003). Private credit / GDP from IFS.

Appendix Table 3. Industry-level database

Crises covered		Industries covered in each crisis
Country	Period	
1 Australia	1989-1992	1 Plastic products
2 Chile	1981-1983	2 Professional & scientific equipment
3 Colombia	1982-1987	3 Machinery, electric
4 Finland	1991-1994	4 Other chemicals
5 Indonesia	1992-1994	5 Machinery, except electrical
6 Indonesia	1997-2002	6 Glass and products
7 Japan	1991-ongoing	7 Other manufactured products
8 Malaysia	1985-1988	8 Transport equipment
9 Malaysia	1997-2001	9 Misc. petroleum and coal products
10 Mexico	1995	10 Wood products, except furniture
11 New Zealand	1987-1990	11 Industrial chemicals
12 Norway	1990-1993	12 Furniture, except metal
13 South Korea	1997-2002	13 Rubber products
14 Sweden	1991-1994	14 Printing and publishing
15 Turkey	1982-1985	15 Textiles
16 Turkey	1994	16 Paper and products
17 United States	1988-1991	17 Food products
18 Uruguay	1981-1984	18 Iron and steel
		19 Beverages
		20 Other non-metallic mineral products
		21 Petroleum refineries
		22 Wearing apparel, except footwear
		23 Non-ferrous metals
		24 Footwear, except rubber or plastic
		25 Leather products
		26 Pottery, china, earthenware
		27 Tobacco

Sources: UNIDO Database of Industrial Statistics.