The Long Run Effects of Banking Crises on Investment

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Abstract: The literature on the effects of banking crises on the real economy has typically found that the effects are short-lived. We find that banking crises have a prolonged negative effect on investment. Using data for 150 countries from 1963 to 2007, we find that the investment to GDP ratio is on average about 1.5 percent lower during each of the 7 to 9 years following a banking crisis. We also find that this adverse effect is due largely to loss of confidence. Results show that experiencing repeated crises over time, which we argue reduces confidence in the system, may also reduce investment and partly account for the persistence of this effect. Furthermore, we find that in countries where the banking crises imposed significant negative costs on wide segments of the population, confidence in the banking system is reduced, leading to the prolonged decrease in investment.

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I. Introduction

A large body of research has established that banking crises lead to a steep decline in output, investment, and employment.[1] This literature finds that economic growth resumes in about 2-3 years, the amount of time that it typically takes to resolve the major problems in the financial sector. However, even though economic growth resumes, some recent studies find that there may be a long term decline in output which remains below its pre-crisis trend. For example, Cerra and Saxena (AER, 2008) find that, even ten years after a banking crisis, output remains about 7 percent below its pre-crisis trend. Hence, banking crises may have persistent effects on the economy. The IMF's World Economic Outlook (2009) further finds that the persistent fall in output in the medium term arises from reductions in both employment and capital.

This literature, however, has not explored the channels that account for the observed persistent reduction in output and its inputs. In this paper, we explore how investment in capital, a key component of output, is affected by banking crises. Further, we explore how confidence in the banking sector may be a key channel through which banking crises may lead to lower investment for a prolonged period of time. Confidence in the banking system can erode with repeated crises or when the effects are widespread within a country, for example, causing losses on deposits or extensive bank closures. We test whether this "confidence channel" can account for the investment decline observed after banking crises.

We define "confidence" as the perceived increase in the threat of a banking crisis which typically brings about disruptions to financing and a slowdown of the economy. The occurrence

[1] This literature includes Dell'Ariccia, Detragiache and Rajan (2008), Demirgüç-Kunt, Detragiache, and Gupta (2006), Kaminsky and Reinhart (1999), and Eichengreen and Rose (1998).

of a banking crisis reveals how abruptly an economy can shift from the rapid rates of economic growth that usually precede banking crises to financial and economic collapse. The memory of such an event may stay with investors for several years after a banking crisis, leading to greater caution and lower levels of investment. This confidence effect may be particularly important if a country has experienced multiple crises or if wide segments of the population incurred substantial losses. In such countries, the recurrence of crises may be seen as a pattern that could raise the perceived likelihood of a new crisis.

Our focus on the effects of confidence follows the "learning-from-experience" literature which studies the effects of experience on beliefs and behavior. This literature finds that expectations of key economic variables are strongly influenced by dramatic events during a person's lifetime. Hence, economic agents incorporate various sources of information about the economy in their decision making process. This literature finds that personally experienced events have a disproportionately strong effect on beliefs and behaviors. For example, Malmendier and Nagel (2009) show that people who have lived through a period of high inflation have persistently higher levels of expected inflation. Giuliano and Spilimbergo (2009) show that people who have grown up during recessions favor more income redistribution and have less trust in government. Malmendier and Nagel (2010) show that people who have lived through periods of low stock market returns are less likely to take financial risk and are less likely to participate in the stock market. Moreover, these effects can persist for decades. Mudd and Valev (2009) show that people who had experienced a loss during a banking crisis are more likely to expect another banking crisis, even a decade after the crisis. In addition, a seminal paper by Calvo (1986) on "temporary stabilizations" shows that, in countries with a history of

currency crises, economic agents do not expect stabilizations to be permanent.[2] Finally, studying the Great Depression, Cagan (1965) modeled the expectations of the future rate of loss on deposits as depending on some average of the past experience of losses.

In summary, findings from the above literature are consistent with our hypothesis that a dramatic banking crisis can influence expectations of stability for a long time. Investment may be particularly sensitive to expectations of instability since it requires the commitment of funds to often illiquid assets for a number of years. Uncertainty about the economy, the banking system, and a perception that a banking crisis may occur can be a drag on investment for many years.[3]

Thus, our goal is to investigate whether investment declines after a banking crisis and, if it does, for how long and by how much. We follow the work of Cerra and Saxena (2008) who also study the long-term impacts of banking crises (and other shocks), but we focus on investment instead of output levels. Furthermore, we explore a particularly important channel that may drive the persistent effects. We use data for 150 countries from 1963 to 2007, including the well-known Reinhart and Rogoff (2008) event data on banking crises episodes. Our results confirm that banking crises have long-term consequences. We find that crises reduce investment even after controlling for: the availability of credit and other sources of financing; feedback effects from growth to investment; the magnitude of the crisis; and a number of other factors. In fact, the investment to GDP ratio is on average about 1.5 percent lower during *each* of the 7 to 9 years following a banking crisis. We also find that this adverse effect is due largely to loss of confidence. While we do not have a direct measure of confidence, we proxy for people's

[2] The hysteresis of currency substitution has also been explained by persistent expectations of renewed instability (Melvin and Fenske, 1982; Clements and Schwartz, 1992).
[3] Other related theoretical literature on the effects of uncertainty on investment includes: the effects of uncertain tax policy (e.g., Hassett and Metcalf, 1999) and the effect of output price uncertainty (e.g., Abel, 1983; and Pindyck, 1982)

personal experiences with banking crisis as follows. First, we argue that the number of banking crises experienced by a country is likely to affect the confidence of the population in their banking system. Our results show that experiencing repeated crises over time reduces investment and partly account for the persistence of the effect. Second, we propose that in countries in which banking crises imposed significant negative costs on wide segments of the population, confidence in the banking system will likely be reduced. The extent to which the population is affected by a banking crisis can be measured by, among other things, whether banking deposits were frozen or banks were closed. We find that these proxies of confidence can account for the prolonged adverse effect on investment.

We are also cautious about potential reverse causality. In Diamond and Dybvig's (1983) framework, a banking crisis can occur because of a shift in confidence. Then, it is not the banking crisis that reduces confidence and lowers subsequent investment. Instead, the deterioration of confidence causes the crisis and the decline in investment. We confront this issue to the degree that we can using a lagged structure in our empirical models. However, we cannot entirely rule out the potential of reverse causality.

The rest of the paper is structured as follows: Section II describes the data and methodology; Section III discusses the results; and Section IV concludes.

II. Data and Methodology

Reinhart and Rogoff (2008) identify episodes of banking crises as "*periods when bank runs lead to the closure, merging or takeover of financial institutions or, if there are no runs, the closure, merging, takeover or large program assistance from the public sector to an important financial institution [which] led to similar distress in other financial institutions.*" Using this

definition, Reinhart and Rogoff (2008) identify 156 banking crises in 110 countries from 1963 to 2007. The frequency of banking crises has varied over time but seems to have trended upwards. For instance, only 3 banking crisis in our dataset occurred between 1960 and 1975, whereas about 35% of all crises occurred in the 1980s and 45% in the first half of the 1990s. This trend declined in the latter years of the sample as only 16% of the crises happened after 1995. The data also show that different regions have been affected differently by banking crises. Latin American economies have experienced a high number of banking crises. For example, Argentina, Brazil, and Bolivia represent the most extreme cases, having suffered more than 3 crises each. Many countries in Sub-Saharan Africa, Eastern Europe, and Central Asia have also suffered from multiple banking crises. Only a quarter of the countries in these regions have not experienced a banking crisis, while 13 countries experienced two crises.

Since we are interested in the effect of banking crises on long-run capital formation, our dependent variable is *Investment,* which is defined as real gross capital formation as share of GDP. These data come from the Penn World Tables (Heston, Summers, and Athen, 2006). As the summary statistics in Table 1 show, investment is on average 15% of GDP. In order to investigate how long a banking crisis may affect investment, we construct a dummy variable *crisis* that takes the value 1 for the year when a banking crisis started, and zero otherwise. We then construct lagged values of the *crisis* variable for each country in the sample and enter up to 10 lags in the following empirical specification:

$$(1) \quad Investment_{i,t} = \alpha + \sum_{k=1}^{10} \theta_k crisis_{i,t-k} + \gamma X_{i,t} + e_{i,t}$$

This specification allows us to estimate the effect of a crisis on investment up to ten years after the onset of the crisis. We are interested in the magnitude and statistical significance of the

estimated parameters θ at different lags. For example, $\hat{\theta}_6 < 0$ would indicate that a banking crisis reduces investment in the 6th year after the crisis began.

There are a couple of exogeneity-related issues that need to be discussed. First, Cerra and Saxena (2008) include the contemporaneous crisis dummy in their baseline regressions, which assumes that the crises dummies are exogenous to growth. This is reasonable to do since they are interested in the cumulative effect on output. However, to reduce the potential endogeneity issue, we do not include the contemporaneous crisis dummy but only lags since we focus on how long the adverse effects on investment last.[4] Second, the possibility that an omitted variable drives both a crisis to occur and investment to fall cannot be ruled out. We try to account for this by including a wide array of independent variables in the estimations.

The set of control variables that may affect investment, *X*, is drawn from the literature. One key determinant of investment is the amount of credit issued to the private sector. We use *Private Credit* defined as the amount of credit issued by banks to the private sector as a share of GDP. This measure has been widely used in the finance and growth literature (Levine, 2005). Given the potential reverse causality issue of higher investment leading to more demand for private credit, we instrument for private credit using legal origin variables as typically done in the literature (Beck, 2008)[5]. Another key determinant of investment is the well-known "accelerator effect." When output in an economy has been growing fast, business profits and cash flows increase, which leads firms to increase investment. Hence, we use the average GDP growth over the previous 5 years to control for this "investment accelerator" effect.

[4] In any event, Cerra and Saxena (2008) test both cases: with a contemporaneous crisis dummy and with lags of crisis dummies only. They find that their results are robust to both specifications and that the lags-only specification yields somewhat smaller effects on output. Likewise, in unreported robustness tests, we run our estimations including the contemporaneous dummy variable finding very similar results.

[5] We follow La Porta et al. (1997, 1998) who identified differences in country's legal origins as an exogenous variable that explains the current variability in financial development. We regress Private Credit on British, French, German, and Socialist legal origins, with Scandinavian being the omitted category. We attempt to capture the exogenous component of Private Credit; then we use its predicted value in the investment regressions.

The other variables that comprise our baseline control set are: GDP per capita, inflation, government spending (as a share of GDP), and trade openness (as a share of GDP). As in standard growth models, we would expect countries with high GDP per capita to also have high investment rates. We expect inflation to have a negative effect as it affects potential future returns (Aizenman and Marion, 1999). Openness of the economy to trade is likely to have a positive effect on investment (Aizenman and Noy, 2006). The government share of GDP is typically found to have a negative effect on economic growth; hence, a negative effect on investment would be expected. We also control for stock market activity which can be an alternative source of funds for investment. We use the *Turnover Ratio* which measures the value of the traded shares in the domestic stock market divided by the total value of shares in the market. It measures how active or liquid the stock market is relative to its size. In some specifications, we also use the real interest rate for robustness to account for the cost of borrowed funds. However, the sample declines by about one-third due to lack of data for this variable. Finally, we use indexes of *Investment Risk* and *Bureaucratic Quality* published by the International Country Risk Guide (ICRG) as measures of institutional development.[6] We expect that countries with less developed institutions would have lower investment rates. Adding institutions to the equation is important as banking crises might be a symptom of underdeveloped institutions and, therefore, the effect of crises on investment that we detect could be a proxy for the role of institutions. Appendix 1 shows the definitions and the sources of the data, while Tables 1 and 2 present the summary statistics.

In order to test if crises have lasting effects on confidence as described in the introduction, we next add a measure for the frequency of banking crises in a particular country.

[6] The definitions of these two index measures from ICRG are provided in Appendix 1.

The variable *Multiple Crises*$_{i,t}$ equals the number of crises that country *i* has experienced through year *t*:

$$(2) \quad Investment_{i,t} = \alpha + \sum_{k=1}^{10} \theta_k crisis_{i,t-k} + \sigma Multiple\ Crises_{\ i,t} + \gamma X_{i,t} + e_{i,t}$$

Our hypothesis is that the occurrence of multiple crises would reduce investment as they are a strong indicator of recurrent instability. *Multiple crises* reduce long-run confidence in economic stability and would tend to lower investment over the years, so we would expect that $\sigma < 0$. In addition, the inclusion of *Multiple Crises* in the estimation allows us to observe what happens to the coefficients on the crisis dummies, θ's. It is possible that a new banking crisis is simply a reminder that crises are a recurrent problem in a particular country. Then, adding *Multiple Crises* would lower the estimated values of θ. This would indicate that one reason why investment declines for several years after a banking crisis is that confidence in economic stability is reduced for a number of years.

Banking crises are more likely to affect confidence if their effects ripple through the population. If households and firms lose money, a banking crisis is no longer some event from the news, but a personal experience. The "learning-from-experience" literature discussed in the introduction suggests that these personal experiences are more likely to affect expectations and behavior (e.g., Malmendier and Nagel, 2009, 2010; Giuliano and Spilimbergo, 2009). Therefore, the next step in the analysis is to test whether banking crises that have more widespread effects reduce investment for longer periods and by greater magnitudes.

We denote the extent to which the effects of a crisis are widespread as *Dispersion* and use three alternative measures to gauge it. First, *Deposit Freeze* indicates whether deposits were frozen during the banking crisis. For example, in Argentina partial withdrawal restrictions on

deposits ("corralito") were imposed between December 2001 and December 2002. Our contention is that having deposits frozen is a traumatic event for depositors, investors, and the population in general which would particularly affect subsequent confidence in the banking system. The second alternative measure of dispersion is *Bank Closures* which is the number of banks closed during the crisis. We conjecture that the larger the number of banks that are closed during a crisis, the more likely this is to negatively affect confidence in the banking sector. The third alternative measure is *Currency Crisis* which indicates whether there was a simultaneous currency crisis along with the banking crisis. The effects of currency crises are widespread, so they are felt by a large share of the population, not just by those that have direct links to the affected banks in a banking crisis. In that sense, *Currency Crisis* may also measure how confidence is affected by banking crises. We obtain these variables for a smaller sample of countries for which detailed data on banking crises have been collected by Laeven and Valencia (2008), and enter an interaction term with the banking crisis dummies:

$$(3) \quad Investment_{i,t} = \alpha + \sum_{k=1}^{10} \theta_k crisis_{i,t-k} + \sum_{k=1}^{10} \eta_k Dispersion_{i,t-k} \times crisis_{i,t-k} + \gamma X_{i,t} + e_{i,t}$$

where *Dispersion* is measured alternatively by one of the three variables discussed above. Our hypothesis is that $\theta_k < 0$ and $\eta_k < 0$.

III. Results

The Effects of Banking Crises on Investment

We first estimate equation (1) regressing investment as a share of GDP on lags of the banking crisis dummy and our baseline control set. Both fixed effects and random effects regressions were initially estimated with the Hausman test indicating that random effects is the more appropriate approach. All the estimations presented in the paper henceforth are random effects regressions. The results in Table 3 show that investment can be adversely affected by banking crises for as long as 7 to 9 years. The banking crisis literature cited in the introduction has usually found that this effect only lasts about three years for growth rates. However, the effect on the investment share is persistent. Regression (1) shows that the effect of a crisis reduces investment for up to 9 years. The coefficient estimates for the crises dummies indicate the percent of GDP by which investment is affected. Therefore, this adverse effect is economically significant as investment is on average about 1.5% of GDP lower. The control variables are generally also significant and of expected signs. For example, the average growth rate of GDP over the previous five years, which accounts for the "investment accelerator" effect, is positive with a 1% increase implying investment is 0.21% higher. Similarly, *Private Credit* and *Turnover Ratio* are positive and statistically significant determinants of investment as expected. Among the remaining control variables, *Inflation*, and *Openness* are statistically significant and have the expected signs; *Government Spending* is positive in regression (1), but not significant in the other regressions; GDP per capita is not statistically significant in any of the regressions.

Table 3 subsequently presents several robustness tests. In regression (2), we add the real interest rate. The sample is reduced due to the availability of the real interest rate data.

Nevertheless, the effect of banking crisis still lasts 7 years. Next, we include the two measures of institutions described in the previous section as there could be an argument made that they may affect the investment climate. Hence, we add *Investment Risk* and *Bureaucratic Quality* in regressions (3) and (4) respectively. As expected both variables have a positive and significant effect on investment. The effects of the banking crisis remain significant for 7 years in these robustness tests after accounting for a wide variety of determinants of investment. Why is investment affected for so many years after a banking crisis? For the answer, we explore the "confidence channel."

The Confidence Channel

A. Multiple Crises

As we argued earlier, repeated crises in a country can worsen investor confidence in economic stability. We would therefore expect investment to be lower in countries with multiple crises. We test this hypothesis by adding the *Multiple Crises* variable to our baseline model. Regression (2) in Table 4 includes *Multiple Crises*, while regression (1) is our baseline estimation from Table 3 which is shown for comparison. The coefficient of -0.961 on *Multiple Crises* indicates that, for every additional crisis, investment is about 0.9 percentage points of GDP lower. This suggests that one of the reasons for the adverse effect of a banking crisis on investment is that earlier crises reinforce perceptions of long-term instability. Thus, reduced investor confidence seems to play an important role.

How does accounting for *Multiple Crisis* affect the banking crises dummies? The size of the effect of the banking crisis dummies is lower, about half as large, once we account for *Multiple Crises*. For example, the estimated coefficient for lag 4 of the crisis is -0.587

(regression 2) vs. –1.443 (regression 1). In regression (3), we add the two measures of institutions for robustness obtaining similar results. Summarizing, measuring confidence with the number of crisis that a country has experienced in the past is an important determinant of investment and accounts for about half of the persistent effect of banking crises on investment.

It is interesting to explore this channel further to see how it might vary across countries of different income levels. We split countries into four groups according to their World Bank classification: High Income, Upper Middle Income, Lower Middle Income, and Low Income.[7] Table 5 reports the results for the three country groups. Two regressions are reported for each country group. The explanatory variables in the first regression are the crisis dummies and the baseline control set (coefficients for the control variables are not reported for the sake of brevity). The second regression adds *Multiple Crisis* as an explanatory variable. This is done to test if multiple crises make a difference and to compare how the coefficients on the crisis dummies vary once we account for multiple crises. In high income countries, the crisis dummies affect investment for about 7 years. However, the *Multiple Crises* variable in regression (2) is not statistically significant. This result is expected because in this group of countries, only the U.K. had had multiple banking crises through the end of our sample, 2007.

Conversely, in Upper Middle Income countries, banking crises have a negative and statistically significant effect for 6 years (regression 3). When we account for *Multiple Crises*, investment is reduced by 1.2% of GDP per crisis, as regression (4) shows. Therefore, the repeated crises in Upper Middle Income countries appear to decrease confidence and have reduced investment for the average country by about 1.2% of GDP. Furthermore, comparing the coefficients of regressions (4) with (3) shows that the effect of the crisis dummies is lower and

[7] The High Income group includes both OECD countries and non-OECD countries. The number of crisis by income group is presented in Appendix 2. The list of countries for each group is presented in Appendix 3.

does not last as long when accounting for multiple crises. This would indicate that the level of confidence in the banking system is a key determinant of investment in Upper Middle Income countries in particular.

In Lower Middle Income countries, the effect of *Multiple Crises* is even larger: an additional crisis is associated with a reduction in investment of -1.612% of GDP (regression (6)). Furthermore, the estimated coefficients of the crisis dummies are smaller and have lower statistical significance in regression (6). Again, this points to the long term effect of crises on investment arising largely from reduced confidence in the system. Finally, regressions (7) and (8) show that investment in Low Income countries is not very much affected by crises dummies or by multiple crises. Only lag 6 of the banking crisis dummy is statistically significant in regressions (7) and (8), while the other lags are not. The *Multiple Crisis* variable is also not statistically significant in this group of countries.[8] It is possible that the relatively small size of the banking sector in this group (only about 13% of GDP compared to 28% in middle income countries) may account for the negligible effect of crisis on investment.

B. Different Measures of Dispersion

Table 6 presents the results using the smaller sample of countries from Laeven and Valencia (2008) and the measures of dispersion or widespread effect of a crisis: *Deposit Freeze*, *Bank Closures*, and *Currency Crisis*. While Laeven and Valencia's (2008) data set has a wide array of variables related to banking crises, the number of crises and countries covered is limited. We are only able to use observations for 30 countries for this section. Regression (1) shows the baseline estimation with the lags of the banking crisis dummies and baseline control set

[8] The absence of an effect of banking crises is further confirmed by joint significance tests of all dummy variables.

(estimates of the control variables are not shown for briefness). In this group of countries, the adverse effects on investment are larger and last longer as expected since this detailed data set only includes countries that experienced banking crises. The alternative measures of confidence used in this section are only available for each crisis episode, so they do not have time variation. Accordingly, we introduce various lags of these variables into the regressions similarly to the crisis dummies. For example, lags of *Deposit Freeze* are introduced in regression (2). The estimated coefficients are negative, large, and generally statistically significant: when deposits are frozen, investment is about 2% of GDP lower even 8 years after the crisis. In addition, the sizes of the estimated coefficient of the crises dummies are of smaller size, about 1%, than in the baseline. Hence, the *Deposit Freeze* measure of confidence accounts for a good part of the negative effect of banking crisis on investment. The effects of the other alternative measures presented in regressions (3) and (4) show a similar pattern. *Bank Closures* has a somewhat smaller negative effect, while *Currency Crisis* has a larger negative effect. Nevertheless, the effect of the alternative dispersion measures confirms the overall result that confidence accounts for a large part of the reduction in investment due to banking crises.

C. Measuring the Depth of the Crisis

As yet another robustness test, we try to account for the severity of the banking crisis since some may be deeper than others and have more widespread effect. This is a caveat that could be applied to our previous estimates. Unfortunately, in the large data set used for Tables 3-5, data that could help us distinguish the severity of the crisis were not available. Using Laeven and Valencia's (2008) detailed banking crisis data set allows us to account for the severity of the crisis. We use the fiscal cost of the crisis as percent of GDP as a measure of its severity. We

define *Crisis Severity* as =1 if the fiscal cost was between 0 and 15% of GDP; =2 if the cost was between 15% to 30% of GDP, and =3 if it was above 30% of GDP. For example, the Argentinean banking crises of 2001-2003 had a fiscal cost of 9.6% of GDP, so *Crisis Severity* would equal 1. More dramatically, the Indonesian banking crisis of 1997 had a cost of 57% of GDP, so *Crisis Severity* would be equal to 3. Table 7 reruns the estimations of Table 6 using the lags of the severity measure of crisis. In all respects, the results are very similar, so we do not discuss them in detail for conciseness. Banking crises still depress investment for several years and our measures of confidence seem to account for a large part of that effect.

IV. Conclusions

We find that banking crises can persistently reduce investment for up to 7 to 9 years. This effect is robust across empirical specifications that control for a range of economic and financial variables. Moreover, we find that the long-term effect of banking crises on investment can be attributed to sustained loss of confidence. This conclusion is based on three pieces of evidence. First, banking crises have a long-term negative effect on investment even after we control for multiple alternative determinants of investment that could also deteriorate after a banking crisis, most importantly credit and other forms of financing. Second, the repeated occurrence of banking crises in a country, which we propose reduces confidence, can explain part of the long term adverse effect on investment. Third, we show that banking crises with widespread negative consequences for the population have deeper and longer-lasting negative effects on investment.

Our results suggest that the cost of banking crises may be larger than the typical measures of fiscal cost or initial output loss. Recurrent crises can depress investment by a sizable amount

and for a long time. We believe that this merits further study with more precise data on expectations and confidence across groups of countries or with detailed data from individual countries. Future research could also investigate the effects of various policies of containment and resolution to preserve and/or restore confidence and investment. Our analysis suggests that avoiding repeated crises, deposit losses, and currency crises can reduce the long-term effect of banking crises on investment.

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Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Investment Ratio	14.49	8.56	0.14	52.53
Crisis	0.02	0.13	0	1
Main Controls				
GDP per capita	7142.34	7946.68	170.56	84408.23
Avg. GDP growth	2.01	3.60	-29.11	29.99
Inflation	38.83	442.09	-21.68	23773.13
Gov. spending	21.88	11.12	1.53	78.64
Private credit	33.36	30.14	0.41	217.85
Turnover	45.06	78.77	0.00	1601.71
Openness	71.00	50.33	2.00	623.46
Real interest rate	6.04	15.29	-98.15	374.31
Investment Risk	8.68	2.82	0	12
Bureaucratic Quality	2.16	1.22	0	4

Table 2: Correlations

	Investment Ratio	Crisis	GDP per capita	Avg. GDP growth	Inflation	Gov. spending
Investment Ratio	1					
Crisis	-0.030	1				
GDP per capita	0.557	-0.082	1			
Avg. 5yr GDP growth	0.321	0.007	0.152	1		
Inflation	-0.045	-0.006	-0.064	-0.066	1	
Gov. spending	-0.250	-0.006	-0.264	-0.059	-0.020	1
Private credit	0.570	-0.024	0.658	0.156	-0.076	-0.245
Turnover	0.432	-0.078	0.372	0.159	-0.035	-0.130
Openness	0.295	-0.072	0.242	0.170	-0.053	-0.060
Real interest rate	-0.077	0.129	-0.179	-0.097	-0.165	0.084
Investment Risk	0.446	-0.035	0.555	0.125	-0.132	-0.173
Bureaucratic Quality	0.451	-0.020	0.709	0.094	-0.092	-0.035

	Private credit	Turnover	Openness	Real interest rate	Investment Risk	Bureaucratic Quality
Private credit	1					
Turnover	0.318	1				
Openness	0.311	-0.037	1			
Real interest rate	-0.141	-0.127	-0.098	1		
Investment Risk	0.414	0.184	0.267	-0.082	1	
Bureaucratic Quality	0.554	0.200	0.130	-0.141	0.467	1

Table 3: The Effect of Banking Crisis on Investment

Investment as a share of GDP is the dependent variable. Results shown are from random effects regressions. *Lj.Crisis* is a dummy variable for a banking crisis that occurred *j* years ago. *GDP per cap* is log of GDP per capita. Robust standard errors are in parenthesis. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at 10%.

VARIABLES	(1)	(2)	(3)	(4)
L1.crisis	-1.149***	-0.990**	-1.167***	-1.335***
	(0.345)	(0.400)	(0.332)	(0.341)
L2.crisis	-1.304***	-0.988***	-1.048***	-1.202***
	(0.317)	(0.373)	(0.374)	(0.381)
L3.crisis	-1.584***	-1.331***	-1.236***	-1.366***
	(0.294)	(0.337)	(0.330)	(0.335)
L4.crisis	-1.443***	-1.138***	-1.054***	-1.174***
	(0.256)	(0.285)	(0.286)	(0.291)
L5.crisis	-1.440***	-0.828***	-0.983***	-1.083***
	(0.262)	(0.284)	(0.301)	(0.298)
L6.crisis	-1.803***	-1.194***	-1.208***	-1.281***
	(0.268)	(0.291)	(0.309)	(0.307)
L7.crisis	-1.574***	-1.020***	-0.867***	-0.942***
	(0.293)	(0.320)	(0.320)	(0.320)
L8.crisis	-0.703*	-0.320	-0.0256	-0.0744
	(0.388)	(0.345)	(0.447)	(0.457)
L9.crisis	-0.746**	-0.208	-0.295	-0.345
	(0.340)	(0.376)	(0.315)	(0.317)
L10.crisis	-0.455	0.0393	-0.182	-0.204
	(0.469)	(0.535)	(0.354)	(0.351)
GDP per cap	-0.175	0.255	0.668	0.397
	(0.278)	(0.329)	(0.413)	(0.430)
Inflation	-0.425**	-1.216***	-0.364*	-0.395**
	(0.197)	(0.384)	(0.195)	(0.198)
Gov. spending	0.056**	0.028	0.003	-0.003
	(0.022)	(0.027)	(0.040)	(0.041)
Openness	0.033***	0.023***	0.032***	0.031***
	(0.005)	(0.006)	(0.007)	(0.007)
Avg. 5yr GDP growth	0.213***	0.195***	0.139***	0.136***
	(0.028)	(0.032)	(0.043)	(0.042)
Private credit	0.142***	0.129***	0.111***	0.100***
	(0.036)	(0.036)	(0.037)	(0.038)
Turnover ratio	0.134***	0.132***	0.122***	0.129***
	(0.032)	(0.033)	(0.035)	(0.035)
Real interest rate		-2.020***		
		(0.573)		
Investment Risk			0.078*	
			(0.047)	
Bureaucratic Quality				0.504***
				(0.156)
Constant	3.415	1.706	-1.454	0.763
	(2.269)	(2.632)	(3.302)	(3.529)
Observations	3986	2699	2108	2108
Number of Countries	151	141	118	118
R2 overall	0.19	0.28	0.36	0.37

Table 4: The Effect of Multiple Crises on Investment

Investment as a share of GDP is the dependent variable. Results shown are from random effects regressions. *Lj.Crisis* is a dummy variable for a banking crisis that occurred j years ago. *GDP pc* is log of GDP per capita. Robust standard errors are in parenthesis. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at 10%.

VARIABLES	(1)	(2)	(3)
L1.crisis	-1.149***	-0.328	-0.894**
	(0.345)	(0.367)	(0.360)
L2.crisis	-1.304***	-0.470	-0.768*
	(0.317)	(0.344)	(0.401)
L3.crisis	-1.584***	-0.750**	-0.940***
	(0.294)	(0.321)	(0.351)
L4.crisis	-1.443***	-0.587**	-0.760**
	(0.256)	(0.292)	(0.311)
L5.crisis	-1.440***	-0.603**	-0.652**
	(0.262)	(0.297)	(0.321)
L6.crisis	-1.803***	-0.984***	-0.888***
	(0.268)	(0.301)	(0.322)
L7.crisis	-1.574***	-0.706**	-0.529
	(0.293)	(0.326)	(0.335)
L8.crisis	-0.703*	0.106	0.289
	(0.388)	(0.418)	(0.473)
L9.crisis	-0.746**	0.0319	0.00146
	(0.340)	(0.367)	(0.333)
L10.crisis	-0.455	0.298	0.105
	(0.469)	(0.484)	(0.364)
Multiple Crises		-0.961***	-0.705***
		(0.154)	(0.189)
GDP per cap	-0.175	0.0437	0.482
	(0.278)	(0.281)	(0.431)
Inflation	-0.425**	-0.617***	-0.540***
	(0.197)	(0.214)	(0.206)
Gov. spending	0.052**	0.046**	-0.004
	(0.022)	(0.022)	(0.041)
Openness	0.033***	0.035***	0.033***
	(0.005)	(0.005)	(0.007)
Avg. 5yr GDP growth	0.213***	0.209***	0.133***
	(0.028)	(0.027)	(0.042)
Private credit	0.142***	0.139***	0.099***
	(0.036)	(0.036)	(0.038)
Turnover ratio	0.134***	0.130***	0.119***
	(0.032)	(0.032)	(0.036)
Investment Risk			0.066
			(0.047)
Bureaucratic Quality			0.473***
			(0.156)
Constant	3.415	1.964	0.086
	(2.269)	(2.284)	(3.504)
Observations	3986	3986	2108
Number of Countries	151	151	118
R2 overall	0.19	0.20	0.36

Table 5: The Effect of Multiple Crises on Investment in Different Income Groups

Investment as a share of GDP is the dependent variable. Results shown are from random effects regressions. *Lj.Crisis* is a dummy variable for a banking crisis that occurred *j* years ago. All regressions also include the log of GDP per capita, average GDP growth, inflation, government spending, and openness. Robust standard errors are in parenthesis. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at 10%.

VARIABLES	(1) High income	(2) High income	(3) Upper Middle income	(4) Upper Middle income	(5) Lower Middle income	(6) Lower Middle income	(7) Low income	(8) Low income
L1.crisis	-0.782	-1.007	-2.434***	-1.398	-1.276**	0.248	-0.401	-0.400
	(0.831)	(0.883)	(0.929)	(0.939)	(0.569)	(0.620)	(0.439)	(0.494)
L2.crisis	-0.940	-1.164	-2.781***	-1.733***	-1.889***	-0.291	-0.0152	-0.0136
	(0.870)	(0.908)	(0.591)	(0.646)	(0.600)	(0.666)	(0.392)	(0.446)
L3.crisis	-1.399**	-1.620**	-2.399***	-1.388**	-2.326***	-0.706	-0.492	-0.490
	(0.643)	(0.678)	(0.611)	(0.684)	(0.565)	(0.627)	(0.421)	(0.492)
L4.crisis	-1.696***	-1.935***	-1.747***	-0.676	-2.203***	-0.616	-0.465	-0.464
	(0.575)	(0.636)	(0.608)	(0.668)	(0.496)	(0.593)	(0.402)	(0.473)
L5.crisis	-1.403**	-1.626**	-1.383**	-0.259	-2.180***	-0.623	-0.813	-0.812
	(0.596)	(0.635)	(0.631)	(0.695)	(0.438)	(0.549)	(0.507)	(0.550)
L6.crisis	-1.817***	-2.035***	-1.359**	-0.253	-2.274***	-0.836	-1.360***	-1.358***
	(0.601)	(0.634)	(0.642)	(0.676)	(0.518)	(0.607)	(0.441)	(0.496)
L7.crisis	-1.584***	-1.832***	-0.986	0.105	-2.079***	-0.542	-0.970*	-0.968*
	(0.563)	(0.631)	(0.658)	(0.676)	(0.592)	(0.706)	(0.499)	(0.545)
L8.crisis	0.276	0.0459	0.0303	1.108	-1.455**	-0.164	-0.427	-0.425
	(1.261)	(1.242)	(0.708)	(0.740)	(0.677)	(0.765)	(0.539)	(0.593)
L9.crisis	-1.179**	-1.390**	-0.0973	1.006	-1.340*	-0.0699	-0.226	-0.223
	(0.529)	(0.578)	(0.757)	(0.781)	(0.756)	(0.828)	(0.556)	(0.596)
L10.crisis	-1.021*	-1.210*	-0.163	0.854	-1.180	-0.090	0.396	0.397
	(0.619)	(0.655)	(0.843)	(0.839)	(0.982)	(1.028)	(0.952)	(0.986)
Multiple Crises		0.308		-1.200***		-1.612***		-0.004
		(0.325)		(0.277)		(0.331)		(0.281)
Observations	1054	1054	717	717	1032	1032	1183	1183
Number of countries	33	33	25	25	44	44	49	49
R2 overall	0.25	0.25	0.14	0.09	0.01	0.01	0.25	0.25

Table 6: The Confidence Channel and Investment

Investment as a share of GDP is the dependent variable. Results shown are from random effects regressions. *Lj.Crisis* is a dummy variable for a banking crisis that occurred j years ago. The Dispersion measure is Deposit Freeze, Bank Closures and Currency Crisis in regressions 2, 3, and 4, respectively. All regressions also include the log of GDP per capita, average GDP growth, inflation, government spending, and openness. Robust standard errors are in parenthesis. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at 10%.

VARIABLES	(1)	(2)	(3)	(4)
		Dispersion Measure		
	Base	Deposit Freeze	Bank Closures	Currency Crisis
L1.crisis	-1.483***	-0.857**	-0.857	-0.543
	(0.484)	(0.435)	(0.524)	(0.481)
L2.crisis	-2.065***	-1.163**	-1.695***	-1.043*
	(0.519)	(0.472)	(0.596)	(0.563)
L3.crisis	-2.174***	-1.612***	-1.925***	-1.734***
	(0.424)	(0.389)	(0.481)	(0.454)
L4.crisis	-1.491***	-1.108**	-0.922*	-0.754
	(0.429)	(0.434)	(0.539)	(0.504)
L5.crisis	-1.569***	-0.806	-0.668	-0.601
	(0.434)	(0.528)	(0.577)	(0.564)
L6.crisis	-1.936***	-1.219**	-0.912	-0.886*
	(0.471)	(0.544)	(0.643)	(0.530)
L7.crisis	-1.662***	-1.124*	-0.585	-0.711
	(0.556)	(0.658)	(0.744)	(0.678)
L8.crisis	-1.259**	-0.649	-0.423	-0.533
	(0.550)	(0.700)	(0.790)	(0.660)
L9.crisis	-1.332**	-0.628	-0.635	-0.533
	(0.591)	(0.728)	(0.766)	(0.683)
L10.crisis	-1.318**	-0.641	-0.436	-0.224
	(0.667)	(0.778)	(0.828)	(0.755)
L1.(Dispersion x crisis)		-3.223**	-0.599**	-2.827***
		(1.586)	(0.284)	(1.007)
L2. (Dispersion x crisis)		-4.184***	-0.436*	-3.121***
		(1.253)	(0.255)	(0.996)
L3. (Dispersion x crisis)		-2.295**	-0.308	-1.653**
		(1.056)	(0.201)	(0.803)
L4. (Dispersion x crisis)		-1.140	-0.507**	-2.116***
		(1.109)	(0.256)	(0.816)
L5. (Dispersion x crisis)		-2.519**	-0.787***	-2.656***
		(1.018)	(0.260)	(0.847)
L6. (Dispersion x crisis)		-2.473***	-0.932***	-3.145***
		(0.927)	(0.285)	(0.886)
L7. (Dispersion x crisis)		-1.941*	-0.991***	-2.912***
		(1.098)	(0.302)	(1.030)
L8. (Dispersion x crisis)		-2.072**	-0.850**	-2.790***
		(0.866)	(0.362)	(1.033)
L9. (Dispersion x crisis)		-2.363*	-0.877*	-3.307***
		(1.213)	(0.476)	(1.156)
L10. (Dispersion x crisis)		-2.744*	-1.016*	-3.665***
		(1.412)	(0.526)	(1.343)
Observations	819	819	819	819
Number of countries	30	30	30	30
R2 overall	0.48	0.50	0.51	0.44

Table 7: Crisis Severity and Investment

Investment as a share of GDP is the dependent variable. Results shown are from random effects regressions. *Lj.Crisis Severity* is a dummy variable for the severity of a banking crisis that occurred *j* years ago. The Dispersion measure is Deposit Freeze, Bank Closures and Currency Crisis in regressions 2, 3, and 4, respectively. All regressions also include the log of GDP per capita, average GDP growth, inflation, government spending, and openness. Robust standard errors are in parenthesis. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at 10%.

	(1)	(2)	(3)	(4)
		Dispersion Measure		
VARIABLES	Base	Deposit Freeze	Bank Closures	Currency Crisis
L1.Crisis Severity	-1.402***	-0.719*	-0.988*	-0.396
	(0.487)	(0.424)	(0.590)	(0.595)
L2. Crisis Severity	-2.193***	-1.400***	-2.180***	-1.439**
	(0.470)	(0.383)	(0.586)	(0.561)
L3. Crisis Severity	-1.764***	-1.067***	-1.527***	-1.081**
	(0.393)	(0.329)	(0.520)	(0.464)
L4. Crisis Severity	-1.408***	-1.024***	-1.162**	-0.732*
	(0.319)	(0.301)	(0.453)	(0.389)
L5. Crisis Severity	-1.565***	-0.976***	-1.149***	-0.852**
	(0.284)	(0.277)	(0.413)	(0.348)
L6. Crisis Severity	-1.703***	-1.013***	-1.088**	-0.860**
	(0.330)	(0.349)	(0.483)	(0.405)
L7. Crisis Severity	-1.666***	-1.176***	-1.133**	-1.051**
	(0.382)	(0.354)	(0.498)	(0.486)
L8. Crisis Severity	-1.668***	-1.198***	-1.361***	-1.182***
	(0.360)	(0.365)	(0.479)	(0.406)
L9. Crisis Severity	-1.628***	-1.026**	-1.218**	-0.874*
	(0.371)	(0.428)	(0.584)	(0.496)
L10. Crisis Severity	-1.665***	-0.700	-0.973	-0.295
	(0.449)	(0.669)	(0.802)	(0.788)
L1.(Dispersion x crisis)		-3.196**	-0.464	-3.087***
		(1.483)	(0.362)	(1.123)
L2. (Dispersion x crisis)		-3.592***	-0.0234	-2.375***
		(1.004)	(0.287)	(0.895)
L3. (Dispersion x crisis)		-2.650***	-0.269	-2.264***
		(0.944)	(0.253)	(0.769)
L4. (Dispersion x crisis)		-0.890	-0.285	-2.218***
		(0.974)	(0.273)	(0.663)
L5. (Dispersion x crisis)		-1.988**	-0.482*	-2.387***
		(0.897)	(0.263)	(0.759)
L6. (Dispersion x crisis)		-2.389**	-0.738**	-3.121***
		(0.939)	(0.290)	(0.885)
L7. (Dispersion x crisis)		-1.478	-0.647***	-2.426**
		(1.013)	(0.244)	(1.002)
L8. (Dispersion x crisis)		-1.307*	-0.441	-2.180**
		(0.764)	(0.270)	(1.025)
L9. (Dispersion x crisis)		-1.814	-0.587	-3.144**
		(1.343)	(0.571)	(1.301)
L10. (Dispersion x crisis)		-2.435	-0.752	-3.885**
		(1.860)	(0.709)	(1.671)
Observations	997	819	997	997
Number of countries	30	30	30	30
R2 overall	0.484	0.491	0.487	0.459

Appendix 1.- Sources of Information

Variable	Definition	Source
Crisis	Dummy variable that assumes the value of 1 for the year when a banking crisis begins.	Reinhart and Rogoff (2008)
Investment	Investment share of real GDP per capita	Penn World Tables (2006)
GDP per capita	Real GDP per capita (Constant Prices: Chain series) in prices 2005	Penn World Tables (2006)
Avg. 5yr GDP growth	Average annual growth of GDP per capita of the last 5 years	Penn World Tables (2006)
Inflation	Inflation, consumer prices (annual %)	World Development Indicators
Gov. spending	Government Share of real GDP per capita	Penn World Tables (2006)
Private credit	Private credit by deposit money banks to GDP	Beck, et al.(2009)
Turnover	Ratio of the value of total shares traded to average real market capitalization.	Beck, et al.(2009)
Openness	Exports plus Imports divided as a percentage of real GDP	Penn World Tables (2006)
Real interest rate	Real interest rate (in %)	World Development Indicators
Investment Risk	This is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.	International Country Risk Guide (ICRG)
Bureaucratic Quality	The institutional strength and quality of the bureaucracy is another shock absorber that tends to minimize revisions of policy when governments change. High 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. Countries that lack the cushioning effect of a strong bureaucracy receive low points because a change in government tends to be traumatic in terms of policy formulation and day-to-day administrative functions.	International Country Risk Guide (ICRG)
Deposit Freeze	Dummy variable that indicates if there was any deposit freeze policy as a consequence of the crisis	Laeven and Valencia (2008)
Bank Closures	Dummy variable that indicates if there was any bank closure the year of the crisis	Laeven and Valencia (2008)
Currency Crisis	Dummy variable that indicates if there was a currency crisis the year of the crisis	Laeven and Valencia (2008)
Crisis Severity	Constructed by the authors based on Laeven and Valencia's Fiscal Cost of banking crises. Variable =1 if the fiscal cost was between 0 and 15% of GDP; =2 if the cost was between 15% to 30% of GDP, and =3 if it was above 30% of GDP.	Laeven and Valencia (2008)

Appendix 2: Number of countries with multiple crises by income group

Income group	No crisis	1 crisis	2 crises	3 or more crises
High Income OECD	8	14	0	1
High Income non OECD	10	5	0	0
Upper Middle Income	16	9	5	3
Low Middle Income	24	18	10	2
Low Income	20	30	7	1

Appendix 3: Countries by World Bank income level classification

High Income		Middle Income		
OECD	**Non-OECD**	**Upper Middle**	**Lower Middle**	**Low Income**
Australia	Bahamas	Antigua	Albania	Afghanistan
Austria	Bermuda	Argentina*	Algeria	Angola
Belgium	Brunei	Bahrain	Belarus	Armenia
Canada	Cyprus	Barbados	Belize	Azerbaijan
Denmark	Hong Kong	Botswana	Bolivia*	Bangladesh
Finland*	Israel	Brazil*	Bosnia and Herzegovina	Benin
France	Kuwait	Chile*	Bulgaria*	Bhutan
Germany	Macao	Croatia*	Cape Verde	Burkina Faso
Greece	Malta	Czech Republic*	Colombia*	Burundi
Iceland	Morocco	Estonia*	Costa Rica	Cambodia
Ireland	Netherlands Antilles	Gabon	Cuba	Cameroon
Italy	Qatar	Grenada	Djibouti	Central African Republic
Japan*	Singapore	Hungary	Dominica	Chad
Luxembourg	Slovenia	Korea	Dominican Republic*	China
Netherlands		Lebanon	Ecuador*	Comoros
New Zealand		Libya	Egypt	Congo
Norway*		Malaysia*	El Salvador	Cote d`Ivoire*
Portugal		Mauritius	Fiji	Ethiopia
Spain		Mexico*	Georgia	Gambia
Sweden*		Oman	Guatemala	Guinea
Switzerland		Palau	Guyana	Guinea-Bissau
United Kingdom		Panama	Iran	Haiti
United States		Poland	Iraq	Honduras
		Puerto Rico	Jamaica*	India
		Saudi Arabia	Jordan	Indonesia*
		Seychelles	Kazakhstan	Kenya
		Slovak Republic	Kiribati	Korea
		St. Kitts and Nevis	Latvia*	Kyrgyzstan
		St. Lucia	Lithuania*	Laos

Continued

High Income		Medium Income		
OECD	**Non-OECD**	**Upper middle**	**Lower middle**	**Low Income**
		Trinidad andTobago	Macedonia	Lesotho
		Turkey	Maldives	Liberia
		Uruguay*	Micronesia	Madagascar
		Venezuela*	Namibia	Malawi
			Papua New Guinea	Mali
			Paraguay*	Mauritania
			Peru	Moldova
			Philippines*	Mongolia
			Romania	Mozambique
			Russia*	Nepal
			Samoa	Nicaragua*
			Serbia and Montenegro	Niger
			South Africa	Nigeria
			Sri Lanka*	Pakistan
			St.Vincent and Grenadines	Rwanda
			Suriname	Sao Tome and Principe
			Swaziland	Senegal
			Syria	Sierra Leone
			Thailand*	Solomon Islands
			Tonga	Somalia
			Tunisia	Sudan
			Ukraine*	Tajikistan
			Uzbekistan	Tanzania
			Vanuatu	Togo
				Turkmenistan
				Uganda
				Vietnam*
				Yemen
				Zimbabwe

* These countries are part of the smaller sample used in Laeven and Valencia (2008). There have been 47 crisis in this small sample