

Sudden Stops, Banking Crises and Investment Collapses in Emerging Markets*

Joseph P. Joyce
Department of Economics
Wellesley College
Wellesley, MA 02481[†]

Malhar Nabar
Department of Economics
Wellesley College
Wellesley, MA 02481[‡]

March 14, 2008

Abstract

We evaluate whether financial openness leaves emerging market economies vulnerable to the adverse effects of capital reversals (“sudden stops”) on domestic investment. We investigate this claim in a broad sample of emerging markets during the period 1976-2002. If the banking sector does not experience a systemic crisis, sudden stop events fail to have a significant impact on investment. Bank crises, on the other hand, have a significant negative effect on investment even in the absence of a contemporaneous sudden stop crisis. We also find that openness to capital flows exacerbates the severity of the adverse impact of banking crises on investment. Our results provide statistical support for the policy view that a strong banking sector which can withstand the negative fallout of capital flight is essential for countries that open their economies to international financial flows.

JEL Classification: F32, F41, F43, E44

Key words: financial openness, sudden stops, banking crises, investment, emerging markets

*We are grateful to Margaret Settli, Yukari Koya and Sadia Raveendran for outstanding research assistance, and to Jeffrey Frankel, Eduardo Cavallo and Adam Honig for their data. We thank seminar audiences at the Conference on Small Open Economies, Rimini; Eastern Economic Association Meetings, New York; the Reserve Bank of India, Mumbai; and the Conference on Open Macroeconomics and Development, Aix-en-Provence, for valuable feedback and suggestions.

[†]jjoyce@wellesley.edu. Telephone: 781 283 2160.

[‡]mnabar@wellesley.edu. Telephone: 781 283 2165.

1 Introduction

Financial crises in emerging markets have become a central feature of the world economy in recent times. These crises often inflict high costs of adjustment on the economies that experience them. Calvo and Reinhart (2000) document that financial crises in emerging markets became more severe in the 1990s than was the case previously. As a result, several prominent researchers have questioned the merits of financial globalization. Stiglitz (2002) and Bhagwati (2004), for example, argue that financial openness leaves emerging market countries vulnerable to external crises, which have a severe negative effect on domestic economic performance.

In this paper we examine precisely how openness and financial crises affect investment in a dynamic panel of 26 emerging market economies during the period 1976-2002. The crises we study are “sudden stops” in the net inflow of capital, defined as significant declines in the financial account of the balance of payments, and domestic banking crises. We use the databases assembled by Caprio, Klingebiel, Laeven and Noguera (2005) to date banking crises and by Frankel and Cavallo (2004) and Calvo, Izquierdo and Mejia (2004) to record sudden stop crises. We employ the Arellano-Bond (1991) technique to address concerns about dynamic panels.

In contrast with much of the existing empirical work on the costs of financial crises in emerging markets, we focus on investment rather than output to study the effects of these crises on the domestic economy. Whereas output growth may pick up quickly after a crisis if exports drive the recovery, investment may remain persistently low. Tracking the path of output in the immediate aftermath of a crisis will lead to an incomplete and misleading assessment of the effects of the crisis. If investment does not bounce back, the robustness of the recovery and the prospects for long run growth could be severely compromised. An IMF (2005) study, for example, demonstrates that investment has not yet recovered in several East Asian countries following the financial crisis that occurred in the region in 1997. Figure 1 tracks the time paths of investment for two of the countries affected by the Asian financial

crisis of 1997 - Malaysia and Thailand. Even five years after the crisis, investment failed to reach its pre-crisis average level. Output growth, on the other hand, recovered rapidly.¹

The rationale for financial openness is that it promotes domestic financial development and growth (Mishkin, 2006). Our findings highlight the importance of a well-regulated, transparent banking system for countries pursuing financial globalization. We establish that in the absence of a bank crisis, a sudden stop event would not by itself have a significant impact on investment. The evidence suggests that investment does not decline if the domestic banking sector can withstand the external crisis and continue to provide financial intermediation services in the face of capital reversals.² On the other hand, the importance of the banking sector to the domestic economy is highlighted by the fact that regardless of whether or not a sudden stop occurs, a banking crisis has a significant, negative impact on investment.³ We also find that the impact of a bank crisis is worse in economies that have a higher degree of financial openness.

The paper is organized as follows. Section 2 outlines the channels through which external crises and banking crises affect investment, and relates our work to previous research. Section 3 discusses our data and how we measure the occurrence of crises. Section 4 reports the results from our basic specifications. Section 5 examines the separate effects of bank crises and sudden stops on investment. Section 6 concludes.

2 Sudden Stops, Banking Crises and Investment

In this paper, we examine the impact of sudden stops and banking crises on domestic investment. Much of the previous empirical work in this area has tended to focus on the impact

¹The contrast between the recovery in output and the continued collapse in investment in the countries hit by the Asian Crisis was also the subject of recent articles that examined the aftermath of the crisis a decade after its occurrence. See, for example, Keith Bradshaw, *New York Times*, June 28, 2007.

²An example of a country that experienced a sudden stop but not a banking crisis at the same time is Turkey, 1994. As seen in Figure 2(a), while output growth turns negative in the year of the crisis and then recovers subsequently, investment/GDP is not appreciably affected by the crisis.

³An example of a country in our dataset that experienced a banking crisis but not a sudden stop at the same time is Chile, 1981. As seen in Figure 2(b), investment/GDP does not regain its pre-crisis level even five years after the crisis. Output growth rebounds relatively quickly.

of various types of external crisis on aggregate GDP. Table 1 lists the type of crisis and outcome studied by some of these papers. Hutchison and Noy (2006), for example, reported that currency crises reduced output growth by about 2-3%, while a sudden stop reduced output by 13-15% over a three-year period.

We believe that focusing on investment rather than GDP in the aftermath of a crisis allows for a fuller understanding of its impact on the domestic economy.⁴ If the growth of fixed capital formation slows down in the aftermath of a crisis, the prospects for sustained improvements in productivity and long run growth can be affected adversely. GDP may grow in the short run if net exports rise in response to a currency depreciation, but investment may continue to remain sluggish. Calvo and Reinhart (2000) note that exports recover relatively more quickly than other sectors following a financial crisis. Hutchison and Noy (2006) document that output suffers a sharp drop followed by a quick recovery after a sudden stop crisis, a phenomenon they refer to as a “Mexican Wave”.

Our current study attempts to bring into sharper focus the importance of tracking investment in the aftermath of financial crises in emerging markets. In contrast with the previous empirical work in this area, we separate out statistically the impact of sudden stops from that of bank crises on this key macroeconomic aggregate.

Existing research has studied several channels through which sudden stops could potentially inflict serious long run economic costs on the domestic economy due to a fall in investment. Domestic investment may collapse following an external crisis if the supply of foreign funds for domestic investment dries up. Firms that had been borrowing directly from overseas may no longer be able to do so because their credit-worthiness goes down if an accompanying devaluation raises the effective value of their existing external liabilities.⁵ In

⁴Other studies that examine the impact of financial crises on investment include Edwards (2002) and Park and Lee (2003).

⁵Choi and Cook (2004) model the impact of currency devaluations on external liabilities and the net worth of domestic firms. Bleakley and Cowan (2005) argue that the question is ultimately an empirical one since there are two opposing effects to consider: while devaluations can have a negative balance sheet effect in terms of reducing the net worth of firms, they also boost export competitiveness. In their study of the impact of currency realignments on firm-level investment in five Latin American countries, Bleakley and Cowan find no evidence of firms with larger dollar debt investing less than firms with small dollar liabilities in the aftermath of currency declines.

addition, foreign direct investment into local subsidiaries of multinational corporations or to joint-venture domestic partner firms might decline, inhibiting the ability of these domestic firms to make domestic investment expenditures (Bosworth and Collins, 1999).

Furthermore, if external crises are accompanied or followed by banking sector crises, then the allocation of resources and investment could be potentially severely affected while the financial intermediaries clean up their balance sheets. Calvo, Izquierdo and Mejia (2004), for example, argue that the solvency of the banking system can be undermined when banks borrow overseas in foreign currencies and then advance credit to domestic firms in the non-tradable sector. In the aftermath of a capital reversal, the net worth of the domestic banking sector may decline if the effective value of existing external liabilities increases on account of any real depreciation that takes place. Mishkin (1997) and Caprio and Klingebiel (1997) demonstrate the importance of the banking sector in developing countries and the severe effect of banking crises on those economies. When the banking sector is in crisis, the economy can no longer rely on it to perform its traditional role of screening out bad risks and mitigating adverse selection in investment projects. Even with a high domestic saving rate, the economy may not be able to channel saving into investment when the banking sector is in crisis.

Our empirical evidence complements recent theoretical work that has emphasized the role domestic credit markets play in transmitting external shocks to the domestic economy. In a series of papers, Caballero and Krishnamurthy (2001, 2003, 2004) highlight the importance of domestic financial development for reducing the vulnerability of emerging market economies to adverse real effects of external crises. Arellano and Mendoza (2002) and Mendoza and Smith (2006) argue for the importance of introducing credit frictions and collateral constraints into standard small open economy RBC models in order to account for the empirical regularities associated with sudden stops, including investment collapses.

Mendoza (2006a & b) shows theoretically the importance of leverage ratios and collateral constraints in amplifying the investment responses following sudden stops. In economies with

high levels of leverage (high value of borrowing relative to asset values), an adverse shock is more likely to trigger a collateral constraint, which causes firms to engage in distress sales of assets to meet marginal calls on loans. This sale of assets drives down the price of capital, and sets off a downward spiral of declining asset prices and collapsing investment. Economies with high levels of leverage are also possibly more vulnerable to a banking crisis. The evidence we provide indicates that investment is affected adversely by a sudden stop event only when there is a domestic banking crisis, suggesting, in line with Mendoza's work, that the vulnerability of the banking sector is an important link connecting external shocks to investment collapses.

Gopinath (2004) shows that in an economy where foreign investors do not have adequate information about returns associated with investment projects, they engage in costly search to evaluate different projects. This search friction generates an asymmetric response in capital flows, with a gradual inflow and gradual project creation in response to positive shocks and a sharp outflow and sharp project destruction in response to negative shocks. The intuition of the paper suggests that foreign investors are likely to face greater information problems in economies with less-transparent, poorly-regulated, crisis-prone banking systems, and these economies are therefore more likely to see a decline in investment when the capital outflows that occur during sudden stops are accompanied by a banking crisis. Our results provide empirical support for this view.

3 Data

For the data analysis, we consulted the Standard & Poor's Emerging Market Index, the Morgan Stanley Capital International Emerging Market Index and the IMF's International Capital Markets Department's list of emerging markets. The 26 countries in our sample appeared on at least two of those three lists. The countries are: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Jordan, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, Slovakia, South Africa, Sri

Lanka, Thailand, Turkey, Venezuela and Zimbabwe. Husain, Mody and Rogoff (2005) have shown that emerging markets experience more banking or twin (banking and currency) crises than do advanced or developing economies. They point out that such economies are more exposed to capital flows than other developing economies, but have more fragile financial sectors than do the advanced economies. Similarly, Becker and Mauro (2006), in a cross country analysis of the “shocks that matter”, found that sudden stops were particularly costly (when measured in terms of the decline in output) in emerging markets.

Our sample covers the period 1976-2002. For ten countries in our sample, we have data for all years during this period. The start dates for the other countries in our sample depend on the availability of data. In addition, in the case of the transition countries the sample periods begin at the time of changeover from a planned to market economy, using the dates suggested by de Melo, Denzier and Gelb (1996) and de Melo, Denizer, Gelb and Tenev (2001). Table 2 lists the countries in our sample and the years in which they experienced either banking crises or sudden stops (or both if the crises occurred simultaneously).

The macroeconomic data were obtained from the World Bank’s *World Development Indicators*, supplemented by the IMF’s *International Financial Statistics*. The variables and their sources are listed in Table 3. Our definition of a sudden stop is based on the work of Frankel and Cavallo (2004) and Calvo, Izquierdo and Mejia (2004). A sudden stops occurs when there is a fall in the financial account surplus which exceeds twice the standard deviation of the financial account during the period.⁶ We obtained data on episodes of systemic financial crises, where much or all of bank capital was exhausted, from Caprio, Klingebiel, Laeven and Noguera (2005).

Table 4 shows the number of data points (country-year observations) of sudden stops and systemic banking crises. There were 46 country-years with sudden stops in our sample and a total of 132 country-years with banking crises. There were 17 years where both events

⁶In their study, Calvo, Izquierdo and Mejia (2004) focus on emerging markets during the period 1990-2001. They identify episodes in which the year-on-year fall in capital flows is at least two standard deviations below the sample mean. Since their definition of Sudden Stops is very similar to that of Frankel and Cavallo (2004), in our sample we identify events as Sudden Stops if identified as such by either of these two papers. We thank an anonymous referee for suggesting this.

occurred simultaneously. Table 5 provides descriptive statistics of key variables.

4 Crises and Investment: Fixed Effects and GMM estimates

In our basic model, investment gcy (gross capital formation as a fraction of GDP) is determined by

$$gcy_{it} = \alpha_i + \delta_t + \sum_{j=1}^n \beta_j x_{ijt} + \gamma_1 SS_{it} + \gamma_2 BANKCRI_{it} + \epsilon_{it}$$

where SS and $BANKCRI$ are dummy variables that take on a value 1 if there is a sudden stop or a bank crisis respectively in country i at time t , x_j is the j^{th} element of the vector of control variables, α_i is a country fixed effect term that captures time-invariant influences specific to country i , δ_t is a vector of calendar-year dummies, and ϵ_{it} is a mean zero, constant variance disturbance term.

The vector of controls consists of variables commonly used in the empirical literature on the determinants of investment spending in developing economies.⁷ The vector includes the lagged dependent variable, lagged GDP growth, inflation as measured by the growth rate of the Consumer Price Index, trade openness measured by the sum of exports and imports as a fraction of GDP, Foreign Direct Investment (FDI) as a percentage of GDP, and total debt service scaled by GDP.

The existing empirical literature suggests mechanisms through which each of these controls may be associated with investment spending. There is a consensus that investment displays persistence (potentially reflecting partial adjustment in investment behavior), which calls for the lagged dependent variable on the right hand side.⁸ The inclusion of lagged GDP growth is motivated by the possibility of a flexible accelerator effect on investment from lagged real output growth. Inflation may affect investment because it adds to uncertainty. Trade openness can influence investment since countries that are more open to trade could also be

⁷See, for example, Aizenmann and Marion (1993), Attanasio, Picci and Scorcu (2000), Bleaney (1996), Bosworth and Collins (1999), Ghura and Goodwin (2000), Greene and Villanueva (1991), Larrain and Vergara (1993), Mody and Murshid (2005), Pindyck and Solimano (1993), Servén (1998, 2003) and Servén and Solimano (1993).

⁸See Thomas (2002) for a summary of recent research on investment expenditures and partial adjustment mechanisms.

more efficient and generate higher returns on investment. Furthermore, it is possible that countries more open to trade develop more sophisticated financial intermediation, involving a deeper network of supplier credit and risk-sharing intermediaries, and that this financial development generates investment. FDI can provide an external source of funding important for domestic investment. Debt service may also have an impact on investment by influencing the supply of loanable funds: potential borrowers in countries that have higher debt service ratios may find themselves relatively more credit-rationed at the prevailing world interest rate than borrowers in countries that have lower debt service ratios.⁹ We also add time dummies to our base specification to control for year-specific events (such as international business cycle and contagion effects) that might affect all countries in the sample.

In Table 6 we examine the relationship between sudden stops, bank crises and investment, controlling for the standard determinants of investment spending. The first equation is a standard fixed effects specification. Both crises variables have a negative and significant impact on investment spending in the basic specification. However, the fixed-effects estimator is not consistent in the presence of a lagged endogenous variable; moreover, there is possible endogeneity among the regressors. In order to address these concerns, in the subsequent estimations, we employ the Generalized Method of Moments estimator developed by Arellano and Bond (1991). In this method, the equation to be estimated is first-differenced, and second and higher lagged values of the dependent variable and the predetermined variables in levels are used as instruments for the lagged dependent variable and any endogenous variables.

The equation that appears in Column 2 uses the same variables as the previous estimation; inflation, trade openness, FDI and total debt service are specified as endogenous variables. The crises variables are treated as exogenous in this specification. The sign and statistical significance on the crises variables do not change from the basic fixed effects specification; coefficients on both crises variables are significant at the 1% level. In Column 3, we treat both crises variables as endogenous. While sudden stops are sometimes considered to be

⁹We have in mind here a quantity rationing effect that acts on investment over and above the interest rate (cost of borrowing) effect. In our robustness checks we also include the real interest rate as a conditioning variable.

exogenous to the economies where they take place, there can be domestic factors that make an economy vulnerable to capital outflows. For example, a collapse in investment and capital outflows can both be driven by a common underlying negative shock to expected returns to investment in the domestic economy. The coefficients on both crises variables continue to be significant at the 1% level. They are also economically meaningful. The short run impact of a sudden stop is to reduce the investment/GDP ratio by 1.432 percentage points, which is equivalent to 22% of the standard deviation of this ratio for our sample.¹⁰ In the case of the bank crisis, the short run impact of -1.275 percentage points is equivalent to 19.5% of the standard deviation of the investment/GDP ratio.

Since this is a partial adjustment model, the coefficients on the crises variables are indicative only of the short run impact. The long-run cumulative effect of a sudden stop can be calculated from the coefficients for lagged investment and the short-run impact estimate. The long-run decrease in investment spending as a share of GDP based on this parameter is 3.75 ($=1.432/[1-0.618]$) percentage points, equivalent to 57.4% of the standard deviation of the investment share of GDP in our sample. The long run impact of a bank crisis on the investment share of GDP is a decline in this ratio of 3.34 ($=1.275/[1-0.618]$) percentage points, equivalent to 51.1% of the standard deviation of the investment share of GDP in our sample.¹¹

The reported test statistics include the Sargan test, which is a test of the hypothesis that the instrumental variables are uncorrelated with the residuals. The hypothesis cannot be rejected for this equation. The tests for serial correlation indicate the presence of first-order but not higher-order correlation of the residuals, which is consistent with our expectations.

The final column (Equation 4) repeats the previous specification using robust standard errors. Both crises variables remain significant at the 1% level.¹²

¹⁰The standard deviation of the investment/GDP ratio is 6.53% (see Table 5).

¹¹Note that some of the other variables, such as GDP growth, can also slow investment during a sudden stop or bank crisis, so the cumulative effect may be higher.

¹²The use of the Sargan test assumes homoscedasticity in the error terms. Since we estimate Equation 4 and all subsequent

4.1 Robustness

We next test for the robustness of the results from the basic specification to rule out the possibility that the event dummies are proxying for the influence of other incentives to invest in the domestic economy. The additional controls introduced in Table 7 are the change in the terms of trade, the volatility of the nominal exchange rate, domestic liability dollarization, and the real interest rate.

In Equation 5 of Table 7 we include the change in the terms of trade, which may influence the relationship between the crises variables and investment by affecting the relative prices of imported capital goods. The impact of both crises on investment is robust to the inclusion of changes in the terms of trade. The coefficient on the change in the terms of trade is not significant. This finding is also in line with previous research. Mody and Murshid (2005) reported that the terms of trade did have a significant impact on investment in the 1980s but not in the 1990s. Ghura and Goodwin (2000) did not find evidence of a significant effect in their study.

In order to examine whether our crises variables may be proxying for the effect of currency fluctuations on investment, we include a measure of nominal exchange rate volatility in Equation 6. This is calculated as the annual standard deviation of monthly percentage changes in the nominal exchange rate (USD-local currency) compiled from the IMF's International Financial Statistics database. Both crises variables remain significant at the 1% level. Furthermore, the effect of exchange rate volatility on investment is not significant in our sample.

Related to the effect of currency fluctuations on investment is the possibility that the level of liability dollarization potentially influences the impact of crises on investment. To address this concern, in Equation 8 we include a proxy for liability dollarization - the ratio of foreign currency deposits to the total deposits of the banking system - used in previous

equations using robust standard errors, the test statistic is not calculated.

work by Levy Yeyati (2006) and Berkman and Cavallo (2007).¹³ As discussed in Section 2, Calvo et al. (2004) argue that the impact of an external shock on the domestic economy is related to the level of liability dollarization in the financial system. While the bank crisis variable continues to have a significant impact (at the 1% level), the coefficient on sudden stops drops to the 10% level of significance. Liability dollarization is itself insignificant.

In the final column we introduce the real interest rate, the lending rate adjusted for inflation. The coefficients on both crises variables remain significant at the 1% level. The real interest rate itself has an insignificant coefficient. This is consistent with the previous findings. Mody and Murshid (2005), for example, also found that the real interest rate did not have a significant impact on investment spending.

The results in Table 6 and 7 establish that the events identified as sudden stops and bank crises in our data set have negative effects on investment, as predicted by theory. The coefficient estimates do not, however, provide an indication of the impact of one crisis in the absence of the other. For instance, the marginal effect of a sudden stop on investment is averaged out over instances in which bank crises also occur simultaneously and periods in which sudden stops occur in isolation. We examine the separate effects of each crisis in the next section.

5 Crises and investment: separating out the effects

In order to investigate the relationship between sudden stops, banking crises, and investment further, we evaluate the impact of sudden stops in the absence of a bank crisis and vice versa. We do this by adding to our basic specification an interaction term that captures the joint occurrence of sudden stops and bank crises:

$$gcy_{it} = \alpha_i + \delta_t + \sum_{j=1}^n \beta_j x_{ijt} + \gamma_3 SS_{it} + \gamma_4 BANKCRI_{it} + \gamma_5 (SS_{it} * BANKCRI_{it}) + \epsilon_{it}$$

¹³We thank Eduardo Cavallo for sharing this data.

In this regression, the coefficient on the level terms for each individual crisis variable gives us the impact on investment when only that crisis occurs and not the other. The coefficient on the interaction term gives us the additional impact on investment of a joint occurrence of both crises.

The coefficient on the sudden stop dummy is insignificant in Equation 9 (Table 8). This indicates that in the absence of a bank crisis, the sudden stop does not have an independent impact on investment. Bank crises, on the other hand, have a significant negative effect on investment regardless of whether or not there is an accompanying sudden stop.

As discussed in Section 3, sudden stops are events of large and abrupt reversals in the financial account of the balance of payments. The net outflow that takes place during such events is a combination of portfolio flows, net cross-border bank lending, and domestic residents transferring balances overseas. Such an event can lead to a reduction in the flow of finance that supports domestic investment if firms had been previously directly borrowing from overseas or if domestic banks had relied heavily on overseas funds which were then loaned on to domestic firms. However, if domestic banks are not heavily dependent on overseas borrowing which is then channeled to domestic firms, or if domestic firms do not rely on foreign portfolio capital to finance domestic investment, an abrupt outflow would not necessarily affect domestic investment even if it is large enough to show up as a sudden stop event on the balance of payments. The result reported in Equation 9 suggests that such an outflow will not itself adversely affect investment when domestic banks continue to provide intermediations services (i.e. the domestic banking sector is not in crisis).¹⁴

The coefficient on the interaction term in Equation 9 is significant, indicating that a joint occurrence of a bank crisis and a sudden stop does have an additional negative impact on investment. A bank crisis that occurs in the absence of a sudden stop reduces the investment/GDP ratio by 0.91 percentage points in the short run (equivalent to 13.94% of

¹⁴The finding is in line with Mishkin (1998) who argued that international capital movements and financial volatility that are not linked to “substantial deteriorations in the balance sheets of firms, households and banks” (p. 25) are unlikely to have harmful effects on the domestic economy.

a standard deviation of this ratio in our sample). The cumulative effect on investment over time is a decline of 2.375 percentage points. The joint occurrence of a sudden stop and a bank crisis has an additional negative impact of a decline of 3.05 percentage points in the investment/GDP ratio (equivalent to 46.72% of a standard deviation of this ratio in our sample). The cumulative effect of the joint crisis is a decline of 7.963 percentage points in this ratio over time.¹⁵

In Equation 10, we focus on a subset of bank crises that are determined to have external causes. Beim (2001) classifies the bank crises tabulated by Caprio and Klingebiel (1999) into four different categories based on the major precipitating factor that causes each crisis. Beim's four categories are: crises caused by domestic private depositors' withdrawal of funds; crises caused by the domestic government's withdrawal of support for the banking sector; crises caused by external private depositors withdrawing their funds; crises caused by international financial institutions' withdrawal of their support. We combine the two external precipitating factors to create a category of bank crises caused by withdrawal of funds by external depositors. We now have 57 bank crisis-years in this specification. The coefficient on the sudden stop variable continues to be insignificant while the coefficient on the bank crisis dummy remains significant at the 10% level. The coefficient on the interaction term appears as negative and significant at the 5% level. This pattern of coefficients confirms that in the absence of bank crises, sudden stops fail to have an impact on investment.

The remaining equations in Table 8 check the robustness of our findings. We include additional controls that may influence both the incentives to invest as well as the timing of the crises. We control separately for the change in the terms of trade, the volatility of the nominal exchange rate, and the real interest rate. In each case, the coefficient on the sudden stop variable continues to be insignificant and the coefficient on the bank crisis

¹⁵We also ran two additional versions of this specification: first, we dropped Middle Eastern and African countries from the sample to focus on emerging markets in Latin America, Eastern Europe, and Asia; second, we estimated the equation using countries that had experienced at least one sudden stop during this period. The results are robust to these changes in the sample. Sudden stops do not have a significant effect on investment in the absence of bank crises whereas bank crises do have an adverse impact in the absence of sudden stops. The joint occurrence of both crises has a statistically significant additional negative impact. Results are available upon request from the authors.

dummy remains significant at the 1% level; the coefficient on the interaction term appears as negative and significant at the 5% level in Equations 11 and 12 while it is insignificant in Equation 13. Our finding from Equations 9 and 10, that sudden stops do not have an effect on investment in the absence of bank crises, is robust to the inclusion of these additional controls. The evidence is also indicative of an indirect impact of sudden stops on investment acting in combination with the effects of a banking crisis, although the interaction term is not significant when the sample size drops due to limited data availability in Equation 13.

5.1 Additional Controls: Financial Openness

Countries differ in the degree to which they are integrated financially with international capital markets. In order to examine whether the extent of financial integration affects the relationship between the crises variables and investment, in Table 9 we introduce various different indicators of financial openness and exposure to capital outflows.

In the first column (Equation 14), we add the liability dollarization measure discussed previously. The inclusion of this control variable does not alter the pattern of coefficients reported in the preceding table: sudden stops fail to have a significant impact on investment in the absence of a bank crisis, whereas bank crises do affect investment adversely even in the absence of a sudden stop. The impact of bank crises is significant at the 1% level. The interaction term is significant at the 10% level, suggesting that there is a marginal additional negative impact on investment of a joint occurrence of the two crises.

The second indicator of financial integration we include is a measure of (net) cross-border commercial bank flows and trade-related lending as a fraction of GDP, obtained from the *World Development Indicators*. As the results in Equation 15 demonstrate, the coefficients on the crises variables are similar in their pattern of statistical significance to the ones reported in previous equations. Sudden stops only have an impact on investment indirectly (as suggested by the significant coefficient on the interaction term) in the sense that they worsen the adverse impact of bank crises on the investment/GDP ratio. In the absence of bank crises, sudden stops fail to affect investment.

In Equation 16 we introduce the Lane-Milessi Ferretti (2006) measure of financial openness, which is the sum of foreign portfolio assets and liabilities as a fraction of GDP. This is a measure of de facto openness which provides an indication of how closely connected to world capital markets a particular country's financial system is. The pattern of coefficients on the crises variables is once again similar to the ones seen previously: sudden stops do not have an impact on investment when there is no accompanying bank crisis. However, when they occur together with bank crises, sudden stops worsen the adverse impact of bank crises on investment. We explore this relationship further in Equation 17 by interacting the bank crisis variable with the measure of financial integration. As the final column of Table 9 indicates, the coefficient on the interaction term (*Financial Integration * BANKCRI*) is negative and significant, suggesting that as the degree of openness increases, bank crises have an increasingly more adverse impact on investment.¹⁶

We interpret this finding as a reflection of the impact of the reversal of short duration flows interacting with an ongoing bank crisis. Economies with more open capital regimes are more exposed to short duration international portfolio flows.¹⁷ The impact of a bank crisis on investment tends to be greater in more financially open economies because the ability of the banking sector to intermediate between savers and investors is further impeded when it is more exposed to the withdrawal of deposits by foreign lenders. If these withdrawals exacerbate the fragility of the banking system, any bank crisis that occurs will have an even more severe impact on investment than a bank crisis that occurs in a relatively more closed economy. Furthermore, the results in Tables 8 and 9 confirm that a sudden stop crisis that occurs in isolation of a bank crisis does not have a significant impact on investment, suggesting that the portfolio outflows that occur during sudden stops will not of their own

¹⁶The interpretation of the coefficients on the two crisis variables and the interaction term is not possible within sample since they refer to the effects of the crises for cases where financial integration is zero. We also ran this specification with an additional interaction between sudden stops and financial openness. The new interaction term was insignificant, while the remaining terms were similar to the result reported here. Sudden stops and bank crises were both insignificant whereas the interaction between sudden stops and bank crises was negative and significant, as was the interaction between bank crises and openness. Results available upon request from the authors.

¹⁷Montiel and Reinhart (1999) have found that in economies that are more open to capital flows, short-duration flows as a proportion of the total capital inflows tend to be higher than in economies with stricter capital controls.

accord be associated with lower domestic investment. As long as the banking sector does not also simultaneously experience a crisis, a decline in the financial account by itself will not affect the investment/GDP ratio.

Our results relate to previous research (Mody and Murshid, 2005, for example) which found that portfolio flows did not have a significant impact on domestic investment in developing and emerging market countries in the 1980s and 1990s. Mody and Murshid (p. 259) point out that “the amount of portfolio capital flowing to developing countries was negligible” in comparison with other international capital flows during the 1980s and 1990s. Our results suggest that a central aspect of the relationship between fluctuations in portfolio flows and investment is whether or not a banking crisis occurs.

6 Conclusion

Investment collapses in emerging markets have become a source of concern in policy circles. Not only does the collapse in investment create worries for long run growth in emerging market countries, but it is also thought to contribute significantly to the build-up of eventually unsustainable "global imbalances" (at the time of writing, this term refers mainly to the US current account deficit which is being financed largely by capital flows from emerging markets). Some commentators have linked investment collapses to sudden stops of inflows and capital flight from emerging markets, and have used this to argue that openness to global capital flows inflicts serious costs on the domestic economy because of the heightened vulnerability to capital reversals. Others contend that these crises are the short run costs of financial liberalization, which in the long run does benefit these economies.¹⁸

Previous research has established that emerging market countries are more vulnerable to external crises than either advanced industrial or less developed countries. They are also more likely to experience another type of crisis which can have a bearing on investment – banking crises. Our analysis indicates that in the absence of a bank crisis, a sudden stop by

¹⁸Ranciere, Tornell and Westermann (2006).

itself would not cause investment to decline. We also find that the more open an economy is to capital flows, the more severe is the impact of banking crises on investment. This suggests that the critical component of the capital flight associated with a sudden stop is the reversal of short duration flows, intermediated through the banking sector. Any impact of a sudden stop (or, more generally, a decline in the financial account of the balance of payments) therefore appears to act through the bank crisis channel. Provided the banking sector does not experience a crisis, investment remains unaffected by changes in the balance of payments position.

Our results speak directly to an ongoing crucial policy debate on the merits of financial globalization. One of the arguments against financial globalization heard in policy circles is that openness leaves economies vulnerable to adverse effects of sudden stops on investment and output. Our findings indicate that provided the banking sector does not collapse when faced with the withdrawal of funds by external depositors, sudden stop events fail to have a significant impact on investment. The results suggest that a strong banking sector that can withstand any negative fallout of international capital movements is essential for countries embarking on a path of financial liberalization. An ancillary conclusion is that an appropriate sequencing of financial reforms is imperative – policy makers in emerging market countries need to fix the strength of their banking sector first before they contemplate opening up their capital markets to international financial flows. Our results also highlight the importance of further research on the conditions under which the withdrawal of deposits by foreign lenders affects the ability of domestic banks to intermediate between savers and investors.

References

- Arellano, Cristina and Enrique G. Mendoza.** 2002. "Credit Frictions and 'Sudden Stops' in Small Open Economies: An Equilibrium Business Cycle Framework for Emerging Markets Crises." NBER Working Paper No. 8880. Cambridge, MA: National Bureau of Economic Research.
- Arellano, Manuel and Stephen Bond.** 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58 (2): 277-297.
- Attanasio, Orazio P., Lucio Picci and Antonello E. Scorcù.** 2000. "Saving, Growth, and Investment: A Macroeconomic Analysis Using a Panel of Countries." *Review of Economics and Statistics* 82 (2): 182-21.
- Aizenman, Joshua and Nancy Marion.** 1993. "Policy Uncertainty, Persistence and Growth." *Review of International Economics* 1 (2): 145-163.
- Becker, Torbjorn and Paolo Mauro.** 2006. "Output Drops and the Shocks That Matter?" IMF Working Paper WP 06/172. Washington, DC: International Monetary Fund.
- Beim, David O.** 2001. "What Triggers a Systemic Banking Crisis?" Columbia Business School Working Paper. Columbia University.
- Berkmen, Pelin and Eduardo Cavallo.** 2007. "Exchange Rate Policy and Liability Dollarization: An Empirical Study?" mimeo, Inter-American Development Bank.
- Bhagwati, Jagdish N.** 2004. *In Defense of Globalization*. New York: Oxford University Press.
- Bleakley, Hoyt and Kevin Cowan.** 2005. "Corporate Dollar Debt and Depreciations: Much Ado About Nothing?" Mimeo.
- Bleaney, Michael F.** 1996. "Macroeconomic Stability, Investment and Growth in Developing Countries." *Journal of Development Economics* 48 (2): 461-477.
- Bradshaw, Keith.** 2007. "Asia's Long Road Back." *New York Times*. Section C, Page 1. June 28.

Bosworth, Barry P. and Susan M. Collins. 1999. "Capital Flows to Developing Economies: Implications for Saving and Investment." *Brookings Papers on Economic Activity* No. 1: 143-69.

Caballero, Ricardo J. and Arvind Krishnamurthy. 2001. "International and Domestic Collateral Constraints in a Model of Emerging Market Crises." *Journal of Monetary Economics* 48 (3): 513-548.

Caballero, Ricardo J. and Arvind Krishnamurthy. 2003. "Excessive Dollar Debt: Financial Development and Underinsurance." *Journal of Finance* 58 (2): 867-893.

Caballero, Ricardo J. and Arvind Krishnamurthy. 2004. "Smoothing Sudden Stops." *Journal of Economic Theory* 119 (1), 104-127.

Calvo, Guillermo A., Alejandro Izquierdo and Luis-Fernando Mejia. 2004. "On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects." NBER Working Paper No. 10520. Cambridge, MA: National Bureau of Economic Research.

Calvo, Guillermo A. and Carmen M. Reinhart. 2000. "When Capital Inflows Suddenly Stop: Consequences and Policy Options." In Peter B. Kenen and Alexander K. Swoboda (eds.), *Reforming the International Monetary and Financial System*. Washington, DC: IMF, p. 175-201.

Caprio, Gerard and Daniela Klingebiel. 1997. "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?" In Michael Bruno and Boris Pleskovic (eds.), *Annual World Bank Conference on Development Economics 1996*. Washington, DC: World Bank, 79-104.

Caprio, Gerard and Daniela Klingebiel. 1999. "Episodes of Systemic and Borderline Financial Crises." Dataset available at World Bank's "Finance Research" web site.

Caprio, Gerard, Daniela Klingebiel, Luc Laeven and Guillermo Noguera. 2005. "Banking Crisis Database." In Patrick Honohan and Luc Laeven (eds.), *Systemic Financial Crises: Containment and Resolution*. Cambridge, UK and New York: Cambridge University Press.

Cerra, Valerie and Sweta C. Saxena. 2003. "Did Output Recover From the Asian

Crisis?” IMF Working Paper WP 03/48. Washington, DC: International Monetary Fund.

Choi, Woon Gyu and David Cook. 2004. “Liability Dollarization and the Bank Balance Sheet Channel.” *Journal of International Economics* 64 (2): 247-75.

de Melo, Martha, Cevdet Denizer and Alan Gelb. 1996. “Patterns of Transition from Plan to Market.” *World Bank Economic Review* 10 (3): 397-424.

de Melo, Martha, Cevdet Denizer, Alan Gelb and Stoyan Tenev. 2001. “Circumstance and Choice: The Role of Initial Conditions and Policies in Transition Economies.” *World Bank Economic Review* 15 (1): 1-31.

Edwards, Sebastian. 2002. “Does the Current Account Matter?” In Sebastian Edwards and Jeffrey A. Frankel (eds.), *Preventing Currency Crises in Emerging Markets*. Chicago and London: University of Chicago Press, p. 21-68.

Edwards, Sebastian. 2004. “Thirty Years of Current Account Imbalances, Current Account Reversals, and Sudden Stops.” *IMF Staff Papers* 51 (0): 1-49.

Frankel, Jeffrey A. and Eduardo A. Cavallo. 2004. “Does Openness to Trade Make Countries More Vulnerable to Sudden Stops, or Less? Using Gravity to Establish Causality.” NBER Working Paper No. 10957. Cambridge, MA: National Bureau of Economic Research.

Frankel, Jeffrey A. and Shang-Jin Wei. 2005. “Managing Macroeconomic Crises: Policy Lessons.” In Joshua Aizenman and Brian Pinto (eds.), *Managing Economic Volatility and Crises*. Cambridge, UK: Cambridge University Press, p. 315-405.

Ghura, Dhaneswar and Barry Goodwin. 2000. “Determinants of Private Investment: A Cross-Regional Empirical Investigation.” *Applied Economics* 32 (14): 1819-1829.

Gopinath, Gita. 2004. “Lending Booms, Sharp Reversals and Real Exchange Rate Dynamics.” *Journal of International Economics* 62 (1): 1-23.

Greene, Joshua and Delano Villanueva. 1991. “Private Investment in Developing Countries.” *IMF Staff Papers* 38 (1): 33-58.

Gupta, Poonam, Deepak Mishra and Ratna Sahay. 2003. “Output Responses to Currency Crises.” IMF Working Paper WP 03/230. Washington, DC: International Mone-

tary Fund

Husain, Aasim M., Ashoka Mody and Kenneth S. Rogoff. 2005. "Exchange Rate Regime Durability and Performance in Developing versus Advanced Economies." *Journal of Monetary Economics* 52 (1): 35-64.

Hutchison, Michael M. 2003. "A Cure Worse Than the Disease? Currency Crises and the Output Costs of IMF-Supported Stabilization Programs." In Michael P. Dooley and Jeffrey A. Frankel (eds.), *Managing Currency Crises in Emerging Markets*. Chicago: University of Chicago Press, p. 321-354.

Hutchison, Michael M. and Ilan Noy. 2005. "How Bad Are Twins? Output Costs of Currency and Banking Crises." *Journal of Money, Credit and Banking* 37 (4): 725-752.

Hutchison, Michael M. and Ilan Noy. 2006. "Sudden Stops and the Mexican Wave: Currency Crises, Capital Flow Reversals and Output Loss in Emerging Markets." *Journal of Development Economics* 79 (1): 225-248.

International Monetary Fund. 2005. *World Economic Outlook September 2005*. Washington, DC: International Monetary Fund.

Kaminsky, Graciela L. 2006. "Currency Crises: Are They All the Same?" *Journal of International Money and Finance* 25 (3): 503-527.

Lane, Phillip and Gian Maria Milesi-Ferretti (2006) "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004." IMF Working Paper WP 06/69. Washington, DC: International Monetary Fund.

Larrain, Felipe and Rodrigo Vergara. 1993. "Investment and Macroadjustment: The Case of East Asia." In Luis Servén and Andrés Solimano (eds.), *Striving for Growth after Adjustment: The Role of Capital Formation*. Washington, DC: World Bank, p. 229-274.

Levchenko, Andrei and Paolo Mauro. 2006. "Do Some Forms of Financial Flows Help Protect from Sudden Stops?." IMF Working Paper WP 06/202. Washington, DC: International Monetary Fund.

Levy Yeyati, Eduardo. 2006. "Financial Dollarization: Evaluating the Consequences."

Economic Policy (45), 61-118.

Mendoza, Enrique G. 2006a. “Lessons from the Debt Deflation Theory of Sudden Stops.” NBER Working Paper No. 11966. Cambridge, MA: National Bureau of Economic Research.

Mendoza, Enrique G. 2006b. “Endogenous Sudden Stops in a Business Cycle Model with Collateral Constraints: A Fisherian Deflation of Tobin’s Q.” mimeo, University of Maryland.

Mendoza, Enrique G. and Katherine A. Smith. 2006. “Quantitative Implications of a Debt-Deflation Theory of Sudden Stops and Asset Prices.” *Journal of International Economics* 70 (1): 82-114.

Milesi-Ferretti, Gian Maria and Assaf Razin. 1998. “Sharp Reductions in Current Account Deficits: An Empirical Analysis.” *European Economic Review* 42 (3-5): 897-908.

Milesi-Ferretti, Gian Maria and Assaf Razin. 2000. “Current Account Reversals and Currency Crises: Empirical Regularities.” In Paul Krugman (ed.), *Currency Crises*. Chicago and London: University of Chicago Press, p. 285-323.

Mishkin, Frederic S. 1997. “Understanding Financial Crises: A Developing Country Perspective.” In Michael Bruno and Boris Pleskovic (eds.), *Annual World Bank Conference on Development Economics 1996*. Washington, DC: World Bank, p. 29-62.

Mishkin, Frederic S. 1998. “International Capital Movements, Financial Volatility and Financial Instability.” NBER Working Paper No. 6390. Cambridge, MA: National Bureau of Economic Research.

Mishkin, Frederic S. 2006. *The Next Great Globalization*. Princeton: Princeton University Press.

Mody, Ashoka and Antu Panini Murshid. 2005. “Growing Up with Capital Flows.” *Journal of International Economics* 65 (1): 249-66.

Montiel, Peter and Carmen M. Reinhart. 1999. “Do Capital Controls and Macroeconomic Policies Influence the Volume and Composition of Capital Flows? Evidence From

the 1990s.” *Journal of International Money and Finance* 18 (4): 619-35.

Park, Yong-Chul and Jong-Wha Lee. 2003. “Recovery and Sustainability in East Asia” In Michael P. Dooley and Jeffrey A. Frankel (eds.), *Managing Currency Crises in Emerging Markets*. Chicago and London: University of Chicago Press, p. 275-316.

Pastor, Manuel, Jr. and Jae Ho Sung. 1995. “Private Investment and Democracy in the Developing World.” *Journal of Economic Issues* 29 (1): 223-243.

Pindyck, Robert S. and Andrés Solimano. 1993. “Economic Instability and Aggregate Investment.” In Olivier Jean Blanchard and Stanley Fischer (eds.), *NBER Macroeconomics Annual 1993*. Cambridge, MA and London: MIT Press, p. 259-303.

Ranciere, Romain, Aaron Tornell and Frank Westermann. 2006. “Decomposing the Effects of Financial Liberalization: Crises vs. Growth.” NBER Working Paper No. 12806. Cambridge, MA: National Bureau of Economic Research.

Rodrik, Dani. 1998. “Who Needs Capital-Account Convertibility?” in Stanley Fischer et al., *Should the IMF Pursue Capital-Account Convertibility?* Essay in International Finance No. 207. Princeton, NJ: Princeton University.

Servén, Luis. 1998. “Macroeconomic Uncertainty and Private Investment in LDCs: An Empirical Investigation.” Policy Research Working Paper No. 2035. Washington, DC: World Bank Policy Development Research Group.

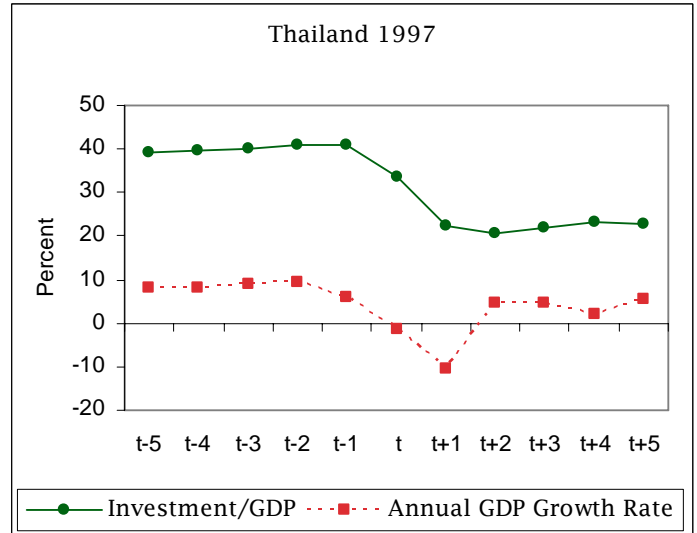
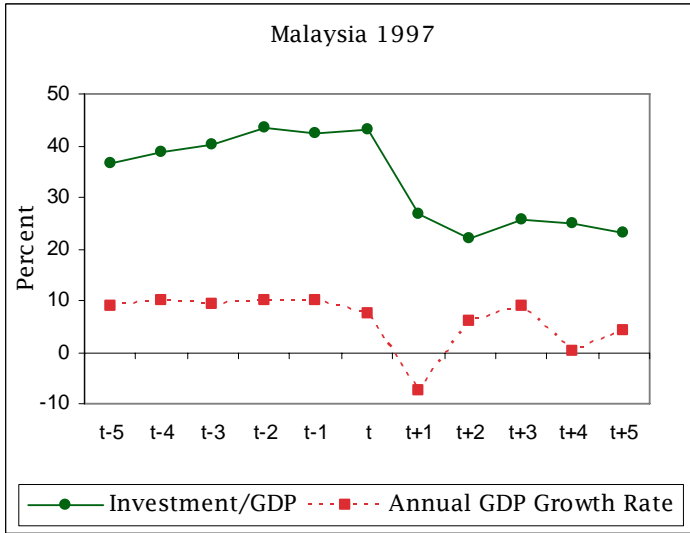
Servén, Luis. 2003. “Real-Exchange-Rate Uncertainty and Private Investment in LDCs.” *Review of Economics and Statistics* 85 (1): 212-218.

Servén, Luis and Andrés Solimano. 1993. “Economic Adjustment and Investment Performance in Developing Countries.” In Luis Servén and Andrés Solimano (eds.), *Striving for Growth after Adjustment: The Role of Capital Formation*. Washington, DC: World Bank, p. 147-179.

Stiglitz, Joseph E. 2002. *Globalization and its Discontents*. New York: W.W. Norton.

Thomas, Julia K. 2002. “Is Lumpy Investment Relevant for the Business Cycle?” *Journal of Political Economy* 110 (3): 508-534.

Figure 1
Twin Crises: Joint Occurrence of Sudden Stops and Banking Crises



Note: "t" represents the initial year of crisis. See Tables 2 & 3 for data sources.

Figure 2 (a): Sudden Stop Separate from Banking Crisis

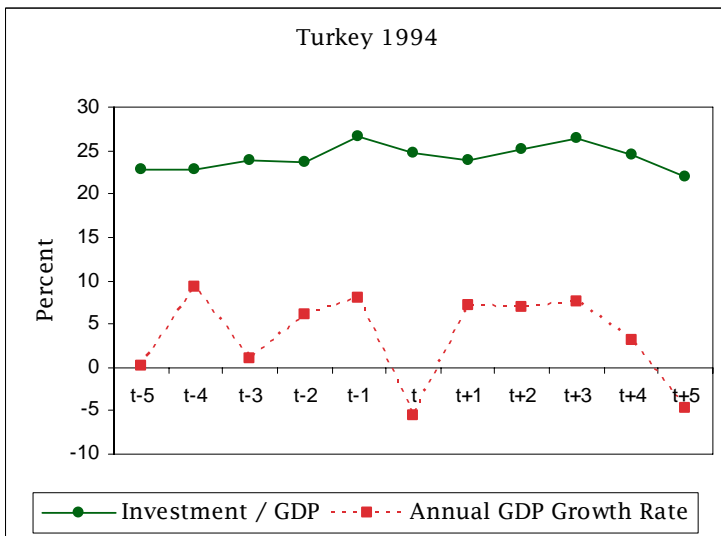
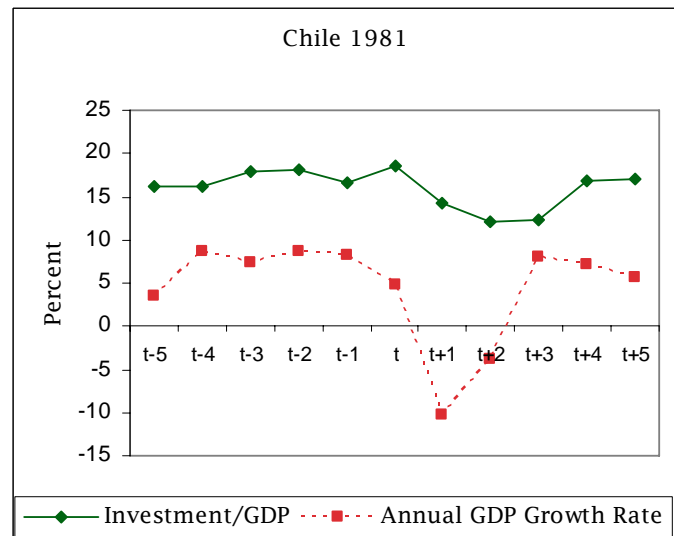


Figure 2(b): Banking Crisis Separate from Sudden Stop



Note: "t" represents the initial year of crisis. See Tables 2 & 3 for data sources.

Table 1
Related Papers

<i>Author(s)</i>	<i>Type of Crisis</i>	<i>Outcome</i>
Milesi-Ferretti and Razin (1998)	Current Account Reversals Currency Crises	Output Growth
Milesi-Ferretti and Razin (2000)	Current Account Reversals	Output Growth, Exports
Cerra and Saxena (2003)	Currency Crises	Output Growth
Gupta, Mishra and Sahay (2003)	Currency Crises	Output Growth
Hutchison (2003)	Currency Crises	Output Growth
Edwards (2004)	Current Account Reversals Sudden Stops	Output Growth
Frankel and Cavallo (2004)	Sudden Stops	Output Growth
Frankel and Wei (2005)	Currency Crises	Output Growth
Hutchison and Noy (2005)	Currency Crises Banking Crises	Output Growth
Becker and Mauro (2006)	Different Types of Crises	Output Growth
Hutchison and Noy (2006)	Currency Crises Capital Flow Reversals	Output Growth
Kaminsky (2006)	Different Types of Crises	Access to Capital Markets Output Growth

Table 2

List of Countries and Crises

<i>Country</i>	<i>Sudden Stops</i>	<i>Banking Crises</i>	<i>Externally-Induced Bank Crises</i>
Argentina	1994-1995, 1999, 2001	1980-1982, 1989-1990, 1995, 2001-2002	1980-1982, 1989-1990, 1995
Brazil	2002	1990, 1994-1999	1990
Chile	1982-1983, 1998-1999	1976, 1981-1983	1976, 1981-1983
China	-	1990-2002	-
Colombia	1998-2000	1982-1987	-
Czech Republic	1997	-	-
Egypt	1990	1980-1983	1980-1983
Hungary	1996	1991-1995	-
India	-	-	-
Indonesia	1997-1998	1997-2002	1997-1999
Jordan	1992-1993, 2001	-	-
Malaysia	1997	1997-2001	1997-1999
Mexico	1982, 1994-1995	1981-1991, 1994-2000	1981-1991, 1994-1997
Morocco	1995	1980-1983	-
Pakistan	1998	-	-
Peru	1997-1998	1983-1990	-
Philippines	1997-1999	1983-1987, 1998-2002	1998-2002
Poland	1994, 2001	1992-1995	-
Russia	-	1995, 1998-1999	1995, 1998-1999
Slovak Republic	-	1994-1995	-
South Africa	2000	-	-
Sri Lanka	2001	1989-1993	1989-1993
Thailand	1996-1998	1983-1987, 1997-2002	1983-1987, 1997-1999
Turkey	1991, 1994-1995, 1998-1999, 2001	1982-1985, 2000-2002	-
Venezuela	1994	1994-1995	-
Zimbabwe	1983	1995-1996	-

Sources: Beim (2001), Calvo et al. (2004), Caprio, Klingebiel, Laeven and Noguera (2005), Frankel and Cavallo (2002)

Table 3
Data Definitions and Sources

<i>Name</i>	<i>Definition</i>	<i>Source</i>
BANKCR	Indicator of Systemic Banking Crisis	Caprio, Klingebiel, Laeven and Noguera (2005)
BANKCREXFAC	Indicator of Systemic Banking Crisis Precipitated by External factors	Beim (2001)
CPIGR	CPI Growth (annual % growth)	<i>WDI</i>
DTOT	Change in Terms of Trade (%)	<i>WDI</i>
EXVOL	Exchange Volatility	<i>IFS</i>
FDIY	Foreign Direct Investment (% of GDP)	<i>WDI</i>
FAL	Foreign Assets + Liabilities (% of GDP)	Lane and Milesi-Ferretti (2006)
GCY	Gross Capital Formation (% of GDP)	<i>WDI</i>
	Liability Dollarization	Levy Yeyati (2006)
REALR	Real Interest Rate (Lending rate – Inflation)	<i>WDI</i>
SS	Sudden Stop Indicator	Frankel and Cavallo (2002), Calvo et al. (2004)
TDSY	Total Debt Service (% of GDP)	<i>WDI</i>
TRADY	Trade (Exports + Imports) (% of GDP)	<i>WDI</i>
YGR	GDP Growth (annual % growth)	<i>WDI</i>

Note: IFS is the on-line edition of the IMF's *International Financial Statistics*.

WDI is the on-line edition of the World Bank's *World Development Indicators*.

Table 4

Distribution of Sudden Stops and Banking Crises

		<i>Banking Crises</i>		
		Yes	No	Total
<i>Sudden Stops</i>	Yes	17 (3%)	29 (5%)	46 (8%)
	No	115 (21%)	389 (71%)	504 (92%)
	Total	132 (24%)	418 (76%)	550

Note: The unit of observation is a country-year.

Table 5

Summary Statistics of Key Variables

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
Gross Capital Formation/GDP (%)	23.6238	6.5271
Debt Service/GDP (%)	6.8723	3.8977
Foreign Direct Investment/GDP (%)	1.7481	2.1862
Real GDP Growth (% Δ)	4.0137	4.8142
Inflation (% Δ CPI)	77.1198	430.7938
Trade Openness: (EX+IM)/GDP (%)	57.9649	36.6185

Table 6

Investment, Sudden Stops and Bank Crises

	(1)	(2)	(3)	(4)
Lagged Investment	0.622*** (0.031)	0.618*** (0.031)	0.618*** (0.031)	0.618*** (0.035)
Lagged Growth	0.150*** (0.033)	0.154*** (0.032)	0.154*** (0.032)	0.154*** (0.036)
Inflation	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001*** (0.000)
Trade Openness	0.040*** (0.010)	0.039*** (0.010)	0.040*** (0.010)	0.040*** (0.013)
FDI/GDP	0.198** (0.091)	0.200** (0.088)	0.200** (0.088)	0.200 (0.150)
Debt Service/GDP	-0.148*** (0.055)	-0.148*** (0.053)	-0.148*** (0.053)	-0.148*** (0.055)
Sudden Stop	-1.444*** (0.482)	-1.433*** (0.465)	-1.432*** (0.465)	-1.432*** (0.512)
Bank Crisis	-1.282*** (0.360)	-1.276*** (0.348)	-1.275*** (0.348)	-1.275*** (0.308)
Sargan Test (p-value)	-	0.9937	1.0000	-
1 st order serial correlation (p-value)	-	0.0000	0.0000	0.0006
2 nd order serial correlation (p-value)	-	0.4022	0.4020	0.4092
Observations	511	482	482	482

Note: Dependent variable is the investment share of GDP (Investment / GDP). Equation 1 estimated with fixed-effects estimator, all other equations with GMM estimator. Standard errors in parentheses. *, **, *** significant at 10%, 5%; 1%. Column 4: Robust Standard Errors.

Table 7
Robustness Checks

	(5)	(6)	(7)	(8)
Lagged Investment	0.571*** (0.047)	0.621*** (0.034)	0.569*** (0.046)	0.521*** (0.039)
Lagged Growth	0.160*** (0.047)	0.151*** (0.034)	0.140*** (0.047)	0.216*** (0.048)
Inflation	-0.000** (0.000)	-0.001 (0.001)	-0.001*** (0.000)	-0.000 (0.000)
Trade Openness	0.039** (0.017)	0.039*** (0.013)	0.051*** (0.019)	0.030 (0.019)
FDI/GDP	0.325* (0.190)	0.201 (0.149)	-0.013 (0.105)	0.122 (0.137)
Debt Service/GDP	-0.192*** (0.049)	-0.149*** (0.056)	-0.233** (0.101)	-0.219*** (0.079)
Sudden Stop	-1.469*** (0.531)	-1.477*** (0.498)	-1.108* (0.620)	-1.576*** (0.578)
Bank Crisis	-1.515*** (0.399)	-1.343*** (0.361)	-2.367*** (0.428)	-1.680*** (0.409)
ΔTerms of Trade	-0.018 (0.021)	-	-	-
Exchange Volatility	-	0.018 (0.028)	-	-
Liability Dollarization	-	-	0.016 (0.020)	-
Real Interest Rate	-	-	-	0.001 (0.025)
1 st order serial correlation (p-value)	0.0015	0.0009	0.0010	0.0007
2 nd order serial correlation (p-value)	0.9580	0.1755	0.7841	0.3435
Observations	414	482	277	330

Note: Dependent variable is the investment share of GDP (Investment/GDP). All equations estimated with GMM estimator. Robust standard errors in parentheses. *, **, *** significant at 10%, 5%; 1%.

Table 8
Sudden Stops and Bank Crises – Separate Effects on Investment

	(9)	(10)	(11)	(12)	(13)
Lagged Investment	0.617*** (0.036)	0.617*** (0.038)	0.574*** (0.048)	0.620*** (0.034)	0.526*** (0.041)
Lagged Growth	0.153*** (0.035)	0.162*** (0.035)	0.162*** (0.046)	0.150*** (0.033)	0.213*** (0.049)
Inflation	-0.001*** (0.000)	-0.001*** (0.000)	-0.000** (0.000)	-0.001 (0.001)	-0.000 (0.000)
Trade Openness	0.042*** (0.014)	0.053*** (0.016)	0.040** (0.017)	0.041*** (0.014)	0.032 (0.020)
FDI/GDP	0.210 (0.146)	0.268* (0.153)	0.326* (0.188)	0.211 (0.145)	0.134 (0.133)
Debt Service/GDP	-0.139*** (0.052)	-0.160*** (0.061)	-0.184*** (0.047)	-0.140*** (0.052)	-0.207*** (0.072)
Sudden Stop	-0.378 (0.447)	-0.372 (0.509)	-0.536 (0.523)	-0.419 (0.438)	-0.762 (0.556)
Bank Crisis	-0.910*** (0.323)	-	-1.180*** (0.389)	-0.978*** (0.379)	-1.346*** (0.455)
Sudden Stop*Bank Crisis	-3.050*** (1.134)	-	-2.545** (1.245)	-3.066*** (1.150)	-2.197 (1.364)
Bank Crisis (Ext Factors)	-	-1.300* (0.736)	-	-	-
Sudden Stop*Bank Crisis(Ext Factors)	-	-2.960** (1.460)	-	-	-
ΔTerms of Trade	-	-	-0.018 (0.021)	-	-
Exchange Volatility	-	-	-	0.018 (0.027)	-
Real Interest Rate	-	-	-	-	0.004 (0.024)
1 st order serial correlation (p-value)	0.0006	0.0007	0.0016	0.0008	0.0009
2 nd order serial correlation (p-value)	0.4256	0.9609	0.9785	0.1896	0.3803
Observations	482	463	414	482	330

Note: Dependent variable is the investment share of GDP (Investment/GDP). All equations estimated with GMM estimator. Robust standard errors in parentheses. *, **, *** significant at 10%, 5%; 1%

Table 9
Sudden Stops and Bank Crises: Open Economy Effects

	(14)	(15)	(16)	(17)
Lagged Investment	0.572*** (0.047)	0.597*** (0.030)	0.600*** (0.036)	0.592*** (0.038)
Lagged Growth	0.142*** (0.046)	0.154*** (0.036)	0.135*** (0.036)	0.122*** (0.033)
Inflation	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Trade Openness	0.051*** (0.018)	0.041*** (0.015)	0.057*** (0.015)	0.066*** (0.016)
FDI/GDP	-0.000 (0.096)	0.218 (0.134)	0.240 (0.152)	0.200 (0.146)
Total Debt Service/GDP	-0.208** (0.090)	-0.124** (0.051)	-0.088* (0.053)	-0.110* (0.058)
Sudden Stop	-0.300 (0.524)	-0.373 (0.462)	-0.320 (0.460)	-0.364 (0.449)
Bank Crisis	-1.901*** (0.436)	-0.898*** (0.318)	-0.817** (0.352)	1.672 (1.109)
Sudden Stop*Bank Crisis	-2.414* (1.300)	-2.974*** (1.138)	-2.959*** (1.102)	-2.505** (1.019)
Liability Dollarization	0.016 (0.019)	-	-	-
Foreign Bank Lending	-	0.202** (0.097)	-	-
Financial Integration	-	-	-0.022** (0.011)	-0.012 (0.012)
Bank Crisis*Financial Integration	-	-	-	-0.027** (0.013)
1 st order serial correlation (p-value)	0.0011	0.0007	0.0006	0.0006
2 nd order serial correlation (p-value)	0.8494	0.4295	0.3355	0.4181
Observations	277	482	482	482

Note: Dependent variable is the investment share of GDP (Investment/GDP). All equations estimated with GMM estimator. Robust standard errors in parentheses.
*, **, ***significant at 10%, 5%; 1%