

Deb, Saubhik

**Working Paper**

## Output growth, capital flow reversals and sudden stop crises

Working Paper, No. 2006-06

**Provided in Cooperation with:**

Department of Economics, Rutgers University

Suggested Citation: Deb, Saubhik (2005) : Output growth, capital flow reversals and sudden stop crises, Working Paper, No. 2006-06, Rutgers University, Department of Economics, New Brunswick, NJ

This Version is available at:

<http://hdl.handle.net/10419/31265>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# **Output Growth, Capital Flow Reversals and Sudden stop Crises**

By  
Saubhik Deb

Department of Economics  
Rutgers University

June, 2005

## **Abstract**

This paper studies the effects of capital flow reversals and sudden stop crises on output growth and how these effects vary across regions and between emerging and industrial countries. We found that capital flow reversals are generally contractionary in the developing countries and particularly in Asia and Africa. But neither capital flow reversals nor sudden stop crises have any significant growth effect in the industrial countries. Our initial estimates for sudden stop crises support the widely held belief regarding the contractionary nature of such crises. Further robustness checks indicate that the estimated negative growth effects for such crises are mainly driven by the presence of the Asian countries in the sample. Moreover, when the turbulent years of the East Asian crises are excluded from the sample, no significant effect of sudden stop crises could be found. Our research reconfirms the contractionary nature of capital flow reversals in developing countries but raises doubt about the existence of contractionary sudden stop crises.

JEL Classification: F32; F43

Keywords: Currency Crisis; Capital Flow Reversal; Sudden Stop Crisis

## **1. Introduction**

The recent episodes of financial crises in emerging economies and their devastating consequences for those economies have led to renewed interest, both in academic and policy circles, about the importance of financial factors in economic performance. After the Mexican debt crisis of 1981, most of the Latin American countries were excluded from the international capital markets. They were reintegrated into the international financial markets around 1989. There was a sharp increase in capital inflows to emerging markets accompanied by an increase in net portfolio flows as well.

However, the Mexican crisis in 1994 and the East Asian crisis in 1997 led to a reversal of capital flows from these regions. The latter had a huge and lasting negative effect on the economic performance of the region. Since all currency crises are not necessarily contractionary, and the most contractionary ones are the ones associated with a capital inflow reversal, there have been attempts to link capital inflow reversals, financial crises and output destruction.

Calvo (1998), Calvo and Reinhart (2000) outlined a mechanism through which a sudden cessation in capital inflow, a “Sudden Stop” might result in a financial crisis and might have a significant deleterious effect on the output of an economy. Calvo’s work prompted a good number of theoretical models further formalizing the linkages between sudden stop of capital inflows and contractionary financial crises [Caballero and Krishnamurthy (2000), Mendoza (2001), Mendoza and Smith (2002) etc.]. Milesi-Ferretti and Razin (1998, 2000), Edwards (2002, 2004) and Guidotti, Sturzenegger and Villar (2004) have analyzed the output effects of capital flow reversals. Milesi-Ferretti and Razin (1998) found no systematic evidence of growth slowdowns following current account reversals. Guidotti, Sturzenegger and Villar (2004) defined capital flow reversal as deterioration in the capital account. They found that such reversals have a significant negative effect on output growth. Interestingly, in a recent paper, Chari, Kehoe and McGrattan (2005) developed a theoretical model where declines in capital inflows lead to output increases. They concluded: “To generate an output drop during a financial crisis, the model must include other frictions which have negative effects on output that are large enough to overwhelm the positive effect of the sudden stop.”<sup>1</sup>

---

<sup>1</sup> Chari, Kehoe and McGrattan (2005), “Sudden Stops and Output Drops”, NBER Working Paper No. 11133, page 1

The empirical literature on sudden stop currency crisis is not very abundant. A sudden stop crisis is a type of financial crisis where a capital flow reversal or sudden stop leads to a currency crisis. Kaminsky (2003) discussed the identification of such crises episodes. However, Hutchison and Noy's (2002) work remains the only paper to date which studied the output effect of a sudden stop crisis. They defined a sudden stop as a joint occurrence of capital flow reversal and financial crisis. Using a panel data set of 24 emerging economies, they studied the output growth dynamics following currency crises, capital flow reversals and sudden stop. Like the previous studies, they found that both currency crises and capital flow reversals have a significant negative effect on output. And the growth slowdown following a sudden stop crisis is significantly higher than a capital flow reversal. The later conclusion is surprising considering the fact that the sudden stop crises are very rare and our preliminary data analysis (presented later) reveals that the majority of these crises are not contractionary.

Economies are hit by financial crises mostly when they are over-heated. Cyclical downturns could be the result of such financial crises. But very often economies go into recessions without any financial crises in the vicinity. So, in the vicinity of an over-heated economy, financial crises can be considered contractionary only if the growth slowdowns following such events are higher than the growth slowdowns following cyclical peaks which are not associated with any such crises. In addition, capital flow reversals and sudden stop crises are very often preceded by currency and/or banking crises. Since each of them has a negative effect on output, it is important to control for these variables to find out the marginal effects of capital flow reversals and sudden stop crises on output growth.

This paper reinvestigates the growth effects of capital flow reversals and sudden stop crises using a panel dataset of 80 countries, developing and developed, covering the period from 1975 to 1999. Unlike Hutchison and Noy (2002), we define a sudden stop as a currency crisis which is triggered by a capital flow reversal. We argue that sudden stop is not just a concurrent occurrence of currency crisis and reversal; it has a causality leading from reversal to crisis. Though causality is a difficult problem to disentangle, a proxy would be the episodes where capital flow reversals are followed by currency crises. Moreover, it has very often been argued that sudden stop and reversals are mostly developing country phenomena. The large dataset gives us the flexibility to delve into this question in more detail. This paper addresses the following questions: How contractionary are capital flow reversals and sudden stops? Are reversals and sudden stops truly developing country phenomena? Are there any regional patterns in the growth effects of such crises?

The rest of the paper has been organized as follows. In section 2, we discuss the mechanism through which a capital flow reversal might lead to a sudden stop and output destruction. Section 3 discusses the identification of different types of crises, reversals and business cycle peaks, our proxy for an over-heated economy, and the degree of association among them. In Section 4, we present our empirical model. Section 5 contains the data analysis and the results from our estimation. Section 6 concludes

## **2. Capital Flow Reversals, Sudden Stops and Output Growth**

In this section, we try to relate capital inflow reversal, sudden stop crisis and output destruction from a theoretical perspective. Specifically, we will discuss how an exogenous slowdown in capital inflow might result in a financial crisis (sudden stop

crisis) and how each of them might lead to significant output loss. The discussion is mainly based on Calvo (1998).

In an economy, capital inflow equals the current account deficit (CAD) and net reserve accumulation. So, a slowdown in capital inflow can be met either by reducing the CAD and/or by releasing foreign reserves. Since CAD is the difference between domestic income and absorption, a reduction in CAD can be achieved by lowering the domestic demand for tradables. This would result in a proportional decrease in the demand for non-tradables, which would depress their relative price and increase the real exchange rate. Lower relative prices might adversely affect the ability of the firms in the non-tradable sector to repay their loans. With tighter international credit, the defaulting firms might find it impossible to borrow causing widespread bankruptcies. Since firms are related through inter-enterprise credit, these bankruptcies might have a domino effect resulting in bankruptcies in otherwise healthier firms, which are related to the bankrupt firms through the credit channel. So an attempt to adjust to the sudden slowdown in capital inflow through a reduction in the demand for tradables might lead to a collapse of output especially in the non-tradable sector.

A slowdown in capital inflow typically causes an increase in all domestic interest rates. To check the interest rates from rising, the Central Bank can release reserves through a discount window, cushioning the credit crunch in the economy (as pointed out by Calvo, a tight monetary policy under this situation will aggravate the credit destruction problem). The resulting increase in high-powered money will put downward pressure on the nominal exchange rate. Under a flexible exchange rate, the devaluation might seriously jeopardize the solvency of the non-tradable sector, if they have undertaken

significant dollar-denominated debt (this is known as the balance sheet effect). However, if the country is committed to a fixed exchange rate, the Central Bank has to intervene in the foreign exchange market and has to release foreign reserves. This makes the Central Bank vulnerable to a speculative attack. People will lower their demand for assets denominated in the domestic currency and will try to convert their dollar-denominated liabilities into domestic currency denominated liabilities. This could result in further contraction in capital inflow (might cause a capital outflow as well) and a financial crisis could ensue.

To summarize, a sudden stop crisis involves a reversal of the capital account followed by an over-shooting of the real exchange rate that leads to a currency crisis. As mentioned earlier, an attack on the domestic currency might itself trigger a capital inflow slowdown or reversal. However, such events would not qualify as sudden stop crises. It is not just a concurrent occurrence of currency crisis and current account reversal, as has been interpreted by Hutchison and Noy (2002). The sequence of events is crucial. Since currency crisis indices have been constructed on a monthly basis and capital inflow data is mostly annual, identifying sudden stop crises becomes a difficult problem. We will be dealing with this issue in the next section.

### **3. Empirical Identification of Crises, Reversals and Cyclical Peaks**

#### **3.1 Currency Crises**

There are two basic approaches to the identification of a currency crisis. In the studies of Frankel and Rose (1996), Esquivel and Felipe (1998) and Milesi-Ferretti and Razin (1998), a currency crisis has been defined as a sharp break in the path of the

exchange rate such as abandonment of a currency peg and forced devaluations or a major acceleration of the rate of depreciation in the case of more flexible regimes. For example, Frankel and Rose (1996) defined a currency crash as a nominal depreciation of the exchange rate of at least 25 percent, which is also at least 10 percent higher than the depreciation in the previous year. The later condition has been added to avoid capturing the large exchange rate fluctuations associated with high inflation episodes. Accordingly, their crisis index is:

$$\begin{aligned} \text{Crisis} &= 1 \text{ if } \% \Delta e_{i,t} > 25\% \text{ and } \% \Delta e_{i,t} > 10\% + \% \Delta e_{i,t-1} \\ &= 0 \text{ otherwise.} \end{aligned}$$

Where  $\% \Delta e_{i,t}$  denotes the percentage depreciation in the nominal exchange rate in country  $i$  at period  $t$ .

However, this definition captures only the successful attacks on the currency and would exclude instances of crises where the currency was successfully defended by the Central Bank. Eichengreen, Rose and Wyplosz (1996), inspired by the monetary model of Girton and Roper (1977), constructed a crisis index based on a measure of exchange rate pressure. The basic idea is that, an episode of exchange rate pressure is characterized by an excess demand for foreign exchange at the prevailing exchange rate. The monetary authorities can meet the excess demand by devaluing the currency, by running down their international reserves, by raising the interest rates, or by using a combination of all three. Eichengreen et. al. (1996), therefore, used a weighted average of exchange rate changes, reserve changes and interest rate changes to construct their exchange market pressure index (EMPI). The variables were measured relative to a reference country, Germany.



The weights were chosen so as to equalize the sample volatilities of each of the three components, thereby preventing any one of them from dominating the index.

$$EMPI_{j,t} = \frac{1}{\sigma_e} \frac{\Delta e_{j,t}}{e_{j,t}} - \frac{1}{\sigma_r} \left( \frac{\Delta rm_{j,t}}{rm_{j,t}} - \frac{\Delta rm_{G,t}}{rm_{G,t}} \right) + \frac{1}{\sigma_i} (\Delta(i_{j,t} - i_{G,t}))$$

where  $e_{j,t}$  denotes the price of a DM in country j's currency at time t;  $rm_{j,t}$  is the ratio of gross foreign reserve to M1 for country j at period t;  $i_{j,t}$  denotes the nominal interest rate for country j at period t; subscript G denotes the reference country Germany;  $\sigma_e$  denotes the standard deviation of the rate of change of nominal exchange rate;  $\sigma_r$  is the standard deviation of the rate of change of the ratio of foreign reserves to money relative to the reference country;  $\sigma_i$  denotes the standard deviation of the nominal interest rate differential. Eichengreen et. al. defined a crisis if the index exceeds its historic mean by more than 1.5 standard deviation. Thus,

$$\begin{aligned} Crisis_{j,t} &= 1 \text{ if } EMPI_{j,t} > 1.5\sigma_{EMPI} + \mu_{EMPI} \\ &= 0 \text{ otherwise} \end{aligned}$$

However, a problem with the above methodology is the choice of appropriate weights. Nitithanprapas and Willett (2002) showed that the use of the reciprocal of the variances of each series as weights would result in an understatement of unsuccessful speculative attacks under fixed exchange rate regimes. The pressure would be manifested in high fluctuations in reserves during the pre-crisis period. As a result, reserve changes would have a high variance and a low weight in the crisis index. By the same logic, the depreciation following a successful attack under fixed exchange rate would be over weighted.

Another genuine problem with this index is the availability and the quality of interest rate and M1 data for the developing countries. For most of these countries, the data is not available on a monthly or quarterly basis. So, Kaminsky and Reinhart (1999) modified the Eichengreen et al formulation to include only exchange rate and international reserve changes in their Index of Currency Market Turbulence (I).

$$I = \frac{\Delta e}{e} - \frac{\sigma_e}{\sigma_r} \cdot \frac{\Delta r}{r}$$

where  $r$  denotes the reserves and  $\sigma_r$  is the standard deviation of the rate of change of reserves.

It is important to point out that exclusion of interest rate changes remains a potentially serious drawback of this index. The speculative attack on Hong Kong in October 1997 didn't affect the international reserves much. Since it was unsuccessful, neither did it affect the exchange rate. However, there was a substantial increase in interest rates and fall in stock prices. Incidences of pressures like this would be ignored by the index.

In our analysis, we have adopted the Kaminsky and Reinhart's formulation to identify episodes of exchange market pressure in our sample of 80 countries. We have used monthly exchange rate and reserve data from the International Financial Statistics database. Since high devaluations are common occurrences during periods of hyperinflation, the sample has been split into periods of high and low inflation and separate indices have been constructed for each sub-sample. A hyperinflation episode has been defined as the average inflation rate in the preceding six months exceeding 150 percent. A crisis month has been identified as the month for which the index exceeds the

mean by two standard deviations. Kaminsky and Reinhart (1999) used mean plus three standard deviations as the critical value of their crisis index. However, there is no theoretical rationale for preferring the use of say two instead of three standard deviations or vice versa. The value of the index and hence, the critical value depend on the range of the sample. Kaminsky and Reinhart (1999) used data from 1970 to 1995, whereas, our sample ranges from 1975-1999. Many of the Asian countries faced severe crises in 1997. That would increase the historic mean and standard deviation of the index for these crises hit economies. As a result, some of the not so severe crisis episodes in the previous years might be ignored. For example, the crises years of 1978, 1981 and 1984 in Thailand (as identified by Kaminsky and Reinhart) would be ignored in our sample if we use three standard deviations as the critical value. So, we decided to use two standard deviations instead of three.

### **3.2 Banking Crises**

Banking crises are characterized by bank runs and/or continuous and protracted deterioration in banks' asset quality. A banking system is under duress when many small banks or some of the largest banks experience panic runs marked by simultaneous withdrawals by large number of depositors. This could dry up the supply of new deposits and the availability of private inter-bank loans. Alternatively, a collapse in asset prices, increased bankruptcies in the non-financial sector and mounting non-performing loans might adversely affect the solvency of the banking sector, resulting in a crisis. Caprio and Klingebiel (1999) have distinguished between two types of crises – a systemic banking crisis, characterized by an almost complete erosion of banks' capital, and a borderline

crisis where banks' capital suffer little erosion. In our study, we have used the dates of systemic banking crises as identified by Caprio and Klingebiel (1999). Their study covers episodes from 1974 to 1998. For 1999, the banking crises dates have been supplemented by the works of Bordo, Eichengreen, Klingebiel and Martinez-Peria (2000) and Kane and Rice (2000).

### **3.3 Capital Flow Reversals and Sudden Stop Crises**

Calvo et al (2003) defined a capital flow reversal as an annual contraction in capital account which is two standard deviations below its sample mean. Following this definition, the same magnitude of capital inflow slowdown will be identified as reversal in a country with low volatility and non-reversal in a country where capital inflows are much more volatile. Milesi-Ferretti and Razin (1998), Edwards (2002), Hutchison and Noy (2002) and Guidotti, Sturzenegger and Villar (2004) used a much simpler definition of reversal based on changes in either current account or capital account as percentage of GDP. Likewise, we have defined a capital inflow reversal as a situation where the annual contraction in capital account exceeds 5 percentage points of GDP. For sensitivity analysis, we have used an alternate measure by changing the threshold to 3 percentage points. Since quarterly figures of capital account variables are not available for most of the countries in our sample, we have constructed capital account to GDP using annual data from the IFS database.

Once we have identified the crisis years and the reversal years, if a capital account reversal year coincides with or is followed by a currency crisis year, then that currency crisis has been defined as a sudden stop crisis. Our definition of sudden stop crisis differs

from the one used by Hutchison and Noy (2002). They defined a sudden stop as a concurrent occurrence of currency crisis and capital inflow reversal. Due to the annual frequency of capital inflow data, in case of contemporaneous occurrence of crisis and reversal, it is very difficult to speculate the causality between the two. It might well happen that these are also the episodes of severe crises that prompted a slowdown or outflow of capital. Consequently, the negative output effect of such crises would be considerably higher. For example, in January 1989, Argentina faced a severe currency crisis and the capital account contracted by more than 9 percent of GDP in that same year. It is very likely that a capital account contraction of such magnitude was the result of the severe currency crisis that the country faced. Inclusion of lagged capital flow reversal would tend to reduce the biases arising from episodes like that.

Table 1 summarizes the frequency and the geographical distribution of currency crisis, banking crisis, capital flow reversal and sudden stop crisis in our sample. The table reveals that while currency crisis is equally prevalent in both developing and developed countries, banking crisis, capital flow reversal and sudden stop crisis are mostly developing country phenomena.

Table 1. Frequency and the Geographical Distribution of Crises and Reversal

<b>Sample</b>	<b>Currency Crisis</b>	<b>Banking Crisis</b>	<b>Capital Account Reversal</b>	<b>Sudden Stop Crisis</b>
All	324	77	174	68
Developing Countries	217	67	158	60
Industrial Countries	107	10	16	8
Asian Countries	62	15	25	15
Latin-American Countries	78	24	55	22
African Countries	68	23	54	16

### 3.4 Business Cycle

Economies become more prone to crises and reversals during times of economic downturn. So an analysis of the growth impact of crises and reversals should take into

account some measure of the state of economic activity. Sahay et al (2003) used an index based on the three-year average pre-crisis growth rate. Their index takes discrete values between -1 and 1 if the average growth rate is less than 0, between 0 and 3 and above 3 percent respectively. For our study, we have used established business cycle methods instead of ad hoc growth measures. We have defined business cycle turning points based on an existing business cycle dating algorithm. Once we have identified the peaks and the troughs, we have controlled for one period lagged cyclical peaks to isolate the growth effects of capital flow reversals and sudden stop crises.

Burns and Mitchell (1946) defined the business cycle as a pattern in the aggregate economic activity. So, measuring business cycles require a proxy for aggregate economic activity. The most commonly used one is real GDP, which we have used in our analysis. The business cycle researchers have taken two main approaches in defining cyclical fluctuations – classical cycles are based on fluctuations in the level of aggregate economic activity, while deviation cycles (also known as growth cycles) are based on fluctuations around some trend. The most well known classical cycle algorithm is the Bry-Boschan (1971) procedure. It performs different degrees of smoothing on the data to locate the neighborhood of the business cycle turning points, which are then finalized using the unsmoothed series. Harding (1997) and Harding and Pagan (2002) introduced the concepts of expansion terminating sequence and contraction terminating sequence and set the exit probabilities to identify the business cycle turning points. However, because of the annual nature of our data (for the majority of countries in our sample, the real GDP figures are available only at annual frequency), we cannot use either of the above procedures. Instead we have used the simple calculus rule to identify the business

cycle peaks and troughs. We have defined a peak if a year of positive growth is followed by a year of negative growth and a trough if a year of negative growth is followed by a year of positive growth. Thus year  $t$  has a peak if  $\Delta y_t > 0$  and  $\Delta y_{t+1} < 0$ ; and year  $t$  has a trough if  $\Delta y_t < 0$  and  $\Delta y_{t+1} > 0$ . Accordingly, the minimum duration of a cycle is two years.

For comparison purpose, we have used deviation cycle dates based on band-pass (BP) filter [Baxter and King, 1999]. A BP filter defines business cycles as components of the time series with frequencies between two and eight years in duration. It's a linear filter which only retains the business cycle frequencies while removing all other components with higher and lower frequencies. In Table 2, we compare our classical cycle and deviation cycle dates with the NBER dates between 1965 and 1999 using annual data for real US GDP. As evident from Table 2, the Band Pass filter generates more cycles than the simple calculus rule. However, our methodology does collect the business cycle chronologies on a consistent basis.

Table 2 Comparison of Business Cycle Dates with NBER Dates: US, 1965-1999

<b>NBER Dates</b>		<b>Classical Cycle</b>		<b>BP Filter</b>	
<i>Peak</i>	<i>Trough</i>	<i>Peak</i>	<i>Trough</i>	<i>Peak</i>	<i>Trough</i>
				1966	1967
Dec. 1969	Nov. 1970			1969	1970
Nov. 1973	Mar. 1975	1973	1975	1973	1975
Jan. 1980	July. 1980	1979	1980	1979	1980
July 1981	Nov. 1982	1981	1982	1981	1982
				1984	1987
July 1990	Mar. 1991	1990	1991	1989	1991
				1994	1996

### **3.5 Association among Crises, Reversals and Cyclical Peaks**

Once we have identified crises dates, reversal dates and business cycle peaks, we calculate a number of conditional probabilities to determine their interdependence. The conditional probabilities are presented in Table 3.

First we calculate the unconditional probabilities to examine the relative frequencies of crises and reversal in our sample. The probabilities have been calculated by dividing the total number of crises/reversal episodes by the total number of observations in our sample. Thus the unconditional probabilities of currency, banking, capital-flow reversal and sudden stop crises in our sample are 0.16, 0.04, 0.09 and 0.04 respectively. The differences in the probabilities suggest that currency crises are more frequent than capital-flow reversals, while banking and sudden stop crises are very rare. The conditional probabilities are calculated to examine the link between different types of crises and reversal and their relation to recessions. The probability of a currency crisis conditional on a banking crisis within the last one year is the number of cases where a banking crisis was followed by a currency crisis within the next one year divided by the total number of banking crisis in our sample. This calculation yields a probability of 0.58. This implies that in 58 percent of the cases, a banking crisis led to a currency crisis within the next one year. Interestingly, the conditional probabilities of all the events are higher than their respective unconditional probabilities. So, knowing that there is a banking crisis or a business cycle peak improves the predictability of a currency crisis or a sudden stop crisis.

An interesting finding is that the presence of a cyclical peak within the last one-year helps to predict the onset of a currency crisis and capital flow reversal. The



conditional probabilities are 0.5 and 0.26 respectively. Even though the probabilities of banking crisis and sudden stop crisis conditional on cyclical peak within last one year are much lower, they are almost three times their respective unconditional probabilities. This lends support to the view that economies become more prone to crises when they are over-heated. This also provides justification to control for business cycle peaks in our growth regressions.

Table 3 Probabilities of Crises and Reversal

<i>Probabilities of Currency Crises</i>	
<i>Type</i>	<i>Probability</i>
Unconditional	0.16
Conditional on Banking Crisis	0.58
Conditional on Capital Flow Reversal	0.40
Conditional on Business Cycle Peak	0.50
<i>Probabilities of Banking Crises</i>	
<i>Type</i>	<i>Probability</i>
Unconditional	0.04
Conditional on Currency Crisis	0.09
Conditional on Capital Flow Reversal	0.11
Conditional on Business Cycle Peak	0.15
<i>Probabilities of Capital Flow Reversal</i>	
<i>Type</i>	<i>Probability</i>
Unconditional	0.09
Conditional on Currency Crisis	0.20
Conditional on Banking Crisis	0.36
Conditional on Business Cycle Peak	0.26
<i>Probabilities of Sudden Stop Crises</i>	
<i>Type</i>	<i>Probability</i>
Unconditional	0.04
Conditional on Banking Crisis	0.29
Conditional on Business Cycle Peak	0.16

The calculated probabilities seem to suggest a reverse causality between a banking crisis and capital flow reversal than what has been suggested by the theory. As pointed out earlier, a capital flow reversal might lead to increased bankruptcies in the non-tradable sector due to deterioration in the relative prices of non-tradable goods. To the extent that firms are linked through inter-enterprise credits, bankruptcies in the non-

tradable sector can spread to other sectors of the economy. The widespread bankruptcies and the consequent default on bank loans might lead to a severe banking crisis. Our estimated probability of a banking crisis conditional on capital-flow reversal within previous one year is 0.11. And the probability of a capital-flow reversal conditional on banking crisis is 0.36. So the data seems to suggest that a banking crisis is more helpful in predicting a capital flow reversal than a reversal predicting a banking crisis. Similarly, conditional on a banking crisis in the previous one year, the probability of a sudden stop crisis is 0.29; which is seven and half times the unconditional probability of a sudden stop crisis. Banking crises are known to have a prolonged and significant negative effect on output. This combined with the association between banking crisis, capital flow reversal and sudden stop crisis suggests the need to control for banking crisis in our growth regressions. This will enable the estimation of marginal effects of reversals and sudden stop crises on output growth.

#### **4. Estimating the Output Costs of Crises: The Model**

There are many papers which have estimated the output costs associated with crises. The models used are standard growth models where output growth is expressed as a linear function of policy variables, external variables, structural factors and an unobservable random disturbance. In our study, we have estimated a similar growth model. The per capita GDP growth has been expressed as a linear function of initial level of GDP, a proxy for human capital formation, domestic policy variables, like credit growth, government consumption expenditure and investment, structural factors such as

the openness of the economy to international trade and external factors, the growth rate of per capita GDP in United States and the real US interest rates. A problem of incorporating the domestic policy and structural variables in the growth regression is the simultaneity biases that might arise due to the responsiveness of these variables to output growth itself. We have avoided this problem by using lagged variables instead of contemporaneous ones.

In addition to the standard growth specification, we have used a set of dummy variables to isolate the growth effects of crises and reversal. Unlike other studies, we have been cautious to introduce relevant control variables in our regression specification. This would enable a more appropriate estimation of marginal effects of crises and reversal variables. The conditional probabilities estimated earlier suggest some association among different types of crises, reversal and cyclical peaks. So, we have used the relevant dummies to control for the individual growth effects of each of these events.

A common problem encountered in incorporating the crises, reversal dummies in growth regressions is that these events are not truly random outcomes. Such events are very often the culmination of various country specific macroeconomic and/or structural vulnerabilities that might themselves have a negative effect on economic growth. This problem is very similar to the ones that arise in the studies of the effects of labor union or manpower training programs on wage earnings where the explanatory dummy is endogenous. Heckman (1978) showed that this can be thought of as a specification error or omitted variables bias and can be corrected effectively using a two-stage estimator. Since then, a huge body of literature, known as treatment effects models, has emerged to

address this issue. In our study, we have used a similar treatment effects model to analyze the effects of crises and reversals (the treatments) on output growth (the outcome).

Our empirical model can be represented by the following specification:

$$y_{it} = \alpha + x_{it}'\beta + D_{it}\gamma + D'_{jt-1}\delta + \varepsilon_{it} \quad (1)$$

Where  $y_{it}$  is the growth rate of per capita GDP in country  $i$  at time  $t$ ;  $x_{it}$  is a vector of domestic policy, structural and external variables and  $\beta$  is a coefficient vector measuring the impact of changes in these variables on output growth.

$D_{it}$  and  $D_{jt-1}$  are vectors of dummy variables;

$$D_{it} = D_{it}^{KR} \text{ or } D_{it}^{SS}$$

$$D_{jt-1} = [D_{jt-1}^{CC} D_{jt-1}^{BC} D_{jt-1}^R]'$$

Where  $D_{jt-1}^{CC}$ ,  $D_{jt-1}^{BC}$  and  $D_{jt-1}^R$  are the dummies for one period lagged currency crisis, banking crisis and business cycle peak respectively.  $D_{it}^{KR}$  is the dummy for capital flow reversal in period  $t$ .  $D_{it}^{SS}$ , the sudden stop crisis dummy has been defined as an interactive dummy such that:

$$D_{it}^{SS} = D_{it}^{CC} \cdot D_{it}^{KR} + D_{it}^{CC} \cdot (1 - D_{it}^{KR}) \cdot D_{i(t-1)}^{KR} \quad (2)$$

$\gamma$  measures the growth effect of sudden stop or reversal and  $\delta$  is a vector of coefficients which measure the lagged effect on output growth of currency crisis, banking crisis and recession;  $\varepsilon_{it}$  is the unobservable random disturbance.

The dummy variables for sudden stop and reversal,  $D_{it}^k$  are assumed to depend on a threshold crossing rule. In other words, the events are observed only when the latent variables surpass some critical value.

$$D_{it}^k = 1, \text{ if } D_{it}^{k*} > 0$$

$$= 0, \text{ otherwise} \quad (3)$$

$$D_{it}^{k*} = w_{it}^k \theta + u_{it}^k \quad (4)$$

Where  $k = KR, SS$

So, whether a country experiences sudden stop or reversal is assumed to be the result of the unobserved latent variable  $D_{it}^{k*}$ .  $D_{it}^{k*}$  is assumed to depend on the vector  $w_{it}^k$ . We have relied on the existing literature on capital flow reversal and sudden stop to determine the list of variables to be included in  $w_{it}^k$ .  $\varepsilon$  and  $u$  are assumed to be bivariate normal with mean zero and covariance matrix

$$\begin{bmatrix} \sigma & \rho \\ \rho & 1 \end{bmatrix}$$

The model is estimated using a two-step procedure as outlined in Maddala (1983).

Equation (4) is estimated using a maximum likelihood probit. The estimates of  $\theta$ ,  $\hat{\theta}$  are then used to construct the hazard variable. The hazard,  $h_j$ , for each observation  $j$  is computed as

$$h_j = \frac{\phi(w_j \hat{\theta})}{\Phi(w_j \hat{\theta})} \text{ if } D_j^* = 1$$

and

$$h_j = \frac{-\phi(w_j \hat{\theta})}{1 - \Phi(w_j \hat{\theta})} \text{ if } D_j^* = 0$$

where  $\phi(Z)$  and  $\Phi(Z)$  are the density function and distribution function of the standard normal evaluated at  $Z$ .

Equation (1) is then estimated using OLS with the hazard variable as an additional regressor.

## 5. Data Analysis and Estimation Results

### 5.1 Data Analysis

In this section, we first take a cursory look at the contractionary effects of capital flow reversals and sudden stop crises on output growth. We define a crisis or reversal as contractionary if the actual GDP growth rate in the crisis/ reversal year is lower than its trend growth rate. The trend growth rate has been defined as the average GDP growth rate for five years preceding the crisis or reversal. Accordingly, we have found 76 episodes of contractionary capital flow reversals and 33 contractionary sudden stop crises. A summary of the numbers of crises episodes and their geographic distribution is presented in Table 4. We also present the episodes of currency and banking crises for comparison.

Table 4 Frequency and Distribution of Contractionary Crises and Reversals

Type of Crisis	Total No. of Crises	Total No. of Contractionary Crises	Percent of Total
<b>Currency Crises</b>	324	130	40.12
Developing Countries	217	90	41.47
Industrial Countries	107	40	37.38
Asian Countries	62	28	45.16
Latin-American Countries	78	29	37.18
African Countries	68	26	38.24
<b>Banking Crises</b>	77	55	71.42
Developing Countries	67	47	70.15
Industrial Countries	10	8	80.00
Asian Countries	15	15	100.00
Latin-American Countries	24	15	62.50
African Countries	23	14	60.87
<b>Capital Flow Reversal</b>	174	76	43.68
Developing Countries	158	68	43.04
Industrial Countries	16	8	50.00
Asian Countries	25	10	40.00
Latin-American Countries	55	23	41.82
African Countries	54	28	51.85
<b>Sudden Stop Crises</b>	68	33	48.53
Developing Countries	60	28	46.67
Industrial Countries	8	5	62.50
Asian Countries	15	10	66.67
Latin-American Countries	22	9	40.91
African Countries	16	5	31.25

As Table 4 reveals, in general, with the exception of banking crises, the majority of currency crises, capital flow reversals and sudden-stop crises are not contractionary. While a currency crisis is a common phenomenon, both developed and developing countries alike, the same is not true about the other types of crises. They are more prevalent in the developing countries. For example, out of 77 episodes of banking crises in our sample, only 10 are in the industrial countries. The numbers are even lower for the capital flow reversals and sudden-stop crises. They are 158 episodes of capital flow reversals in the developing countries as opposed to only 16 in the developed countries. And only 8 of the 68 episodes of sudden-stop crises occurred in the industrial countries. This lends support to the hypothesis that capital inflow reversal and sudden-stop crisis are mostly developing country phenomena. However, interestingly, when the developed countries encountered reversals or sudden-stop crises, those episodes were mostly contractionary compared to their developing counterparts. Around 50 percent of the capital flow reversals and 63 percent of the sudden stop crises in industrial countries were contractionary. The African and the Latin American countries were subjected to frequent capital flow reversals – 55 and 54 respectively. In comparison, the Asian countries encountered only 25 episodes of such reversals. And only around 40 percent of these reversals in Asian and Latin American countries were contractionary. Whereas, more than half of the capital flow reversals in African countries resulted in a slow down in output growth. However, only 5 of the 16 sudden stop crises in African countries were associated with a growth slowdown. The numbers are slightly higher for the Latin American countries, where around 41 percent of these episodes were contractionary. In sharp contrast, 67 percent of the sudden stop crises in Asia had a contractionary effect on

output growth. Notably, 6 of the 10 contractionary episodes in Asia occurred between 1997 and 1998.

Next we look at the average growth slowdown during each of these contractionary crises and reversals. This is presented in Table 5. The numbers represent the average deviation from the trend GDP growth during periods of contraction. The table supports the general consensus on the growth effects of sudden stop crises and capital flow reversals. The growth slowdowns following these events are substantially higher than that after banking or currency crises. However, for the industrial and African countries, banking crises appear to be more contractionary than any other crises or reversals. Interestingly, for developing countries, the contractionary effects of capital flow reversals are marginally higher than that of sudden stop crises. Sudden stop crises, however, are the most contractionary for both Asian and Latin American countries.

In Asian countries, the growth effects of both capital flow reversals and sudden stop crises are substantially lower than the respective averages of the developing countries in general and the Latin American and African countries in particular. Another interesting fact is the considerably higher negative growth impacts of crises and reversals in the Latin American countries than any other groups or regions. This is even more pronounced for capital flow reversals and sudden stop crises episodes for which the average growth slowdown is 7.94 and 9.79 percent respectively.

To summarize, a preliminary analysis of the data reveals that banking crises are generally contractionary both across groups and regions. In comparison, less than half of the capital flow reversals and sudden stop crises episodes in the developing countries were contractionary. But the growth slowdowns following these episodes were much



higher compared to banking crises. Among the developing countries, the negative growth effects were higher in the Latin American countries and quite modest in the Asian countries. For sudden stop crises, a small percentage in Africa and the majority in Asia were contractionary. But most of these contractionary events in Asia occurred between 1997 and 1998, suggesting the omission of these years for robustness check in our econometric analysis. In the industrial countries, both capital flow reversals and sudden stop crises were very rare. However, the majority of the sudden stop crises in those countries were contractionary.

Table 5 Output Contraction (in percent) at Different Time Horizons Following Crises

<b>Currency Crisis</b>						
Time	All Countries	Developing	Industrial	Asia	Latin-America	Africa
t	-3.84	-4.32	-2.74	-3.57	-6.12	-3.04
t+1	-2.84	-3.05	-2.37	-3.69	-4.65	-0.77
<b>Banking Crisis</b>						
Time	All Countries	Developing	Industrial	Asia	Latin-America	Africa
t	-4.54	-4.68	-3.72	-3.12	-5.14	-5.86
t+1	-2.66	-2.48	-3.71	-4.72	-2.72	-0.84
<b>Capital Flow Reversal</b>						
Time	All Countries	Developing	Industrial	Asia	Latin-America	Africa
t	-5.72	-6.04	-3.02	-3.77	-7.94	-5.22
t+1	-3.07	-3.10	-2.86	-5.45	-5.70	0.55
<b>Sudden-Stop Crisis</b>						
Time	All Countries	Developing	Industrial	Asia	Latin-America	Africa
t	-5.47	-5.91	-3.02	-4.25	-9.79	-4.63
t+1	-4.04	-4.26	-2.84	-5.80	-4.97	-2.84

## 5.2 Regression Results

The results from the estimation of varied specifications of our model are reported in Tables 6 to 17. We included country and year dummies in our regressions. But the coefficients are not reported for space considerations. The first panel in the tables contains the results from the growth regressions, while the second panel reports the probit

results on the endogenous dummy variable. In our growth regressions, we included logarithm of initial per capita GDP ( $\ln gdp_0$ ) as well as a human capital variable ( $educ$ ). In addition, we experimented with different variables representing structural, policy and external factors. But the majority of these variables were not significant across specifications. So, we finally settled for only three variables, government consumption expenditure to GDP, investment to GDP and trade openness. The decision of not including too many variables in the growth regressions was also motivated by the works of Levine and Renelt (1992). They found that the inclusion of a variety of economic policy, structural and political indicators in cross-country growth regressions are not typically robust to model specification. For specification of the treatment equation of endogenous dummies, we mostly relied on the existing literature. But at the same time, we restricted our variable choices so as to retain as many observations as possible. In our regression results, we have reported the estimates of the hazard parameter as well as  $\rho$ , the correlation coefficient between the error terms of the outcome equation and the treatment equation. The hazard parameter in most of the specifications is positive and significant, justifying the use of the treatment model. The  $\rho$  value is mostly positive, suggesting that a simple OLS would underestimate the negative growth effects of crisis or reversal.

In our growth regressions, a negative coefficient of the initial per capita GDP variable would indicate conditional convergence in growth processes. With the exception of African countries, the estimated coefficient is negative and mostly significant. The coefficient of the human capital variable is positive, though not always significant. A higher level of human capital is associated with higher per capita GDP

growth rates. Similarly, a higher investment ratio and trade openness foster per capita GDP growth. Government consumption expenditure, however, does not have a significant effect on output growth. Barro and Sala-i-Martin (1995) reported a negative coefficient for government consumption expenditure. They argued that this was indicative of crowding out of private investment. However, if there are unutilized capacities in the economy, higher government expenditure might have a favorable effect on economic growth. In our regressions, only for the industrial countries, we found the coefficient to be negative and significant. For all other samples and specifications, the coefficient has ambiguous signs none of which are significantly different from zero.

### **5.2a Capital Flow Reversal**

The probit estimates for full sample as well as the sample of developing countries show that lagged trade openness has a significant and positive probability of predicting a reversal. Countries which are more open are also more susceptible to capital outflows. The lagged current account surplus has a negative coefficient, implying that a lower current account deficit or a higher surplus reduces the probability of experiencing a reversal. The coefficient of lagged domestic credit to private sector is positive though not always significant. The net international reserves of the central bank, however, have a significantly positive coefficient in our full sample. For developing countries, the coefficient is positive and significant at 10% level. Edwards (2004), on the contrary, found that a high international reserve reduces the probability of a reversal. Since he defined a capital flow reversal in terms of current account, the finding is hardly surprising. A slowdown in capital inflows can be absorbed by releasing international

reserves without affecting the current account. In that way a high reserve would reduce the probability of a current account reversal. In our case, high international reserves might reduce the probability of a reversal to the extent that they are an indicator of a country's sound economic fundamental. However, even with high international reserves, a country might experience a reversal due to a liquidity crunch by the leading investors and subsequent herding by others. When we re-estimate our model for Asian countries only, the coefficient of net international reserves is found to be negative and not significantly different from zero. The lagged business cycle peak, banking crisis and currency crisis dummies, though not always significant have positive probabilities of predicting a reversal.

In our initial estimates (Table 6), coefficient of capital flow reversal dummy is always significantly negative. For the full sample, a capital flow reversal reduces the per capita GDP growth rate by 5.4 percent. This is close to the estimates of Edwards (2004). He found the growth impact of a current account reversal to be around -6 percent. However, if we control for lagged banking crisis, currency crisis and cyclical peak, the marginal effect of a reversal on per capita GDP growth is around -4.16 percent. The coefficients of lagged currency crisis, banking crisis and cyclical peak are significant at the 1 percent level. The results indicate that following a business cycle peak, the growth slowdown is around 5.6 percent, whereas the growth effects of a lagged banking crisis and currency crisis are between -1 and -2 percent. The dummy for the industrial countries is insignificant. The Asian and the Latin American country dummies, however, are significantly positive and the dummy for the African Countries is significantly negative.

To check for the robustness of our result, we re-estimated our model for different sub-samples. When we drop the industrial countries from our sample (Table 6), there is no qualitative change in the results. For developing countries, a capital flow reversal reduces the per capita GDP growth by 3.46 percent. When we use the sample for Industrial countries only (Table 6), we could not find any significant effect of reversal on output growth.

For the sample of Asian countries, we found that a capital flow reversal had a significantly high negative effect on output growth (Table 7). If we do not control for the lagged effects of other financial crises or a business cycle peak, the coefficient of the reversal dummy is -10.7. When we control for these variables, growth effect of a reversal is still around -5 percent. Surprisingly, for Latin American countries, we could not find a similar effect of capital flow reversal on output growth. The coefficient of the reversal dummy is positive and insignificant. Similarly, for low income countries, we couldn't find any significant effect of capital flow reversal on output growth.

Given the high negative growth effect of capital flow reversal in Asian countries and not so significant effect in Latin American and Low income countries, we re-estimated our model by dropping either African countries or Asian countries or Latin American countries from our sample of developing countries. The results are presented in Table 8. Dropping African countries or Latin American countries do not cause any qualitative change in the results from our initial estimates for the developing countries. The growth effect of reversal is around -4.8 percent and significant at 1% level. However, when we drop the Asian countries from our sample, coefficient of the reversal dummy is insignificant in all specifications.

Since nine of the twenty-five episodes of capital flow reversal in Asia occurred during the Asian financial crises, we dropped the turbulent years of the Asian Crises (from 1997 to 1999) from our sample. In our new estimates (Table 9), coefficient of the reversal dummy is not significant for the Asian and Latin American countries. However, our results indicate that capital flow reversals still have a negative effect on output growth in developing countries. So, we estimated our model for African countries for two different sample periods – 1975 to 1996 and 1975 to 1999. In both cases we found that capital flow reversals had a significant negative effect on output growth.

For sensitivity analysis, we define a reversal as deterioration in the capital account which is higher than 3 percent of GDP. The results (not reported) are not qualitatively any different and do not alter our findings.

### **5.2b Sudden Stop Crises**

Probit estimates for sudden stop crisis indicate that none of the variables are consistently significant across specifications and robust across samples. Since sudden stop crises are very rare, it is not surprising that there are hardly any good predictors of such events. Lagged banking crisis and currency crisis have positive probabilities of predicting a sudden stop. So has the lagged business cycle peak variable. However, for the Asian countries, coefficient of the lagged banking crisis variable is negative and significant. Countries with high M2 to reserve ratio, high current account deficits, low levels of international reserves and high domestic credits have higher probabilities of experiencing a sudden stop. The coefficient of the trade openness variable is consistently negative in all specifications and mostly insignificant.

From our growth regressions we find that a sudden stop crisis reduces per capita GDP growth by 8.27 percent (Table 11). When we control for banking crisis, cyclical peak and currency crisis in the previous year, the contemporaneous effect of a sudden stop on output growth is -3.67 percent. The lagged effects of banking crisis and recession on output growth are similar to the ones estimated for capital flow reversals. The dummies for Asian, African, Latin American and Industrial countries are positive and significant.

For the developing countries, a sudden stop crisis reduces per capita GDP growth by 10.27 percent (Table 11). When we control for lagged banking and currency crises, the estimated coefficient of sudden stop dummy is -8.37. Further controlling for business cycle peak yielded a coefficient of -4.60. However, when we use the sample for industrial countries only, we couldn't get a consistent estimate (results not reported). So our initial regression results indicate that sudden stop crisis is mostly a developing country phenomenon with a substantial negative growth effect.

Next we estimate our model separately for Asian countries, African countries, Latin American countries and low income countries. For African and low income countries, we didn't get any significant result (not reported). For Latin American countries, a sudden stop crisis reduces per capita GDP growth by 4.97 percent (Table 12). The result does not change much when we control for lagged currency and banking crises. However, when we include lagged business cycle peak variable in our regression, the coefficient of sudden stop dummy is -0.29 and not significantly different from zero. In sharp contrast, the sudden stop crisis dummy is significant in all specifications for

Asian countries (Table 12). So it appears that negative growth effects of sudden stop crises are limited mostly to Asian countries.

To reconfirm our results, we re-estimate our model for three different sub-samples – non-African developing countries, non-Asian developing countries and non-Latin-American developing countries (Table 13). When we exclude either the African or the Latin-American countries from our sample of developing countries, the coefficient of sudden stop dummy is significant in all specifications. But when we exclude the Asian countries, the sudden stop dummy is no longer so significant. The coefficient is -2.85 and significant at 10 percent level when we include lagged banking and currency crises in our specification. When we control further for lagged business cycle peak, the coefficient is -0.69 and not significant. We get a similar result if we use our full sample instead of using the sample for developing countries only (Table 14). These lend support to our conjecture that contractionary sudden stop crises are limited to Asian countries only. The large growth slowdowns estimated for such events are driven by the presence of Asian countries in our sample.

Since nine of the fifteen sudden stop episodes in Asia occurred during the Asian financial crises, we drop the years from 1997 to 1999 from our sample. The estimates for the full sample and the sample for developing countries are presented in Table 15. The estimated coefficients of sudden stop dummy are now much smaller. When we control for lagged banking and currency crises and business cycle peak, none of these coefficients are significantly different from zero.

For sensitivity analysis, we use two alternative definitions of sudden stops and estimate the growth regressions for developing countries, developing countries excluding



Asia and for developing countries again but now restricting the sample range from 1975 to 1997. First we use the definition of sudden stop used by Hutchison and Noy (2002). We define a sudden stop crisis as concurrent occurrence of currency crisis and capital flow reversal. Our estimation results are presented in Table 16. They are not qualitatively any different from our original estimates.

As we argued earlier, a sudden stop is not just a joint occurrence of currency crisis and reversal. It is a currency crisis which is preceded by a capital flow reversal. Our sudden stop variable might potentially contain many episodes where crisis was followed by reversal. So, we use a different dating of currency crisis, defining June to May as a crisis year. In other words, if there is a currency crisis in May 1995, that crisis will be dated as one occurred in 1994. Once all the currency crises are dated this way, a sudden stop is defined as concurrent occurrence of crisis and reversal. This definition is more likely to pick up episodes where currency crisis was preceded by reversal than not. The corresponding growth regression estimates are presented in Table 17. For our sample of developing countries, we find that sudden stop crisis has a significant negative effect on per capita GDP growth. However, if we drop Asian countries from our sample and control for lagged banking and currency crises, the coefficient of sudden stop dummy becomes insignificant. For the sample model specification, if we restrict our sample range to 1996 and use the sample for developing countries, the estimated coefficient of sudden stop dummy is -2.99 and significant only at 10 percent level. If we further control for lagged business cycle peak, the coefficient is -1.24 and not significantly different from zero.

## 6. Conclusion

It is widely believed that capital flow reversals and sudden stop crises are one of the most contractionary financial crises. Though there has been a substantial amount of empirical work on the growth effects of capital flow reversals, the literature on sudden stop crisis is quite scanty. Reference to such crisis in the literature has been mostly tangential. Very often in individual country studies, highly contractionary currency crises episodes with capital flow reversals in the vicinity were loosely termed as sudden stop. Kaminsky (2003) discussed the identification of varieties of currency crises including sudden stops. However, Hutchison and Noy's (2002) work is the only paper till date which discussed the growth effects of a sudden stop crises. They studied the relative growth effects of capital flow reversals and sudden stop crises and concluded that the sudden stop crises are indeed very contractionary.

The focus of this paper was to study the individual growth effects of reversals and sudden stops and how these effects vary across regions and between developing and industrial countries. We found that capital flow reversals are generally contractionary in developing countries and more so in Asian and African countries. But such reversals are not associated with any significant growth slowdown in the industrial countries. So, that way a capital flow reversal is mainly a developing country phenomenon. Our findings regarding sudden stops are quite startling. Our initial estimates supported the widely held belief regarding contractionary nature of such crises in developing countries. Further robustness analyses indicate that a sudden stop is not generally a developing country phenomenon. The growth slowdowns associated with sudden stop crises are only specific to the Asian countries. Moreover, when we remove the turbulent years of the East Asian

crises from our sample, we could not find any significant growth effects of sudden stop even for our sample of developing countries. In conclusion, capital flow reversals are contractionary in developing countries. But are sudden stop crises contractionary as well? Our paper raised some serious doubts.

Table 6 Growth Regressions: Growth Effects of Capital Flow Reversal

	All Countries			Developing Countries			Industrial Countries		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.4170** (0.1632)	-0.4351*** (0.1613)	-0.3156** (0.1414)	-0.4712** (0.2316)	-0.5088** (0.2294)	-0.2128 (0.1995)	-0.5252* (0.2920)	-0.5311* (0.2890)	-0.6341** (0.2516)
gdppcgrowth:lgcegdg	0.0076 (0.0215)	0.0294 (0.0217)	0.0217 (0.0190)	0.0077 (0.0278)	0.0363 (0.0282)	0.0189 (0.0244)	-0.0537** (0.0274)	-0.0480* (0.0272)	-0.0427* (0.0237)
gdppcgrowth:lgfcfgdp	0.1039*** (0.0189)	0.1061*** (0.0186)	0.1148*** (0.0163)	0.1151*** (0.0232)	0.1146*** (0.0228)	0.1209*** (0.0199)	-0.0425 (0.0307)	-0.0366 (0.0304)	-0.0195 (0.0265)
gdppcgrowth:ltradegdp	0.0131*** (0.0026)	0.0128*** (0.0026)	0.0098*** (0.0023)	0.0115*** (0.0036)	0.0120*** (0.0036)	0.0066** (0.0031)	0.0121*** (0.0034)	0.0112*** (0.0034)	0.0106*** (0.0030)
gdppcgrowth:educ	0.0365** (0.0148)	0.0351** (0.0146)	0.0276** (0.0128)	0.0949*** (0.0322)	0.0909*** (0.0319)	0.0600** (0.0277)	0.0089 (0.0100)	0.0100 (0.0099)	0.0111 (0.0086)
gdppcgrowth:dtype	0.7089* (0.4076)	0.6448 (0.4041)	0.4894 (0.3528)						
gdppcgrowth:dasia	1.1945*** (0.3889)	1.2878*** (0.3852)	1.1740*** (0.3371)	1.0075* (0.5560)	1.1078** (0.5530)	1.3751*** (0.4784)			
gdppcgrowth:dafrica	-0.8978** (0.3704)	-0.9791*** (0.3694)	-0.6935** (0.3235)	-0.7365 (0.4688)	-0.8641* (0.4698)	-0.3316 (0.4072)			
gdppcgrowth:dlatin	0.5631 (0.3592)	0.7562** (0.3564)	0.7837** (0.3114)	0.4924 (0.4140)	0.7546* (0.4120)	0.7622** (0.3546)			
gdppcgrowth:ldbank		-2.0037*** (0.4947)	-1.6013*** (0.4322)		-1.8092*** (0.6175)	-1.3614** (0.5310)		-1.7913*** (0.6261)	-1.8377*** (0.5447)
gdppcgrowth:ldcrisis		-1.1021*** (0.2652)	-0.7363*** (0.2322)		-1.4030*** (0.3862)	-1.0303*** (0.3324)		-0.3552 (0.2390)	-0.2470 (0.2082)
gdppcgrowth:lpeak			-5.6648*** (0.2982)			-6.3833*** (0.3966)			-3.6285*** (0.2921)
gdppcgrowth:dcapital5	-5.4110*** (1.0654)	-5.6340*** (1.0708)	-4.1557*** (0.9403)	-5.3284*** (1.2945)	-5.7279*** (1.3065)	-3.4606*** (1.1445)	-0.1372 (1.0841)	-0.5195 (1.0713)	-0.2354 (0.9337)
dcapital5:ltradegdp	0.0084** (0.0039)	0.0078** (0.0039)	0.0089** (0.0040)	0.0083** (0.0040)	0.0077* (0.0041)	0.0088** (0.0041)	0.0428 (0.0401)	0.0355 (0.0425)	0.0390 (0.0431)
dcapital5:lcagdp	-0.0401*** (0.0105)	-0.0395*** (0.0106)	-0.0377*** (0.0107)	-0.0372*** (0.0109)	-0.0365*** (0.0110)	-0.0346*** (0.0111)	-0.1617** (0.0696)	-0.1650** (0.0711)	-0.1631** (0.0718)
dcapital5:lintresgdp	1.5572** (0.7043)	1.7234** (0.7143)	1.7322** (0.7153)	1.1416 (0.7333)	1.3228* (0.7434)	1.3324* (0.7442)	15.2381** (5.9790)	15.3606** (6.2633)	15.4674** (6.2847)
dcapital5:ldcpvtgdp	0.0080* (0.0041)	0.0066 (0.0043)	0.0059 (0.0043)	0.0132*** (0.0048)	0.0121** (0.0050)	0.0111** (0.0051)	-0.0089 (0.0174)	-0.0081 (0.0176)	-0.0079 (0.0176)
dcapital5:ldbank		0.3622 (0.2354)	0.2869 (0.2432)		0.4228* (0.2468)	0.3328 (0.2561)		-5.8117 (0.0000)	-5.7425 (0.0000)
dcapital5:ldcrisis		0.3168** (0.1424)	0.2730* (0.1441)		0.3743** (0.1651)	0.3198* (0.1671)		-0.0328 (0.4548)	-0.0589 (0.4637)
dcapital5:lpeak			0.4394*** (0.1599)			0.4810*** (0.1756)			0.1987 (0.5378)
hazard:lambda	2.0286*** (0.5954)	2.2692*** (0.5960)	1.7519*** (0.5257)	1.9434*** (0.7431)	2.3269*** (0.7466)	1.4100** (0.6580)	0.0658 (0.6509)	0.2493 (0.6447)	0.1643 (0.5627)
Observations	1560	1554	1554	1076	1070	1070	484	484	484
Wald chi2	330.14	394.05	934.48	257.45	305.76	716.72	275.48	266.63	484.25
DF	57.00	61.00	63.00	56.00	60.00	62.00	40.00	43.00	45.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.53	0.60	0.53	0.45	0.54	0.38	0.04	0.13	0.10
sigma	3.81	3.77	3.29	4.31	4.27	3.68	1.87	1.86	1.61

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 7 Growth Regressions: Growth Effects of Capital Flow Reversal; Asian, Latin American and African Countries

	Asian Countries			Latin American Countries			Low Income Countries		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.7686*** (0.2537)	-0.7161*** (0.2138)	-0.6915*** (0.1734)	-0.3694 (0.4106)	-0.3844 (0.4021)	0.0001 (0.3466)	-1.6363*** (0.5246)	-1.4431*** (0.5358)	-1.0760** (0.4823)
gdppcgrowth:lgcegdg	0.0073 (0.0658)	0.0030 (0.0555)	0.0447 (0.0453)	-0.0870 (0.0869)	-0.0451 (0.0869)	-0.0990 (0.0745)	0.0219 (0.0561)	0.0843 (0.0622)	0.0552 (0.0559)
gdppcgrowth:lgfcfgdp	0.2641*** (0.0498)	0.2437*** (0.0419)	0.2472*** (0.0337)	-0.1670*** (0.0599)	-0.1637*** (0.0588)	-0.1399*** (0.0503)	0.1850*** (0.0433)	0.1894*** (0.0432)	0.1900*** (0.0388)
gdppcgrowth:ltradegdp	0.0077* (0.0040)	0.0054 (0.0034)	0.0047* (0.0027)	-0.0029 (0.0203)	-0.0008 (0.0197)	-0.0306* (0.0172)	0.0011 (0.0134)	-0.0113 (0.0140)	-0.0069 (0.0126)
gdppcgrowth:educ	0.0392 (0.0465)	0.0420 (0.0391)	0.0434 (0.0317)	0.2767*** (0.0917)	0.2238** (0.0917)	0.2148*** (0.0787)	0.2017** (0.0816)	0.2252*** (0.0818)	0.1302* (0.0741)
gdppcgrowth:ldbank		-3.9309*** (1.0227)	-3.5751*** (0.8301)		-1.0084 (1.0099)	-0.7209 (0.8613)		-2.6641** (1.1598)	-2.3473** (1.0410)
gdppcgrowth:ldcrisis		-2.0893*** (0.5916)	-1.3349*** (0.4842)		-1.5933** (0.6918)	-0.9144 (0.5952)		-0.3145 (0.7439)	-0.2438 (0.6674)
gdppcgrowth:lpeak			-8.1365*** (0.8119)			-6.1213*** (0.7633)			-5.9918*** (0.6421)
gdppcgrowth:dcapital5	-10.6790*** (2.3347)	-6.9997*** (1.8350)	-4.9695*** (1.3692)	-3.0913* (1.5856)	-2.4361* (1.4155)	0.3281 (1.2376)	-3.4820** (1.7106)	-3.4472** (1.6550)	-2.3930 (1.4877)
dcapital5:ltradegdp	-0.0034 (0.0082)	-0.0048 (0.0087)	-0.0062 (0.0089)	0.0772*** (0.0241)	0.0922*** (0.0289)	0.1080*** (0.0335)	0.0340*** (0.0128)	0.0275* (0.0140)	0.0275* (0.0140)
dcapital5:lcagdp	-0.0382 (0.0343)	-0.0409 (0.0357)	-0.0399 (0.0363)	-0.1697*** (0.0526)	-0.2073*** (0.0630)	-0.1946*** (0.0689)	0.0037 (0.0214)	0.0166 (0.0229)	0.0160 (0.0233)
dcapital5:lintresgdp	-0.6274 (2.7098)	-0.5945 (2.8793)	-1.5587 (3.0249)	2.7992 (6.2487)	7.4648 (7.1624)	12.4047 (8.3103)	3.3215 (3.1561)	4.9342 (3.2916)	4.8025 (3.4075)
dcapital5:ldcpvtgdp	0.0113 (0.0110)	0.0129 (0.0118)	0.0158 (0.0126)	-0.0016 (0.0152)	-0.0019 (0.0171)	-0.0015 (0.0199)	0.0469** (0.0203)	0.0706*** (0.0267)	0.0704*** (0.0266)
dcapital5:ldbank		-0.4031 (0.7208)	-0.3973 (0.7406)		1.8208** (0.8065)	2.0021** (0.9619)		0.2443 (0.6385)	0.2414 (0.6369)
dcapital5:ldcrisis		-1.4429 (0.9172)	-1.4267 (0.9751)		1.0941* (0.5626)	1.2814** (0.6230)		1.1883** (0.5064)	1.2014** (0.5147)
dcapital5:lpeak			-1.3638* (0.8224)			1.8008** (0.7852)			-0.0557 (0.3780)
hazard:lambda	7.3432*** (1.3933)	4.9945*** (1.1120)	3.5107*** (0.8298)	1.4744 (1.0239)	1.2514 (0.9621)	0.2833 (0.8666)	1.0064 (1.0967)	1.1834 (1.0773)	0.5697 (0.9723)
Observations	287	287	287	214	214	214	382	376	376
Wald chi2	110.63	171.15	343.39	169.54	185.58	319.35	275.14	406.45	517.70
DF	44.00	48.00	50.00	44.00	48.00	50.00	48.00	53.00	55.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	1.00	1.00	1.00	0.42	0.36	0.10	0.23	0.28	0.15
sigma	4.26	3.58	2.90	3.51	3.43	2.93	4.36	4.29	3.85

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 8 Growth Regressions: Growth Effects of Capital Flow Reversal; Robustness: Developing Countries Excluding either Africa or Asia or Latin America

	Excluding Africa			Excluding Asia			Excluding Latin America		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.4002 (0.2586)	-0.4684* (0.2524)	-0.1144 (0.2161)	0.0587 (0.2693)	0.0037 (0.2667)	0.2311 (0.2395)	-0.4940* (0.2785)	-0.5151* (0.2764)	-0.3541 (0.2391)
gdppcgrowth:lgcegdg	0.0049 (0.0307)	0.0340 (0.0309)	0.0244 (0.0263)	-0.0677** (0.0332)	-0.0312 (0.0349)	-0.0341 (0.0311)	0.0205 (0.0296)	0.0475 (0.0303)	0.0295 (0.0263)
gdppcgrowth:lgfcfgdp	0.1102*** (0.0297)	0.1041*** (0.0289)	0.1375*** (0.0248)	0.0651** (0.0272)	0.0677** (0.0269)	0.0700*** (0.0240)	0.1555*** (0.0249)	0.1561*** (0.0246)	0.1565*** (0.0214)
gdppcgrowth:ltradegdp	0.0101** (0.0040)	0.0107*** (0.0039)	0.0044 (0.0033)	0.0258*** (0.0068)	0.0240*** (0.0061)	0.0143** (0.0039)	0.0105*** (0.0039)	0.0106*** (0.0039)	0.0073** (0.0034)
gdppcgrowth:educ	0.1035*** (0.0340)	0.0962*** (0.0332)	0.0576** (0.0284)	0.0868* (0.0513)	0.0692 (0.0516)	0.0339 (0.0462)	0.0749** (0.0364)	0.0703* (0.0361)	0.0542* (0.0313)
gdppcgrowth:dasia	1.0808* (0.5737)	1.2581** (0.5607)	1.4697*** (0.4773)				0.8094 (0.6220)	0.9200 (0.6192)	0.9476* (0.5351)
gdppcgrowth:dlatin	0.4633 (0.4163)	0.8055** (0.4084)	0.8101** (0.3460)	0.6027 (0.4421)	0.7914* (0.4382)	0.7514* (0.3907)			
gdppcgrowth:dafrica				0.1465 (0.5003)	-0.0886 (0.5069)	0.2908 (0.4545)	-0.8230 (0.5069)	-0.9174* (0.5094)	-0.5528 (0.4403)
gdppcgrowth:ldbank		-1.3274* (0.7162)	-0.9922 (0.6061)		-1.1210 (0.7071)	-0.7137 (0.6299)		-2.1630*** (0.7437)	-1.7136*** (0.6411)
gdppcgrowth:ldcrisis		-2.1217*** (0.4300)	-1.4964*** (0.3661)		-1.1692** (0.4596)	-0.9560** (0.4090)		-1.1769** (0.4630)	-0.6958* (0.4000)
gdppcgrowth:lpeak			-6.5347*** (0.4724)			-6.2061*** (0.4468)			-6.4082*** (0.4498)
gdppcgrowth:dcapital5	-7.0555*** (1.5207)	-7.0181*** (1.5528)	-4.8620*** (1.3479)	-1.8808 (1.3421)	-2.1387 (1.3307)	-0.5104 (1.1861)	-6.4973*** (1.4096)	-6.8684*** (1.4581)	-4.7489*** (1.2838)
dcapital5:ltradegdp	0.0058 (0.0046)	0.0050 (0.0046)	0.0062 (0.0047)	0.0207*** (0.0060)	0.0215*** (0.0062)	0.0241*** (0.0063)	0.0065 (0.0043)	0.0059 (0.0044)	0.0062 (0.0044)
dcapital5:lcagdp	-0.0323** (0.0134)	-0.0295** (0.0136)	-0.0256* (0.0138)	-0.0438*** (0.0126)	-0.0437*** (0.0129)	-0.0405*** (0.0131)	-0.0348*** (0.0121)	-0.0317*** (0.0122)	-0.0315*** (0.0122)
dcapital5:lintlresgdp	0.5318 (1.3006)	0.8683 (1.3321)	0.8491 (1.3353)	1.2769 (0.7997)	1.5586* (0.8161)	1.5616* (0.8215)	1.2791* (0.7749)	1.3487* (0.7846)	1.3550* (0.7835)
dcapital5:ldcpvtgdp	0.0126** (0.0052)	0.0106* (0.0056)	0.0096* (0.0056)	0.0105 (0.0073)	0.0122 (0.0083)	0.0141* (0.0085)	0.0160*** (0.0056)	0.0150** (0.0059)	0.0143** (0.0059)
dcapital5:ldbank		0.4273 (0.2949)	0.3414 (0.3056)		0.7175** (0.2926)	0.6013* (0.3076)		0.3506 (0.3094)	0.3250 (0.3135)
dcapital5:ldcrisis		0.1977 (0.2005)	0.1361 (0.2034)		0.6364*** (0.1973)	0.6029*** (0.1988)		0.2639 (0.2046)	0.2317 (0.2083)
dcapital5:lpeak			0.4552** (0.2118)			0.6548*** (0.2002)			0.1897 (0.2139)
hazard:lambda	2.9358*** (0.8624)	3.0142*** (0.8744)	2.1571*** (0.7635)	-0.2771 (0.7864)	-0.0126 (0.7853)	-0.4938 (0.7022)	2.8365*** (0.8074)	3.1767*** (0.8295)	2.1284*** (0.7366)
Observations	778	772	772	811	805	805	862	856	856
Wald chi2	224.82	270.87	604.96	148.58	171.77	435.01	225.95	258.14	554.16
DF	55.00	59.00	61.00	54.00	58.00	60.00	54.00	58.00	60.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.69	0.73	0.61	-0.07	-0.00	-0.13	0.64	0.73	0.57
sigma	4.25	4.14	3.51	4.23	4.19	3.74	4.40	4.36	3.76

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 9 Growth Regressions: Growth Effects of Capital Flow Reversal; Robustness: Sample 1975 – 1996, Developing Countries, Asian and Latin American Countries

	Developing Countries			Asian Countries			Latin American Countries		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.5593** (0.2490)	-0.5879** (0.2468)	-0.2735 (0.2199)	-0.7760*** (0.2254)	-0.7110*** (0.2098)	-0.7471*** (0.1760)	-0.3902 (0.4794)	-0.3882 (0.4654)	-0.0050 (0.4026)
gdppcgrowth:lgecgdp	0.0095 (0.0296)	0.0374 (0.0301)	0.0247 (0.0267)	-0.0249 (0.0578)	-0.0339 (0.0533)	0.0124 (0.0450)	-0.1067 (0.1064)	-0.0747 (0.1050)	-0.1025 (0.0902)
gdppcgrowth:lgfcfgdp	0.1225*** (0.0244)	0.1235*** (0.0241)	0.1240*** (0.0214)	0.2634*** (0.0438)	0.2549*** (0.0405)	0.2573*** (0.0338)	-0.1794*** (0.0659)	-0.1766*** (0.0643)	-0.1399** (0.0556)
gdppcgrowth:ltradegdp	0.0122*** (0.0038)	0.0120*** (0.0038)	0.0065* (0.0034)	0.0036 (0.0036)	0.0013 (0.0033)	0.0014 (0.0027)	0.0118 (0.0240)	0.0138 (0.0230)	-0.0251 (0.0204)
gdppcgrowth:educ	0.1124*** (0.0362)	0.0999*** (0.0360)	0.0642** (0.0320)	0.0419 (0.0430)	0.0341 (0.0400)	0.0284 (0.0336)	0.2248** (0.1073)	0.1591 (0.1071)	0.1459 (0.0922)
gdppcgrowth:dasia	1.3929** (0.6041)	1.3913** (0.5984)	1.6547*** (0.5299)						
gdppcgrowth:dafrica	-0.6071 (0.4982)	-0.8125 (0.4999)	-0.2817 (0.4437)						
gdppcgrowth:dlatin	0.8712* (0.4489)	1.0656** (0.4474)	0.9341** (0.3948)						
gdppcgrowth:ldbank		-1.0576 (0.6514)	-0.7838 (0.5738)		-2.1694** (1.0660)	-2.4175*** (0.8934)		-0.8406 (1.1052)	-0.5880 (0.9458)
gdppcgrowth:ldcrisis		-1.1789*** (0.4136)	-0.7887** (0.3649)		-1.5360** (0.5970)	-0.7693 (0.4997)		-1.8381** (0.7604)	-0.9943 (0.6597)
gdppcgrowth:lpeak			-6.2479*** (0.4409)			-8.9866*** (0.9314)			-6.5413*** (0.9188)
gdppcgrowth:dcapital5	-4.5594*** (1.3713)	-4.6916*** (1.3887)	-2.6969** (1.2371)	-4.7181* (2.4672)	-2.2613 (1.9466)	-1.2184 (1.4361)	-3.6679** (1.8039)	-2.7321* (1.6096)	0.1990 (1.4092)
dcapital5:ltradegdp	0.0095** (0.0048)	0.0091* (0.0049)	0.0101** (0.0049)	-0.0076 (0.0129)	-0.0123 (0.0144)	-0.0219 (0.0164)	0.0769*** (0.0252)	0.0940*** (0.0314)	0.1084*** (0.0348)
dcapital5:lcagdp	-0.0382*** (0.0117)	-0.0363*** (0.0119)	-0.0340*** (0.0120)	-0.0313 (0.0421)	-0.0322 (0.0459)	-0.0339 (0.0488)	-0.1470*** (0.0537)	-0.1770*** (0.0623)	-0.1643** (0.0685)
dcapital5:lintresgdp	1.3316* (0.8018)	1.5288* (0.8171)	1.5028* (0.8168)	-0.1956 (3.1160)	0.1873 (3.4666)	-3.1171 (3.9961)	-3.6203 (7.5599)	2.0227 (8.8906)	5.7072 (10.0223)
dcapital5:ldcpvtgdp	0.0084 (0.0062)	0.0089 (0.0067)	0.0088 (0.0067)	0.0085 (0.0176)	0.0082 (0.0204)	0.0219 (0.0233)	-0.0049 (0.0180)	-0.0022 (0.0201)	0.0001 (0.0218)
dcapital5:ldbank		0.5545** (0.2681)	0.4831* (0.2771)		0.2727 (1.1177)	0.1473 (1.2919)		1.7837** (0.7836)	1.9208** (0.9509)
dcapital5:ldcrisis		0.3268* (0.1822)	0.2763 (0.1838)		-6.9886 (0.0000)	-7.7126 (0.0000)		0.9645* (0.5789)	1.1243* (0.6298)
dcapital5:lpeak			0.4983** (0.1975)			-8.4352 (0.0000)			1.8888** (0.9296)
hazard:lambda	1.7125** (0.7923)	1.8823** (0.8010)	1.0898 (0.7174)	4.4740*** (1.4550)	2.8916** (1.2017)	1.9465** (0.9402)	1.9971* (1.1510)	1.6288 (1.0843)	0.5426 (0.9747)
Observations	942	936	936	248	248	248	184	184	184
Wald chi2	266.08	289.59	602.56	147.53	130.94	275.97	220.54	298.21	359.93
DF	50.00	54.00	56.00	38.00	42.00	42.00	40.00	44.00	45.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.40	0.44	0.29	1.00	0.91	0.73	0.54	0.45	0.18
sigma	4.31	4.27	3.76	3.43	3.17	2.66	3.70	3.59	3.08

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 10 Growth Regressions: Growth Effects of Capital Flow Reversal; African Countries

	African Countries Sample: 1975 – 1999			African Countries Sample: 1975 – 1996		
	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	0.1525 (0.6799)	0.2117 (0.6751)	0.3011 (0.6178)	0.2924 (0.7419)	0.3783 (0.7355)	0.3958 (0.6746)
gdppcgrowth:lgcegdg	-0.0029 (0.0705)	-0.0117 (0.0705)	-0.0227 (0.0646)	-0.0103 (0.0776)	-0.0186 (0.0774)	-0.0219 (0.0710)
gdppcgrowth:lgfcfgdp	0.0905** (0.0451)	0.0875* (0.0448)	0.0723* (0.0411)	0.0782 (0.0482)	0.0745 (0.0478)	0.0626 (0.0439)
gdppcgrowth:ltradegdp	0.0281*** (0.0100)	0.0279*** (0.0098)	0.0241*** (0.0090)	0.0324*** (0.0108)	0.0317*** (0.0106)	0.0270*** (0.0098)
gdppcgrowth:educ	-0.0654 (0.1123)	-0.0802 (0.1120)	-0.0939 (0.1024)	-0.1140 (0.1424)	-0.1291 (0.1416)	-0.1242 (0.1298)
gdppcgrowth:ldbank		-2.4170** (1.2218)	-1.9504* (1.1211)		-2.4042* (1.2640)	-1.9451* (1.1627)
gdppcgrowth:ldcrisis		0.7602 (0.8687)	1.0191 (0.7955)		0.6519 (0.9598)	1.0029 (0.8815)
gdppcgrowth:lpeak			-5.3970*** (0.7340)			-5.3701*** (0.7713)
gdppcgrowth:dcapital5	-3.2365* (1.8212)	-3.6434** (1.6507)	-3.4302** (1.5050)	-3.1673* (1.8968)	-3.3543* (1.7136)	-3.2313** (1.5667)
dcapital5:ltradegdp	0.0317** (0.0136)	0.0384*** (0.0145)	0.0405*** (0.0148)	0.0250* (0.0142)	0.0296* (0.0154)	0.0313** (0.0157)
dcapital5:lcagdp	-0.0794*** (0.0267)	-0.0899*** (0.0289)	-0.0970*** (0.0305)	-0.0815*** (0.0272)	-0.0952*** (0.0298)	-0.1034*** (0.0316)
dcapital5:lintlresgdp	2.3475* (1.2031)	2.9164** (1.3566)	3.1924** (1.3800)	2.6354** (1.2804)	3.6747** (1.5377)	3.9991** (1.5727)
dcapital5:ldcpvtgdp	0.0114 (0.0189)	0.0199 (0.0221)	0.0198 (0.0224)	0.0148 (0.0205)	0.0345 (0.0258)	0.0335 (0.0261)
dcapital5:ldbank		0.8418 (0.7378)	0.7589 (0.7661)		0.8370 (0.7313)	0.7627 (0.7587)
dcapital5:ldcrisis		1.5984*** (0.2247)	1.4843*** (0.2233)		1.6481*** (0.5567)	1.5475*** (0.5560)
dcapital5:lpeak			0.5847 (0.4294)			0.5915 (0.4307)
hazard:lambda	1.5149 (1.1332)	2.0038* (1.0705)	2.2339** (0.9727)	1.5008 (1.1835)	1.8382 (1.1225)	2.1333** (1.0240)
Observations	298	298	298	272	272	272
Wald chi2	92.45	103.46	178.25	158.51	162.47	215.40
DF	47.00	51.00	53.00	43.00	47.00	49.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.35	0.46	0.56	0.33	0.41	0.51
sigma	4.39	4.37	4.01	4.54	4.52	4.15

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



Table 11 Growth Regressions: Growth Effects of Sudden Stop Crises; All Countries and Developing Countries

	All Countries			Developing Countries		
	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.3324** (0.1640)	-0.3356** (0.1597)	-0.2439* (0.1395)	-0.2670 (0.2351)	-0.2839 (0.2278)	-0.0767 (0.1965)
gdppcgrowth:lgecgdp	0.0219 (0.0219)	0.0233 (0.0213)	0.0157 (0.0187)	0.0255 (0.0285)	0.0271 (0.0276)	0.0141 (0.0239)
gdppcgrowth:lgfcgdp	0.0803*** (0.0187)	0.0800*** (0.0183)	0.0916*** (0.0161)	0.0964*** (0.0236)	0.0939*** (0.0231)	0.1037*** (0.0200)
gdppcgrowth:ltradegdp	0.0101*** (0.0025)	0.0097*** (0.0024)	0.0074*** (0.0021)	0.0073** (0.0034)	0.0072** (0.0033)	0.0039 (0.0028)
gdppcgrowth:educ	0.0296** (0.0148)	0.0306** (0.0144)	0.0245* (0.0126)	0.0801** (0.0328)	0.0805** (0.0319)	0.0536* (0.0276)
gdppcgrowth:dtype	0.7867* (0.4058)	0.8530** (0.3963)	0.6973** (0.3456)			
gdppcgrowth:dasia	1.7337*** (0.3898)	1.8003*** (0.3796)	1.5658*** (0.3317)	1.8566*** (0.5647)	1.9036*** (0.5467)	1.8950*** (0.4703)
gdppcgrowth:dafrica	-0.8735** (0.3768)	-0.8491** (0.3671)	-0.6103* (0.3207)	-0.5093 (0.4868)	-0.5130 (0.4716)	-0.1346 (0.4061)
gdppcgrowth:dlatin	0.7232** (0.3664)	0.7782** (0.3540)	0.7547** (0.3082)	0.7924* (0.4322)	0.8421** (0.4159)	0.8047** (0.3568)
gdppcgrowth:ldbank		-1.7387*** (0.4961)	-1.5331*** (0.4305)		-1.3369** (0.6339)	-1.1578** (0.5412)
gdppcgrowth:ldcrisis		-0.8360*** (0.2725)	-0.6122*** (0.2359)		-0.9795** (0.4028)	-0.8061** (0.3434)
gdppcgrowth:lpeak			-5.6106*** (0.2992)			-6.2025*** (0.4029)
gdppcgrowth:dsudden	-8.2674*** (1.4248)	-6.5819*** (1.3017)	-3.6716*** (1.0907)	-10.2667*** (1.6928)	-8.3655*** (1.6083)	-4.6023*** (1.3490)
dsudden:lmreserve	0.0130* (0.0068)	0.0099 (0.0071)	0.0060 (0.0075)	0.0142* (0.0075)	0.0111 (0.0077)	0.0066 (0.0082)
dsudden:ltradegdp	-0.0033 (0.0059)	-0.0041 (0.0060)	-0.0008 (0.0063)	-0.0037 (0.0062)	-0.0043 (0.0062)	-0.0013 (0.0066)
dsudden:lcagdp	-0.0191 (0.0166)	-0.0252 (0.0170)	-0.0147 (0.0174)	-0.0215 (0.0175)	-0.0257 (0.0178)	-0.0156 (0.0181)
dsudden:lintresgdp	-0.6064 (1.1646)	-0.1374 (1.1860)	-0.2882 (1.2072)	-0.4891 (1.1763)	-0.1091 (1.1949)	-0.1738 (1.2170)
dsudden:lpcvtgdp	0.0066 (0.0054)	0.0035 (0.0056)	0.0032 (0.0059)	0.0109* (0.0063)	0.0077 (0.0065)	0.0075 (0.0069)
dsudden:ldbank		0.5260* (0.2753)	0.4459 (0.2899)		0.6244** (0.2910)	0.5490* (0.3064)
dsudden:ldcrisis		0.6933*** (0.1889)	0.6574*** (0.1937)		0.6033*** (0.2182)	0.5640** (0.2233)
dsudden:lpeak			0.8306*** (0.2254)			0.8253*** (0.2507)
hazard:lambda	3.1626*** (0.7730)	2.5352*** (0.7223)	1.5452** (0.6196)	4.3441*** (0.9249)	3.6012*** (0.8960)	2.1779*** (0.7730)
Observations	1517	1516	1516	1046	1045	1045
Wald chi2	323.08	398.19	940.79	248.03	300.45	696.07
DF	52.00	56.00	58.00	49.00	53.00	55.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.83	0.69	0.48	0.99	0.85	0.59
sigma	3.79	3.69	3.22	4.40	4.26	3.66

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 12 Growth Regressions: Growth Effects of Sudden Stop Crises; Asian and Latin American Countries

	Asian Countries			Latin American Countries		
	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.7065*** (0.2091)	-0.6732*** (0.1874)	-0.6655*** (0.1591)	-0.2019 (0.4349)	-0.2520 (0.4239)	-0.0185 (0.3553)
gdppcgrowth:lgcegdg	-0.0145 (0.0550)	-0.0126 (0.0494)	0.0339 (0.0422)	-0.0862 (0.0893)	-0.0485 (0.0891)	-0.0911 (0.0753)
gdppcgrowth:lgfcfgdp	0.1958*** (0.0394)	0.1960*** (0.0354)	0.2124*** (0.0301)	-0.1934*** (0.0612)	-0.1853*** (0.0600)	-0.1430*** (0.0509)
gdppcgrowth:ltradegdp	0.0028 (0.0031)	0.0022 (0.0027)	0.0021 (0.0023)	-0.0012 (0.0203)	0.0008 (0.0198)	-0.0275 (0.0169)
gdppcgrowth:educ	0.0517 (0.0380)	0.0491 (0.0340)	0.0484* (0.0289)	0.2203** (0.0958)	0.1852* (0.0953)	0.2225*** (0.0801)
gdppcgrowth:ldbank		-4.2789*** (0.8752)	-3.8650*** (0.7432)		-0.8946 (1.0378)	-0.6326 (0.8688)
gdppcgrowth:ldcrisis		-1.6098*** (0.5110)	-1.1162** (0.4362)		-1.4830** (0.7178)	-0.7216 (0.6082)
gdppcgrowth:lpeak			-7.3651*** (0.7578)			-6.0348*** (0.7468)
gdppcgrowth:dsudden	-9.9389*** (1.5473)	-6.3230*** (1.2835)	-3.3371*** (1.1344)	-4.9675** (2.0223)	-4.1654** (1.9372)	-0.2911 (1.6345)
dsudden:ltradegdp	-0.0116 (0.0129)	-0.0103 (0.0168)	-0.0100 (0.0172)	0.0374 (0.0275)	0.0358 (0.0271)	0.0639* (0.0378)
dsudden:lmreserve	0.0195 (0.1083)	0.2160 (0.1678)	0.2172 (0.1690)	0.0748* (0.0437)	0.0831* (0.0473)	0.0977* (0.0518)
dsudden:lcagdp	0.0349 (0.0673)	-0.0244 (0.0741)	-0.0248 (0.0743)	-0.0772 (0.0570)	-0.0631 (0.0590)	-0.0298 (0.0646)
dsudden:lintresgdp	-9.6863 (6.5469)	-6.1665 (6.1732)	-6.0547 (6.3519)	-14.3391 (11.1215)	-17.6041 (12.4881)	-13.5042 (13.2699)
dsudden:ldcpvtgdp	0.0182 (0.0151)	0.0263 (0.0193)	0.0262 (0.0193)	-0.0444* (0.0245)	-0.0439* (0.0246)	-0.0437 (0.0267)
dsudden:ldbank		-6.7262*** (1.3946)	-6.7314*** (1.4772)		0.7919 (0.7752)	0.3781 (0.9013)
dsudden:ldcrisis		-2.5862 (1.7357)	-2.6062 (1.7586)		-0.3362 (0.5484)	-0.4317 (0.6044)
dsudden:lpeak			0.0522 (0.6888)			1.6859* (1.0104)
hazard:lambda	5.5476*** (0.9763)	2.6201*** (0.9044)	0.9794 (0.8828)	2.8360** (1.2435)	2.4001** (1.2123)	0.5585 (1.0834)
Observations	280	280	280	210	210	210
Wald chi2	169.89	279.40	458.04	151.60	164.97	302.89
DF	37.00	40.00	42.00	40.00	44.00	46.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00
rho	1.00	0.85	0.38	0.79	0.68	0.19
sigma	3.44	3.08	2.61	3.60	3.51	2.95

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 13 Growth Regressions: Growth Effects of Sudden Stop Crises; Robustness: Developing Countries except Africa or Asia or Latin America

	Excluding Africa			Excluding Asia			Excluding Latin America		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.1876 (0.2647)	-0.2425 (0.2562)	-0.0064 (0.2159)	0.0837 (0.2664)	0.0778 (0.2629)	0.2485 (0.2336)	-0.3110 (0.2777)	-0.3223 (0.2695)	-0.2171 (0.2355)
gdppcgrowth:lgcegdg	0.0003 (0.0311)	0.0060 (0.0301)	0.0056 (0.0254)	-0.0334 (0.0350)	-0.0286 (0.0347)	-0.0284 (0.0308)	0.0365 (0.0298)	0.0341 (0.0290)	0.0206 (0.0254)
gdppcgrowth:lgfcgdp	0.1006*** (0.0299)	0.0938*** (0.0290)	0.1249*** (0.0246)	0.0518* (0.0277)	0.0495* (0.0274)	0.0543** (0.0243)	0.1360*** (0.0251)	0.1358*** (0.0245)	0.1390*** (0.0215)
gdppcgrowth:ltradegdp	0.0036 (0.0038)	0.0043 (0.0037)	0.0004 (0.0031)	0.0240*** (0.0065)	0.0229*** (0.0064)	0.0150*** (0.0057)	0.0052 (0.0036)	0.0050 (0.0035)	0.0034 (0.0031)
gdppcgrowth:educ	0.0790** (0.0345)	0.0790** (0.0333)	0.0490* (0.0282)	0.0637 (0.0524)	0.0602 (0.0518)	0.0286 (0.0461)	0.0668* (0.0363)	0.0674* (0.0353)	0.0511* (0.0309)
gdppcgrowth:dasia	1.9913*** (0.5803)	2.0541*** (0.5605)	1.9776*** (0.4709)				1.6696*** (0.6212)	1.6809*** (0.6026)	1.5147*** (0.5261)
gdppcgrowth:dlatin	0.7123* (0.4229)	0.8484** (0.4082)	0.7818** (0.3424)	0.8151* (0.4515)	0.8441* (0.4432)	0.7992** (0.3925)			
gdppcgrowth:dafrika				-0.0122 (0.5134)	-0.0204 (0.5072)	0.2680 (0.4506)	-0.5768 (0.5136)	-0.5661 (0.4987)	-0.3254 (0.4352)
gdppcgrowth:ldbank		-0.7469 (0.7254)	-0.8370 (0.6053)			-0.9318 (0.7363)		-1.6343** (0.7416)	-1.4483** (0.6444)
gdppcgrowth:ldcrisis		-1.4349*** (0.4479)	-1.1719*** (0.3729)		-1.0887** (0.4658)	-0.8985** (0.4118)		-0.7141 (0.4675)	-0.4545 (0.4062)
gdppcgrowth:lpeak			-6.0409*** (0.4953)			-6.0950*** (0.4362)			-6.1513*** (0.4562)
gdppcgrowth:dsudden	-11.9370*** (1.6521)	-10.5474*** (1.6141)	-5.7784*** (1.3225)	-4.8993*** (1.8132)	-2.8448* (1.7181)	-0.6857 (1.4863)	-10.7633*** (1.8155)	-8.8066*** (1.7240)	-5.4270*** (1.5015)
dsudden:lmreserve	0.0032 (0.0166)	-0.0020 (0.0173)	-0.0076 (0.0180)	0.0114 (0.0083)	0.0083 (0.0086)	0.0042 (0.0092)	0.0157* (0.0080)	0.0118 (0.0085)	0.0086 (0.0089)
dsudden:ltradegdp	-0.0051 (0.0072)	-0.0060 (0.0071)	-0.0012 (0.0078)	-0.0070 (0.0107)	-0.0050 (0.0109)	-0.0006 (0.0111)	-0.0059 (0.0071)	-0.0060 (0.0072)	-0.0050 (0.0075)
dsudden:lcagdp	-0.0077 (0.0233)	-0.0150 (0.0234)	0.0046 (0.0249)	-0.0553** (0.0237)	-0.0608** (0.0248)	-0.0487* (0.0249)	-0.0114 (0.0215)	-0.0120 (0.0221)	-0.0099 (0.0222)
dsudden:lintresgdp	-8.2138*** (2.8803)	-7.2402** (2.8956)	-6.6523** (3.0020)	1.1816 (1.4517)	1.6470 (1.5004)	1.4571 (1.5304)	-0.3217 (1.2625)	0.1009 (1.3117)	0.1140 (1.3326)
dsudden:ldepvtdgdp	0.0205*** (0.0074)	0.0175** (0.0076)	0.0168** (0.0082)	-0.0129 (0.0115)	-0.0117 (0.0120)	-0.0089 (0.0124)	0.0152* (0.0086)	0.0110 (0.0088)	0.0098 (0.0091)
dsudden:ldbank		0.3033 (0.3522)	0.1510 (0.3918)		1.0310*** (0.3714)	0.9885** (0.3870)		0.6789* (0.3850)	0.6821* (0.3949)
dsudden:ldcrisis		0.6350** (0.2793)	0.5299* (0.2917)		0.4505* (0.2658)	0.4668* (0.2710)		0.6484** (0.2978)	0.5548* (0.3072)
dsudden:lpeak			1.0699*** (0.2980)			0.7936** (0.3467)			0.6835** (0.3241)
hazard:lambda	5.2569*** (0.9338)	4.7873*** (0.9107)	2.9904*** (0.7656)	1.9654* (1.0588)	0.9284 (1.0262)	0.2351 (0.8982)	4.8330*** (1.0113)	4.0854*** (0.9677)	2.7078*** (0.8716)
Observations	755	754	754	787	786	786	836	835	835
Wald chi2	231.24	279.99	606.63	127.08	147.60	394.41	225.04	263.43	549.90
DF	46.00	50.00	52.00	46.00	50.00	52.00	46.00	50.00	52.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	1.00	1.00	0.86	0.46	0.22	0.06	1.00	0.97	0.74
sigma	4.27	4.12	3.47	4.25	4.19	3.72	4.36	4.22	3.68

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 14 Growth Regressions: Growth Effects of Sudden Stop Crises; Robustness: All Countries except Africa or Asia or Latin America

	Excluding Africa			Excluding Asia			Excluding Latin America		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.4471*** (0.1682)	-0.4637*** (0.1641)	-0.3406** (0.1422)	0.1150 (0.1991)	0.1058 (0.1972)	0.1787 (0.1758)	-0.4155** (0.1728)	-0.4116** (0.1689)	-0.3812** (0.1492)
gdppcgrowth:lgcegdg	0.0024 (0.0223)	0.0071 (0.0217)	0.0102 (0.0188)	-0.0240 (0.0252)	-0.0206 (0.0250)	-0.0252 (0.0223)	0.0325 (0.0219)	0.0316 (0.0214)	0.0230 (0.0189)
gdppcgrowth:lgfcfgdp	0.0633*** (0.0213)	0.0633*** (0.0209)	0.0925*** (0.0182)	0.0391* (0.0211)	0.0389* (0.0209)	0.0472** (0.0186)	0.1111*** (0.0190)	0.1127*** (0.0187)	0.1193*** (0.0165)
gdppcgrowth:ltradegdp	0.0092*** (0.0025)	0.0092*** (0.0025)	0.0066*** (0.0021)	0.0225*** (0.0043)	0.0215*** (0.0042)	0.0164*** (0.0038)	0.0087*** (0.0025)	0.0083*** (0.0024)	0.0072*** (0.0021)
gdppcgrowth:educ	0.0344** (0.0140)	0.0346** (0.0137)	0.0266** (0.0118)	0.0077 (0.0160)	0.0086 (0.0158)	0.0038 (0.0141)	0.0252* (0.0146)	0.0265* (0.0143)	0.0238* (0.0126)
gdppcgrowth:dtype	1.0470*** (0.4038)	1.1647*** (0.3961)	0.8901*** (0.3419)	0.8766** (0.4076)	0.9250** (0.4046)	0.7913** (0.3606)	0.8947** (0.4022)	0.9287** (0.3947)	0.8437** (0.3482)
gdppcgrowth:dasia	1.7209*** (0.3759)	1.8106*** (0.3666)	1.5120*** (0.3169)				1.4802*** (0.3881)	1.5344*** (0.3795)	1.2528*** (0.3355)
gdppcgrowth:dlatin	0.6161* (0.3409)	0.7639** (0.3316)	0.7510*** (0.2860)	0.8095** (0.3622)	0.8292** (0.3558)	0.8008** (0.3165)			
gdppcgrowth:dafrica				-0.2125 (0.4179)	-0.2125 (0.4143)	0.0134 (0.3695)	-0.9901*** (0.3708)	-0.9453*** (0.3629)	-0.7870** (0.3206)
gdppcgrowth:ldbank		-1.4342*** (0.5311)	-1.4180*** (0.4544)		-1.2047** (0.5535)	-0.9797** (0.4913)		-2.1416*** (0.5441)	-1.9043*** (0.4787)
gdppcgrowth:ldcrisis		-1.1785*** (0.2768)	-0.9252*** (0.2363)		-0.7164** (0.2931)	-0.5031* (0.2603)		-0.6853** (0.2880)	-0.4074 (0.2531)
gdppcgrowth:lpeak			-5.3628*** (0.3307)			-5.3621*** (0.3104)		-5.4977*** (0.3169)	
gdppcgrowth:dsudden	-9.0585*** (1.4021)	-8.0576*** (1.3118)	-4.4236*** (1.0585)	-3.9307*** (1.4663)	-2.4876* (1.3501)	-0.6523 (1.1611)	-7.5215*** (1.4816)	-6.0014*** (1.3588)	-3.6670*** (1.1655)
dsudden:lmreserve	0.0003 (0.0128)	-0.0042 (0.0136)	-0.0072 (0.0146)	0.0125* (0.0075)	0.0093 (0.0077)	0.0060 (0.0082)	0.0144** (0.0072)	0.0107 (0.0077)	0.0079 (0.0081)
dsudden:ltradegdp	-0.0071 (0.0064)	-0.0081 (0.0064)	-0.0024 (0.0071)	-0.0050 (0.0100)	-0.0043 (0.0102)	0.0000 (0.0105)	-0.0045 (0.0066)	-0.0051 (0.0067)	-0.0034 (0.0070)
dsudden:lcagdp	0.0032 (0.0208)	-0.0105 (0.0212)	0.0105 (0.0226)	-0.0486** (0.0215)	-0.0543** (0.0225)	-0.0421* (0.0227)	-0.0115 (0.0202)	-0.0138 (0.0209)	-0.0109 (0.0211)
dsudden:lintresgdp	-5.6970** (2.4010)	-4.7576* (2.4584)	-4.8565* (2.5827)	0.5731 (1.4210)	1.1290 (1.4745)	0.8397 (1.4949)	-0.2477 (1.2363)	0.1748 (1.3053)	0.1077 (1.3238)
dsudden:ldcptvgdp	0.0150** (0.0061)	0.0114* (0.0064)	0.0106 (0.0067)	-0.0109 (0.0086)	-0.0111 (0.0089)	-0.0095 (0.0090)	0.0072 (0.0067)	0.0035 (0.0070)	0.0021 (0.0072)
dsudden:ldbank		0.2645 (0.3151)	0.0995 (0.3496)		0.7570** (0.3367)	0.6972** (0.3511)		0.5329 (0.3530)	0.5410 (0.3638)
dsudden:ldcrisis		0.7494*** (0.2239)	0.6448*** (0.2342)		0.6007*** (0.2178)	0.6118*** (0.2225)		0.7329*** (0.2357)	0.6425*** (0.2440)
dsudden:lpeak			1.1058*** (0.2560)			0.7704*** (0.2887)		0.7620*** (0.2735)	
hazard:lambda	3.2545*** (0.7577)	3.0552*** (0.7172)	1.8452*** (0.6033)	1.4081* (0.8355)	0.7399 (0.7859)	0.1626 (0.6846)	2.8407*** (0.8222)	2.3166*** (0.7722)	1.5564** (0.6760)
Observations	1226	1225	1225	1237	1236	1236	1307	1306	1306
Wald chi2	279.09	360.15	838.54	226.51	255.47	636.34	302.04	364.25	805.71
DF	50.00	54.00	56.00	49.00	53.00	55.00	49.00	53.00	55.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.92	0.89	0.62	0.39	0.21	0.05	0.78	0.65	0.50
sigma	3.53	3.44	2.97	3.61	3.57	3.18	3.63	3.55	3.13

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 15 Growth Regressions: Growth Effects of Sudden Stop Crises; Sample 1975:1996, All Countries and Developing Countries

	All Countries			Developing Countries		
	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.3967** (0.1743)	-0.3978** (0.1717)	-0.3066** (0.1534)	-0.4260* (0.2460)	-0.4384* (0.2417)	-0.1754 (0.2155)
gdppcgrowth:lgcegdg	0.0240 (0.0230)	0.0261 (0.0226)	0.0218 (0.0202)	0.0260 (0.0297)	0.0285 (0.0293)	0.0207 (0.0260)
gdppcgrowth:lgfcfgdp	0.0917*** (0.0197)	0.0923*** (0.0195)	0.0976*** (0.0174)	0.1038*** (0.0246)	0.1036*** (0.0243)	0.1063*** (0.0216)
gdppcgrowth:ltradegdp	0.0101*** (0.0026)	0.0096*** (0.0025)	0.0073*** (0.0023)	0.0083** (0.0034)	0.0081** (0.0034)	0.0043 (0.0030)
gdppcgrowth:educ	0.0322** (0.0158)	0.0307** (0.0156)	0.0242* (0.0139)	0.1020*** (0.0361)	0.0955*** (0.0356)	0.0598* (0.0318)
gdppcgrowth:dtype	0.9570** (0.4266)	1.0507** (0.4220)	0.8814** (0.3765)			
gdppcgrowth:dasia	1.9959*** (0.4121)	2.0575*** (0.4066)	1.8136*** (0.3634)	1.8614*** (0.5872)	1.9175*** (0.5777)	2.0421*** (0.5138)
gdppcgrowth:dafrika	-0.8503** (0.3956)	-0.8550** (0.3900)	-0.6165* (0.3485)	-0.5494 (0.5038)	-0.6011 (0.4956)	-0.1596 (0.4413)
gdppcgrowth:dlatin	0.9777** (0.3913)	1.0307*** (0.3828)	0.8875*** (0.3412)	0.9907** (0.4570)	1.0373** (0.4465)	0.9069** (0.3959)
gdppcgrowth:ldbank		-1.3645*** (0.5138)	-1.2063*** (0.4568)		-0.9576 (0.6575)	-0.8035 (0.5807)
gdppcgrowth:ldcrisis		-0.8660*** (0.2832)	-0.5802** (0.2516)		-1.0365** (0.4190)	-0.7187* (0.3701)
gdppcgrowth:lpeak			-5.5369*** (0.3207)			-6.2705*** (0.4398)
gdppcgrowth:dsudden	-5.0694*** (1.5322)	-3.5368** (1.4268)	-1.4216 (1.2134)	-6.3265*** (1.8501)	-4.4757** (1.7697)	-1.9592 (1.5041)
dsudden:lmreserve	0.0127* (0.0074)	0.0100 (0.0076)	0.0067 (0.0081)	0.0124 (0.0083)	0.0103 (0.0085)	0.0064 (0.0090)
dsudden:ltradegdp	-0.0039 (0.0080)	-0.0039 (0.0082)	0.0007 (0.0086)	-0.0043 (0.0083)	-0.0037 (0.0086)	0.0009 (0.0090)
dsudden:lcagdp	-0.0221 (0.0183)	-0.0237 (0.0186)	-0.0129 (0.0190)	-0.0238 (0.0193)	-0.0242 (0.0196)	-0.0134 (0.0200)
dsudden:lintresgdp	-0.3408 (1.3205)	0.1151 (1.3610)	-0.1043 (1.3654)	0.1101 (1.3349)	0.4951 (1.3723)	0.3374 (1.3857)
dsudden:lpcvtgdp	-0.0076 (0.0080)	-0.0081 (0.0082)	-0.0070 (0.0084)	-0.0094 (0.0103)	-0.0091 (0.0108)	-0.0072 (0.0113)
dsudden:ldbank		0.6071* (0.3130)	0.5646* (0.3284)		0.7766** (0.3336)	0.7461** (0.3512)
dsudden:ldcrisis		0.5432*** (0.2069)	0.5032** (0.2114)		0.4081* (0.2480)	0.3554 (0.2542)
dsudden:lpeak			0.8183*** (0.2636)			0.8731*** (0.3056)
hazard:lambda	1.8680** (0.8592)	1.1853 (0.8139)	0.5262 (0.7035)	2.5939** (1.0547)	1.7098* (1.0255)	0.9090 (0.8873)
Observations	1331	1330	1330	912	911	911
Wald chi2	458.16	490.71	929.78	349.75	397.33	718.86
DF	46.00	50.00	52.00	43.00	47.00	49.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00
rho	0.50	0.32	0.16	0.61	0.41	0.24
sigma	3.71	3.66	3.27	4.26	4.18	3.72

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 16 Growth Regressions: Growth Effects of Sudden Stop Crises; Sensitivity Analysis: Sudden Stop=dcapital5\*dcrisis

	Developing Countries			Developing Countries Excluding Asia			Developing Countries Sample: 1975 – 1996		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.2328 (0.2321)	-0.2491 (0.2264)	-0.0633 (0.1943)	0.1356 (0.2680)	0.1232 (0.2648)	0.2640 (0.2338)	-0.3867 (0.2456)	-0.3995* (0.2420)	-0.1633 (0.2144)
gdppcgrowth:lgecgdp	-0.0027 (0.0279)	0.0037 (0.0273)	-0.0016 (0.0235)	-0.0468 (0.0351)	-0.0393 (0.0349)	-0.0357 (0.0308)	0.0030 (0.0292)	0.0101 (0.0289)	0.0078 (0.0256)
gdppcgrowth:lgefcgdp	0.1215*** (0.0235)	0.1173*** (0.0230)	0.1195*** (0.0198)	0.0722*** (0.0275)	0.0705*** (0.0272)	0.0709*** (0.0240)	0.1224*** (0.0244)	0.1213*** (0.0241)	0.1203*** (0.0213)
gdppcgrowth:ltradegdp	0.0056* (0.0033)	0.0058* (0.0032)	0.0028 (0.0028)	0.0215*** (0.0065)	0.0210*** (0.0065)	0.0136** (0.0057)	0.0071** (0.0034)	0.0070** (0.0034)	0.0034 (0.0030)
gdppcgrowth:educ	0.0737** (0.0328)	0.0757** (0.0320)	0.0518* (0.0275)	0.0624 (0.0528)	0.0617 (0.0524)	0.0325 (0.0463)	0.0986*** (0.0363)	0.0935*** (0.0358)	0.0600* (0.0318)
gdppcgrowth:dasia	1.6611*** (0.5541)	1.7645*** (0.5416)	1.7693*** (0.4641)				1.7289*** (0.5861)	1.8047*** (0.5780)	1.9364*** (0.5109)
gdppcgrowth:dafrica	-0.5714 (0.4779)	-0.5357 (0.4670)	-0.1099 (0.4010)	0.0296 (0.5137)	0.0462 (0.5091)	0.3540 (0.4495)	-0.5591 (0.5010)	-0.5748 (0.4945)	-0.0977 (0.4381)
gdppcgrowth:dlatin	0.6127 (0.4183)	0.7471* (0.4089)	0.7163** (0.3498)	0.7744* (0.4424)	0.8714** (0.4393)	0.7988** (0.3870)	0.8746** (0.4449)	0.9942** (0.4400)	0.8436** (0.3883)
gdppcgrowth:ldbank		-1.4118** (0.6237)	-1.2461** (0.5322)		-0.8002 (0.7209)	-0.5973 (0.6340)		-0.9838 (0.6496)	-0.8399 (0.5722)
gdppcgrowth:ldcrisis		-1.1437*** (0.3905)	-0.9496*** (0.3334)		-1.0244** (0.4618)	-0.8911** (0.4064)		-1.0981*** (0.4136)	-0.7960** (0.3648)
gdppcgrowth:lpeak			-6.3265*** (0.3932)			-6.0940*** (0.4366)			-6.3732*** (0.4338)
gdppcgrowth:dsudden1	-12.2241*** (1.7581)	-10.5172*** (1.6188)	-4.9784*** (1.3501)	-7.7047*** (1.6933)	-6.1864*** (1.5893)	-2.1571 (1.3499)	-8.3617*** (1.8682)	-6.6266*** (1.7844)	-2.2458 (1.4864)
dsudden1:lmreserve	0.0308*** (0.0118)	0.0285** (0.0128)	0.0232* (0.0130)	0.0289** (0.0146)	0.0295* (0.0173)	0.0246 (0.0176)	0.0305** (0.0134)	0.0295** (0.0147)	0.0261* (0.0152)
dsudden1:ltradegdp	-0.0097 (0.0086)	-0.0106 (0.0086)	-0.0041 (0.0092)	-0.0005 (0.0169)	-0.0009 (0.0185)	0.0194 (0.0206)	-0.0015 (0.0129)	0.0005 (0.0141)	0.0152 (0.0161)
dsudden1:lcagdp	-0.1025*** (0.0318)	-0.1241*** (0.0357)	-0.1039*** (0.0350)	-0.1981*** (0.0563)	-0.2289*** (0.0645)	-0.1847*** (0.0621)	-0.1379*** (0.0436)	-0.1502*** (0.0474)	-0.1243*** (0.0442)
dsudden1:lintresgdp	-0.6501 (3.3112)	1.6243 (3.4868)	1.5835 (3.5337)	-9.0206 (8.0651)	-6.4003 (9.1382)	-4.7723 (9.8284)	4.0252 (5.1334)	7.4677 (5.7333)	9.0705 (6.0164)
dsudden1:ldcpvtgdp	0.0141* (0.0082)	0.0086 (0.0091)	0.0078 (0.0099)	-0.0212 (0.0163)	-0.0193 (0.0184)	-0.0188 (0.0199)	-0.0172 (0.0159)	-0.0152 (0.0174)	-0.0128 (0.0189)
dsudden1:ldbank		0.7061* (0.3939)	0.5499 (0.4303)		1.5902** (0.7083)	1.5605** (0.7942)		0.9618* (0.5119)	0.9784* (0.5824)
dsudden1:ldcrisis		0.8606*** (0.3263)	0.7462** (0.3354)		0.7254 (0.4753)	0.7076 (0.4978)		0.5685 (0.3925)	0.4468 (0.4075)
dsudden1:lpeak			0.9803*** (0.3463)			1.6719** (0.7035)			1.4096*** (0.5105)
hazard:lambda	5.4496*** (0.9815)	4.9876*** (0.9164)	2.5691*** (0.8093)	3.9779*** (1.0274)	3.3735*** (1.0252)	1.8288* (0.9413)	4.1078*** (1.0673)	3.3240*** (1.0684)	1.6251* (0.9532)
Observations	1068	1067	1067	803	802	802	934	933	933
Wald chi2	265.00	314.31	712.12	138.61	153.93	401.53	318.75	330.14	637.13
DF	47.00	51.00	53.00	43.00	47.00	49.00	41.00	45.00	47.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	1.00	1.00	0.70	0.92	0.79	0.49	0.95	0.78	0.43
sigma	4.39	4.28	3.66	4.31	4.26	3.76	4.31	4.24	3.75

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 17 Growth Regressions: Growth Effects of Sudden Stop Crises; Sensitivity Analysis: Sudden Stop = dcapital5\*dcrisis1

	Developing Countries			Developing Countries Excluding Asia			Developing Countries Sample: 1975 – 1996		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
gdppcgrowth:lngdp0	-0.2695 (0.2298)	-0.3206 (0.2241)	-0.0882 (0.1939)	0.1369 (0.2656)	0.0866 (0.2629)	0.2540 (0.2331)	-0.4018* (0.2431)	-0.4453* (0.2396)	-0.1723 (0.2136)
gdppcgrowth:lgcegdgdp	-0.0252 (0.0266)	0.0063 (0.0271)	0.0004 (0.0234)	-0.0781** (0.0324)	-0.0364 (0.0346)	-0.0317 (0.0306)	-0.0205 (0.0278)	0.0123 (0.0287)	0.0098 (0.0255)
gdppcgrowth:lgfcfgdp	0.1134*** (0.0233)	0.1120*** (0.0227)	0.1189*** (0.0197)	0.0644** (0.0273)	0.0649** (0.0270)	0.0687*** (0.0239)	0.1157*** (0.0243)	0.1174*** (0.0239)	0.1192*** (0.0213)
gdppcgrowth:ltradegdp	0.0057* (0.0033)	0.0057* (0.0032)	0.0027 (0.0028)	0.0241*** (0.0065)	0.0205*** (0.0065)	0.0128** (0.0057)	0.0071** (0.0034)	0.0067** (0.0034)	0.0032 (0.0030)
gdppcgrowth:educ	0.0919*** (0.0325)	0.0840*** (0.0317)	0.0547** (0.0275)	0.0849 (0.0520)	0.0608 (0.0520)	0.0288 (0.0461)	0.1124*** (0.0361)	0.0948*** (0.0356)	0.0587* (0.0317)
gdppcgrowth:dasia	1.6978*** (0.5495)	1.7291*** (0.5364)	1.7673*** (0.4630)				1.8512*** (0.5811)	1.8512*** (0.5728)	1.9490*** (0.5089)
gdppcgrowth:dafrica	-0.2287 (0.4690)	-0.4567 (0.4627)	-0.0536 (0.3996)	0.3445 (0.4960)	0.0549 (0.5040)	0.3364 (0.4467)	-0.2526 (0.4894)	-0.5527 (0.4892)	-0.0914 (0.4356)
gdppcgrowth:dlatin	0.5311 (0.4161)	0.6679* (0.4051)	0.7157** (0.3492)	0.6668 (0.4447)	0.7372* (0.4376)	0.7311* (0.3874)	0.7425* (0.4425)	0.8616** (0.4352)	0.8024** (0.3866)
gdppcgrowth:ldbank		-1.3120** (0.6337)	-1.0345* (0.5458)		-1.0537 (0.7364)	-0.7373 (0.6521)		-1.1434* (0.6545)	-0.8650 (0.5817)
gdppcgrowth:ldcrisis		-1.3452*** (0.3841)	-0.9802*** (0.3315)		-1.2681*** (0.4553)	-0.9886** (0.4035)		-1.2938*** (0.4061)	-0.8487** (0.3619)
gdppcgrowth:lpeak			-6.5448*** (0.3784)			-6.2766*** (0.4222)			-6.5284*** (0.4174)
gdppcgrowth:dsudden2	-10.7265*** (1.8936)	-8.9278*** (1.7500)	-5.5105*** (1.5135)	-4.8581** (2.1331)	-2.3008 (1.7451)	-0.3031 (1.5487)	-5.2156** (2.0778)	-2.9910* (1.7526)	-1.2356 (1.5620)
dsudden2:lmreserve	0.0134 (0.0083)	0.0100 (0.0088)	0.0077 (0.0091)	0.0114 (0.0100)	0.0067 (0.0113)	0.0050 (0.0119)	0.0098 (0.0099)	0.0060 (0.0107)	0.0057 (0.0111)
dsudden2:ltradegdp	-0.0182** (0.0088)	-0.0205** (0.0088)	-0.0195** (0.0090)	-0.0142 (0.0141)	-0.0201 (0.0161)	-0.0183 (0.0166)	-0.0188 (0.0145)	-0.0231 (0.0162)	-0.0227 (0.0166)
dsudden2:lcagdp	-0.0645** (0.0263)	-0.0827*** (0.0298)	-0.0718** (0.0304)	-0.0778** (0.0339)	-0.1172*** (0.0439)	-0.1078** (0.0473)	-0.0733** (0.0335)	-0.0930** (0.0391)	-0.0911** (0.0419)
dsudden2:lintresgdp	0.4211 (2.7132)	2.5617 (2.9550)	2.1659 (2.9534)	2.7512 (4.1991)	8.5905* (5.0371)	8.0006 (5.1437)	2.0290 (4.4625)	6.2984 (4.9423)	6.1574 (5.0706)
dsudden2:ldcpvtgdp	0.0150* (0.0082)	0.0062 (0.0088)	0.0060 (0.0089)	-0.0250 (0.0200)	-0.0341 (0.0251)	-0.0335 (0.0254)	-0.0257 (0.0192)	-0.0354 (0.0220)	-0.0353 (0.0220)
dsudden2:ldbank		0.9967*** (0.3611)	0.9350** (0.3706)		2.3623*** (0.6947)	2.3292*** (0.7110)		1.9565*** (0.6020)	1.9477*** (0.6085)
dsudden2:ldcrisis		0.7712** (0.3208)	0.7111** (0.3221)		1.1515** (0.4813)	1.1106** (0.4840)		0.7199* (0.4155)	0.7087* (0.4255)
dsudden2:lpeak			0.4055 (0.3695)			0.2936 (0.6235)			0.0705 (0.6006)
hazard:lambda	4.5442*** (1.0344)	4.0242*** (0.9855)	2.3825*** (0.8851)	1.8473 (1.2793)	0.4943 (1.1716)	-0.5088 (1.0387)	2.2921* (1.2376)	1.2101 (1.1343)	0.2612 (1.0178)
Observations	1074	1068	1068	809	803	803	940	934	934
Wald chi2	251.67	303.61	711.16	124.93	146.74	404.35	315.73	357.47	672.36
DF	45.00	49.00	51.00	42.00	46.00	48.00	39.00	43.00	45.00
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rho	1.00	0.95	0.65	0.43	0.12	-0.14	0.54	0.29	0.07
sigma	4.37	4.24	3.66	4.29	4.23	3.75	4.28	4.20	3.73

Standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## Reference:

- Barro, Robert J. and Xavier Sala-i-Martin (1995), *Economic Growth*, MIT Press
- Baxter, M. and R. G. King (1999), “Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series”, *Review of Economics and Statistics*, 81(4)
- Bordo, Michael, B. Eichengreen, D. Klingebiel and M. S. Martinez-Peria (2000), “Is the Crisis Problem Growing More Severe?” *mimeo*, Rutgers University and NBER
- Bry, G, and C. Boschan (1971), *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs*, Technical Paper 20, NBER, New York
- Burns, A. and W. Mitchell (1944), *Measuring Business Cycle*, Volume 2 of *Studies in Business Cycles*, NBER, New York
- Caballero, Ricardo and Arvind Krishnamurthy (2000), “International and Domestic Collateral Constraints in a Model of Emerging Market Crises”, NBER Working Paper No. 7971
- Calvo, Guillermo (1998), “Capital Flows and Capital-Market Crises: The Simple Economics of Sudden Stop”, *Journal of Applied Economics*, Vol. I (1), May
- Calvo, Guillermo and Carmen Reinhart (2000), “When Capital Flows Come to a Sudden Stop: Consequences and Policy”, in Peter B. Kenen and Alexander K. Swoboda, eds. *Reforming the International Monetary and Financial System*, Washington, DC, IMF
- Calvo, Guillermo and Carmen Reinhart (2002), “Fear of Floating”, *Quarterly Journal of Economics*, May, 117(2)
- Calvo, Guillermo, Izquierdo Alejandro and Luis-Fernando Mejía (2003), “On the Empirics of Sudden Stops”, IADB Working Paper
- Caprio, Gerard, Jr. and Daniela Klingebiel (1999), “Episodes of Systematic and Borderline Financial Crises”, unpublished manuscript, World Bank, available at [http://econ.worldbank.org/files/23456\\_banking\\_crisis\\_data.pdf](http://econ.worldbank.org/files/23456_banking_crisis_data.pdf)
- Chari, Kehoe and McGrattan (2005), “Sudden Stops and Output Drops”, NBER Working Paper No. 11133
- Demirgüç-Kunt, Asli and Enrica Detragiache (1997), “The Determinants of Banking Crises: Evidence from Developing and Developed Countries”, IMF Working Paper No. 97/106



- Edwards, Sebastian (2002), "Does the Current Account Matter?" in Edwards, S. and Frankel, J. eds. *Preventing Currency Crises in Emerging Markets*, The University of Chicago Press, Chicago
- Edwards, Sebastian (2004), "Thirty Years of Current Account Imbalances, Current Account Reversals and Sudden Stops", NBER Working Paper No. 10276
- Edwards, Sebastian (2004), "Financial Openness, Sudden Stops and Current Account Reversals", NBER Working Paper No. 10277
- Eichengreen, Barry, Andrew K. Rose and Charles Wyplosz (1995), "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks", *Economic Policy*, 21 (October)
- Eichengreen, Barry, Andrew K. Rose and Charles Wyplosz (1996), "Speculative Attacks on Pegged Exchange Rates: An Empirical Exploration with Special Reference to the European Monetary System", in Matthew Canzoneri, Wilfred Ethier and Vittorio Grilli eds. *The New Trans-Atlantic Economy*
- Eichengreen, Barry, Andrew K. Rose and Charles Wyplosz (1996), "Contagious Currency Crises", CEPR Discussion Paper No. 1453
- Esquivel, Gerardo and Felipe Larraín (1998), "Explaining Currency Crises", HIID Development Discussion Paper No. 666
- Frankel, Jeffrey and Andrew K. Rose (1996), "Currency Crises in Emerging Markets: An Empirical Treatment", *Journal of International Economics*, 41(3-4)
- Girton, L. and D. Roper (1977), "A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience", *American Economic Review*, Volume 67(4)
- Guidotti, Pablo, F. Sturzenegger and A. Villar (2004), "On the Consequences of Sudden Stops", *Economia*, Volume 4(2)
- Gupta, Poonam, Deepak Mishra and Ratna Sahay (2003), "Output Response to Currency Crises", IMF Working Paper, WP/03/230
- Harding, Don (1997), "The Definition, Dating and Duration of Cycles", Paper presented to the Melbourne Institute Conference on Business Cycles: Policy and Analysis
- Harding, Don and Adrian Pagan (2002), "Dissecting the Cycle: A Methodological Investigation", *Journal of Monetary Economics*, Volume 49(2)
- Heckman, James (1978), "Dummy Endogenous Variables in a Simultaneous Equation System", *Econometrica*, Volume 49(4)

- Hutchison, Michael and Ilan Noy (2002), "Sudden Stops and the Mexican Wave: Currency Crises, Capital Flow Reversals and Output Loss in Emerging Markets", Pacific Basic Working Paper Series PB02-03, Federal Reserve Bank of San Francisco
- Kaminsky, Graciela and Carmen Reinhart (1999), "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems", *American Economic Review*, Volume 89(3)
- Kaminsky, Graciela (2003), "Varieties of Currency Crises" NBER Working Paper No. 10193
- Kane, Edward and Tara Rice (2000), "Bank Runs and Banking Policies: Lessons for African Policymakers, NBER Working Paper No. 8003
- Maddala, G. S. (1983), *Limited-Dependant and Qualitative Variables in Econometrics*, Cambridge University Press
- Mendoza, Enrique (2001), "Credit, Prices and Crashes: Business Cycles with a Sudden Stop", NBER Working Paper No. 8338
- Mendoza, Enrique and Katherine Smith (2002), "Margin Calls, Trading Costs, and Asset Prices in Emerging Markets: The Financial Mechanics of the 'Sudden Stop' Phenomenon", NBER Working Paper No. 9286
- Milesi-Ferretti, Gian Maria and Assaf Razin (1998), "Sharp Reductions in Current Account Deficits: An Empirical Analysis", *European Economic Review*, Volume 42(3-5)
- Milesi-Ferretti, Gian Maria and Assaf Razin (2000), "Current Account Reversals and Currency Crises: Empirical Regularities", in Paul Krugman (ed.), *Currency Crises*, The University of Chicago Press, Chicago
- Nitithanprapas, Isriya and Thomas Willett (2002), "Classifying Exchange Rate Regimes", IIE Workshop Papers, Claremont Graduate University

## Appendix 1 – List of Countries

Algeria	Argentina	Australia	Austria
Bangladesh	Barbados	Belgium	Benin
Bolivia	Botswana	Brazil	Burkina Faso
Burundi	Cameroon	Canada	Central African Republic
Chile	China	Colombia	Costa Rica
Cote d'Ivoire	Denmark	Dominican Republic	Ecuador
Egypt, Arab Rep.	El Salvador	Finland	France
Gabon	Germany	Ghana	Greece
Guatemala	Haiti	Honduras	Iceland
India	Indonesia	Ireland	Israel
Italy	Jamaica	Japan	Kenya
Korea, Rep	Malaysia	Mexico	Morocco
Netherlands	New Zealand	Nicaragua	Niger
Nigeria	Norway	Oman	Pakistan
Papua New Guinea	Paraguay	Peru	Philippines
Portugal	Saudi Arabia	Senegal	Singapore
South Africa	Spain	Sri Lanka	Swaziland
Sweden	Switzerland	Thailand	Togo
Trinidad and Tobago	Tunisia	Turkey	United Kingdom
Uruguay	Venezuela, RB	Zambia	Zimbabwe

## **Appendix 2 – Data Appendix**

### *Description of Variables and Data Sources*

gdppcgrowth: Growth rate of per capita GDP. World Development Indicators (WDI)

lngdp0: logarithm of per capita GDP at constant US Dollars in 1975. WDI

lgcegdgdp: Government consumption expenditure as % of GDP, lagged one year. WDI

lgfcfgdp: Gross fixed capital formation as % of GDP, lagged one year. WDI

ltradedgdp: Openness variable defined as sum of Exports and Imports as % of GDP; lagged one year. WDI

educ: Percentage of Secondary School Complete in Total Population. Barro and Lee Data Set, “International Data on Educational Attainment: Updates and Implications”, Center for International Development Working Paper No. 42, April 2005

lcagdp: Current account balance as % of GDP, lagged one year. WDI

ldcpvtgdp: Domestic credit to private sector as % of GDP, lagged one year. WDI

lintresgdp: Net international reserve as % of GDP, lagged one year. IFS line 1L.d divided by 99b converted into dollar using IFS line rf.

lmreserve: Ratio of M2 to net international reserve, lagged one year. IFS lines 34 plus 35 converted into dollar using IFS line rf, divided by IFS line 1L.d.

Nominal exchange rate: National currency per US dollar. IFS line rf. For Brazil, Barbados, Egypt and El Salvador, IFS line ae has been used either due to data discrepancy or unavailability. For Australia, Ireland, New Zealand, Papua New Guinea, Swaziland, United Kingdom and Zimbabwe, inverse of IFS line rh has been used.

Reserves: IFS line 1L.d

Consumer Price Index: IFS line 64

Capital account balance: IFS lines 78bcd plus 78bjd plus 78cad

GDP: IFS line 99b

dtype: Dummy variable for industrial countries

dasia: Dummy variable for Asian countries

dafrica: Dummy variable for African countries

dlatin: Dummy variable for Latin American countries

dcapital5: Dummy variable for capital flow reversal. Capital flow reversal has been defined as contraction in capital account by more than 5 percent of GDP

dcapital3: Dummy variable for capital flow reversal. Capital flow reversal has been defined as contraction in capital account by more than 3 percent of GDP

dbank: Dummy variable for banking crisis

ldbank: Dummy variable for one period lagged banking crisis

dcrisis: Dummy variable for currency crisis

ldcrisis: Dummy variable for one period lagged currency crisis

dcrisis1: Dummy variable for currency crisis with crisis year defined from June to May.

dsudden: Dummy variable for sudden stop crisis

dsudden1: Dummy variable for sudden stop crisis. Sudden stop defined as dcapital5 multiplied by dcrisis

dsudden2: Dummy variable for sudden stop crisis. Sudden stop defined as dcapital5 multiplied by dcrisis1

lpeak: Dummy variable for one period lagged business cycle peak.