# Managing Sudden Stops

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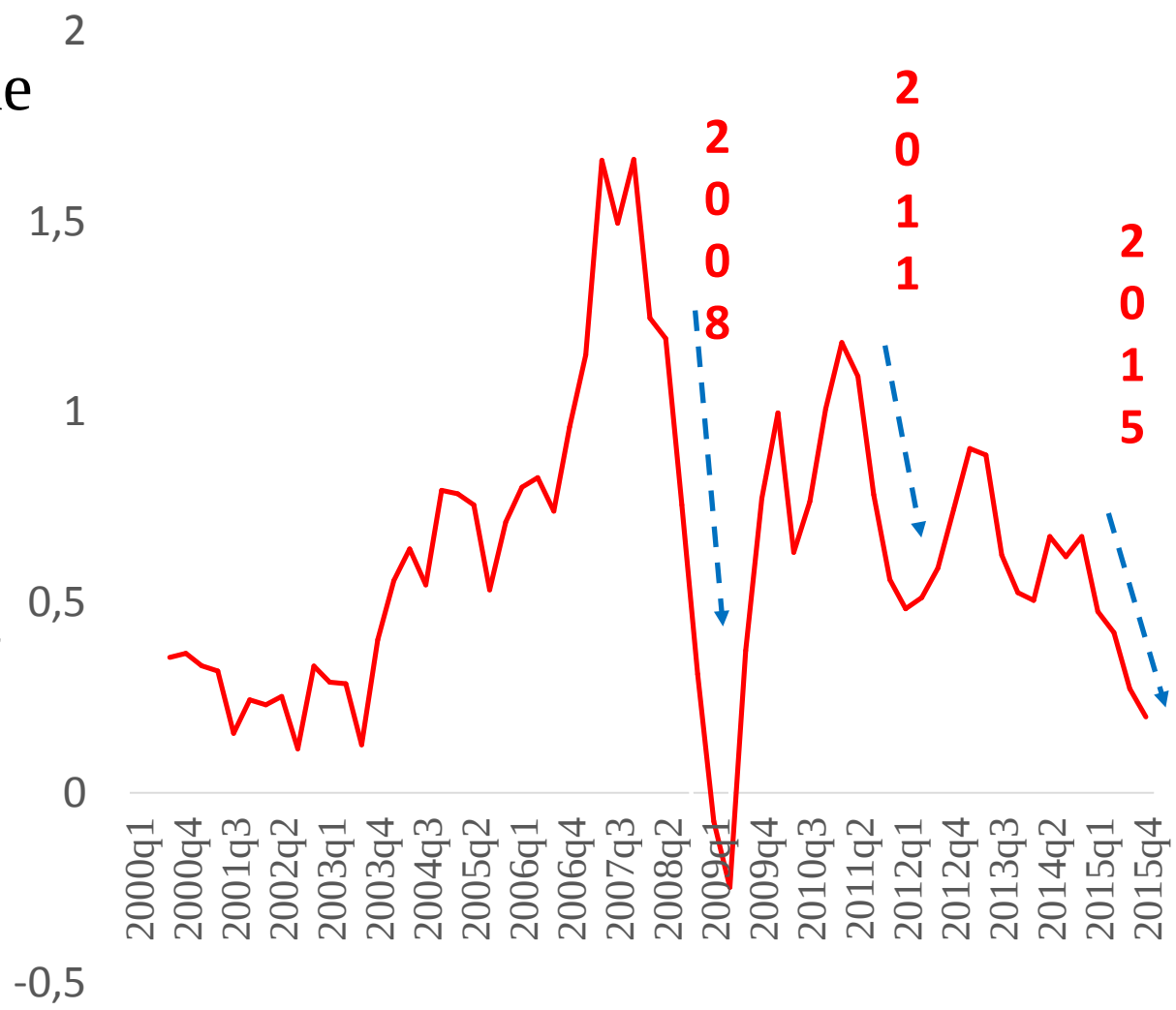
Views are personal

# Context

- Capital flows to emerging markets continue to be volatile-- pointing up the continuing relevance of the sudden stop problem.
- This paper analyzes the sudden stops in capital flows to emerging markets since 1991.
- Have SS become more frequent, disruptive overtime?
- Do stronger domestic fundamentals insulate countries from SS?
- How have the correlates of SS and the policy response to SS evolved overtime?

# Capital Flows seem to have become more volatile

- Capital flows have become particularly volatile since 2008—the Lehman episode (after a period of tranquility when emerging markets attracted large capital flows)
- There have been three episodes of enmasse reversals from EMs in last decade--2008, 2011, 2015!
- Besides there have been “milder events” such as tapering Talk and Brexit!



# What triggered these events: US monetary policy? Not really

None originated in the US policy (or of other AEs), but due to a confluence of factors.

2008 erupted with the collapse of Lehman;

2011 with the sovereign debt crisis of Europe;

2015 coincided with oil prices and the slowdown in Chinese economy

Except for Lehman they did not have an exact date when they started.

# Emerging markets face different kinds of shock to their capital accounts

- Brexit– quite unexpected and very short term impact
- Tapering Talk– lasted a quarter. The impact larger, but still short lived
- Rebalancing events: 2008, 2011, 2015; lasted 3 quarters on average
- Sudden stops–

➢the old kinds when country specific factors matters and US monetary policy mattered;

➢and the new kinds which are somewhat similar to rebalancing events (the rest of the presentation today)

# Identifying Sudden Stops: Data and Methodology

(i) We use quarterly data for 34 emerging economies from 1986 to identify SS from 1991. Our country sample is all emerging markets with their own currencies for which capital flow data are available for at least 24 consecutive quarters between 1991 and 2014.

(ii) Data for portfolio flows and other flows (bank loans, trade credit), by non residents; source of quarterly gross capital flow data is the International Monetary Fund's International Financial Statistics (accessed through Haver Analytics).

(iii) Divide the sample period into halves: Compare SS across the subperiods 1991-2002, and 2003-2014.

(iv) Unbalanced panel but check the robustness to a balanced panel

# Data and Methodology

- We identify SS using methodology standard in the literature:

➢when capital flows decline sharply--below the average in previous 20 quarters by at least one standard deviation

➢when the decline lasts for more than one quarter

➢and when flows are two standard deviations below their prior average in at least in one quarter.

➢Episodes end when capital flows recover to the prior mean minus one standard deviation.

# Data and Methodology

(i) Document and compare the incidence of sudden stops in two periods

(ii) Estimate probit regressions on variables normalized around mean zero and standard deviation 1; we report marginal effects

(iii) Collate and present information on policy matrix (put together by sifting through article IV reports of the IMF, AREAER publication of the IMF, detailed program information available publically, and Haver Analytics)

(iv) Did not look at the impact of policies in this paper (preventive or reactive)

# Summary of Findings

- Frequency and duration of the sudden stops have remained unchanged, but the relative importance of different factors in their incidence is now different.
- Global factors appear to have become more important relative to country-specific characteristics and policies
- Sudden stops now tend to affect different parts of the world simultaneously, rather than bunching regionally.
- Stronger macroeconomic and financial frameworks have allowed policy makers to respond more flexibly.
- Despite more flexible responses, impact on GDP growth is not mitigated (larger turnaround in capital flows; smaller positive impact of exchange rate adjustment!)

# Incidence of the Sudden Stops in the two sub periods

- For much of the analysis, we split the sample in half, in 2002.
- In an effort to highlight what if anything has changed between the earlier and later periods.
- The 5 most cited papers on SSs are Calvo, Izquierdo and Mejia (2004), Calvo, Izquierdo and Talvi (2003), Cavallo and Frankel (2008), Edwards (2004a) and Edwards (2004b). None covers data for the period after 2002.

| | 1991-2002 | 2003-2014 |
|---|---|---|
| # of sudden stops | 16 | 28 |
| % of available observations | 1.8 % | 2.1 % |
| # of quarters for which the sudden stops last | 4.5 | 3.64 |
| Capital flows during sudden stops (% of GDP), average for first four quarters | -1.79 | -1.4 |
| Capital flows in the four quarters preceding Sudden stops (% of GDP) | 1.28 | 2.1^^ |
| Capital flow turnaround: Avg. capital flows during four quarters of sudden stops- Avg. capital flows in the four preceding quarters | -3.06 | -3.59* |
| Portfolio flows in four quarters preceding Sudden stops (% of GDP) | .68 | .40** |
| Other flows in four quarters preceding Sudden stops (% of GDP) | .60 | 1.70^^^ |

# Sudden Stops in the Data

- We identify 46 sudden stops since 1991.
- The frequency of sudden stops in any one quarter is about 2 percent, or 8 percent in a year.
- These episodes last on average for four quarters.
- Capital outflows during sudden stops average about 1.5 percent of GDP per quarter (cumulatively 6 percent of GDP for the duration of the stop) compared to inflows of about 1.7 percent of GDP a quarter over the preceding year.
- This implies a swing in capital flows of some 3 percent of GDP in a quarter, a large amount!

Table 1. Sudden Stops, 1991-2002 vs. 2003-2014

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# Comparing Subperiods

- Frequency, duration, and the magnitude of the associated capital outflows are similar across subperiods.
- The turnaround is significantly larger in the second subperiod than the first: Capital inflows in the four quarters preceding sudden stops were larger as a share of recipient-country GDP in the second period.
- The increase in the volume of inflows in the preceding period is more than fully accounted for by an increase in "other" inflows (interbank borrowing, suppliers' credits, trade etc.).

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# Bank-related flows (and misc. credits) are especially volatile around sudden stops

- Here we regress flows of different types of capital on an indicator for the first four quarters of a sudden stop.
- The results indicate that while both portfolio and other inflows by nonresidents decline significantly during SSs, the shift is larger for other flows (bank-related, suppliers' credits, trade credits) than for portfolio flows.
- We also see, consistent with previous studies, that residents respond in stabilizing ways, reducing capital outflows during SSs (more so in the 2000s than previously), although the decline in outflows by residents is not sufficient to offset flight by nonresidents.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Portfolio Flows (% of GDP) | Other Flows (% of GDP) | Total Flows, % of GDP) | Net Capital Flows (% of GDP) |
| **Sudden Stop** | -0.58*** | -1.823*** | -2.41*** | -2.29*** |
| | [3.40] | [4.18] | [6.73] | [6.85] |
| **Dummy for 2003-2015** | 0.118** | 0.095 | 0.211* | -0.082 |
| | [2.24] | [0.90] | [1.82] | [0.72] |
| **SS* Dummy for 2003-2015** | -0.376 | 0.117 | -0.243 | 0.338 |
| | [1.63] | [0.28] | [0.61] | [0.82] |
| **Constant** | 0.273*** | 0.533*** | 0.798*** | 0.419*** |
| | [8.51] | [8.19] | [11.81] | [6.46] |
| **Observations** | 2,626 | 2,610 | 2,610 | 2,610 |
| **R-squared** | 0.052 | 0.079 | 0.130 | 0.085 |
| **# of countries** | 34 | 34 | 34 | 34 |

# Impact of Sudden Stops

- When a SS occurs, the exchange rate depreciates and reserves decline
- GDP growth decelerates; Investment growth declines and the current account strengthens.

Table 3. Comparing the Impact Over Time

| | (1) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|
| | Exchange Rate Depreciation | % Change in Reserves | % Change in Equity prices (real) | GDP growth (quarterly yoy) | Investment Growth (quarterly yoy) | Current Account Balance % GDP |
| Sudden Stop | 11.08** | -12.24** | -3.20 | -3.78*** | -11.64*** | 1.67 |
| | [2.58] | [2.65] | [0.96] | [3.39] | [2.88] | [1.52] |
| Sudden Stop * Dummy for 2003-14 | -3.08 | 4.26 | -7.89* | -1.47 | 0.92 | -0.76 |
| | [0.69] | [0.84] | [2.04] | [0.99] | [0.15] | [0.52] |
| Constant | 4.46*** | 2.86*** | -1.64*** | 3.78*** | 7.78*** | -1.51** |
| | [4.71] | [8.84] | [3.78] | [12.73] | [7.09] | [2.74] |
| Dummy 2003-2014 | -4.51*** | -0.39 | 2.81*** | 0.77* | 0.48 | -0.20 |
| | [2.92] | [0.90] | [4.52] | [1.78] | [0.29] | [0.24] |
| Observations | 2,569 | 2,573 | 2,284 | 2,160 | 1,959 | 2,000 |
| Number of countries | 34 | 34 | 31 | 32 | 29 | 30 |
| Adj. R-squared | 0.053 | 0.022 | 0.025 | 0.079 | 0.030 | 0.003 |

# Impact of Sudden Stops

- Looking at the impact across specific quarters: the impact on financial variables peaks in the first two quarters, the impact on real variables like GDP growth and investment peaks later.

| Dependent Variables | Exchange Rate Depreciation | % change in Reserves | GDP Growth (yoy) | Investment Growth (yoy) |
|---|---|---|---|---|
| **Quarter 1** | **10.12*** ** | **-14.5*** ** | **-2.27*** ** | **-6.01** ** |
| | **[4.37]** | **[4.75]** | **[3.09]** | **[2.75]** |
| **Quarter 2** | **12.853*** ** | **-6.49*** ** | **-5.521*** ** | **-9.038** ** |
| | **[3.40]** | **[2.85]** | **[4.97]** | **[2.17]** |
| **Quarter 3** | **3.514** ** | **-7.844** | **-5.845*** ** | **-16.643*** ** |
| | **[2.39]** | **[1.50]** | **[4.51]** | **[3.83]** |
| **Quarter 4** | **5.621** | **-4.861** | **-5.193*** ** | **-14.447** ** |
| | **[1.67]** | **[0.64]** | **[2.95]** | **[2.46]** |
| **Constant** | 1.823*** ** | 2.173*** ** | 4.204*** ** | 7.904*** ** |
| | [17.68] | [15.93] | [70.94] | [41.00] |
| **Observations** | 2,658 | 2,669 | 2,236 | 2,031 |
| **R-squared** | 0.029 | 0.008 | 0.074 | 0.034 |
| **# of countries** | 34 | 34 | 33 | 29 |
| **Adj. R-squared** | 0.027 | 0.01 | 0.07 | 0.03 |

# Taper Tantrum was a Milder Event—not a Sudden Stop

- No sudden stops so defined occurred during the “taper tantrum” of mid-2013
- A decline in capital inflows into emerging markets and in some cases capital-flow reversals occurred in this period, but these lasted only one quarter.
- In addition, the magnitude of the capital flow reversal was not comparable. The swing from inflow to outflow was 1½ percent of GDP a quarter as opposed to more than 3 percent of GDP in our sudden stop episodes.
- Currency depreciation was more than three times as large in sudden stop episodes. The decline in equity prices was five times as large.

# Determinants/correlates of Sudden Stops

- Use probit model, normalize variables around zero mean and standard deviation one.
- External Variables (same quarter)
- Domestic Variables (average of previous 8 quarters/2 years)
- Contagion/Concurrence variables (same quarter): Number of sudden stops starting elsewhere in the region or in the world in the same quarter

# Regression Results for Sudden Stops

- An increase in the VIX significantly raises the probability of a sudden stop. The effect is not just statistically significant but numerically large.
- The significance and magnitude of the two "sudden stops in other countries" variables similarly point to the importance of the external environment and global factors.

**Table 6 & 7: Correlates of Sudden Stops**

| | 1991-2002 | | 2003-2014 | |
|---|---|---|---|---|
| | (2) | (8) | (2) | (8) |
| VIX, Log | 0.86* | 0.74 | 1.14*** | 0.62** |
| | [1.92] | [1.61] | [6.56] | [2.04] |
| US Policy Rates (%) | 0.97*** | 0.90*** | 0.51* | 0.39 |
| | [4.79] | [3.61] | [1.76] | [1.21] |
| Capital Flows/GDP | 01.28*** | 1.21*** | 0.14 | 0.07 |
| | [6.02] | [6.17] | [1.22] | [0.52] |
| Domestic Credit/GDP | -0.23 | -0.17 | 0.34*** | 0.37*** |
| | [1.07] | [0.80] | [3.06] | [3.05] |
| # of Sudden Stops elsewhere in the world | | -0.32 | | 0.37** |
| | | [0.50] | | [2.39] |
| # of Sudden Stops elsewhere in the Region | | 0.79* | | 0.09 |
| | | [1.66] | | [0.80] |
| Observations | 862 | 862 | 1,316 | 1,316 |
| Pseudo R-squared | 0.121 | 0.137 | 0.278 | 0.330 |

# Regression Results for Sudden Stops

- Domestic factors associated with the increase in the probability of a sudden stop are capital flows in prior years and domestic credit as a share of GDP; both are positively associated with the probability of a country experiencing a sudden stop.
- International reserves and the real exchange rate do not show up as significant, perhaps because of their correlation with the capital-flow and credit variables.

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# Comparing the two subperiods:

- Some change in the relative importance of different external factors over time: U.S. monetary policy was more important in the 1990s, but global risk aversion as captured by the VIX mattered more subsequently.
- The influence of country characteristics like the reserve-to-GDP ratio, real exchange rate appreciation, and a negative international investment position seem to matter less consistently in the more recent period.
- This suggests that global (push) factors have been playing a larger role in sudden stops in the more recent decade.
- The changing nature of contagion effects (regional in the 1990s, global in the 2000s) similarly points to the growing influence of global factors.

# Extensive Robustness Tests

- Alternative regressions models (logit, cloglog)
- Balanced sample
- Country fixed effects
- Additional domestic variables, and external variables
- Winsorized observations at 1 percent on each end
- Divided subperiods differently

# What policy kit do/can EM deploy in practice?

Exchange rate– the first line of defense; but wary of excessive volatility and overshooting.

Reserves—Even the ones with floating exchange rates use reserves to take the pressure off the exchange rate, and provide forex liquidity to importers (Brazil, India)

Liquidity– as extremal credit markets freeze temporarily, open extra liquidity window to provide relief to the banks.

Monetary policy– exante not clear what should be the role during this phase. In practice either neutral or easing

Swap lines/contingency lines—unavailable, untested, ineffective….

Capital flow measures– Generally not nimble enough to be used during such short periods. Not often used at business cycle frequency

Macro prudential measures– Not used at business cycle frequency either

# Policy Response

- Conventional wisdom is that countries tighten monetary and fiscal policies to counter the drop in the exchange rate and in an effort to restore confidence.
- In extreme cases, they tighten controls on capital outflows and appeal to the International Monetary Fund for emergency assistance.
- But in fact, this conventional response is evident in only a minority of cases.
  - In only 8 of the 43 cases considered here did countries in fact tighten both monetary and fiscal policies in response to sudden stops.
  - Over the entire period, monetary policy was eased in response to sudden stops more often than it was tightened.
  - Instead (or in addition), governments respond to sudden stops with a variety of other measures targeted at buttressing the stability of their domestic financial system and signaling to investors their commitment to sound and stable policies.

# Policy Response to Sudden Stops has evolved too (Consistent with their changing nature, and enhanced policy space!)

**Earlier**

Fiscal Policy tightened

Or/and monetary policy tightened

IMF programs and structural reforms

Increased exchange rate flexibility

**Now**

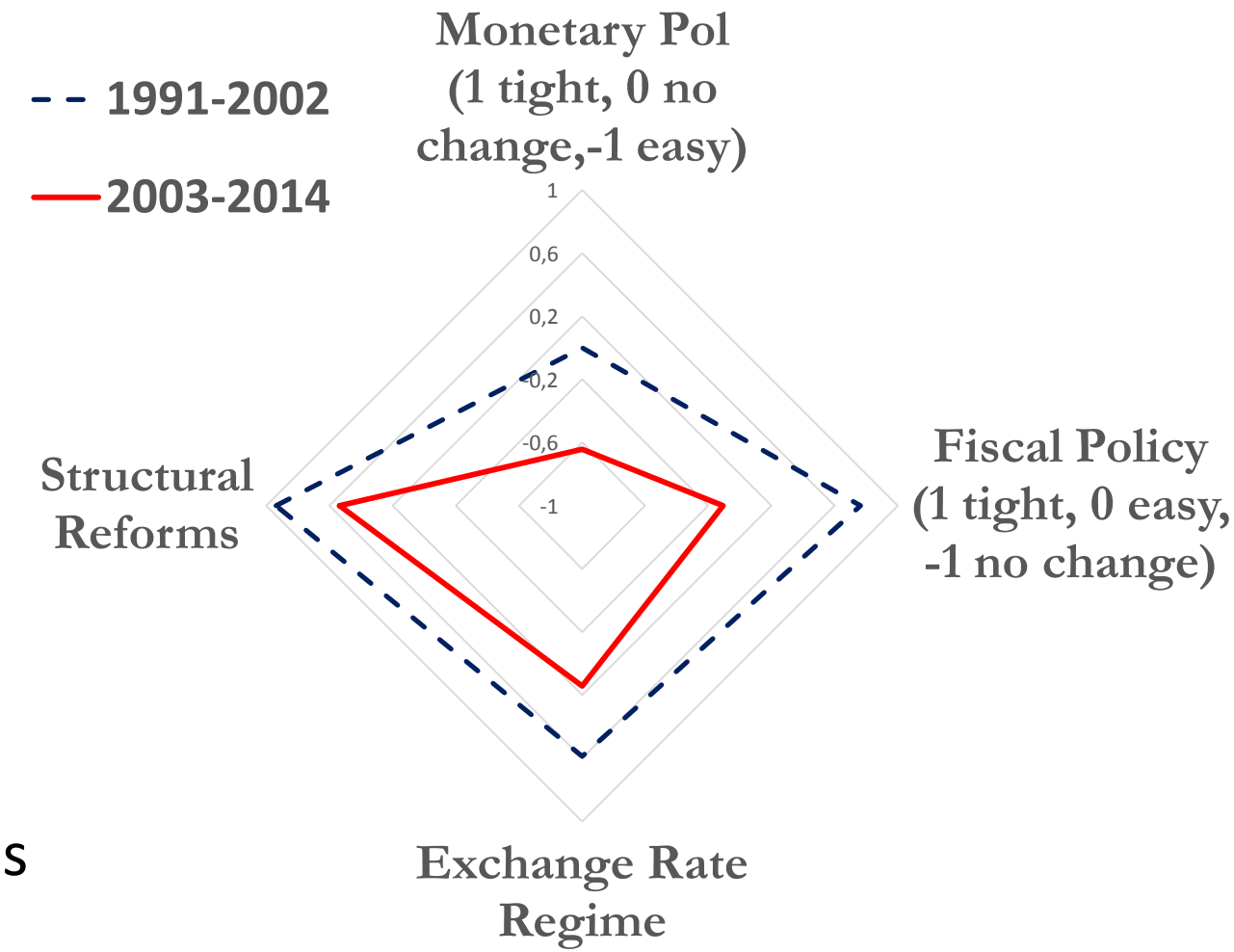
Monetary policy eased more often

Even fiscal policy eased

Less recourse to IMF program,

or changes in exchange rate arrangements

or structural reforms



# These choices are consistent with the changing nature of SS's and of the countries experiencing them

- The average values of a variety of policy variables in the eight quarters prior to sudden stops; distinguishing the two subperiods.

- In the 1990s sudden stops were heavily associated with weak macroeconomic fundamentals, whereas episodes in the subsequent decade occurred despite stronger domestic economic and financial fundamentals.

Table 12. Macroeconomic Frameworks and Structural Factors in the Eight Quarters before Sudden Stops

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Dependent Variable | Fiscal Balance/ GDP | Public Debt/ GDP | Inflation | exchange rate regime | Reserves/ GDP | Foreign Currency Position |
| Dummy for 2003-2014 | 1.4* | -11.03* | -3.27** | 0.44** | 11.39*** | 0.32*** |
| | [1.14] | [1.09] | [1.31] | [1.70] | [4.01] | [5.25] |
| Constant | -2.45** | 51.20*** | 10.69*** | 1.75*** | 8.95*** | -0.31*** |
| | [2.31] | [6.33] | [5.19] | [8.61] | [3.98] | [6.52] |
| Observations | 36 | 42 | 38 | 43 | 43 | 32 |
| R-squared | 0.037 | 0.029 | 0.046 | 0.066 | 0.282 | 0.479 |

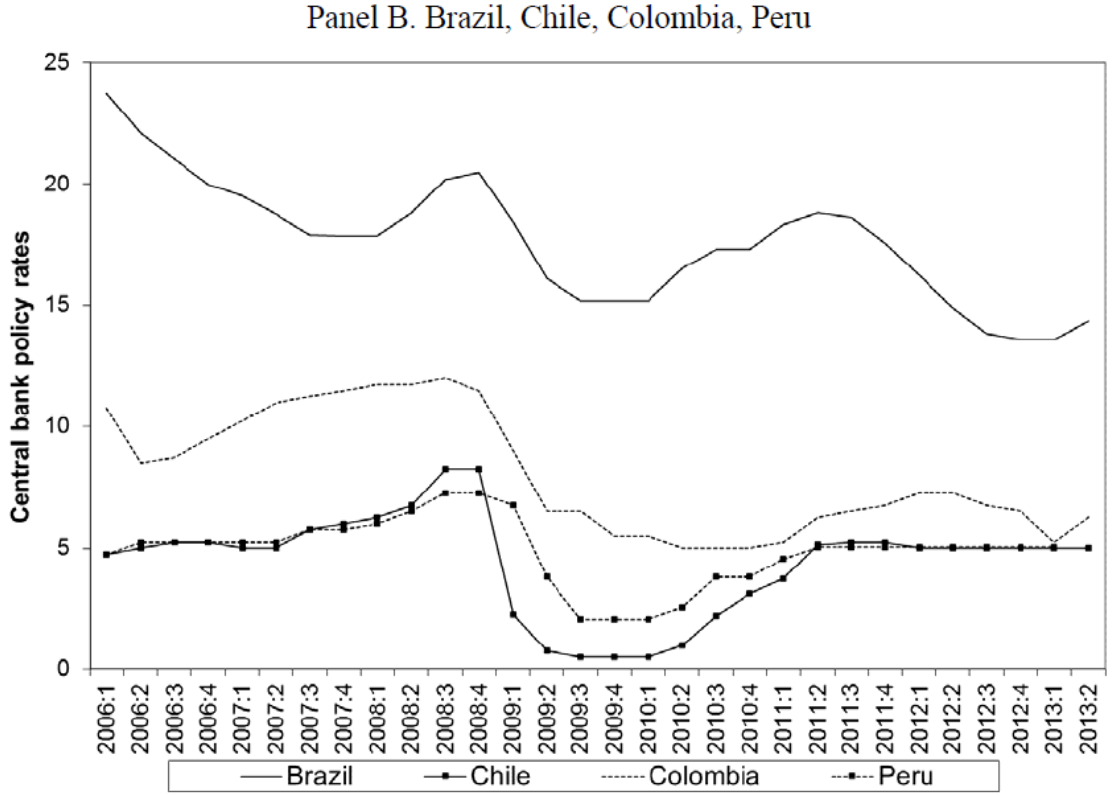
# Emerging Markets now maintain stronger economic frameworks– but these have been insufficient to insulate them

- Stronger fiscal positions
- More resilient growth outlook
- More sustainable public finances and debt levels
- Maintain larger reserves and have less exposure to foreign currency in their debt portfolios
- Flexible exchange rates, more credible monetary policy frameworks (some under IT)

These however have not been adequate to insulate them from sudden reversals of capital flows

# Monetary policy in emerging countries has increasingly become countercyclical (Vegh and Vuletin, 2012)

- Because of improved net foreign currency positions over time, Benetrix et al. (2014)
- Perhaps due to the larger role banks play in the economy; and larger flows mediated through the banks
- Because of inflation targeting frameworks, as noted in McGettigan et al (2013).



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# Evidence and challenges in gauging the effectiveness of policy

- Measurement
- Endoegeneity
- Lag effects
- Forbes and Warnock (2015)

➢Policies (reserve sale, large currency depreciations, substantial changes in policy interest rates, and increased controls on capital outflows) did not yield improvements in growth, employment and inflation

➢Large increase in interest rate or new capital controls can cause decline in GDP growth

➢Currency depreciation may raise GDP but with a lag

# Might be useful to think of different types of shocks and differently phases of the cycles

- When capital flowing in

Exchange rate appreciates, but some modulation through reserve accumulation; monetary policy tightening if needed, including through required reserve ratio, strengthening macro prudential, liberalization of capital inflow slow down; outflows by residents liberalized

- When capital stops flowing in, but a fast and short event (Brexit, tapering)

Exchange rate depreciation; liquidity measures; and possibly some monetary easing

- When capital flows stop, a longer event, similar to rebalancing

Exchange rate depreciation; reserves to avoid overshooting and undue volatility; liquidity measures; and possibly some monetary easing including through required reserve ratio; macrorpeudnrtial easing; further liberalization of capital inflows by non-residents; and no further liberalization of outflows by residents.

# To conclude

- We find that the frequency and duration of sudden stops have remained unchanged, but that the relative importance of different factors in their incidence is now different.
- Global factors appear to have become more important relative to country-specific characteristics and policies.
- In addition, sudden stops now tend to affect different parts of the world simultaneously, rather than bunching regionally.
- Stronger macroeconomic and financial frameworks have allowed policy makers to respond more flexibly, but these more flexible responses have not mitigated the impact of the phenomenon.
- These findings suggest that the challenge of understanding and coping with capital-flow volatility is far from fully met.

Thank you very much

# GDP Growth During the Sudden Stops

- Decline in GDP during sudden-stops is an increasing function of the capital inflows in the preceding eight quarters (the coefficient on capital flows in the preceding period is significant at the 5 percent confidence level).
- The explanatory power in this relationship is concentrated in the second subperiod.
- The breakdown of those prior inflows into portfolio and other flows does not make a difference for the magnitude of the output drop.

Table 8. Average GDP growth in the First Four Quarters of Sudden Stops

| | (1) | (2) | (3) |
|---|---|---|---|
| Capital Flows (% of GDP, Average of past 8 quarters) | -1.800** | 1.080 | 1.727 |
| | [2.14] | [0.68] | [1.11] |
| Capital Flows (% of GDP, Average of past 8 quarters)* dummy 2003-2014 | | -3.305* | -3.86** |
| | | [1.80] | [2.12] |
| Other Flows/Total Flows | -0.677 | | -3.819 |
| | [1.09] | | [1.40] |
| (Other Flows/Total Flows)* dummy 2003-2014 | | | 3.235 |
| | | | [1.16] |
| Dummy for 2003-2014 | | 5.145* | 4.790* |
| | | [1.99] | [1.85] |
| Constant | 2.018* | -2.494 | -2.045 |
| | [1.71] | [1.12] | [0.92] |
| Observations | 41 | 41 | 41 |
| Adj. R-squared | 0.201 | 0.223 | 0.211 |