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Emerging Market Sell-Offs: India and the World

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Abstract

Capital flows to emerging markets are generally volatile, resulting in periodic "sudden stop" episodes – when capital inflows dry up abruptly, with significant negative effects on the economy and on financial variables. This paper reviews India's experience with capital flows. The relative volatility of different kinds of capital flows in India is similar to that in other emerging markets. Our analyses suggest putting in place a medium-term policy framework that includes sound fiscal balance, a sustainable current account deficit, an environment conducive to investment, an appropriate level of reserves, avoidance of excessive appreciation or volatility of the exchange rate (through the use of reserves and macroprudential policy) and prepares the banks and firms to handle greater exchange rate volatility. In addition, it would be good for India to change the capital flow mix toward FDI flows and find ways to diversify the investor base toward investors with a longer-term view. It would also be useful to eventually graduate from the emerging market asset class. Finally, adopting a clear communication strategy to interact smoothly and transparently with market participants – involving regularly reasserting the commitment to sound policies, and reminders of the resilient underlying fundamentals – are likely to be helpful in risk-off times.

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I Introduction

This paper reviews India's experience with capital flows, analysing their evolution and placing them in an international perspective. Examining the pattern of capital flows to emerging markets first, it establishes the following stylized facts.

The experience of emerging markets shows that capital flows are generally volatile.1 Different kinds of capital flows exhibit different levels of volatility. Portfolio capital flows and credit flows are more volatile than flows of foreign direct investment (FDI), while, within portfolio flows, debt flows are more volatile than equity flows. This volatility partly stems from the fact that portfolio flows correlate more closely with external factors than with domestic factors. In contrast, FDI flows correlate more strongly with domestic factors, such as economic outcomes and policy frameworks. An implication is that while emerging market economies may be able to influence FDI flows, they have little control over other forms of capital flows.

Volatility in capital flows is reflected in periodic "sudden stops", as episodes when capital inflows dry up abruptly are known. Sudden stops have significant negative effects on the economy and on financial variables. Typical sudden stops last for about a year, that is, four quarters. Their financial effects materialize first. The exchange rate depreciates; reserves decline; and equity prices fall. The GDP growth then decelerates; investment slows; and the current account strengthens. The growth of GDP falls by roughly 4 percent year-on-year over a typical, four-quarter-long sudden stop.

The incidence of sudden stops has changed over time (Eichengreen and Gupta 2018). During the 1990s and until about the early 2000s, they seemed to correlate with both country-specific factors and external shocks. In the period since then, they have been influenced more by external than domestic factors. As a result, sudden stops now tend to affect different parts of the world simultaneously, rather than bunching regionally. Sudden stops remain frequent and severe, despite the fact that many emerging markets have strengthened their fundamentals and policy frameworks.

The broad pattern of capital flows to India mirrors those in other emerging economies. The relative volatility of different kinds of capital flows is similar to that in other emerging markets, and external or common factors play an important role in their fluctuations. Because of India's initially closed capital account and a calibrated pace of liberalization, it has experienced only two sudden stops in the last three decades. The first one was a classic sudden stop in 1991, which coincided with deteriorating domestic economic fundamentals and an unsustainable macroeconomic outlook. The episode occasioned the country's far-reaching economic reforms. A second sudden stop that India experienced was in 2008–09, when capital flows reversed during the global financial crisis. Keeping with the experience of other emerging markets, this episode can be attributed more to external factors than to domestic factors.

While India has not experienced any other episodes of disruptive sudden stops in the last decade, it has experienced two milder episodes of capital flow reversals, each resulting in financial disruption and volatility. The first of these events was in 2013, at the time of the "taper tantrum", when then-

[1] Bluedorn et. al (2013) show that private capital flows are volatile for all countries-advanced or emerging. They also suggest that fickle capital flows are unavoidable.

Federal Reserve Chairman Ben Bernanke mooted the possibility that the U.S. central bank might begin to reduce its asset purchases. The second event occurred when the Federal Reserve continued with interest rate normalization in 2017 and 2018, and it became clear that the Fed was intent on raising the rates further. The specific periods associated with the two episodes are May–September 2013 and April–October 2018, respectively.

Although these events resulted in a temporary sharp decline in capital inflows, they did not rise to the level of sudden stops as conventionally defined.[2] We refer to them as emerging market sell-offs. Both sell-offs were marked by exchange rate depreciation, declining equity prices, rising bond yields, and falling reserves in emerging markets. India was among the countries that were impacted sharply during both events.

We ask three questions about these episodes, as follows:

(1) How did the impact on India compare with that on other emerging markets?

(2) What country-specific factors shaped that impact?

(3) How effective were the policies adopted in response, and what might be an ideal policy outlook to address the impact of similar events?

An analysis of the effects of the Fed's talk of tapering in the summer of 2013 (Eichengreen and Gupta 2015) showed that emerging markets that allowed the largest appreciation of their real exchange rates and the largest increase in their current account deficits in the prior period of quantitative easing experienced the sharpest currency depreciation, reserve losses, and stock market declines during the tapering talk. Another important determinant of the differential impact was the size of a country's financial market. Countries with larger and more liquid markets experienced sharper impacts. This is interpreted as investors seeking to rebalance their portfolios being able to do so more easily and conveniently if the target country has a large and liquid market and the presence of foreign capital. This suggests that having a large and liquid market can be a mixed blessing when a country is subject to financial shocks from beyond its borders.

Although the 2013 tapering episode affected a large number of emerging markets, commentary focused on Brazil, India, Indonesia, South Africa, and Turkey, which were christened the *fragile five*. In all five countries, currencies depreciated; reserves declined; and equity prices declined (except South Africa). The largest depreciation was in Brazil; the largest decline in stock prices, in Turkey; and the largest reserve loss, in Indonesia. India had the second-largest exchange rate depreciation (nearly 16 percent) and the second-largest decline in reserves (about 6 percent).

The large impact on India during the 2013 episode was not surprising (Basu, Eichengreen, and Gupta 2015). The country had received large capital flows in prior years, and its large and liquid financial markets were a convenient target for investors seeking to rebalance away from other emerging markets. In addition, macroeconomic conditions had weakened in prior years, reflected in an increase in inflation, the fiscal deficit, and the current account deficit, rendering the economy vulnerable to capital outflows, and limiting the policy room for manoeuvre.

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[2] Extensive press coverage notwithstanding, interruptions to capital flows during the sell-off events of 2013 and 2018 were milder than the sudden stops of prior years. The sell-off episodes were shorter, entailed smaller reversals, and had a milder impact on financial and real variables. One might call them sudden pauses rather than sudden stops.

A similar set of countries was affected again during the 2018 episode.[3] The Turkish lira depreciated by 49 percent while the Central Bank of Turkey lost 21 percent of its reserves. In South Africa's case, the rand depreciated by 23 percent, and the reserves fell by 18 percent. The impact on India was significant, though slightly milder relative to other countries. The rupee depreciated by 13 percent, while the reserves of the Reserve Bank of India (RBI) declined by about 8.0 percent. Equity prices actually rose by 3.5 percent during this period.[4]

In the analysis below, we use a framework similar to the one used for the 2013 episode to assess the impact of the 2018 sell-off across countries. It shows a positive correlation among the variables described above (size of financial markets, prior capital inflows, the current account deficit, and prior exchange rate appreciation), on the one hand, and the extent of the sell-off, on the other. Similar to the experience of the 2013 event, countries with lower debts and more reserves were not rewarded with smaller impacts on exchange rates, reserves, and stock prices.

In India's case, the macroeconomic fundamentals were stronger at the onset of the 2018 event than during the 2013 event. Inflation was lower, the current account deficit and fiscal deficit were smaller, and the growth rate was higher. Yet, India was affected sharply again in 2018. These results underscore the importance of external factors in impacting capital flows, and the relevance of the size of financial markets and prior capital inflows in determining the impact during the sell-off events.

India's response to the 2013 sell-off consisted of monetary policy tightening, imposing import duties on gold, restricting capital outflows by residents, expanding a swap line with the Bank of Japan, adopting a new scheme to raise resources from the diaspora, reassurance from the RBI about India's sound fundamentals, and the creation of a special facility to accommodate the demand for foreign exchange from oil-importing companies. A similarly conventional set of measures was then implemented in response to the 2018 sell-off. These consisted of allowing significant exchange rate depreciation, while using reserves to smooth unduly large exchange rate fluctuations; raising the policy rates; careful and selective opening-up of the capital account for foreign inflows; stressing the sound fundamentals of the country through active communication; and reiterating and maintaining a prudent fiscal stance.

An event-study analysis suggests that, although such measures are conventional and globally implemented, they are not effective in stabilizing the financial markets and restoring confidence in the short run. This implies that there may not be any easy choices if a country is caught in the middle of a rebalancing of global portfolios. *Ex ante* policy frameworks, that limit vulnerabilities in advance and maximize the policy space for responding to shocks, are of more value than *ex post* measures to limit the impact.

The results suggest the appropriateness of putting in place a medium-term policy framework that limits vulnerabilities in advance, while maintaining the RBI and Finance Ministry's room for manoeuvre. Elements of such a framework include sound fiscal balance, a sustainable current account deficit, and an environment conducive to investment. In addition, India should continue to

[3] During both episodes, the Indian stock market was not impacted by capital flow reversals initially, and it increased instead. Equity prices reacted negatively later during the episodes, but, even then, the cumulative impact was smaller than in other countries.

[4] Refer to Table 4 for details on top 5 most affected countries.

encourage stable longer-term capital inflows, while discouraging volatile short-term flows; hold an appropriate level of reserves; avoid excessive appreciation or volatility of the exchange rate through the use of reserves and macroprudential policy; and take steps to prepare banks and firms to handle greater exchange rate volatility.

In addition, it will reduce the impact of volatility if India were to change the capital flow mix toward FDI flows, find ways to diversify the investor base toward investors with a longer-term view, and strengthen the current account, including by improving the competitiveness of exports. While such *ex ante* measures can help limit adverse impacts, they are still not a guarantee against sell-offs. If the latter occur, they should be used as an opportunity to build consensus for reforms (and for putting in place these *ex ante* measures, as a way to prevent a repetition of such episodes). Eventually, it will be useful to graduate from the emerging market asset class.

Finally, while implementing this medium-term framework, India could also adopt a clear communication strategy, to interact smoothly and transparently with market participants. Regular communications to reassert the commitment to sound policies and reminders of the resilient underlying fundamentals are likely to be helpful in such risk-off times, i.e., times when investors have lower risk tolerance.

II The Magnitude and Volatility of Capital Flows: Emerging Markets

According to conventional wisdom, capital flows are fickle. We analyse the trends in capital flows and the incidence of sudden stops since the 1990s in emerging markets in an attempt to confirm this conventional wisdom.[5] We make a distinction between FDI and non-FDI flows, and decompose the latter into portfolio equity, portfolio debt, and other flows. The other category, also commonly referred to as credit flows, includes flows through the banking sector (loans, deposits, and banking capital), loans raised by the private sector, and trade credits. We confirm the following stylized facts about capital flows.

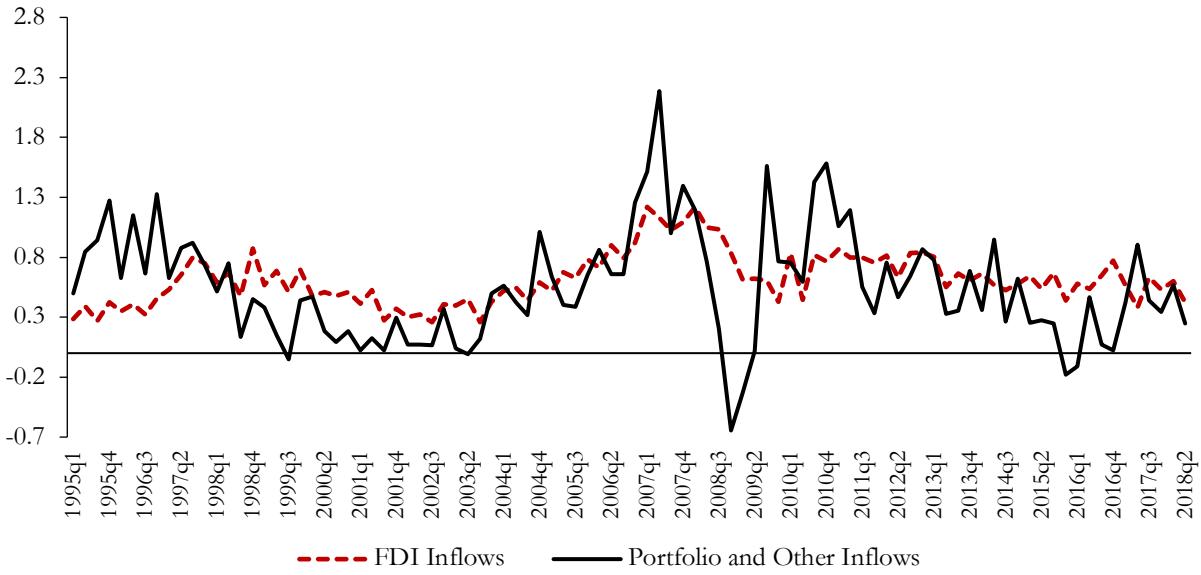
FDI and non-FDI inflows that emerging economies receive are roughly equal in magnitude.[6] Within non-FDI flows, credit flows are the largest, followed by portfolio debt. The relative magnitude of credit flows has declined, while portfolio debt flows have increased, since the global financial crisis. Portfolio equity flows remain relatively small, averaging 0.16 percent of GDP a year over the entire period and only 0.12 percent a year in the last five years.

FDI inflows are definitely more stable than non-FDI inflows (Figures 1 and 2; Table 1). Within non-FDI inflows, portfolio debt and bank-intermediated flows remain the most volatile.

[5] Our sample includes 34 emerging countries, the same set of countries included in Eichengreen, Gupta and Masetti (2018), based on the availability of quarterly capital flows data.

[6] Annual average flows of FDI and non FDI flows to an emerging market economy are 2.6 percent and 2.7 percent of GDP respectively (unweighted averages).

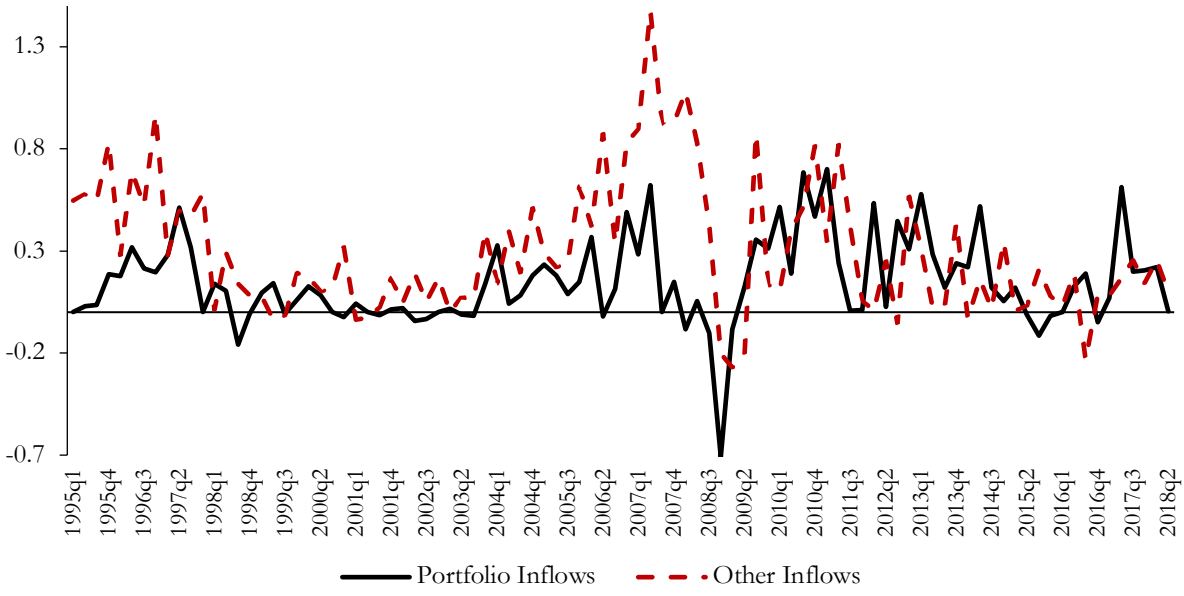
Figure 1: Magnitude of FDI and non-FDI flows
(Median flows for all emerging markets in % of Trend GDP)



Sources: Haver and authors' calculations.

Note: Calculated as a percent of annual trend GDP.

Figure 2. Portfolio and Other Capital Flows
(Median flows for all emerging markets in % of Trend GDP)



Sources: Haver and authors' calculations.

Note: Calculated as a percent of annual trend GDP.

Table 1. Trends in the Magnitude and Volatility of Capital Inflows and Outflows

			1991–95	1996–00	2001–05	2006–10	2011–18
FDI	inflows	Mean (quarterly average)	0.23	0.76	0.55	0.92	0.68
		Standard deviation	0.15	0.5	0.38	0.59	0.42
		Coeff. of variation	0.61	0.71	0.7	0.57	0.65
Portfolio equity	inflows	Mean (quarterly average)	0.06	0.05	0.03	0.05	0.03
		Standard deviation	0.1	0.12	0.09	0.21	0.15
		Coeff. of variation	1.35	1.56	2.21	1.99	2.48
Portfolio debt	inflows	Mean (quarterly average)	0.03	0.11	0.1	0.2	0.27
		Standard deviation	0.23	0.39	0.4	0.63	0.59
		Coeff. of variation	1.52	1.72	1.58	2.64	2.26
Other flows	inflows	Mean (quarterly average)	0.39	0.33	0.16	0.55	0.25
		Standard deviation	0.96	0.73	0.62	1.16	0.74
		Coeff. of variation	0.8	1.47	1	1.53	2.18

Note: The mean, standard deviation, and coefficient of variation reported in this table are the median values across all countries in the sample during the respective time periods. The coefficient of variation is the standard deviation, divided by the mean. Data are quarterly from 1990 Q1 to 2018 Q2. All capital flows are expressed as a % of annual trend GDP.

Eichengreen, Gupta, and Masetti (2018) explore correlates of capital flows by estimating regressions in which different types of capital inflows for country-quarter pairs are regressed on global factors, such as the Federal Funds Rate and the VIX (a commonly used measure of global risk aversion), and country-specific variables such as GDP growth, capital account openness, financial sector depth, and proxies for the business environment. An analysis of the factors correlated with capital flows reveals that, while FDI inflows are driven mainly by pull factors, portfolio debt and equity are driven mainly by push factors. Credit flows are driven by a combination of push and pull factors. A better investment climate, for example, is associated with larger FDI inflows. In contrast, growth and investment climate do not appear to act as pull factors on portfolio flows, which seem to be driven mainly by external factors. An increase in the U.S. policy rate predictably dampens portfolio debt flows. Higher global risk aversion reduces non-FDI, but not FDI inflows.[7]

To further highlight the volatility of capital flows and the impact such volatility can have on an economy, we identify sudden stops, that is, instances in which capital inflows dry up abruptly. These are defined as instances when FDI, portfolio equity and debt, and other inflows from non-residents:
1) fall below the average in the previous 20 quarters by at least one standard deviation,
2) this decline lasts for more than one quarter, and
3) when flows are two standard deviations below the prior average in at least one quarter.[8]

While FDI, portfolio equity, portfolio debt, and other inflows all decline during sudden stops, the decline is sharpest among credit flows and smallest in FDI. Credit flows recover most slowly. Sudden

[7] Global risk appetite is measured using the VIX.
[8] Episodes end if flows recover to at least the prior mean, minus one standard deviation.

stops have negative real and financial impacts, starting with the exchange rate depreciating; reserves declining; and equity prices falling. GDP growth then decelerates, investment slows, and the current account strengthens. On average, GDP growth falls by roughly 4 percent year-on-year in the first four quarters of a sudden stop (see Annex 1A, Table 1A.4). The experience of emerging markets with sudden stops exemplifies the volatility of capital flows and the real and financial impacts such volatility can bring about.

The next question to ask is what causes such episodes of sudden stops – and what, if anything, a country can do to avoid these. Eichengreen and Gupta (2018) analyse the correlates of sudden stops, their impacts, and the policy response to them since the 1990s. They compare the incidence of sudden stops in two periods: one lasting from the early 1990s until the early 2000s, and the other lasting from 2003 to 2016. One of the major findings of this work is that the relative importance of various factors in the incidence of sudden stops has changed even as the frequency and duration are largely unchanged. Global factors have become more important relative to country-specific characteristics and policies in their incidence. Incidentally, better economic outcomes and macroeconomic stability does not guarantee insulation from sudden stops. In addition, sudden stops now tend to affect different parts of the world simultaneously, rather than bunching regionally, further pointing to common factors – external to any of the affected countries – playing a key role in their incidence.

In accordance with the changing nature of sudden stops, the policy response to sudden stops has evolved, too. During the 1990s, countries responded to sudden stops by stepping down the exchange rate or floating the currency, and then supporting that new exchange rate or float with tighter monetary policy. In some cases, countries would also resort to programs with the International Monetary Fund (IMF), which were often conditional on trade reforms, fiscal tightening, and the privatization of public enterprises. Since the early 2000s, there has been less of a tendency to tighten monetary and fiscal policies. Less monetary stringency and some currency depreciation were feasible because countries maintained lower foreign currency mismatches, limiting balance-sheet damage from depreciation. Budgets being stronger, governments were able to respond with less fiscal consolidation. Recourse to the IMF was also less frequent in the 2000s, partly because countries had accumulated larger international reserves and had moved to more flexible exchange rates.

These findings point to the fact that stronger fiscal positions, more flexible exchange rates, deeper financial markets, and less foreign currency mismatch has not insulated emerging markets from sudden stops. It seems as if any benefit from stronger country fundamentals has been offset by larger external shocks. A more flexible and wider policy space, which means that the countries can afford to address the impact of sudden stops, has not limited the negative output effects either. While such stronger frameworks have allowed policy makers to respond more flexibly to the phenomenon, these more flexible responses have not mitigated the impact of the sudden stops. These results indicate that, because of the continued growth of international financial markets and transactions, countries are now exposed to larger capital flow reversals, and these larger reversals have more disruptive output effects. In other words, the challenge of understanding and coping with capital-flow volatility is far from fully met.

III India's Experience

How does India's experience fit in with these international patterns? Until the early 1990s, India maintained a fixed exchange rate, a relatively closed capital account, and a financially repressed financial sector. As a result, its capital account and financial markets were largely insulated from external shocks. Nonetheless, large fiscal and current account deficits and dwindling external reserves culminated in a balance of payments crisis in 1991, when India had to negotiate a program with the IMF to bridge the financing gap. Sweeping structural reforms were introduced in the aftermath, in conjunction with the IMF program.

One of the reforms that India introduced was to move gradually to a more flexible exchange rate. Another was to steadily liberalize capital flows in subsequent years. As a result, limits on inward FDI have been raised incrementally across sectors and eventually completely removed from some sectors. Restrictions on portfolio equity flows have been relaxed by raising the firm-specific and sectoral limits on shares of portfolio equity held by foreigners, by raising the ceilings on foreign investment in government and corporate debt, and by liberalizing external commercial borrowings (ECBs), that is, borrowings by Indian corporates in foreign currency.

Consequently, capital flows to India have evolved in three phases since the early 1990s. During the first phase, from the early 1990s through the early 2000s, capital flows rose steadily, but remained modest in magnitude. During this period, India managed to navigate a series of high-profile crises in Asia, Latin America, and elsewhere relatively unscathed, likely because of its relatively closed capital account.

In the second phase, from the early 2000s through 2007, the growth of inflows outpaced the growth of GDP and monetary aggregates, reflecting liberalization measures, but also the prevalence of easy liquidity globally. India rapidly integrated with international capital markets during this period.

The third phase started in 2008 and saw increased capital-account volatility. There was a sell-off of equities across emerging markets in 2008–09 following the collapse of Lehman Brothers. Outflows from India by portfolio investors amounted to nearly US$10 billion in three quarters starting in 2008 Q3, while equity markets declined by 33 percent during this period. The rupee depreciated by nearly 16 percent, and external reserves declined by US$36 billion, or about 13 percent of the initial stock, between September 2008 and March 2009.[9] GDP growth year-over-year declined to 0.2 percent in 2009 Q1 from above 8 percent growth in the preceding years, while inflation and the current account deficit increased.[10] In keeping with the experience of other countries, policy rates were lowered sharply; the repo rate was reduced from 7.8 in 2008 Q2 to 4.8 percent in 2009 Q2. Another policy response was to liberalize the economy additionally to foreign inflows, particularly the liberalization of sovereign and corporate debt flows.

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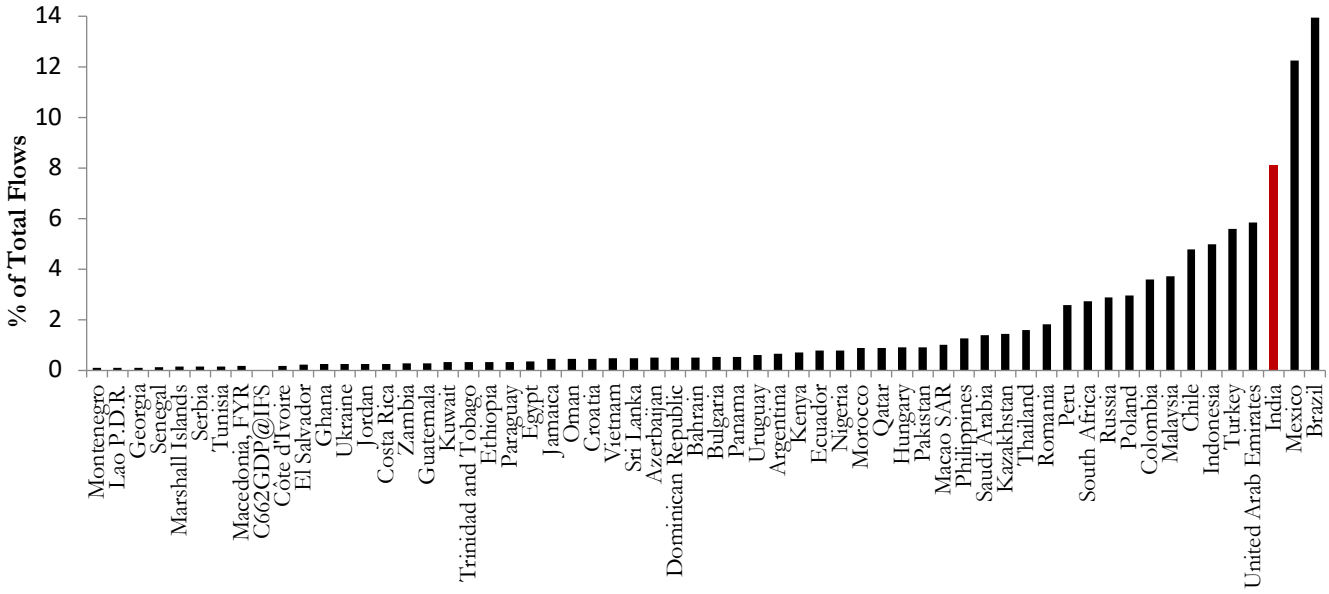
[9] Calculated using daily data on September 1, 2008 to March 31, 2009 in CEIC Data (database), CEIC, New York, https://www.ceicdata.com/en.

[10] This is based on data in a 2004–05 series. A back series of the 2011–12 series is currently unavailable at quarterly frequency. Additionally, 2009 Q1 in the text refers to Q4 2008–09.

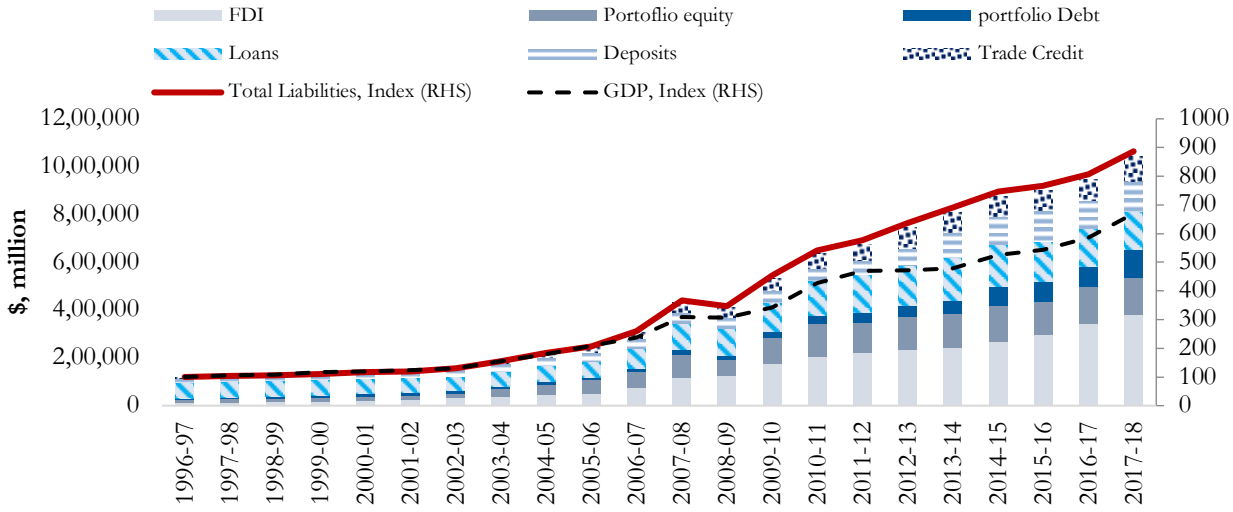
Today, at the end of this process, India is highly integrated into the global financial system. It is one of the largest recipients of private capital flows among emerging markets (Figure 3), attracting about 8 percent of the private capital flows and loans to emerging countries, excluding China, which attracts almost a third of total private capital flows to all emerging markets.[11] It follows that the stock of external liabilities has grown more quickly than GDP (Figure 4).

Figure 3. Allocation of Private Capital Flows (Equity, Bonds and Loans) across Emerging Markets, 2014 (% of flows to all emerging markets, excluding China)



Source: Global Financial Stability Report, IMF 2015.

Figure 4. Total External Liabilities Relative to GDP



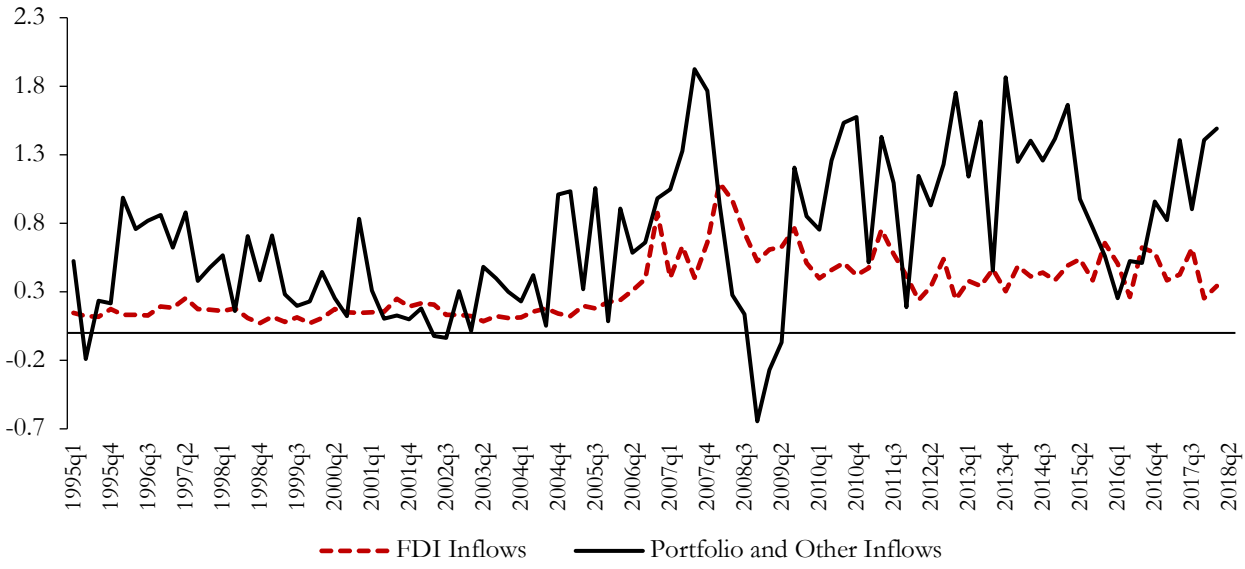
Source: RBI Handbook of Statistics on the Indian Economy; World Development Indicators, World Bank.
Note: Capital flows refer to net capital flows.

[11] This is as of 2015. Updated data are not available.

As in other emerging markets, FDI flows into India are less volatile than non-FDI flows (Figure 5). But capital flows into India are tilted away from FDI (Table 2). Annual FDI inflows average 1.1 percent of GDP, compared with non-FDI inflows of 3.5 percent of GDP since 1995. Even as the share of FDI flows has become larger in recent years, it still remains less than half the level of non-FDI capital flows. In comparison, the 34-country average is 2.5 percent of GDP for FDI inflows and 2.1 percent for non-FDI inflows. This may be one reason why India experiences relatively high levels of capital-flow volatility.[12]

Figure 5. Magnitude of FDI and non-FDI flows

(India, % of Trend GDP)

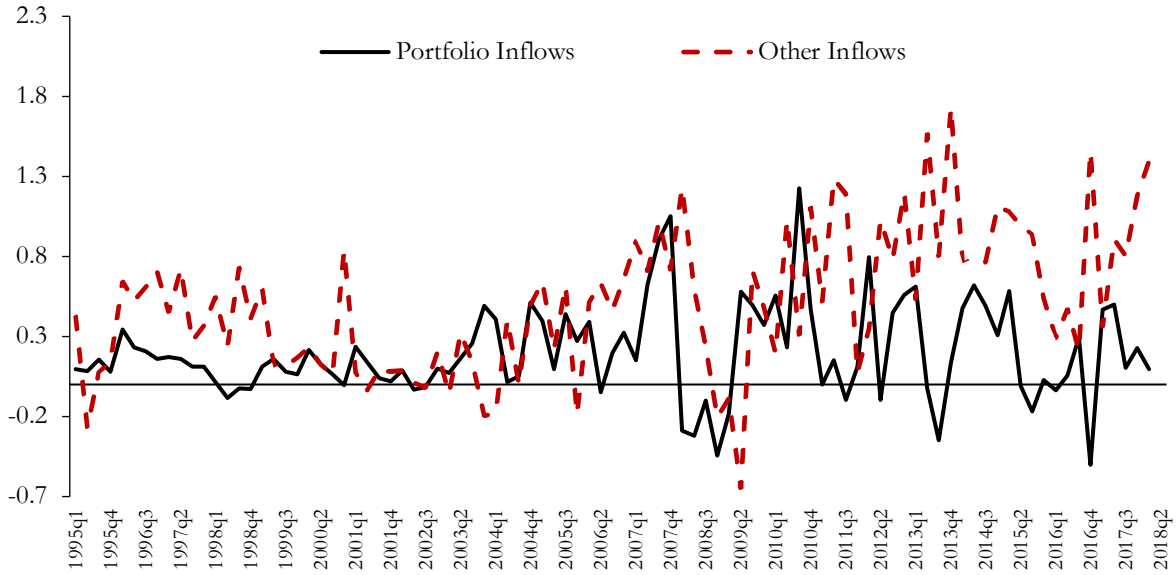


Sources: Haver and WB staff calculations.

Note: Calculated as a percent of annual trend GDP.

[12] That India receives a smaller share of inflows in the form of FDI may be attributed in part to residual restrictions on foreign ownership (Rao and Dhar 2018), but possibly even more to the regulatory environment and business climate or to the perceived low returns on FDI in India.

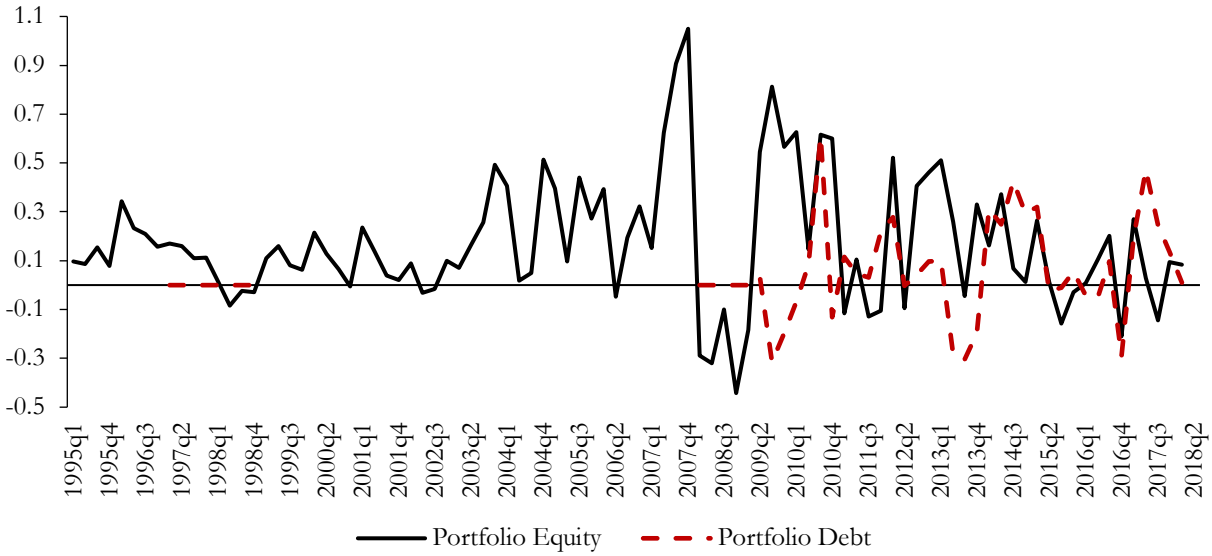
Figure 6. Portfolio and Other Capital Flows
(India, % of Trend GDP)



Sources: Haver and WB staff calculations.

Note: Calculated as a percent of annual trend GDP.

Figure 7. Portfolio Equity and Portfolio Debt Flows
(India, % of Trend GDP)



Sources: Haver and WB staff calculations.

Note: Calculated as a percent of annual trend GDP.

Table 2. Trends in the Magnitude and Volatility of Capital Inflows, India

			1991–95	1996–00	2001–05	2006–10	2011–18
FDI	inflows	Mean (quarterly average)	0.05	0.14	0.16	0.59	0.46
		Standard deviation	0.05	0.04	0.04	0.23	0.14
		Coefficient of variation	0.88	0.32	0.28	0.39	0.30
Portfolio equity	inflows	Mean (quarterly average)	0.12	0.11	0.19	0.32	0.12
		Standard deviation	0.16	0.10	0.18	0.45	0.22
		Coefficient of variation	1.34	0.94	0.95	1.41	1.89
Portfolio debt	inflows	Mean (quarterly average)	-	-	-	0.00	0.09
		Standard deviation	-	-	-	0.23	0.21
		Coefficient of variation	-	-	-	--	2.29
Other flows	inflows	Mean (quarterly average)	0.23	0.41	0.14	0.54	0.90
		Standard deviation	0.30	0.24	0.25	0.48	0.44
		Coefficient of variation	1.31	0.58	1.83	0.89	0.49

Note: The coefficient of variation is the standard deviation, divided by the mean. Data are quarterly from 1990 Q1 to 2018 Q2. All capital flows are expressed as a percentage of the annual trend GDP.

Within non-FDI flows, credit flows are the largest to India, averaging 1.8 percent of GDP, followed by portfolio equity of about 0.6 percent of GDP. The corresponding numbers for the 34-country average are 1.3 percent for credit inflows and 0.2 percent for portfolio equity. Portfolio debt flows, having been liberalized in the last decade, are now as large and at least as volatile as portfolio equity flows (Figures 6 and 7). This tilt toward portfolio flows may be another reason why India experiences capital flow volatility.

IV Emerging Market Sell-offs

While India has not witnessed another sudden stop since the global financial crisis, the period since then has been marked by emerging market sell-offs in 2013 and 2018. These events were milder than the full-blown sudden stops, as defined above. Their impact was notable nonetheless. It is to these episodes that we now turn.

The first of the sell-off events took place in 2013 when then-Federal Reserve Chairman Ben Bernanke unexpectedly mooted the possibility that the U.S. central bank might begin to reduce (taper) its asset purchases. The event is widely known as the taper tantrum. The second event was in 2018 when the Federal Reserve continued with interest rate normalization, and it became clear that the Fed was intent on raising the rates further. Combined with renewed trade tensions between China and the United States and rather large financial volatility in Argentina and Turkey, this resulted in capital flow reversals and financial volatility in several emerging markets.

The specific periods associated with the two episodes are considered to be May–September 2013 and April–October 2018, respectively. Although these events resulted in temporary sharp declines in

capital inflows, the declines did not rise to the level of sudden stops as conventionally defined.[13] These episodes are referred to here as emerging market sell-offs. Both sell-offs were marked by exchange rate depreciation, declining equity prices, rising bond yields, and falling reserves in emerging markets. India was among the countries that were impacted sharply during these events.

This article examines three questions about these episodes: (1) How did the impact on India compare with that on other emerging markets? (2) What country-specific factors shaped that impact? and (3) How effective were the policies that were adopted in response, and what might be the ideal policies to address the impact of similar events?

Table 3. Cumulative Percentage Changes in Capital Market Conditions during Emerging Market Sell-Off Events

	2013 (April–August)	2018 (March–October)
Exchange rates		
Share of countries in which exchange rates depreciated	30/53	48/51
Mean depreciation	6.21	10.29[a]
Median depreciation	5.62	7.52
Foreign reserves		
Share of countries in which reserves declined	29/51	28/35
Mean decline, %	−6.21	−7.25
Median decline, %	−4.55	−6.57
Stock market index		
Share of countries in which stock market indexes declined	25/38	31/37
Mean decline, %	−6.94	−9.42
Median decline, %	−6.21	−8.45
Sovereign bond spreads		
Share of countries in which bond spreads increased	23/31	23/31
Mean increase, basis points	61.39	112.6
Median increase, basis points	58	78.5

Source: Calculated based on data of the Global Economic Monitor database, World Bank.

Note: Average exchange rate depreciation during 2018 episode includes Argentina (depreciation of 83.2 percent) and Turkey (depreciation of 49.3percent), making the mean larger than during the tapering event. Mean depreciation is 7.86 percent if these 2 countries are dropped from the calculation.

In the case of the 2013 tapering episode, the analysis first considers the data on 53 emerging countries, following the work of Eichengreen and Gupta (2015). The analysis shows that 30 of the 53 countries experienced some exchange rate depreciation between the end of April and the end of August 2013 (Table 3). The average rate of depreciation was over 6 percent, and the exchange rates of

13 Excitable press coverage notwithstanding, interruptions to capital flows during the sell-off events of 2013 and 2018 were milder than the sudden stops of prior years. The sell-off episodes were shorter, entailed smaller reversals, and had a milder impact on financial and real variables compared with sudden stops..

half the countries depreciated by more than 5.5 percent.[14] Some of the largest changes were in Brazil, India, and South Africa.

The data on stock market indexes are available for fewer countries. Stock markets declined in 25 of the 38 countries on which data are available. The cumulative decline between April and August 2013 averaged 6.9 percent, and the median decline was 6.2 percent. The effect is seen to be much more heterogeneous on stock markets than on exchange rates. In several emerging markets (Chile, the Czech Republic, Indonesia, Kazakhstan, Peru, Serbia, and Turkey), the decline in the stock market was more than 10 percent, and it was much smaller in others.

Data on sovereign bond spreads are available for a subsample of the countries, but almost three-quarters of countries on which there are data experienced an increase in spreads; the mean effect was about 60 basis points. The countries with the largest increase in bond spreads were Ghana, Indonesia, Morocco, Ukraine, and Venezuela; the latter two experienced increases in spreads of over 150 basis points.

The impact of the 2018 episode was even more widespread. Of the 51 countries tracked for this analysis, 48 experienced some depreciation. The mean depreciation was 10 percent (after including Argentina and Turkey, but 7.9 percent excluding them). Similarly, a larger number of countries, 31 of the 37 on which data are available, experienced a decline in equity prices. The average decline was to the tune of 9.5 percent. Increase in bond yields and the decline in reserves, too, was larger during the 2018 episode.

Table 4: Fragile Five during the Selloff events

	Fragile Five during the 2013 Selloff				**Fragile Five during the 2018 Selloff**		
	% Change in Nominal Exchange Rate	% Change in Stock Indices	% Change in External Reserves		% Change in Nominal Exchange Rate	% Change in Stock Indices	% Change in External Reserves
Brazil	17.01	-5.28	-3.07	Argentina	83.21	-5.19	-
India	15.7	-3.32*	-5.89	Turkey	49.36	-18.3	-21.85
South Africa	10.6	6.81	-5.05	South Africa	22.81	-8.46	-18.3
Turkey	9.21	-15.38	-4.56	Russia	15.24	-9.35	0.34
Indonesia	8.33	-14.21	-13.3	Brazil	14.71	-1.17	0.19
				India	13.11	3.58	-7.64

Source: Calculated based on data of the Global Economic Monitor database, World Bank.
Note: Percent change calculated between April to August 2013; and between March to October 2018 respectively, using monthly averages from the Global Economic Monitor database of the World Bank. * Decline in stock prices in India was 10 percent if calculated using daily data between May 22 and August 31, 2013; and about 11 percent if calculated using daily data between August 31 and October 31, 2018.

[14] A larger number of countries experienced depreciation initially, but then recovered by August.

Although the 2013 tapering episode affected a large number of emerging markets, commentary focused on Brazil, India, Indonesia, Turkey, and South Africa, which were christened the fragile five. In all five countries, currencies depreciated, and reserves declined. Equity prices declined in all but South Africa (Table 4). The largest depreciation was in Brazil; the largest decline in stock prices was in Turkey; and the largest loss in reserves was in Indonesia. India had the second largest exchange rate depreciation and the second largest decline in reserves.

Three of these five countries were impacted the most in 2018. The Turkish lira depreciated by 49 percent while the Central Bank of Turkey lost 21 percent of its reserves. In South Africa's case, the rand depreciated by 23 percent, and the reserves fell by 18 percent. The impact on India was comparable with that during the 2013 event. The rupee depreciated by 13 percent, while the RBI's reserves declined by about 8 percent. Equity prices were not initially affected; they did decline eventually, albeit much later during the episode.[15]

V Who Was Hit – and Why

Eichengreen and Gupta (2015) relate the movement of exchange rates, reserves, and equity prices during the 2013 sell-off to (1) observable macroeconomic fundamentals, such as the budget deficit, public debt, foreign reserves, and GDP growth in the prior period; (2) the size and openness of financial markets; and (3) capital flows and the extent to which capital flow–sensitive indicators (such as the real exchange rate and the current account balance) moved in the prior period. Because potential explanatory variables within each category are correlated, the authors include only one variable from each category in their regressions.[16]

Their results indicate that countries with stronger macroeconomic fundamentals (smaller budget deficits, less debt, more reserves, and stronger growth rates in the immediately prior period) were not rewarded with smaller falls in exchange rates, foreign reserves, and stock prices. The stance of fiscal policy or the intensity of capital controls in the prior period did not exert a consistently significant impact on the effects of tapering. The results do not support the presumption that countries with smaller budget deficits, less debt, more reserves, and stronger growth rates in the prior period were impacted less by the emerging market sell-off in 2013.

What mattered more was the size of the financial markets of the countries. Investors seeking to rebalance their portfolios concentrated on emerging markets with relatively large and liquid financial systems; these were the markets where they could most easily sell without incurring losses and where there was the most scope for portfolio rebalancing. The results also indicate that the largest impact of tapering was felt by countries that attracted large volumes of capital flows and that allowed exchange rates to appreciate and current account deficit to widen most dramatically during the earlier period when large amounts of capital were flowing into the economies.

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[15] During both episodes, the Indian stock market was not affected by capital flow reversals initially, and it grew. Equity prices reacted negatively later during the episodes, but, even then, the cumulative impact was smaller there than in other countries.

[16] The robustness tests conducted by the authors confirm that the results are comparable if alternative measures of size are included.

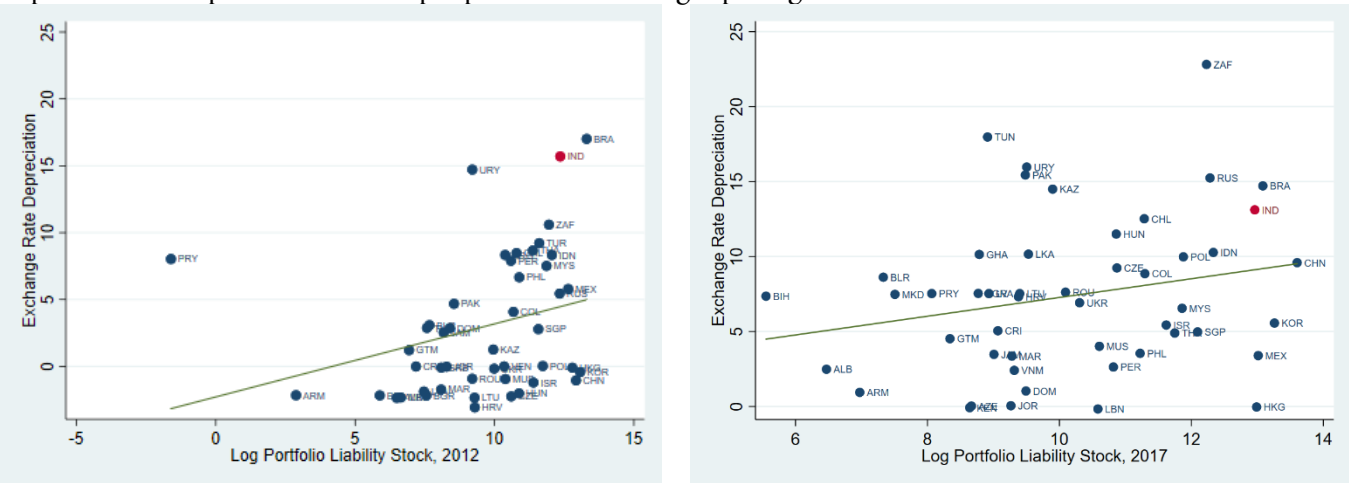
This experience contrasts with the frontier markets with smaller and less liquid financial systems. Eichengreen and Gupta (2015) consider this a reminder that success at growing the financial sector can be a mixed blessing. Among other things, it can accentuate the impact on an economy of financial shocks emanating from outside the country.

In this article, we use a similar approach to analyse the impact of the 2018 sell-off (Figures 8 and 9). The experience turns out to be similar to the one in 2013. The correlation between the size or liquidity of financial markets and the extent of exchange rate depreciation continues to be positive and significant.[17] Countries with less debt and more reserves were, once again, not rewarded with significantly smaller falls in exchange rates, reserves, and equity prices, whereas inflation and the current account deficit were again positively correlated with exchange rate depreciation.

Figure 8. The Size of Financial Markets and the Effect on Exchange Rates during the Sell-Off Event

2013	2018

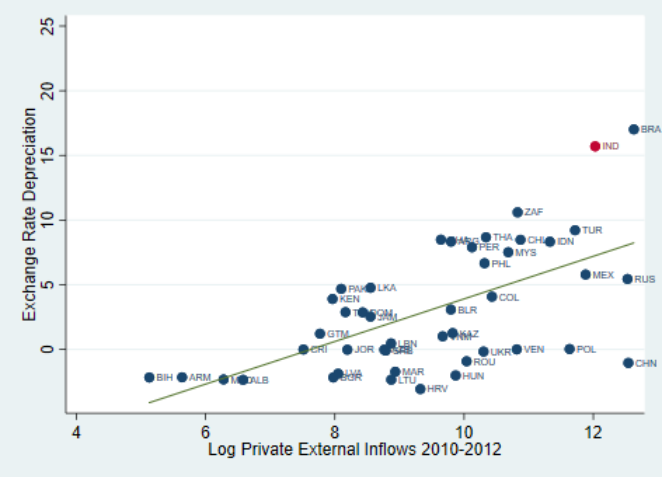
a. Larger financial markets, proxied by stock of portfolio liabilities, witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk

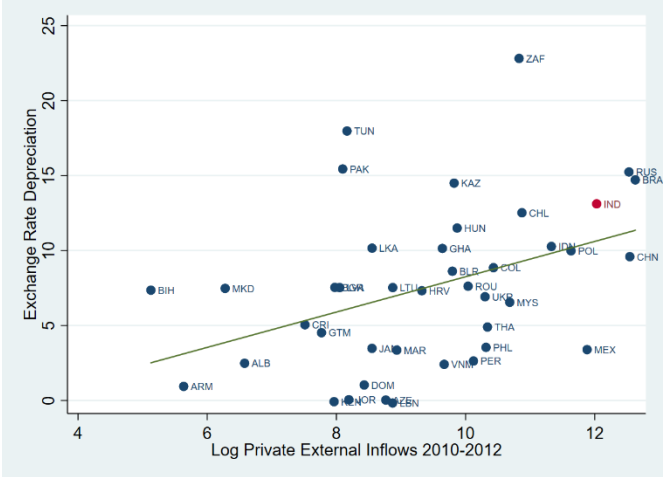


[17] The analysis establishes this correlation in the entire sample that includes Argentina and Turkey, countries with the largest exchange rate depreciation, and also in the sample excluding these countries. As in Eichengreen and Gupta (2015), the analysis considers several measures of the size of a financial market, such as total external private financing received via inflows of equity, bonds, and loans during 2010–12 (from IMF 2015); the stock of portfolio liability (from Lane and Milesi-Ferretti 2017); cumulative portfolio capital flows in three prior years; stock market capitalization; stock market turnover; and aggregate GDP. The various measures are highly correlated, and the use of these alternatives has little material impact on the results.

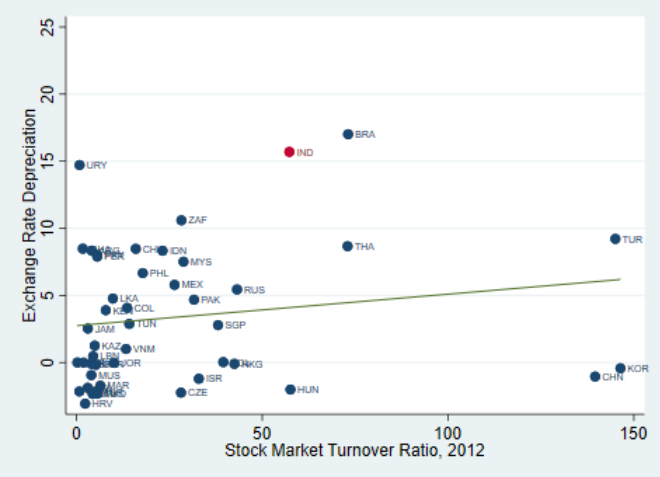
b. Larger financial markets, proxied by stock market capitalization/GDP, witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk

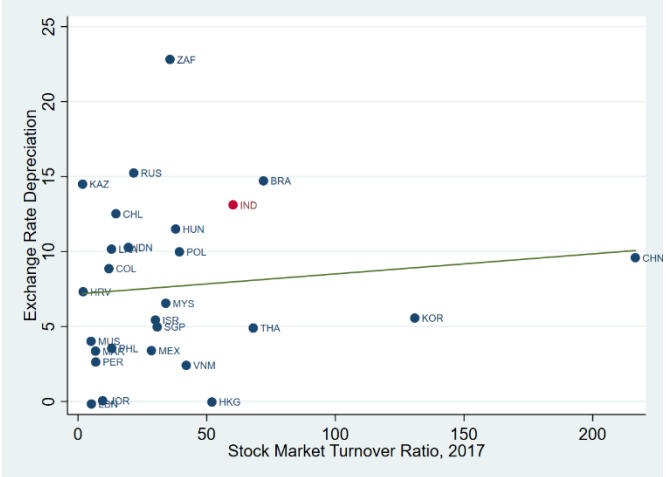
c. Larger financial markets, proxied by private external financing, witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk



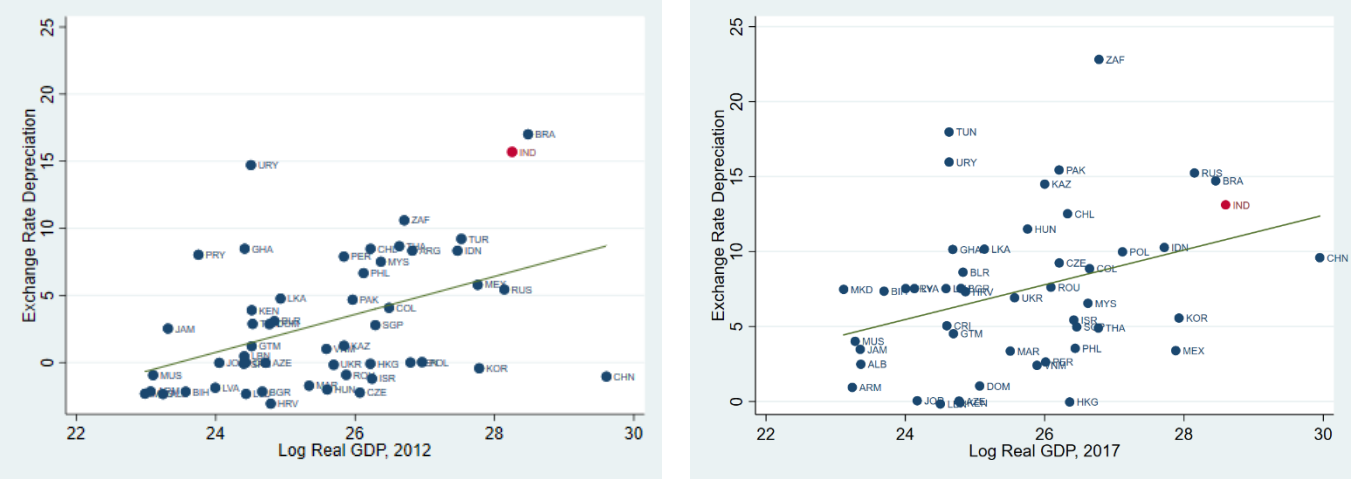


d. More efficient financial markets, proxied by stock market turnover ratio, witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk

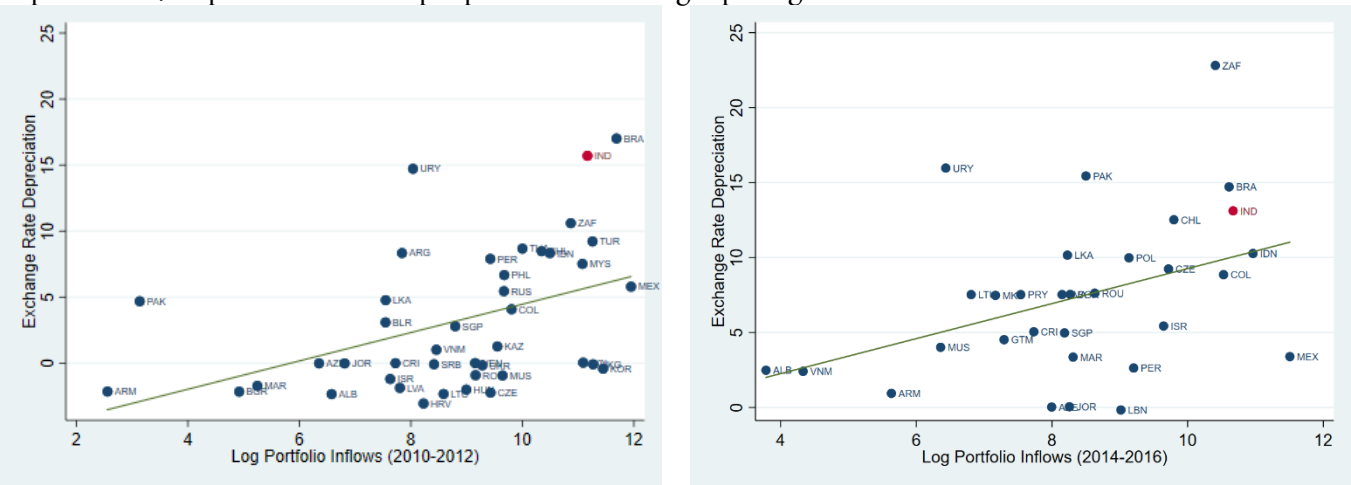




e. Larger economies witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk



f. Economies with greater portfolio inflows in the preceding years witnessed larger exchange rate depreciation; impact on India disproportionate during tapering talk

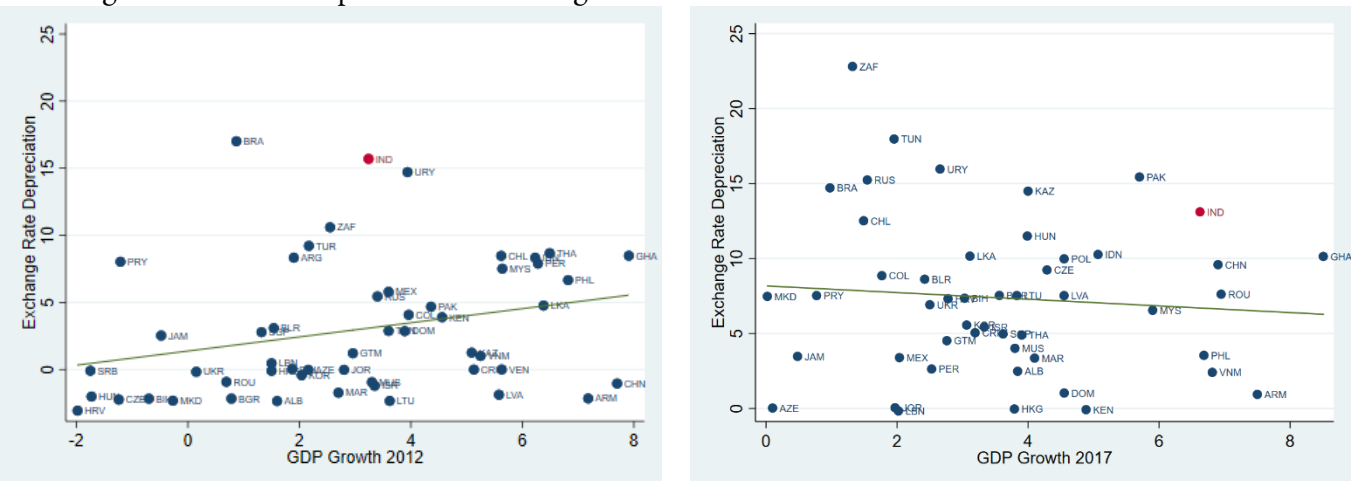


Note: See Annex 1C for variables and sources. The panels exclude Argentina and Turkey from the 2018 event.

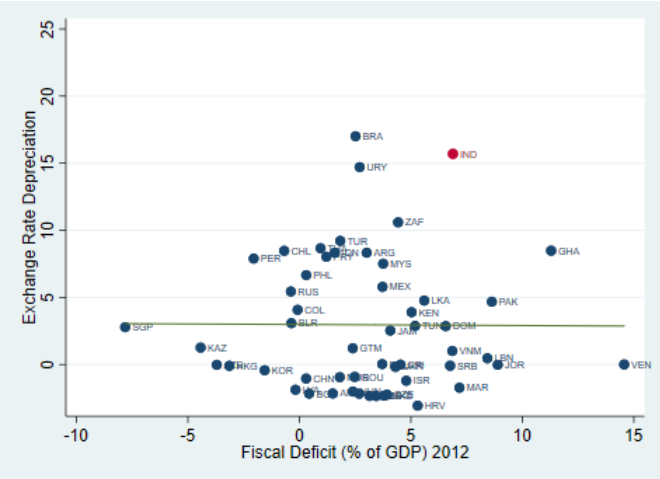
Figure 9. Additional Correlates of the Impact of the Two Sell-Off Events

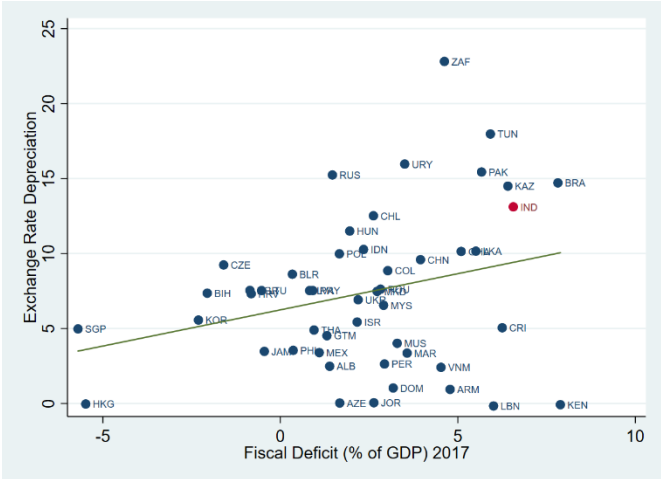
2013	2018

a. GDP growth and the impact on the exchange rate are not correlated

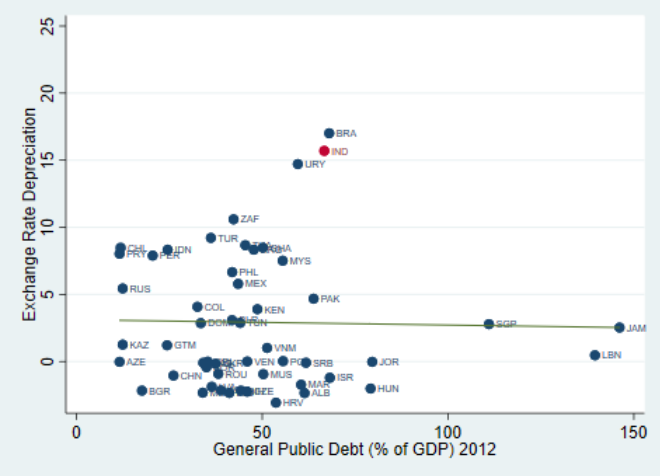


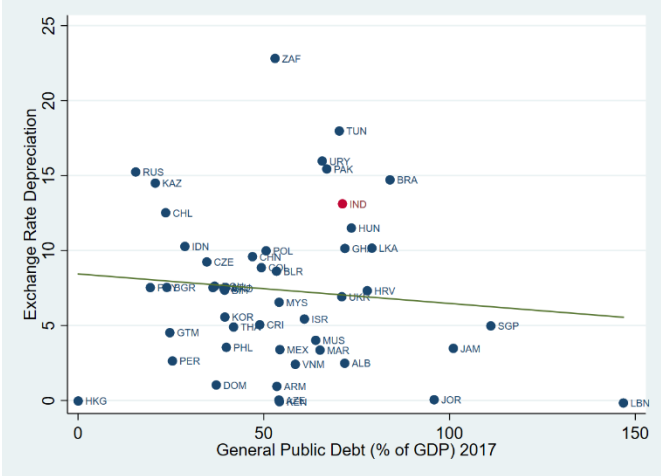
b. The fiscal deficit and the impact on the exchange rate are not correlated in 2013, but seem corelated in 2018



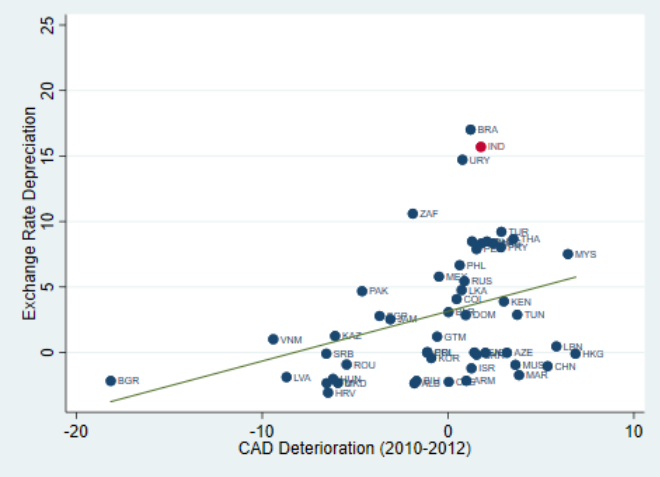


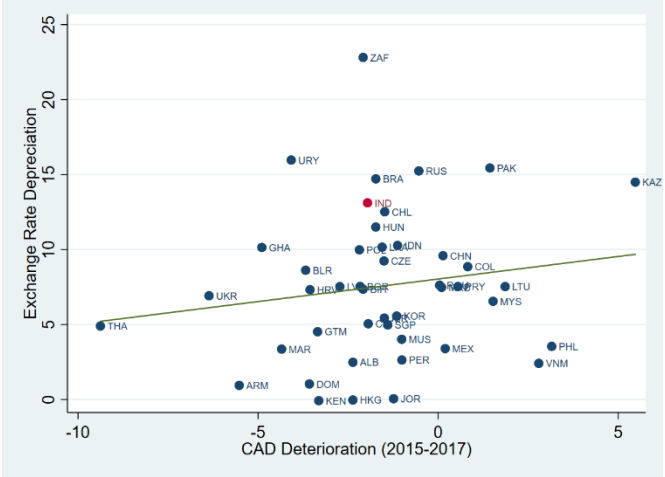
c. Public debt and the impact on the exchange rate are not correlated



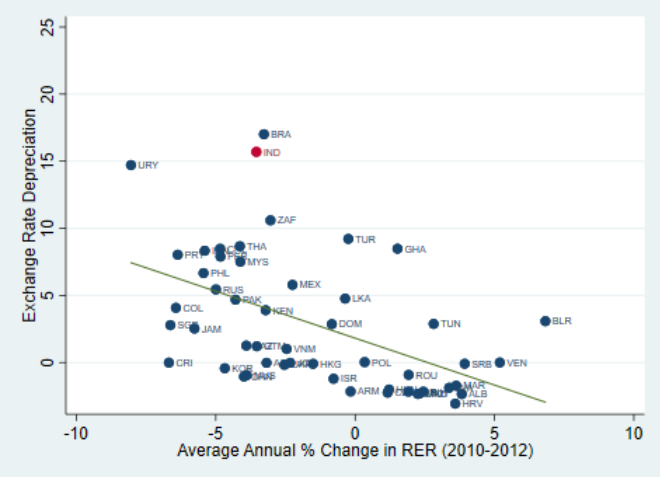


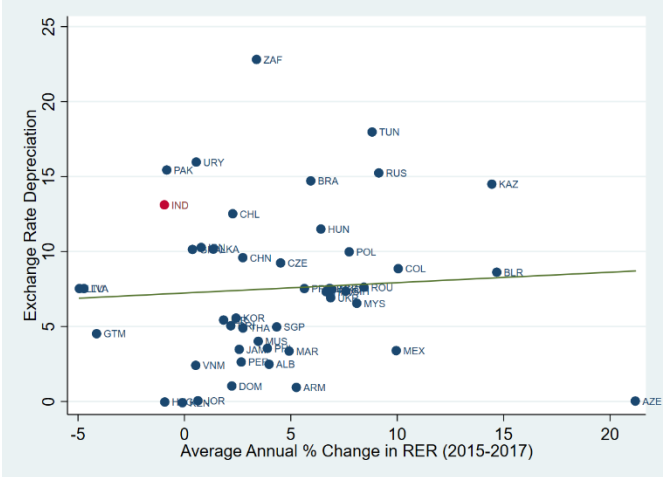
d. The increase in the current account deficit and exchange rate depreciation seem correlated



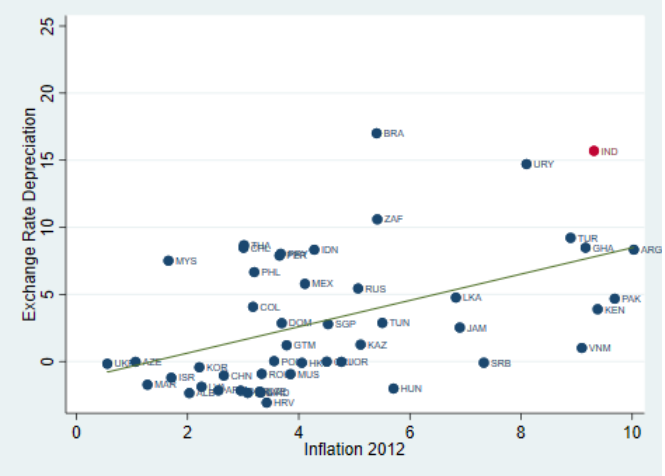


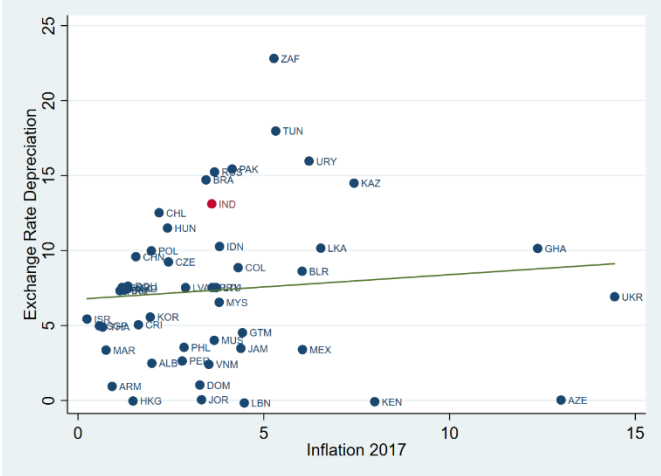
e. There is no apparent correlation between the real exchange rate appreciation in prior years and the exchange rate depreciation during the sell-off events



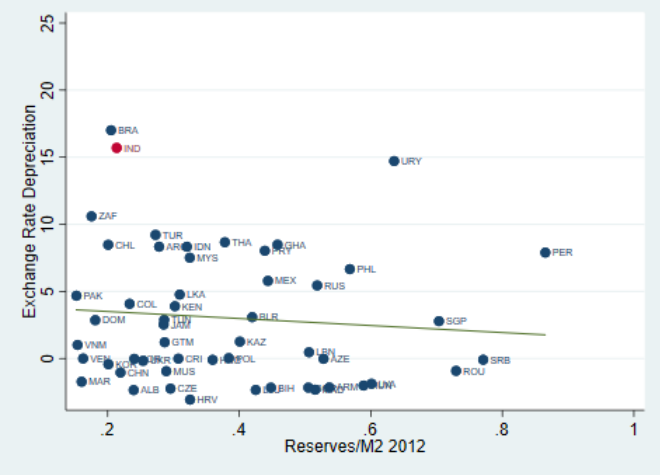


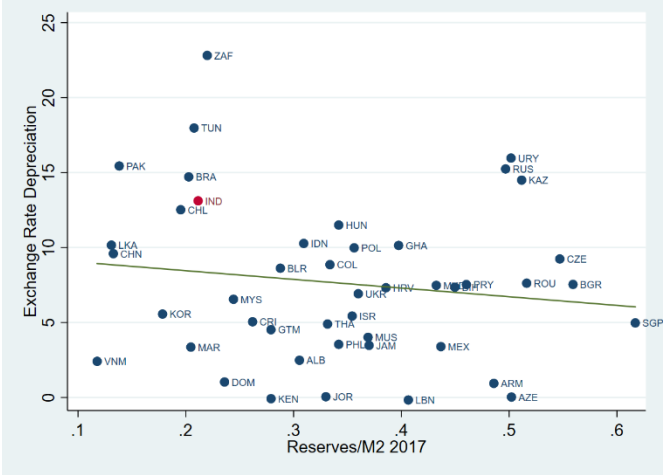
f. Inflation and the impact on the exchange rate depreciation are correlated





g. Reserves to the M2 ratio and exchange rate depreciation does not seem to be correlated





Note: See annex 1C for source. The panels exclude Argentina and Turkey from the 2018 event.

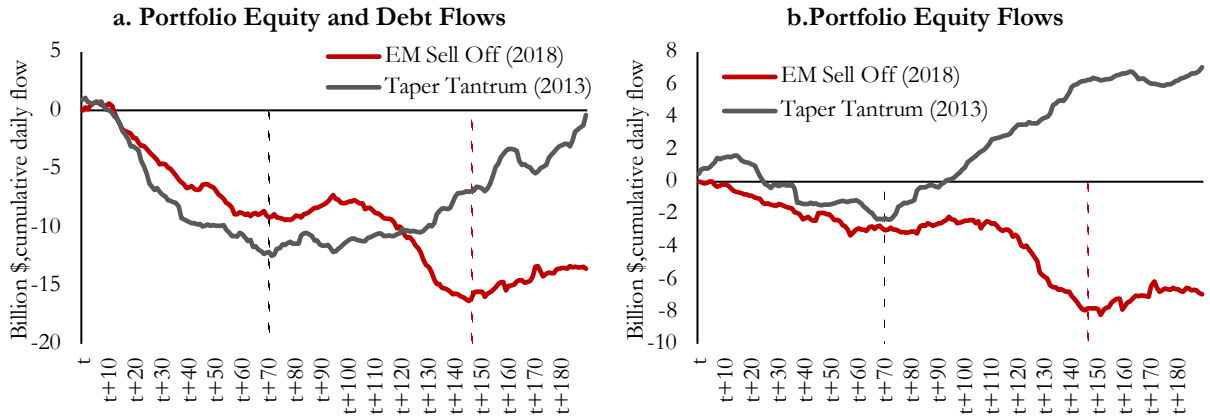
VI The Impact on India

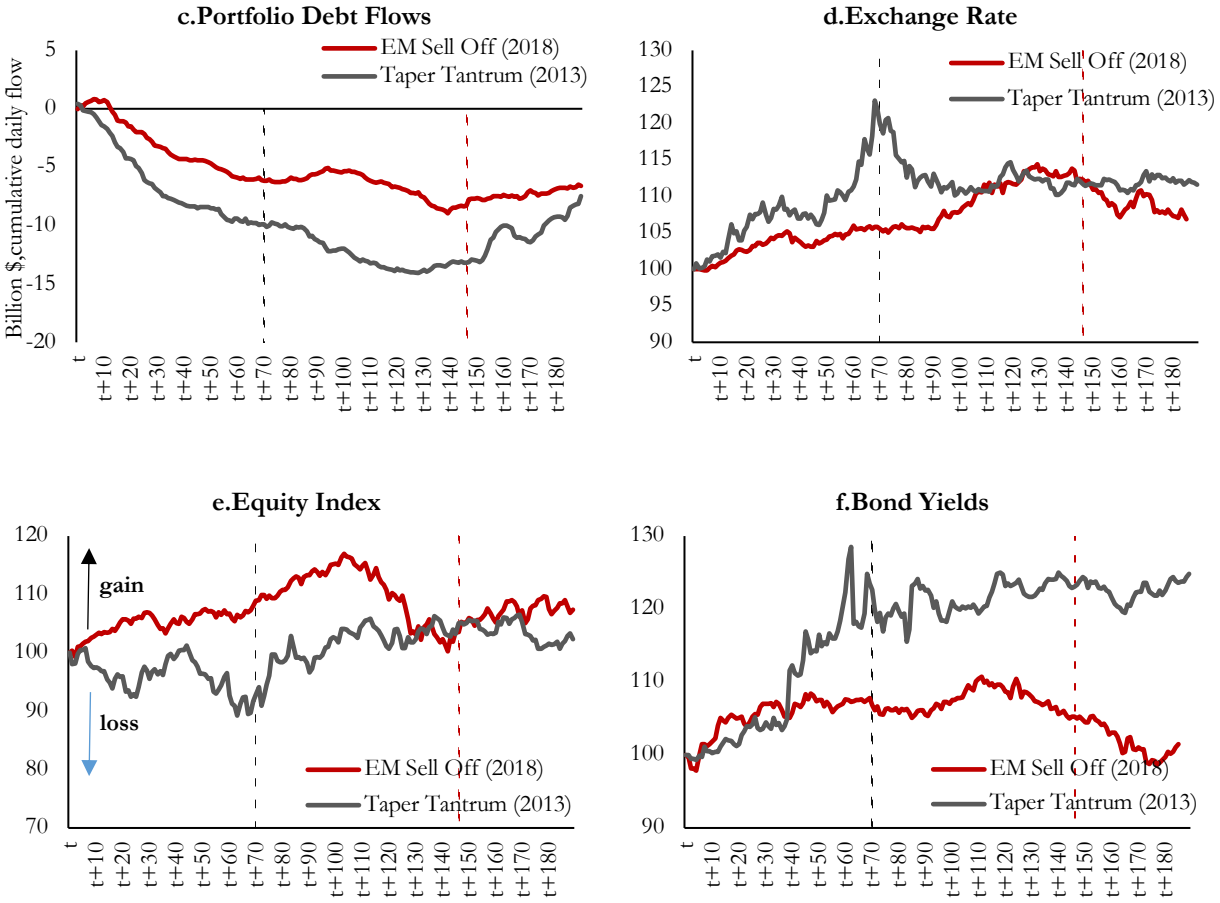
Capital flows to India reversed, and Indian financial markets reacted negatively during both sell-off events (Figure 10). Cumulative capital flow reversal was slightly larger in 2013, when the cumulative withdrawal of capital totalled about US$10 billion during the first 50 days of the event, compared with US$7 billion during the corresponding period in 2018. This was due to larger withdrawal of debt flows initially during 2013, even though the withdrawal of equity flows was similar across the two episodes. As a result, there was a larger increase in bond yields and large exchange rate depreciation during the first two months of the 2013 event.

The pattern evolved later during the event as equity outflows accelerated in 2018, and total capital flow reversals surpassed the level seen in 2013. As a result, at its peak, the total withdrawal of capital was US$12.5 billion during 2013 and about US$16.3 billion during the 2018 episode. Exchange rate depreciation and equity market correction increased toward the end of the 2018 episode.

Another comparison worth making is in the state of macroeconomic conditions prior to the two events (Figure 11). Economic growth had weakened noticeably in the period prior to the 2013 episode, and the economy was running a high current account deficit, high inflation, and an overvalued exchange rate. In contrast, India exhibited somewhat stronger fundamentals prior to the 2018 sell-off event. These were reflected in a higher growth rate, a lower current account deficit, a lower and declining inflation rate, and a stable fiscal deficit.

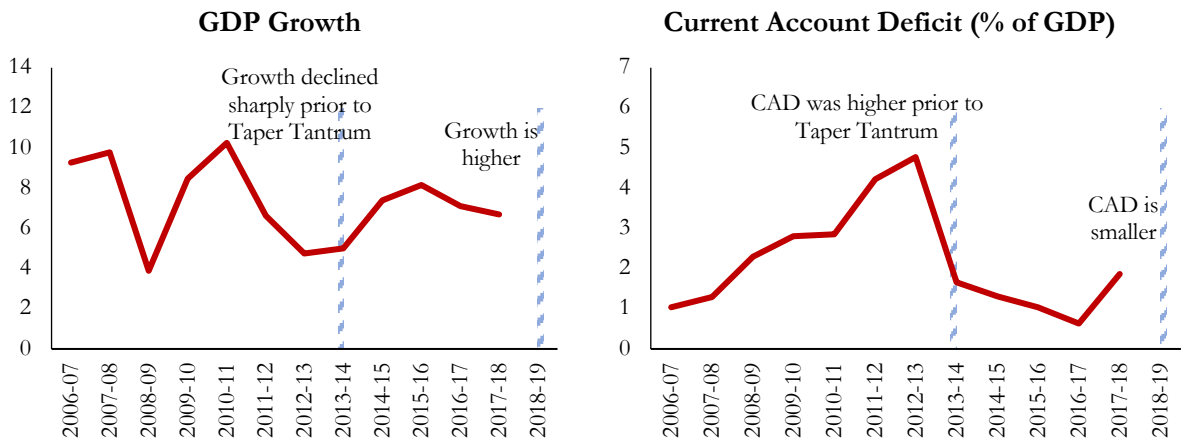
Figure 10. The Impact of Emerging Market Sell-Off Events on Indian Financial Markets

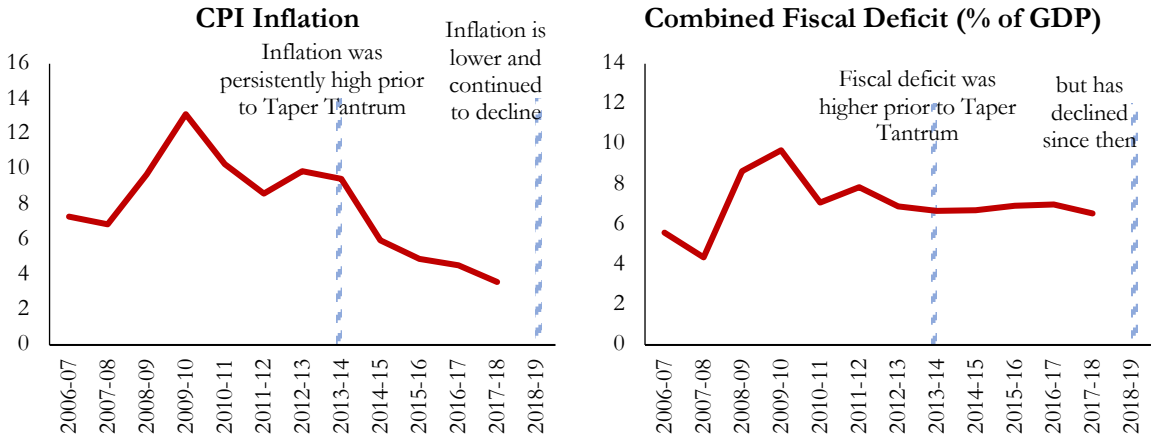




Sources: Haver Analytics and CEIC.
Note: The 2013 episode started on May 22, 2013 (t = 1), and the 2018 event started on April 1, 2018 (t = 1). The vertical lines in the panels indicate the end of the respective sell-off events, which are end-August 2013 and end-October 2018, respectively.

Figure 11. Macroeconomic Fundamentals around the 2013 and 2018 Sell-Offs





Source: CEIC

VII The Policy Response

India announced a number of conventional policy measures to cope with the impact of the 2013 event. The RBI intervened to limit exchange rate depreciation, using some US$13 billion of reserves between end-May and end-September; and increased the marginal standing facility rate (its overnight lending rate) by 200 basis points to 10.25 percent. Because gold imports were partly responsible for a large current account deficit, the government raised the import duty on gold from 6 percent to 15 percent cumulatively. India being an oil importing country, the demand for foreign exchange from companies that import oil apparently added significantly to the overall demand for foreign currency. The RBI opened a separate swap window for three public sector oil marketing companies to remove their demand from the private foreign exchange market and reduce exchange rate volatility.[18]

In addition, new measures to attract capital through deposits targeted the Indian diaspora.[19] The duration of an existing swap line with Japan was extended, and its limit was raised from US$15 billion to US$50 billion. The RBI increased the foreign borrowing limits for banks with capital ratios of at least 12 percent, from 50 percent of unimpaired Tier-I capital to 100 percent (for borrowings of at least three years); the RBI offered to swap these borrowings at a concessional rate of 100 basis points below the market swap rate. It imposed new measures to restrict capital outflows, including reducing the limit on the amount residents could invest abroad or repatriate.

Basu, Eichengreen, and Gupta (2015) have conducted event-study regressions to assess the effectiveness of these measures. The regressions compare the values of the exchange rate and financial market variables in a short window after the policy announcement with those prior to the

[18] None of these policy measures were novel in the Indian context, having been implemented at different times in the past. For example, the import duty on gold was prevalent until the early 1990s; deposits from the Indian diaspora (described below) were attracted in a similar fashion twice in the past, in 1998 and in 2000; a separate swap window was made available to oil-importing companies in 2008 to reduce volatility in the foreign exchange market after the collapse of Lehman Brothers.

[19] The RBI offered a swap facility to the banks to swap their exchange rate risk; the banks could buy this exchange rate risk coverage at a cost of 300 basis points, and they then offered around a 4 percent or 5 percent interest rate on dollar deposits to the diaspora. The total cost of these deposits thus worked out to about 7.5 percent.

announcement. They deployed a five-day post announcement window in their baseline regressions, but also considered shorter windows of two or three days, which yielded similar results. For the control period, they considered two options: first, the entire tapering period from May 22 until the day of the policy announcement and, second, a shorter control period of one week prior to the announcement.

The regression specification is given in equation 1.1, in which *Y* is the log exchange rate, the log stock market index, portfolio debt flows, or portfolio equity flows (portfolio flows are in US$ millions)

$$Y_t = \text{constant} + \mu\ \text{Bond Yield in the US}_t + \alpha\ \text{Tapering Talk Dummy}_t + \beta\ \text{Dummy for a week prior to Policy Announcement}_t + \gamma\ \text{Dummy for Policy Announcement}_t + \varepsilon_t \quad (1.1)$$

The regressors include U.S. bond yields to account for global liquidity conditions and three separate dummies, one each for the tapering period (from May 23, 2013, until a week before the policy announcement was made), for the week prior to the policy announcement, and for the week after the policy announcement. The authors estimate these regressions using data from January 1, 2013, up to the date the policy dummy takes a value of 1, dropping subsequent observations.[20]

Based on the results they conclude that, overall, these measures, including a separate swap window for oil-importing companies, were of limited help in stabilizing financial markets. Some initiatives, such as restricting capital outflows, were counterproductive – they seemed to have undermined investor confidence.

Policy makers have responded similarly to the 2018 sell-off event. The RBI again intervened in the foreign exchange market, expending nearly US$34 billion of reserves, about 8.0 percent of the initial stock, between mid-April and October 2018.[21] It raised policy rates twice, by 25 basis points each time. It relaxed limits on foreign purchases of central government securities and norms on External Commercial Borrowings (ECBs). To ease the pressure of rising crude oil prices, oil marketing companies were allowed to raise ECBs under easier terms. In addition, a US$75 billion swap line was signed with Japan, under which India can acquire dollars from Japan in exchange for rupees.

We assessed the short-run impact of some of these policies announced and implemented by India during the 2018 emerging market sell-off using a framework similar to the one deployed in Basu, Eichengreen, and Gupta (2015).[22]

The RBI increased the repo rate twice during the 2018 sell-off episode, each time by 25 basis points, once on June 6, 2018, and again on August 1, 2018. The results from event study regressions show

[20] They acknowledge the limitations involved in identifying causality using these regressions because of the difficulty in establishing the counterfactual and in controlling for all the relevant factors that may affect the financial markets.
[21] The decline in reserves is based on daily data from CEIC. The reserves declined from $426 bn on April 13, 2018 to $392 bn on October 26, 2018.
[22] Like Basu, Eichengreen, and Gupta (2015), the acknowledgment is made here of the limitations in establishing causality with these regressions.

that the rate of rupee depreciation and portfolio outflows did not stabilize in a few days following the increase in interest rates (Table 1B.2).[23]

Various policy announcements were made between April and October 2018 to liberalize ECBs, portfolio investment in government securities, and masala bonds[24]. On April 6, 2018, the RBI increased the limit for foreign portfolio investment in government securities by 0.5 percent (each year) to 5.5 percent of the outstanding stock of securities in 2018–19 and 6 percent of the outstanding stock of securities in 2019–20. On April 27, 2018, the norms for ECBs were liberalized to include housing finance companies, port trusts, and companies engaged in the business of maintenance, repair and overhaul, and freight (with conditions) as eligible borrowers.

The ECB policy was liberalized further on September 19, 2018, to allow borrowers in the manufacturing sector to raise up to US$50 million or its equivalent with a minimum average maturity period of one year. Additionally, to incentivize the inflow of foreign exchange in the economy, exemption was granted for the interest payable by an Indian company or a business trust to a non-resident, including a foreign company, in respect of rupee-denominated bonds (masala bonds) issued outside India from September 17, 2018, to March 31, 2019. Consequently, the payment of interest in respect of these bonds would become tax free.

On October 3, 2018, a policy was announced to permit public sector oil marketing companies to raise ECBs for working capital purposes with a minimum average maturity of three to five years from all recognized lenders under the automatic route. Furthermore, the individual limit of US$750 million or the equivalent and mandatory hedging requirements according to the ECB framework were also waived for borrowings under this dispensation. The overall ceiling for such ECBs was kept at the equivalent of US$10 billion (Tables 1B.3, 1B.4 and 1B.5).

While the government occasionally communicated its resolve to maintain fiscal discipline and highlighted the strength of the Indian economy rooted in its macroeconomic fundamentals, there was little additional guidance from the central bank during the 2018 sell-off episode. On September 14, 2018, Finance Minister Arun Jaitley announced a five-point strategy to boost market confidence and encourage capital flows against the backdrop of a widening current account deficit and reiterated the commitment to the fiscal target. This inspired some confidence in the market, which was reflected in intraday financial market data. However, such announcements may not be sufficient to soothe the markets for much longer. This underscores the importance of more active communication, especially by the central bank.

Event-study regressions show that the measures adopted to handle the impact of the 2018 sell-off did not stabilize the financial markets immediately, implying that there may not be any easy choices if a country is caught in the midst of a rebalancing of global portfolios. Hence, the analysis highlights the benefits of putting in place a medium-term policy framework that limits vulnerabilities in advance, while maximizing the policy space for responding to shocks.

Elements of such a framework include holding an appropriate level of reserves, avoiding excessive appreciation of the exchange rate through interventions using reserves and macroprudential policy,

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[23] The regressions for the rate increase on August 1, 2018, yield similar results; they are available upon request.

[24] Masala bonds are rupee denominated debt instruments introduced in foreign markets, which shifts the currency risk to the investors.

signing swap lines with other central banks where feasible, preparing banks and the corporates to handle greater exchange rate volatility, adopting a clear communication strategy, avoiding measures that could damage confidence (such as restricting outflows), and managing capital inflows to encourage relatively stable longer-term flows, while discouraging short-term flows.[25] A sound fiscal balance, sustainable current account deficit, and an environment conducive to investment are other closely correlated elements of this policy framework.

VIII Conclusion

In this section we reviewed the experiences of emerging markets with capital flows and placed India's experience alongside. We noted that capital flows to emerging markets are generally volatile. Portfolio capital flows, and credit flows are more volatile than FDI flows, while, among portfolio flows, debt flows are more volatile than equity flows. Volatility in capital flows gets manifested in periodic episodes when capital inflows dry up abruptly, with significant negative real and financial effects.

Capital flows to India conform to these stylized facts. The relative volatility of different kinds of capital flows is similar in India to that in other emerging markets, and external or common factors play an important role in the related fluctuations. India has experienced two sudden stops in the last three decades, in 1991 and in 2008-09.

India has also experienced two milder episodes of emerging market sell-offs – in 2013 and 2017-18. India was among the countries that were sharply affected during both events. The sell-offs resulted in exchange rate depreciation, a decline in equity prices, a rise in bond yields, and a fall in reserves in India and several other emerging markets.

An important determinant of the differential impact across emerging markets was the inflow of capital in prior years, the run-up of the real exchange rate and current account deficit, and the size of a country's financial market. Countries with larger and more liquid markets experienced a sharper impact. This is interpreted as evidence that investors seeking to rebalance their portfolios being able to do so more easily and conveniently when the target country has a large and liquid market and a larger presence of foreign capital.

India's response to the 2013 sell-off consisted of conventional policy responses, as detailed in the previous section. A similar set of measures was then implemented in response to the 2018 sell-off: a significant exchange rate depreciation, using reserves to smooth unduly large exchange rate fluctuations, raising policy rates, raising import duties, a swap line with the Bank of Japan, the selective opening-up of the capital account for foreign inflows, stressing the sound fundamentals of the country through active communication, and reiterating and maintaining a prudent fiscal stance.

Though establishing the effectiveness of the policy responses undertaken during a sell-off is difficult, an event-study analysis suggests that, even though such measures are conventional and

[25] See Zhang and Zoli (2014) and the literature cited therein for the recent contributions on the use of macroprudential policies, in particular, the loan to value ratio, the debt to income ratio, the required reserves ratio, and the countercyclical provisioning and countercyclical capital requirements in Asian economies. See Cordella et al. (2014) on the use of reserve requirements as a countercyclical macroprudential tool in developing countries.

globally implemented, they are not effective in stabilizing financial markets and restoring confidence in the short run.

This implies that there may not be any easy choices when a country is caught in the midst of a rebalancing of global portfolios. *Ex ante* policy frameworks that limit vulnerabilities in advance and maximize the policy space for responding to shocks are of more value than *ex post* measures to limit the impact.

Elements of such a framework include a sound fiscal balance, a sustainable current account deficit, and an environment conducive to investment. In addition, India should continue to encourage stable longer-term capital inflows, while discouraging volatile short-term flows, hold a larger stock of reserves or other safety nets, avoid excessive appreciation of the exchange rate through interventions with the use of reserves and macroprudential policy, and prepare banks and firms to handle greater exchange rate volatility. In addition, it will be beneficial if India were to gently change the capital flow mix toward FDI flows; find ways to diversify the investor base toward investors with a longer-term view; and strengthen its current account, including by improving the competitiveness of exports.

Those who implement a medium-term framework and emergency crisis management measures need to adopt a clear communication strategy to interact smoothly and transparently with market participants. When markets are in a risk averse (risk-off) mode, there is a premium to following conventionally prudent policies. Regular communication to reassert the commitment to sound policies and reminders of the resilient underlying fundamentals are likely to be helpful.

The recent experience has also given rise to the following important policy questions.

First, what role does the exchange rate play as an automatic stabilizer during such events and to what extent should central banks defend their currencies? On the one hand, exchange rate depreciation makes exports more competitive (though possibly with a lag), but also increases the risk of balance sheet impacts, especially if there are currency mismatches. But a sudden and steep exchange rate depreciation could lead to self-fulfilling expectations of further exchange rate depreciations.

Second, what cushion do various safety nets, such as reserves, swap lines, and diaspora deposits or bonds, provide during such sell-off events and how may they be best deployed?

Third, what role do other policies, such as policy rates, exchange rate intervention, or communication, play when a country is undergoing capital flow reversals during sell-off events? Is there any guidance, theoretically or from other countries experiences, on the pace or sequencing of such measures?

Finally, what is the real impact of such sell-off events? While we know from previous analyses that sudden stops are disruptive, do shorter and less-severe sell-off events have any significantly negative real impacts? Our preliminary analysis shows that sell-off events have a relatively milder real impact. If, indeed, they do not have a large adverse impact on growth, should market participants or policy makers worry about them all that much?

While we did not have the space or scope to address these important policy questions in this article, we hope to address them in our future work.

References

Banerjee, Abhijit, Pranjul Bhandari, Sajjid Chinoy, Maitreesh Ghatak, Gita Gopinath, Amartya Lahiri, Neelkanth Mishra, et al. 2018. “An Economic Strategy for India.” University of Chicago Center, New Delhi. https://uchicago.app.box.com/s/f47rz9hwbw9z7lu41f7hnunwxsj58xhp.

Basu, Kaushik, Barry Eichengreen, and Poonam Gupta. 2015. "From Tapering to Tightening: The Impact of the Fed's Exit on India." *India Policy Forum 2014/15*, vol. 11, edited by Shekhar Shah, Arvind Panagariya, and Subir Gokarn, 1–66. New Delhi: Sage.

Bluedorn, John, Rupa Duttagupta, Jaime Guajardo and Petia Topalova. 2013. "Capital Flows are Fickle; Anytime, Anywhere," IMF Working Papers 13/183, International Monetary Fund.

Cordella, Tito, Pablo M. Federico, Carlos A. Vegh, and Guillermo Vuletin, 2014. "Reserve Requirements in the Brave New Macroprudential World." World Bank Study Series, World Bank, Washington, DC.

Eichengreen, Barry, and Poonam Gupta. 2015. "Tapering Talk: The Impact of Expectations of Reduced Federal Reserve Security Purchases on Emerging Markets." *Emerging Markets Review* 25 (December): 1–15.

———. 2018. "Managing Sudden Stops." In *Monetary Policy and Global Spillovers: Mechanisms, Effects, and Policy Measures*, edited by Enrique G. Mendoza, Ernesto Pastén, and Diego Saravia, 9–47. Central Banking, Analysis, and Economic Policies Book Series. Santiago, Chile: Central Bank of Chile.

Eichengreen, Barry, Poonam Gupta, and Oliver Masetti. 2018. "Are Capital Flows Fickle? Increasingly? And Does the Answer Still Depend on Type?" *Asian Economic Papers* 17 (1): 22–41.

IMF (International Monetary Fund). 2015. *Global Financial Stability Report: Vulnerabilities, Legacies, and Policy Challenges; Risks Rotating to Emerging Markets*. October. Washington, DC: IMF.

Lane, Philip, and Gian Maria Milesi-Ferretti. 2017. "International Financial Integration in the Aftermath of the Financial Crisis." IMF Working Paper 17/115, International Monetary Fund, Washington, DC.

Rao, K. S. Chalapati, and Biswajit Dhar. 2018. *India's Recent Inward Foreign Direct Investment: An Assessment*. New Delhi: Institute for Studies in Industrial Development.

Rey, Hélène. 2018. “National Monetary Authorities and the Global Financial Cycle.” Sixteenth L. K. Jha Memorial Lecture, RBI Center, Reserve Bank of India, New Delhi, December 14.

Zhang, Longmei, and Edda Zoli. 2014. “Leaning against the Wind: Macroprudential Policy in Asia.” IMF Working Paper 14/22, International Monetary Fund, Washington, DC.

Annex 1A. Sudden Stops: Incidence, Correlates, Impact, and Policy Response

Following Eichengreen, Gupta and Masetti (2018), we identify sudden stop episodes when total capital inflows (FDI, portfolio equity and debt, and other inflows by non-residents) decline below the average in the 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 one quarter.[26] Episodes end when flows recover to at least their prior mean minus one standard deviation.

We analyse the experience of 34 emerging countries over 1990:Q1 to 2018:Q2. We summarize the behaviour of capital flows around country-specific stops by estimating the panel regression,

$$Y_{ict} = \beta SS_{ct} + \theta_c + t_{ct} + \varepsilon_{ict} \qquad (1A.1)$$

where i refers to specific capital flows, c to the country and t to quarter-year.

We regress capital flows of type i, denoted Y_{ict}, on a dummy variable for the country-specific sudden stop, SS_{ct}, country-fixed effects, θ_c, and country-specific time trends, t_{ct}. For ease of comparison, we normalize Y_{ict} by subtracting from each observation its country specific mean and dividing it by the country-specific standard deviation.

Portfolio equity, portfolio debt, and other inflows all turn negative during sudden stops (table 1A.1). The decline in inflows is sharpest for other flows and smallest for FDI.

Table 1A.1. Capital Inflows in Sudden Stops

	FDI	Portfolio Equity	Portfolio Debt	Other flows
$Stop_{ct}$	-0.373***	-0.680***	-0.997***	-1.303***
	[2.82]	[3.60]	[7.26]	[9.02]
Country fixed-effects	Yes	Yes	Yes	Yes
Country specific trends	Yes	Yes	Yes	Yes
Observations	2,655	2,627	2,655	2,655
# of countries	34	33	34	34
R-squared	0.090	0.035	0.076	0.113

Notes: The dependent variables are capital flows of the respective type as a percentage of trend GDP. They are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. The sample spans from 1990 Q1 to 2018 Q2. Robust t-statistics are reported in brackets. ***, **, * indicate significance at the 1%, 5% and 10% level.

[26] Eichengreen and Gupta (2018) similarly defined sudden stops but only for non-FDI flows.

These patterns are further below summarized as panel regressions:

$$Y_{ict} = \sum_{j=-4}^{j=4} \beta_j \, SS_{ct+j} + \theta_c + t_{ct} + \varepsilon_{ict} \qquad (1A.2)$$

where we regress capital flows (normalized by country specific mean and standard deviation) of type i, for country c in time period t, Y_{ict}, on dummy variables for different quarters before, during and after country-specific sudden stops, on country-fixed effects, θ_c, and on country-specific time trends, t_{ct}.

The results are summarized in table 1A.2.

Table 1A.2. Capital Inflows during Sudden Stops

	FDI	Portfolio Equity	Portfolio Debt	Other flows
Stop -4	0.252	0.146	0.171	0.470***
	[1.45]	[0.51]	[0.66]	[3.20]
Stop -3	0.396*	-0.393*	0.413*	0.303
	[1.83]	[1.88]	[1.78]	[1.61]
Stop -2	0.193	0.091	0.000	0.577***
	[1.05]	[0.45]	[0.00]	[3.19]
Stop -1	0.302	-0.486**	0.131	0.498***
	[1.51]	[2.19]	[0.65]	[2.95]
Stop	-0.425**	-1.227***	-1.032***	-0.933***
	[2.64]	[3.94]	[5.29]	[4.55]
Stop +1	-0.316*	-0.694***	-0.969***	-1.650***
	[1.85]	[2.77]	[4.99]	[8.19]
Stop +2	-0.150	-0.465**	-0.317	-0.818***
	[0.57]	[2.47]	[1.59]	[3.16]
Stop +3	-0.081	-0.114	-0.445***	-0.783***
	[0.63]	[1.00]	[3.32]	[3.46]
Stop +4	-0.229	0.140	-0.187	-0.482***
	[1.59]	[1.10]	[1.20]	[2.76]
Country fixed-effects	Yes	Yes	Yes	Yes
Country specific trend	Yes	Yes	Yes	Yes
Observations	2,655	2,627	2,655	2,655
# of countries	34	33	34	34
R-squared	0.093	0.048	0.071	0.122

Notes: The dependent variables are capital inflows of the respective type as % of trend GDP. Variables are standardized by subtracting the country-specific mean and dividing by the country-specific standard deviation. Capital flows are regressed on country-specific sudden stops and dummies indicating 1-4 quarters before, the quarter when the sudden stop starts, and 1-4 quarters after the start of a sudden stop period. The sample spans from 1990 Q1 to 2018 Q2. Robust t-statistics are reported in brackets. ***, **, * indicate significance at the 1%, 5% and 10% level.

The estimated coefficients indicate that all inflows drop significantly at the start of a sudden stop period. The coefficient is largest for other inflows and portfolio debt inflows. Although the drop at t = 0 is sharp, inflows recover and are back to pre-crisis levels within four quarters. The impact lasts longer for portfolio debt flows and other flows, with the coefficient remaining significantly negative for 3 and 4 quarters, respectively, after the start of the episode. Other flows recover more slowly than portfolio equity and debt flows, and remain negative for four quarters after the beginning of the sudden stop episode.

Eichengreen and Gupta (2018) analyse the determinants of sudden stops to emerging markets since 1991. They show that the frequency and duration of sudden stops have remained largely unchanged since 2002, 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.

Table 1A.3. Incidence of Sudden Stops, 1991–2002 vs. 2003–18

	1991-2002	**2003-2018**
# of sudden stops	16	32
# of sudden stops as percent of available nonstop observations	1.8 % (16/903)	1.79 % (32/1792)
# of quarters for which the sudden stops last	4.5	3.7
Capital flows during Sudden stops (% of GDP), first quarter	-1.62	-1.17
Capital flows during sudden stops (% of GDP), average for first four quarters	-1.79	-1.28^
Capital flows in the four quarters preceding Sudden stops (% of GDP)	1.28	1.92
Portfolio flows in the four quarters preceding Sudden stops (% of GDP)	0.68	0.37**
Other flows in the four quarters preceding Sudden stops (% of GDP)	0.60	1.54^^
Capital flow turnaround: Avg. capital flows during four quarters of sudden stops- Avg. capital flows in the four preceding quarters	-3.06	-3.28
Capital flow turnaround: Avg. Capital flows during all quarters of sudden stops- Avg. capital flows in the four preceding quarters	-2.28	-2.86*

Source: Updated values in Eichengreen and Gupta (2018). The sample spans from 1991-Q1 to 2018-Q2. *, **, *** indicate that the value is significantly lower in the second column, compared to its value in the first column at 10, 5 or 1 percent level of significance (in a one tailed test). ^, ^^, ^^^ indicate that the value is significantly higher in the second column, compared to its value in the first column, at 10, 5 or 1 percent level of significance (in a one tailed test).

Table 1A.4. Impact of sudden stops on Real and financial variables

VARIABLES	(1) Exchange Rate Depreciation	(2) REER (% change)	(3) % Change in Reserves	(4) % Change in Equity prices (real)	(5) GDP growth (quarterly yoy)	(6) Investment Growth (quarterly yoy)	(7) Current Account Balance % GDP
Sudden Stop Dummy	11.08**	8.94***	-11.88**	-3.51	-4.02***	-12.40***	1.33
	[2.59]	[3.48]	[2.48]	[1.08]	[3.61]	[3.45]	[1.21]
Dummy 2003-2018	-4.01***	-0.56	3.17***	8.17***	3.13***	5.76**	-2.33*
	[6.29]	[1.11]	[3.67]	[7.59]	[4.30]	[2.32]	[1.99]
Sudden Stop*Dummy for 2003-2018	-3.42	-5.71**	4.85	-5.95	-0.66	2.92	-0.61
	[0.76]	[2.15]	[0.93]	[1.50]	[0.45]	[0.49]	[0.51]
Constant	3.83***	-0.53	10.51***	12.18***	9.35***	29.41***	-3.93***
	[6.65]	[1.40]	[16.37]	[12.74]	[21.33]	[18.37]	[6.38]
Country Specific Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,022	2,601	3,050	2,528	2,578	2,458	2,362
R-squared	0.148	0.097	0.020	0.061	0.187	0.225	0.253
Number of Countries	34	30	34	31	32	30	30
Adj. R-squared	0.138	0.0858	0.00837	0.0481	0.175	0.214	0.243

Note: Data are quarterly over the period 1991-2018 (Q2). Dependent variables are as indicated in the first row. All variables are in percentage. GDP growth and investment growth are year-over-year. Regressions include country fixed effects and country-specific trends. Robust t statistics are in parentheses. *, **, or *** indicate the coefficients are significant at 10, 5 or 1 percent level of significance. Regressions with year fixed effects instead of a different intercept for post 2003 period yield similar coefficients.

Stronger macroeconomic and financial frameworks in emerging countries have not lowered the probability of a sudden stop. While such stronger frameworks have allowed policy makers to respond more flexibly to the phenomenon, but these more flexible responses have not mitigated the impact of the sudden stops. These findings suggest that the challenge of understanding and coping with capital-flow volatility is far from fully met.

Annex 1B. Policy Actions during Sell-Off Events, 2013 and 2018

Table 1B.1. Policy Actions during Sell-Off Events, 2013 and 2018

Policy	2013	2018
Reserve management	(i) Reserves declined by US$13 billion (~ 5% of initial stock) between end-May and end-September 2018 (ii) The RBI opened a separate swap window for three public sector oil companies to remove their demand from the foreign exchange market (August 28, 2013)	(i) Reserves declined by US$34 billion (~ 8.0 % of initial stock) between mid-April and end-October 2018
Interest rates	(i) The RBI raised the marginal standing facility rate by 200 basis points above the policy repo rate under the Liquidity Adjustment Facility to 10.25 % to "restore stability to the foreign exchange market" (July 15, 2013) (ii) RBI increased the policy rate by 25 bps to 7.5% (September 20, 2013)	(i) Monetary Policy Committee raised the repo rate twice by 25 basis points each on June 6, 2018 (to 6.25%) and August 1, 2018 (to 6.5%). 2) The Marginal Standing Facility was increased twice by 25 basis points each on June 6, 2018 (to 6.5%) and August 1, 2018 (to 6.75%).
Capital flow management	1) Limit on Overseas Direct Investment under automatic route lowered from 400% of the net worth of individuals to 100% on August 14, 2013 (later reinstated to 400% on September 4, 2013). 2) The limit on remittances by resident individuals under the Liberalized Remittances Scheme was reduced from US$200,000 to US$75,000; abolished its use for acquisition of immovable property outside India (August 14, 2013) 3) A swap window was offered to the banks to swap their fresh FCNR (B) dollar funds, mobilized for a minimum tenor of three years; at a fixed rate of 3.5% per annum (September 4, 2013) 4) The overseas borrowing limit of 50% of the unimpaired Tier I capital raised to 100%; the borrowings mobilized under this provision could be swapped with the RBI at the option of the bank at a concessional rate of 100 basis points below the ongoing swap rate prevailing in the market; the schemes was to remain for three months (starting on September 4, 2013)	1) The limit for foreign portfolio investment in central government securities was increased by 0.5% each year to 5.5% of outstanding stock of securities in 2018-19 and 6% of outstanding stock of securities in 2019-20. (April 6, 2018) 2) External commercial borrowings (ECBs) were liberalized (i) to include Housing Finance Companies; Port Trusts and Companies engaged in the business of Maintenance, Repair and Overhaul and Freight as eligible borrowers (April 27, 2018); (ii) to allow borrowers who are into manufacturing sector to raise up to USD 50 million or its equivalent with minimum average maturity period of 1 year (September 19, 2018); and (iii) to permit public sector Oil Marketing Companies to raise ECB for working capital with minimum average maturity period of 3/5 years from all recognized lenders under the automatic route. Further, the individual limit of USD 750 million or equivalent and mandatory hedging requirements as per the ECB framework was waived for borrowings under this dispensation. The overall ceiling for such ECBs was kept at USD 10 billion equivalent. (October 3, 2018) 3) The RBI also made changes in norms wherein Indian banks can market masala bonds overseas. At present, Indian banks can act only as arrangers or underwriters for such bonds and in case of underwriting an issue, their holding cannot be more than 5 per cent of the issue size after six months of the issue. Now, banks can "participate as

		arrangers/underwriters/market makers/traders in rupee-denominated bonds issued overseas, subject to applicable prudential norms". (September 19, 2018) 4) To boost inflows of forex, exemption was granted for interest payable by an Indian company or a business trust to a non-resident, including a foreign company, in respect of rupee-denominated bond (masala bond) issued outside India during the period from September 17, 2018, to March 31, 2019, and, consequently, no tax shall be deducted on the payment of interest in respect of the said bond (September 19, 2018)
Current Account Management	Import duty on gold was raised three times (i) from 6% to 8% (June 5, 2013); (ii) to 10% (August 13, 2013); (iii) to 15% (September 18, 2013)	The customs duty was increased on 19 items to narrow the current account deficit (September 26, 2018)
Currency Swap Lines	India signed a USD 50 billion bilateral currency swap agreement with Japan (September 6, 2013)	India signed a USD 75 billion bilateral currency swap agreement with Japan (October 29, 2018)
Communication	New RBI governor Raghuram Rajan issued a statement outlining priorities and reiterating trust in the health of the economy; laid out the blueprint of further financial sector reforms (September 4, 2013)	(i) Finance Minister Arun Jaitley announced a five-point plan consisting of boosting foreign portfolio investor participation in the corporate bond market, easing rules on ECBs and masala bonds to encourage capital flows against the backdrop of a widening current account deficit; asserted that the government would meet the fiscal deficit target (September 14, 2018) (ii) Secretary, Department of Economic Affairs reiterated the government's commitment to fiscal discipline; allayed fears of rupee 'free fall' terming the recent rupee depreciation a 'temporary phenomenon' (Sep 9, 2018; Sep 19, 2018)

Sources: Basu, Eichengreen, and Gupta 2015; RBI; government notifications.

Event Study Regressions

We assess the short run impact of policies announced and implemented by India during the 2018 emerging market sell off using an event study framework. The framework is similar to the one used in Basu, Eichengreen and Gupta (2015) to assess the impact of policies announced during the 2013 sell off event.

The regression specification is given in Equation 1, in which Y is either log exchange rate, log stock market index, portfolio debt flows, or portfolio equity flows (portfolio flows are in millions of US$).

$$Y_t = \text{constant} + \mu\ \text{Bond yield in the US}_t + \alpha\ \text{EM sell-off Dummy}_t + \beta\ \text{Dummy for 6 working days centered around the policy announcement}_t + \gamma\ \text{Dummy for 3 days since the policy announcement}_t + \varepsilon_t \quad (1)$$

The regressors include US bond yields to account for global liquidity conditions and three separate dummies. First, we include a dummy for the sell-off period (from April 1, 2018, until 6 days before the policy announcement was made). Second, we include a dummy for a 6-day period centred around the policy announcement.[27] Lastly, we include a dummy for 3-days since the announcement of the policy.[28] We estimate these regressions using data from January 1, 2018, up to the date the policy dummy takes a value of 1, dropping subsequent observations.[29]

The results of these regressions for various policies are presented below.

Table 1B.2. Effect of the Increase in the Policy Rate on June 6, 2018

VARIABLES	(1) Log Exchange Rate	(2) Log Stock Market Index	(3) Portfolio Equity, $ million	(4) Portfolio Debt, $ million
US Bond Yield	0.0694***	-0.0288	-228.8*	-410.3***
	(9.160)	(-1.539)	(-1.843)	(-3.459)
Dummy for EM Sell Off-April 1 to May 31 (α)	0.0233***	0.0163***	-49.96	-38.84
	(9.868)	(2.804)	(-1.293)	(-1.051)
Dummy for six days centred around the announcement (β)	0.0317***	0.0281*	127.2	63.54
	(5.463)	(1.964)	(1.338)	(0.699)
Dummy for 3 days since the policy announcement (γ)	-0.00105	0.00970	-140.0	-2.272
	(-0.134)	(0.502)	(-1.092)	(-0.0185)
Constant	3.973***	10.52***	668.9*	1,130***
	(189.9)	(203.6)	(1.951)	(3.447)
Observations	103	103	103	103
Adjusted R-squared	0.814	0.086	0.080	0.168
r2	0.821	0.122	0.116	0.201

Note: Data used in the regressions runs from January 1, 2018-June 8, 2018. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5 and 1 percent level of significance, t statistics are in parentheses.

[27] If a policy was announced on date t, the dummy takes the value 1 for the period [t-3, t+2] where t is a working day.
[28] If a policy was announced on date t, the dummy takes the value 1 for the period [t, t+2] where t is a working day.
[29] We acknowledge the limitations in being able to establish causality using these regressions, due to the difficulty in establishing the counterfactual and in controlling for all the relevant factors that may affect the financial markets.

Table 1B.3 Effect of the Liberalization of External Commercial Borrowings on April 27, 2018

VARIABLES	(1) Log Exchange Rate	(2) Log Stock Market Index	(3) Portfolio Equity, $ million	(4) Portfolio Debt, $ million
US Bond Yield	0.0546***	-0.0675***	-280.7*	-418.7***
	(10.90)	(-3.235)	(-1.858)	(-2.873)
Dummy for EM Sell Off April 1 to April 23 (α)	0.0114***	-0.00169	-59.18	-32.67
	(6.830)	(-0.242)	(-1.171)	(-0.670)
Dummy for six days centred around the announcement (β)	0.0213***	0.0281*	-12.66	58.69
	(6.008)	(1.896)	(-0.118)	(0.568)
Dummy for 3 days since the policy announcement (γ)	0.00373	0.00996	-49.59	-242.6*
	(0.814)	(0.522)	(-0.359)	(-1.820)
Constant	4.014***	10.63***	812.1*	1,153***
	(290.3)	(184.3)	(1.946)	(2.864)
Observations	78	78	78	78
Adjusted R-squared	0.836	0.134	0.045	0.147
r2	0.845	0.179	0.0950	0.191

Note: Data used in the regressions runs from January 1, 2018-May 3, 2018. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5 and 1 percent level of significance, t statistics are in parentheses.

Table 1B.4. Effect of the Additional Policy Initiatives on External Commercial Borrowings and Masala Bonds by the RBI and the Government announced on September 19, 2018

VARIABLES	(1) Log Exchange Rate	(2) Log Stock Market Index	(3) Portfolio Equity, $ million	(4) Portfolio Debt, $ million
US Bond Yield	0.0447***	-0.0460*	-228.6**	-381.9***
	(2.931)	(-1.717)	(-2.036)	(-3.690)
Dummy for EM Sell Off-April 1 to September 13 (α)	0.0503***	0.0559***	-21.63	3.533
	(12.32)	(7.804)	(-0.720)	(0.128)
Dummy for six days centred around the announcement (β)	0.105***	0.107***	6.246	60.70
	(8.246)	(4.794)	(0.0668)	(0.704)
Dummy for 3 days since the policy announcement (γ)	-0.000789	-0.0211	-84.16	-16.34
	(-0.0472)	(-0.720)	(-0.684)	(-0.144)
Constant	4.041***	10.57***	668.4**	1,051***
	(95.85)	(142.8)	(2.154)	(3.677)
Observations	172	172	172	172
Adjusted R-squared	0.693	0.321	0.040	0.085
r2	0.700	0.337	0.0628	0.106

Note: Data used in the regressions runs from January 1, 2018-September 24, 2018. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5 and 1 percent level of significance, t statistics are in parentheses.

Table 1B.5. Effect of the Liberalization of ECBs for Oil Marketing Companies on October 3, 2018

VARIABLES	(1) Log Exchange Rate	(2) Log Stock Market Index	(3) Portfolio Equity, $ million	(4) Portfolio Debt, $ million
US Bond Yield	0.0745***	-0.0284	-282.5**	-351.4***
	(4.578)	(-1.106)	(-2.599)	(-3.608)
Dummy for EM Sell Off-April 1 to September 26 (α)	0.0492***	0.0556***	-18.13	2.138
	(10.84)	(7.750)	(-0.598)	(0.0787)
Dummy for six days centred around the announcement (β)	0.0988***	0.0691***	-32.34	19.10
	(6.863)	(3.038)	(-0.336)	(0.222)
Dummy for 3 days since the policy announcement (γ)	0.00157	-0.0298	-129.1	62.03
	(0.0839)	(-1.009)	(-1.034)	(0.554)
Constant	3.959***	10.52***	817.0***	967.3***
	(87.97)	(148.0)	(2.720)	(3.593)
Observations	180	180	180	180
Adjusted R-squared	0.679	0.297	0.090	0.082
r2	0.686	0.313	0.110	0.102

Note: Data used in the regressions runs from January 1, 2018-October 5, 2018. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5 and 1 percent level of significance, t statistics are in parentheses.

Table 1B.6. The Effect of the Increase in the Customs Duty on September 26, 2018

VARIABLES	(1) Log Exchange Rate	(2) Log Stock Market Index	(3) Portfolio Equity, $ million	(4) Portfolio Debt, $ million
US Bond Yield	0.0582***	-0.0346	-234.5**	-364.3***
	(3.633)	(-1.302)	(-2.093)	(-3.607)
Dummy for EM Sell Off-April 1 to September 20 (α)	0.0501***	0.0559***	-20.81	3.114
	(11.52)	(7.732)	(-0.684)	(0.114)
Dummy for six days centred around the announcement (β)	0.0999***	0.0782***	-72.15	28.20
	(7.177)	(3.382)	(-0.741)	(0.321)
Dummy for 3 days since the policy announcement (γ)	0.00415	-0.00735	-67.90	4.526
	(0.233)	(-0.249)	(-0.546)	(0.0403)
Constant	4.004***	10.54***	684.6**	1,003***
	(90.46)	(143.4)	(2.212)	(3.593)
Observations	176	176	176	176
Adjusted R-squared	0.679	0.301	0.059	0.082
r2	0.686	0.317	0.0809	0.103

Note: Data used in the regressions runs from January 1, 2018-September 28, 2018. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5 and 1 percent level of significance, t statistics are in parentheses.

Annex 1C. Data

Table 1C.1. Variables

Variable, set of variables	Source	Notes
Exchange rate	World Bank GEM Database; Haver	Data expressed as local currency per USD. Original data are recorded as monthly averages. Daily data is from Haver.
Equity price index	World Bank GEM Database; Haver	Original data are indices of local currency, with the index = 100 in Jan 2010. Daily data is from Haver.
Reserves	World Bank GEM Database	Original data expressed in million USD
Bond yields	Investing.com	Daily data converted to monthly frequency.
Real exchange rate	IMF IFS Database and World Bank GEM Database	Real exchange rate is calculated as the nominal exchange rate (local currency to USD, period average) times the inflation index (2005=100) for the US divided by the inflation index for each country.
Stock market capitalization	World Bank Global Financial Development Database	Defined as total value of all listed shares in a stock market as a percentage of GDP
Stock market turnover ratio	World Bank Global Financial Development Database	Defined as total value of shares traded during the period divided by the average market capitalization for the period
Stock of portfolio liability	Lane and Milesi-Ferretti (2017)	Sum portfolio liability stocks for equity and debt; millions of current USD
GDP (nominal and real)	World Development Indicators	-
Private external financial flows	IMF Global Financial Stability Report	Calculated as total emerging market private external finance flows (bond, equities, and loans) between 2010 and 2012. Updated data not available.
Capital flows (FDI, portfolio equity, portfolio debt, other flows)	Haver	Original source is IFS. Old series BPM5 and new series BPM6 are spliced in the first year when the new series is available for each country; quarterly frequency. Annual figures are constructed using quarterly data
Trend GDP (US$)	Generated	Estimated using Hodrick-Prescott filter over annual GDP in USD
GDP growth	Haver	Real GDP in local currency seasonally adjusted, Year-on-Year growth in %; quarterly frequency