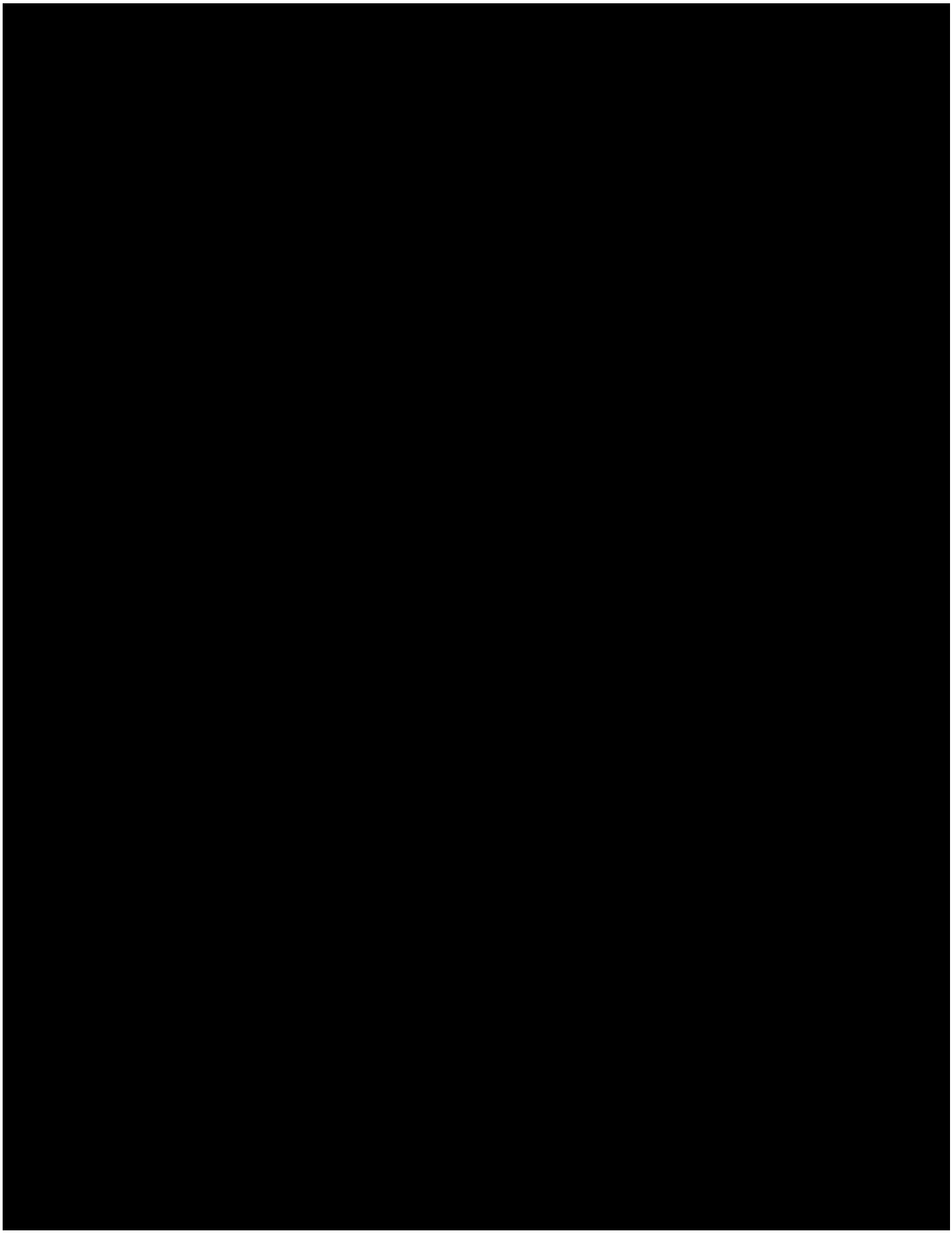

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If the Fed Acts, How do You React? The Liftoff Effect on Capital Flows

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Abstract

After more than six years of ultra-low interest rates, a Fed liftoff (rate hike) is just a matter of time. This paper goes back to history to understand the spillover effect – or what is termed in the paper as the 'liftoff' effect – of the previous five Fed liftoffs on capital flows. Using a dynamic panel framework covering 48 countries (27 advanced economies, 21 emerging markets) over the period 1982-2006, the paper shows that the liftoff effect on capital flows (total private, portfolio) is significantly higher for emerging market economies (EM) than advanced market economies (AM). EM capital flows are hit indiscriminately one quarter before liftoff, suggesting that markets usually price in the liftoff before the actual event. Over time, there is a bit more variation among EM as policy responses/framework can to some extent dampen market reactions. The findings are similar to the unfolding of events during the taper tantrum episode indicating that, even though current circumstances are very different, history could still provide a good guidance.

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Keywords: Fed liftoffs, policy responses, policy framework, capital flows, emerging market economies.

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Contents

I. INTRODUCTION[1]

After more than six years of ultra-low U.S. rates, a liftoff (rate hike) is now just a matter of time. Though there may be surprises, the Fed has already communicated significantly about this issue. Yet, the imminent Fed liftoff is causing a lot of anxiety about the ripple effects on emerging market economies (EM). What makes the anxiety worse is the continued decline in EM growth prospects. And, the memory of the 2013 taper tantrum – if a mere announcement could cause such financial shock waves in the EM world, what havoc would the actual event cause?

This paper goes back to history to understand the spillover effect – or what is termed in the paper as the 'liftoff' effect – of the previous five Fed liftoffs on capital flows. Defining a liftoff as the first hike in the U.S. policy rate that would be the start of a hiking cycle after a period of declining or constant policy rate, the paper gauges the extra sensitivity of capital flows to the U.S. rates during such episodes. The paper then explores what domestic policies can do during liftoff episodes. Is there room for preemptive measures? Is there any particular country characteristic or policy framework that makes countries more susceptible to liftoffs? The paper attempts to answer these questions.

One might argue that this time is different. It is unconventional monetary policies - an unknown territory. The economic conditions and the financial linkages are also very different and have evolved over time. What good is history? At the very least, history can provide a benchmark, a reference point to understand how 'different' things are now. The findings suggest that history can actually be more useful than that. The key conclusions of the paper are similar to the unfolding of events during the taper tantrum episode indicating that, even though current circumstances are very different, history could still provide a good guidance of direction.

Using a dynamic panel framework covering 48 countries over the period 1982-2006, the paper shows that the liftoff effect on capital flows (total private, portfolio) is significantly

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higher for EM than advanced market economies (AM). EM capital flows are hit indiscriminately one quarter before liftoff, suggesting that markets usually price in the liftoff before the actual event. Before liftoff, policy cannot do much to prevent the liftoff effect. In particular, there is no evidence that countries with more open capital accounts are hit more. However, over time, there is a bit more variation among EM as country specific policy responses/framework can to some extent dampen market reactions. In particular, maintaining monetary policy independence and improving near-term budget deficit seem to mitigate negative market reactions post liftoff or during liftoff. Also, countries with open capital account seem to recover quickly over time.

The analysis in this paper contributes to the empirical research on the determinants of capital flows. The paper broadly relates to three strands of work in this particular field. The first body of work focuses on the extreme capital flow episodes – sudden stops and surges – to understand the key determinants of capital flows (Calvo, 1998; Ghosh, Qureshi, Kim and Zalduendo (2012); Forbes and Warnock, 2012). The empirical specification is consistent with the basic tenets of portfolio theory in which expected returns, risk, and risk preferences matter (Ahmed and Zlate, 2014). The determinants are usually divided into external 'push' factors – external conditions that attract investors to increase exposure in a particular country – and domestic 'pull' factors – domestic country characteristics that affect risks and returns to investors. Recent studies have also emphasized the importance of distinguishing between gross and net flows (Ghosh, Qureshi, Kim and Zalduendo, 2012; Forbes and Warnock, 2012; Broner, Didier, Erce and Schmukler, 2013). The second strand of literature focuses on the entire sample, rather than extreme capital flows movements (Ahmed and Zlate, 2014; IMF 2011a; IMF 2011b), with the idea that it is difficult to identify how the longer-term determinants of capital flows may have changed over time when considering only surges and stops (Ahmed and Zlate, 2014). More recently, this body of work has also explored the impact of unconventional monetary policies (Ahmed and Zlate, 2014) and low risk/low global rate episodes (IMF 2011a). The third body of work focuses on the spillover effect of monetary policy shocks (Chen, Mancini-Griffoli and Sahay, 2014). The focus is not restricted to capital flows but on a wide arrange of asset classes. Chen, Mancini-Griffoli and Sahay (2014) give a good summary of literature in this particular field.

The contribution of this paper is that, to my knowledge, this is the first attempt to look specifically at liftoff episodes to determine the extra sensitivity of capital flows movements during such times. At the current juncture, this is an extremely policy relevant question as the Fed is on the brink of hiking after a prolonged period of ultra-low interest rates. The continued decline of EM growth prospects will make it difficult to disentangle the liftoff effect from the negative growth effect on capital flows. Looking at previous liftoff episodes will be useful in making the distinction. The prevailing body of work, while extremely useful in understanding the determinants of capital flows, may not completely be comparable to the current situation. This paper builds on the existing literature to make a more tailor made prescription for the challenges faced by EM in the current global environment.

The rest of the paper is organized as follows. Section II measures the liftoff effect of the U.S. rate – the negative impact on capital flows due to the Fed rate hike. Section III looks at the liftoff effect of policy responses/framework, and discusses which policy responses and policy frameworks dampen the negative liftoff effect of the U.S. rate. The relative liftoff impact of the U.S. rate and the policy responses/framework are also discussed. Both the sections (II and III) identify the timing when the liftoff effects kick in for the U.S. rate and policy responses/framework. Section IV concludes.

II. THE LIFTOFF EFFECT OF THE U.S. RATE

A. Empirical Strategy

The net capital inflows to emerging and advanced market economies are modeled using a dynamic panel framework comprising 48 countries (27 AM, 21 EM) over the period 1982Q1-2006Q4. Since the focus is to capture the liftoff effect, quarterly data is used. Higher frequency data would have been better for such an exercise. However, due to data constraints, particularly the unavailability of higher frequency data for earlier years in EM, quarterly data is used instead. The countries and data sources are given in Appendix. All the results in the paper (and the robustness tests) use robust standard errors (White cross-section covariance method). Where needed, Breusch-Godfrey tests are also performed to check for serial correlation.

The empirical strategy can be summarized in three steps (figure 1). In the first step, a general empirical model is built that explains capital flows using the variables (push/pull factors) that literature has deemed to be important determinants. In the second step, the "liftoff" effect is captured using an augmented model which includes interactive terms of liftoff time dummies (explained in detail below) with the U.S. interest rate. This can be regarded as the saturated model. In the third and final step, the saturated model is reduced by deleting (after appropriate tests) the interactive terms that are not significant. This sub-section discusses these three steps in detail and then lists the robustness tests performed.

Step 1: The Generic Model for Capital Flows

Following literature, the determinants of capital flows are grouped into "push" and "pull" factors (Chuhan, Claessens and Mamingi, 1993; Fernandez-Arias, 1996; Fernandez-Arias and Montiel, 1996; Ghosh, Qureshi, Kim and Zalduendo, 2012; Forbes and Warnock, 2012; Ahmed and Zlate, 2014). Push factors reflect external conditions that attract investors to increase exposure in a particular country. Pull factors are recipient country characteristics that affect risks and returns to investors, and is influenced by local macroeconomic fundamentals.

Specifically, the starting point is a general empirical model that is often used to analyze the determinants of capital flows:

$$\boldsymbol{y_{i,t} = \alpha_0 + \sum_{i=1}^{n-1} \alpha_i D_i + \beta_0 External_t + \beta_1 Domestic_{i,t} + \sum_{j=1}^{s} \alpha_j y_{i,t-j} + \varepsilon_{i,t}} \quad (1)$$

The left hand-side, $y_{i,t}$, represents the ratio of net inflows – either total[2] or portfolio only – to country *i* during time period *t*, as a fraction of the country's nominal GDP. The flows as a share of GDP are modeled as a function of fixed effects (D_i =1 if an observation pertains to country *i*, 0 otherwise), a vector of variables representing external conditions or

[2] Unless stated otherwise, total represents total private flows.

push factors, a vector of variables representing domestic or pull factors, and *s* lagged dependent variables where the length of *s* is regression specific[3].

The *external factors* include the U.S. interest rate, the U.S. consumer prices (year-over-year growth), U.S. GDP Growth (year-over-year growth), an index for risk aversion, and commodity price index (year-over-year growth). For risk aversion or a measure of global market uncertainty, following an approach similar to Ghosh, Qureshi, Kim and Zalduendo (2012), the volatility of S&P 500 index returns[4] is used rather than the more commonly used VIX index because the latter is available from 1990 onwards. However, VIX is also used to perform robustness checks. The *domestic pull factors* include domestic interest rates, consumer prices (year-over-year growth), real effective exchange rate (year-over-year growth), and GDP growth (year-over-year growth). Data sources and list of countries are given in Appendix.

Presented as such, the model can be regarded as the unconstrained version (Ghosh, Qureshi, Kim and Zalduendo, 2012). The constrained model would have included real rate differentials (between the U.S. and the recipient country) and the corresponding GDP growth differentials instead of the individual components presented in the unconstrained model.

Step 2: The Saturated Model Introducing Liftoff Effects

For the purpose of this paper, liftoff is the first increase in the U.S. interest rate which would eventually be the start of a hiking cycle after a period of declining or constant policy rate. A liftoff can be regarded as the turning point in the US monetary policy, where interest rates start to increase after a decline. The "liftoff" effect is defined as the extra sensitivity of variables during such liftoff episodes. It can be thus regarded as the spillover effect of the Fed liftoff. Using this definition, five liftoff episodes are identified in the period 1982-2006 (figure 2): March 1983, January 1987, February 1994, June 1999, and June 2004. Since capital flows data is available on a quarterly basis, the analysis needs to be done using

[3] For few regressions, autoregressive errors, AR(), are used instead of lagged dependent variables. The number of lagged dependent variables or autoregressive terms is quoted in the results.

[4] S&P index volatility is the quarterly average of twelve-month rolling standard deviation of S&P index annual returns.

quarterly frequency. The "liftoff quarters" are: Q1 1983, Q1 1987, Q1 1994, Q2 1999, and Q2 2004. Using this information, five time dummy variables are constructed:

- Two quarters before liftoff = 1 and =0 otherwise.
- One quarter before liftoff = 1 and =0 otherwise.
- Liftoff quarter = 1 and =0 otherwise.
- One quarter post liftoff = 1 and =0 otherwise.
- Two quarters post liftoff = 1 and =0 otherwise.

The presence of five time dummies is useful to extract a comprehensive picture of how capital flows react to variables before, during, and post-liftoffs. The liftoff effect may not necessarily come into play during the liftoff quarter. If the liftoff effect is already priced in, the spillover effect on capital flows will occur before the actual event. The time dummies thus help to identify when exactly the liftoff effect kicks in.

The strategy is to interact the time dummies with relevant variables to capture the liftoff effect and also get a sense of when the liftoff effect kicks in. The liftoff effect of a particular variable is thus the coefficient of the interactive term comprising the time dummy and the variable. The dummy variable in the interactive term helps to identify if the liftoff effect occurs before, during and/or after liftoff. For the first part of the paper, the time dummies are interacted with the U.S. interest rate to measure the liftoff effect of the U.S. interest rate. In the second part, the time dummies are interacted with the variables representing policy responses/framework to measure the liftoff effect of policy framework or policy responses.

In terms of algebraic formulation, one can easily move from the generic model in equation 1, to the saturated model:

$$\boldsymbol{y_{i,t}} = \boldsymbol{\alpha_0} + \sum_{i=1}^{n-1} \boldsymbol{\alpha_i D_i} + \boldsymbol{\beta_0 External_t} + \boldsymbol{\beta_1 Domestic_{i,t}} + \sum_{j=-2}^{j=2} \boldsymbol{d_{j,t}} + \sum_{j=-2}^{j=2} \boldsymbol{d_{j,t} Interest_{U.S.,t}} + \sum_{j=1}^{s} \boldsymbol{\alpha_j y_{i,t-j}} + \boldsymbol{\varepsilon_{i,t}} \quad (2)$$

where $\boldsymbol{d_{j,t}}$ are the five dummy variables with j=-2,-1,0,+1,+2 representing two quarters before liftoff, one quarter before liftoff, liftoff quarter, one quarter after liftoff, and two quarters after liftoff, respectively.

Step 3: The Restricted Model from the Saturated Model

Not all the liftoff variables, that is the time dummies interacted with the U.S. rate, are significant. The interactive dummies that are not significant and the corresponding time dummies are removed from the model using a log-likelihood ratio test to make sure that the restricted version is preferable to the unrestricted/saturated model. This idea of moving from a general model with all the possible interactive terms (with the time dummies) to a parsimonious one with the significant ones, using a log-likelihood ratio test, is inspired from the independent work of on the one hand Cox and Snell (1974) and the other hand Hoover and Perez (1999) and Hendry and Krolzig (2005). A simple exposition of the algorithm is given in Hendry and Nielsen (2007).

Robustness Checks

A host of robustness checks are performed for all the results reported in this paper to assess the rigor of the results. Since the volatility of S&P 500 returns is used in the reported results, the more traditionally used VIX index is used to measure global risk aversion for robustness checks. The presence of real effective exchange rates and inflation rates as dependent variables could lead to potential endogeneity problems, particularly in EM where they turn out to be significant in the specification. Hence, these variables are instrumented using their lags for the regressions on EM. Some of the key coefficients turn out to be higher in magnitude and even more significant in the alternative specification using instruments. Some of the variables in EM have extreme points in the earlier years of the sample. In particular, the longer series for Brazil policy rate (overnight rate/SELIC) has some extreme points. In cross-section containing 21 EM, this should not have much impact on the results. However, as robustness checks, the following alternative specifications are run: 1) excluding data points from the entire sample where policy rate is greater than 30 percent, 2) excluding data points where policy rates or inflation rates are greater than 30 percent, 3) excluding data

points where policy rates or inflation or commodity prices are greater than 30 percent, 4) excluding Brazil from the list of countries, 5) using the policy rate series for Brazil that starts from 1998, that is, using a shorter series. Unless stated otherwise, the main findings are robust to all these specifications. Where they are not robust, the discrepancy is discussed when reporting the results.

B. Results

Model Results

Using the empirical strategy discussed in the previous sub-section, table 1 reports the first set of results for EM. The first three columns report the results for the three steps using net total flows, as a share of GDP, as the dependent variable, while the last three columns report the results using net portfolio flows, as a share of GDP, as the dependent variable. The independent variables are grouped in three categories: the external factors (representing the push factors), the domestic factors (representing the pull factors), and the liftoff variables (the dummy variables interacted with the U.S. interest rate).

The first column for both total and portfolio flows shows that risk aversion and domestic factors are significant determinants of capital flows. However, when the sample excluding extreme data points is used, policy rates and inflation are not significant for total flows and inflation and growth are no longer significant for portfolio flows. Similarly, in the second and third column, some of the coefficients of the variables without liftoff effect (that is, variables not interacted with the dummy variables) can be sensitive to extreme data points. However, the coefficients of the interactive terms, representing the liftoff effects, are similar in all the versions including/excluding extreme data points. Since the focus of the paper is on the liftoff effect and the coefficients of the liftoff effect are similar in all the robustness checks, this does not affect the main findings of the paper.

Turning to the focus of the paper, the results of the second and third column, using both total and portfolio flows, clearly show that there is a significant liftoff effect of the U.S. interest rate one quarter before liftoff – the variable capturing the interaction between the dummy variable representing one quarter before liftoff and the U.S. interest rate is significant in both cases. For every 100bps of the U.S. interest rate, there is 0.72 and 0.33 percent of GDP of net total and net portfolio outflow, respectively, one quarter prior to the liftoff.

This liftoff effect of the U.S. rate seems to be absent for AM, as shown in table 2 where the same exercise is performed using AM instead of EM, and the next sub-section shows that the magnitude is also less than EM (figures 3 and 4). There could be few possible reasons for the diverging results between EM and AM. First, this could be due to the varying reaction of capital flows during risk sell-off episodes. EM typically experience capital outflows during risk sell-off; while AM, especially safe heavens, tend to receive capital inflow. Second, AM tend to borrow in domestic currency while most EM borrow in US dollars, making them more vulnerable to increases in the U.S. rate.

The results are, broadly speaking, robust to alternative specifications discussed in the previous sub-section. In particular, the liftoff effect on EM portfolio flows is robust to all the specifications listed, and in most cases, the coefficients are larger. Hence, the reported results can be regarded as conservative estimates. However, the results on EM total flows in some cases do not hold strongly.

Using Model Results to Get a Sense of Magnitude

The reported coefficients give a sense of the extra marginal impact of the U.S. rate on capital flows during liftoff episodes – this is termed as the liftoff effect in the paper. To get a sense of what could potentially be the extra total impact of a particular variable due to the liftoff, the model results are used to perform two exercises. First, the coefficients are used to compute the extra impact assuming a scenario with one standard deviation shock in the U.S. rate. This is essentially the model coefficients multiplied by one standard deviation of the U.S. rate. In other words, all else equal, what would be the extra impact on capital flows during liftoff episodes (compared to normal times) due to one standard deviation shock in the U.S. rate? Second, the coefficients are multiplied by the average values of the U.S. rate in the past five episodes to get a sense of the model prediction of the extra total impact on capital flows due to the liftoff. Again, this would answer the question that, all else equal, what was the extra impact during liftoff episodes due to the level of the U.S. rate? It must be cautioned that these exercises can give only an approximate idea of magnitude; hence, the numbers should not be over-interpreted. The purpose is to get a sense of magnitude due to the liftoff effect by performing two exercises that, put together, can give the reader an approximate sense of the ranges of the possible impact on capital flows due to the liftoff.

The computations from the first exercise show that one standard deviation shock in the U.S. interest rate would decrease the flows by 2.0 and 0.9 percent of GDP for total and portfolio flows, respectively. When expressed in number of standard deviations of the respective data, these numbers translate to equal magnitude, around 0.3 standard deviations (figure 3). Using the average of the U.S. rate for every quarter before liftoff in the sample, the results imply that, the previous liftoffs resulted in net outflow of 3.5 and 1.6 percent of GDP for total and portfolio flows, respectively (figure 4). In standard deviation terms, these numbers amount to 0.5 and 0.4. For total flows, there seems to be payback one quarter post liftoff, though the magnitude is less than the loss before liftoff (table 1).

C. Why a Liftoff Effect Prior to Liftoff?

The key conclusion from the econometric results thus far is that there is a non-negligible liftoff effect, and it seems to kick in one or two quarters prior to liftoff, not during the liftoff quarter itself. To understand why the liftoff effect acts prior to liftoff, the events leading to the liftoff is explored. In particular, the focus is on two issues: i) the market expectations prior to liftoff, ii) the macroeconomic conditions leading to liftoff.

Markets had already anticipated the rate hike in recent liftoff episodes. If the liftoff is anticipated before the actual event, then markets will price in the liftoff and reposition funds accordingly prior to the liftoff in anticipation of the liftoff. Indeed, for the last two liftoff episodes (June 2004 and June 1999), that seems to be the case. The newspaper reports prior to the previous two episodes clearly show that market had anticipated the rate hike (box I). For June 2004, markets were actually expecting more as core CPI had risen by 3.3 percent in the months leading to the decision. For June 1999, the investors were all certain that the Fed would hike rates to keep inflation from accelerating. Money.cnn had an article titled “Rate hike is on the way” five days before the rate hike.

The events leading to the rate hike in February 1994 are a bit more nuanced. The general widely held view is that the market was caught by surprise. However, delving deeper, one can conclude that market was caught by surprise by the timing and the magnitude of the hike, rather than the hike itself (Allianz Global Investors, 2014). The macroeconomic conditions were improving – evident from President Bill Clinton’s State of the Union address

in January 1994 – and the then Fed Chairman Greenspan was hinting at potential rate hikes for some time.

Box I: News Reports/Statements Prior to Liftoff

June'2004:
Though 25bps hike is the first in nearly 4 years, **markets were expecting more** as core CPI had risen by 3.3 percent in the months leading to the decision *[Chen, Mancini-Griffoli and Sahay (2014) based on money.cnn news, 06/30/04*].

June'1999:
Investors are all but certain the Federal Reserve will lift short-term interest rates at its policy meeting next week to keep inflation from accelerating and allow the U.S. economy to celebrate its ninth year of uninterrupted expansion. [*money.cnn,* five days prior to liftoff, ***Rate hike is on the way***].

February'1994:
Market was caught by surprise (*FT, business insider*), however, **there were clues.** "Auto sales are way up. Home sales are at a record high. Millions of Americans have refinanced their homes. And our economy has produced 1.6m private sector jobs in 1993, more than were created in the previous four years combined." [*President Bill Clinton in his State of the Union address, January 1994*] .

Moreover, in early 1994, the then **Fed Chairman Greenspan had been hinting at potential rate hikes for some time**. Even after that, market was caught by surprise by the timing and the magnitude of the subsequent hike. *["Historical lessons from Federal Reserve rate-hike cycles", Allianz Global Investors, October 2014*].

In all episodes, there were clues, in the form of improving macroeconomic environment in the run-up to the first rate hike. Allianz Global Investors (2014) looks at the past liftoff episodes and concludes that one common factor was the improving macroeconomic environment leading to liftoffs. Typically, the labor market (unemployment rate, non-farm payrolls) had been improving for some time, industrial production was rising, and cyclical sectors were growing. Indeed, as figure 5 shows, for all liftoff quarters, the year-over-year GDP growth was picking up and/or the inflation rate was picking up, hinting that, the Fed's dual mandate of maximum employment and stable prices would entail a rate hike. The improving macroeconomic conditions would provide a hint to the investors that a rate hike was imminent.

Looking at both information about market expectations and macroeconomic performances, one can deduce that liftoffs are usually priced in before the actual event. The empirical results and their interpretations are in line with literature that finds additional negative spillover effects associated with unanticipated U.S. rate hike (IMF 2011a; Kuttner,

2001). Since the rate hike is usually priced in by the quarter of the liftoff, the liftoff effect of the liftoff quarter is insignificant. However, as investors start to digest incoming data showing improved macroeconomic conditions, they start building expectations and re-positioning funds away from emerging markets – hence, the liftoff effect occurs before the actual event.

III. THE LIFTOFF EFFECT OF DOMESTIC POLICIES

The previous section showed that the liftoff is usually accompanied by net capital outflows as the sensitivity of flows to the U.S. rate increases in the quarter before liftoff. Can domestic policies mitigate the negative effect of the Fed liftoff? This section aims to answer that. Conceptually, a useful way of looking into policies would be to divide them into policy responses and policy framework, with the understanding that there is room for overlap between the two (figure 6). The policy response in a particular country would be a function of the underlying policy framework. This sections looks at five areas domestic poly responses/framework. First, the description of the policies are given, followed by the empirical strategy used to include them in the regression specification. Finally, the results are reported, followed by a discussion on the relative magnitude of the liftoff effects owing to the U.S. rate hike and the policy responses/framework.

A. The Policies

To understand the role of domestic policies in mitigating the negative liftoff effect emanating from the U.S. interest rate hike, the following five policies are looked at:

Domestic Policy Rates – In the face of the U.S. rate hike, can increasing domestic policy rates retain capital flows by maintaining the interest rate differentials? The same policy rate as the one in the generic model is used to understand this question. To capture the extra liftoff effect pertaining to domestic policy rates, the interactive term with the liftoff dummies are used.

Monetary Policy Independence – If there is a Fed hike, should domestic rates be increased to chase the hike or when warranted by domestic inflation objective? To capture this idea, a variable is required that portrays the essence of monetary policy independence. For the purpose of this paper, following Aizenman, Chinn and Ito (2013), the idea of monetary policy independence is expressed by looking at the correlation between the domestic policy rate and the U.S. policy rate. More specifically, monetary policy independence (MI) is measured as the reciprocal of the 12-month rolling correlation between each country's policy rate and the U.S. policy rate.

$$MI = 1 - \frac{corr(i_i, i_{U.S.}) - (-1)}{1 - (-1)}$$

By construction, the maximum value is 1 and the minimum value is 0. Higher value of the index means more monetary policy independence.

This is the same algebraic formulation as Aizenman, Chinn and Ito (2013). However, some changes are made to make the index appropriate for the particular question that the paper is asking. First, the base rate – the rate with respect to which the country's policy rate is compared - is always the U.S. policy rate. Aizenman, Chinn and Ito (2013) use different base rates for different countries (Australia, Belgium, France, Germany, India, Malaysia, South Africa, the United Kingdom, and the U.S.). Second, the authors compute the annual correlation. This paper uses 12-month rolling correlation instead, and then takes the quarterly average.

There are some important caveats to this index. First, as noted by Aizenman, Chinn and Ito (2013), for some countries and in some years, especially early ones, the interest rate used for the calculation of the MI index is often constant throughout the 12-month rolling window, making the correlation of the interest rates between the country and the U.S. rate undefined. Following, Aizenman, Chinn and Ito (2013), for these cases, the MI index is given a value of 0.5. The authors discuss in detail the pros and cons of this approach, and why assigning 0.5 is a reasonable compromise. Second, the policy rate of a particular country could move in the same direction as the U.S. rate due to a common shock. For example, during the recent global financial crisis, the reference rates for monetary policy of major

central banks comoved quite strongly, not because they were following the Fed, but because they were hit by a common shock. However, this might be less of an issue for this paper since the period of analysis is until 2006, and hence does not include the global financial crisis.

Exchange Rate Stability – Again, following Aizenman, Chinn and Ito (2013), a very simple expression is used to capture the exchange rate stability of a particular country. The volatility of the month-over-month exchange rate movements are used to understand the exchange rate stability, with the idea that a more fixed exchange rate regime would have less volatility, and vice versa. More specifically, the exchange rate stability index (ERS) is defined as the 12-month rolling standard deviation of the monthly exchange rate change, and included in the formula below to normalize the index between 0 and 1.

$$ERS = \frac{0.01}{0.01 + stdev(\%exchange\ rate)}$$

A higher value of the index indicates more stable movement of the exchange rate. Again, Aizenman, Chinn and Ito (2013) use the exchange rate movement vis-à-vis a base country which is not necessarily always the U.S. However, this paper uses the bilateral exchange rate of the recipient country vis-à-vis the U.S dollar. The paper uses the 12-month rolling standard deviation of currency movements whereas Aizenman, Chinn and Ito (2013) use annual standard deviations of the monthly exchange rate changes.

Capital Account Openness – Are countries with more open capital account more prone to liftoff effects? To answer this question, the widely used Chinn-Ito Index for capital account openness is used. This index is based on information regarding restrictions in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). Chinn and Ito (2006) provide a detailed description of the index. This index is normalized between 0 and 1, with higher value indicating that a country is open to cross-border capital transactions.

Budget Surplus (Deficit) – Fiscal policy is one of the key policy tools available to the government. In the face of a U.S. liftoff, one near-term policy response could be to improve budget deficit to provide a positive signal to the market, particularly if a country's fiscal sustainability is an issue. In order to understand if fiscal policy can play any role in mitigating the negative liftoff effect owing to the U.S. rate hike, the quarter over quarter budget surplus, expressed as a share of GDP, is used. An increase in the variable means more budget surplus, suggesting, all else equal, more fiscal discipline.

B. Empirical Strategy

Similar to the empirical strategy employed when measuring the liftoff effect of the U.S. rate, a 3-step approach is used (figure 7).

The first step starts with the reduced model from the previous section containing country specific fixed effects, "push" and "pull" factors, lagged dependent variables, the U.S. rate interacted with dummy variables (only the significant ones), and the corresponding time dummy variables. All the variables representing policy responses/framework, except budget surplus, are included in this model.

In the second step, all the possible liftoff effects of all the policy variables are included to obtain the saturated model. For each policy variable, the interactive term between the policy variable and each time dummy is included. In other words, there are five interactive terms for each policy variable showing the interaction with two quarters before liftoff, one quarter before liftoff, liftoff quarter, one quarter after liftoff, and two quarters after liftoff. In addition, all the time dummy variables are included. Like the previous section, the liftoff effect of a particular variable is thus the coefficient of the interactive term comprising the time dummy and the variable. The dummy variable in the interactive term helps to identify if the liftoff effect occurs before, during and/or after liftoff.

For the third and the final step, the restricted version is obtained from the saturated model by deleting the interactive terms that are not significant. Log-likelihood ratio tests are also performed to make sure that the reduced version is preferred to the saturated model.

Since the data set for budget surplus is considerably shorter than the other policy variables, the regressions for budget surplus are run separately, using the same 3-step approach. The starting model contains the country specific fixed effects, "push" and "pull"

factors, lagged dependent variables, the U.S. rate interacted with dummy variables (only the significant ones), the corresponding time dummy variables, and budget surplus. This model is extended to include all the interactive terms between the budget surplus and the time dummies. The final restricted version includes only the interactive terms that are statistically significant. Log-likelihood ratio tests are performed to make sure the restricted version is accepted against the saturated model.

C. Results

This sub-section discusses the significance of the results. The magnitude is discussed in the next sub-section. The coefficients of the policy variables and their interactive terms with the dummy variables are reported in tables 3, 4, 5, and 6 for EM total flows, EM portfolio flows, AM total flows, and AM portfolio flows, respectively. The results for fiscal policies are reported separately in table 7.

Some overall observations strike out. First, the liftoff effects of policies are substantially higher for EM than AM. Second, whereas the liftoff effect of the U.S. rate kicks in before liftoff, that of the variables representing policy responses/framework usually act during or after liftoff. Third, though the policy variables (with the exception of policy rates) are not significant on their own, indicating they are not significant during normal times, they are significant when interacted with liftoff dummies. This shows that, some of the policy responses/framework, though not the usual determinant of capital flows, can be significant during liftoff episodes. Looking at specific policy framework/response:

Monetary policy independence: The results indicate that keeping monetary policy independence can help to increase net capital flows during liftoff episodes. Aizenman, Chinn and Ito (2013) find that greater monetary policy independence can dampen output volatility. The statistical significance of monetary policy independence could thus also reflect the indirect impact of less output volatility on capital flows. The policy implication would be to adjust monetary policy according to domestic inflation objectives. This finding is in line with recent literature. IMF (2014) shows that monetary policy was one of the most used tools during the taper tantrum episode. However, the report underscores that most countries raised rates to fight against inflation, not just capital outflows and depreciating currencies. If rates

are increased for the latter purposes, the study cautions that they risk the opposite effects of slowing down the economy, thereby undermining investor confidence, and in turn driving further capital outflows and currency depreciation. In the same vein, a recent study (Goldman Sachs, 2015) shows that the Asian Central Banks followed fundamentals, not the Fed, when tightening in the mid-2000s.

Domestic policy rates: Though the reported results show that some interactive terms between domestic policy rates and dummy variables are significant, they do not survive the robustness tests. In particular, policy rates do not come out significant when extreme data points (independent variables) are removed from the sample. Hence, one can conclude that there is very weak or no evidence that raising policy rates helps during liftoff episodes.

Budget surplus: Interestingly, near term budget improvement – expressed in the regression as quarter-over-quarter change in budget surplus (as a share of GDP) – comes out significant even though near term budget surplus is not significant without the interactive term. Even though fiscal policy is not a usual determinant of capital flows, the results suggest that it could be an important tool during liftoff episodes. This result is very robust to all the robustness checks mentioned previously. However, the results do not hold when budget surplus, as a share of GDP, is expressed as year-over-year change. One possible explanation, for the strong robust significance of the quarter-over-quarter budget surplus (but not year-over-year budget surplus change) could come from the lessons during taper tantrum. IMF (2014) finds that emerging markets that acted early and decisively have tended to fare better. Improvement in the budget surplus could be an early signal to the market that policies are committed towards improving fundamentals.

Capital account openness: One of the most interesting results of the paper is the lack of statistical significance of capital account openness prior or during liftoff. The results show no evidence that countries with more open capital accounts are hit more. This finding is in accord with some recent literature that shows that domestic policies cannot do much to attenuate spillovers during U.S. monetary policy shocks. Fratzscher, LoDuca and Straub (2012) find no evidence that foreign exchange or capital account policies help contain

spillovers. However, the reported results in this paper show that countries with more open capital accounts recover quicker: there is a statistically significant positive liftoff effect one or two quarter after liftoff.

Exchange rate stability: Exchange rate stability is the only variable that shows significant liftoff effect for AM[5]. The results for AM indicate that countries with more flexible exchange rate regimes fare better in attracting capital flows post liftoff. The results for EM are more mixed and not necessarily significant in terms of magnitude (see next sub-section). Countries with more stable exchange rate seem to have more net total outflows two quarters before liftoff and during the liftoff quarter. Countries with more stable exchange rate also have more portfolio outflows during the liftoff quarter. However, more stable currency also attracts more portfolio inflows one quarter prior to liftoff and two quarter post liftoff.

D. Can Policies Mitigate the Negative Liftoff Effect of the U.S. Rate?

This section discusses the potential magnitude of the results. The aim is to get an idea if the policy framework/responses can make a meaningful difference. In particular, can they mitigate the negative liftoff effect of the U.S. rate?[6] The same two exercises, as in the previous section, are performed, and the caveats already mentioned in that section also hold here. The first looks at the extra impact on capital flows during liftoff episodes from one standard deviation shock of each variable. The second exercise computes the extra impact by taking average of the model predictions in the past five liftoff episodes (model coefficient multiplied by the average values of the variables in the past episodes).

[5] The only exception is the interactive term of the domestic policy rate that comes out significant two quarters post liftoff for AM portfolio flows.

[6] Since the spillover effects of the U.S. rate on AM is very limited and the policy response/framework seem not to make any difference, evident from the lack of significant results in tables 5 and 6, this sections focuses on EM only.

The Estimated Extra Impact on Capital Flows during Liftoff Episodes due to One Standard Deviation Shock in Each Variable

To get a sense of the magnitude, the extra impact on capital flows from one standard deviation shock of each variable, both policy and the U.S. rate, is determined. In other words, suppose that there were one standard deviation shock of a particular variable. Compared to normal times, what would be the extra impact on capital flows during liftoff episodes? To answer this question, the relevant coefficients from tables 3 and 4 (and table 7 for budget changes) are multiplied by one standard deviation shock of the U.S. interest rate or the policy variables[7]. While the coefficients representing the liftoff effect of the U.S. interest rate is not reported in tables 3 and 4[8], the coefficients from the same underlying regressions are taken. To keep the exercise manageable, the coefficients of the five interactive terms, representing the liftoff effects of the five quarters (pre/during/post liftoff), are reduced to three time frames: before liftoff, during liftoff, and post liftoff. Only the coefficients that are significant are taken for this calculation. This means that, for example, when both the quarters before liftoff are significant, then the average of the coefficients of both the quarters is computed. If only one quarter is significant and the other quarter is not significant, then the coefficient of the quarter that is significant is taken. In other words, the coefficients are the average values of the results reported in tables 3 and 4 (which reports only significant results). The same rule is applied for the coefficients of the quarters after liftoff. For the liftoff quarter, the coefficient of the liftoff quarter is taken.

The extra impact on total and portfolio flows, that is the relevant coefficient multiplied by the one standard deviation shock, is expressed both in terms of share of GDP and standard deviation of the data of the dependent variable (figures 8 and 9).

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[7] For all the variables, the standard deviation for the entire sample, 1982-2006, is taken. For domestic policy rate, the standard deviation is taken from a sample where only policy rates less than 30 percent are considered. As discussed previously, the policy rates do not turn significant when extreme data points are taken from the sample. Hence, the results can be regarded as weak. Using the standard deviation of the entire sample would falsely give an impression that the policy rates have huge impact in terms of magnitude when the results are not robust to all specifications. The results of the U.S. rate and other domestic policy variables are all robust to all alternative specifications, including the ones looking at extreme data points.

[8] The coefficients are already presented in table 1 and discussed in detail in section II. The coefficients of the U.S. rate in this exercise can be different, but not by a huge margin, from table 1 since the regressions also include policy variables and their interactive terms with the five dummy variables.

For *total flows*, the results indicate that before liftoff, the net outflow due to one standard deviation shock in the U.S. rate could be substantial, around 2.4 percent of GDP (0.3 standard deviation of the data). This effect cannot be completely mitigated by policy variables before liftoff. Only one standard deviation shock of the quarterly improvement in budget could help by attracting net inflow of 1.8 percent of GDP. During the liftoff quarter, improvement in quarterly budget surplus can give substantial boost, attracting around net inflows of 3.7 percent of GDP. After liftoff, monetary policy independence and open capital accounts can help, attracting net inflows of 2.1 and 1.3 percent of GDP, respectively.

For *portfolio flows,* the results indicate that before liftoff, the net outflow due to one standard deviation shock in the U.S. rate could be substantial, around 1.7 percent of GDP. This translates into 0.5 standard deviation of the data, higher than the standard deviation reported for total flows. Unlike total flows, a positive shock in near-term budget does not have an impact before liftoff. However, monetary policy independence and exchange rate stability shocks can help to some extent. During liftoff quarter, maintaining monetary policy independence can help by attracting net inflow of 0.6 percent of GDP. However, countries with more fixed exchange rate seem to be hit more, with a net outflow of 0.6 percent of GDP. After liftoff, near-term budget improvement, exchange rate stability, and capital account openness shocks can increase net portfolio flows, by 1.3, 0.8 and 0.5 percent of GDP, respectively.

The Estimated Extra Impact during Liftoff Episodes using Average Values of Each Variable

While looking at standard deviation shocks can be useful in getting a sense of the magnitude of the results, one can question how realistic it would be to have one standard deviation shock for one particular variable. To complement the results using standard deviation shocks, the coefficients (calculated the same way as the previous exercise) are multiplied by the average of the actual values of the variables during the previous five liftoff episodes. The possible extra impact on total and portfolio flows, that is the relevant coefficient multiplied by the average of the actual values of the variables, is expressed both in terms of share of GDP and standard deviation of the data of the dependent variable. As

shown in figures 10 and 11, the results in some cases come out quite different than the exercise using standard deviation shocks.

For *total flows*, the possible extra impact on capital flows comes out stronger than the exercise with standard deviation shock. The net outflow prior to the liftoff due to the U.S. rate is 4.4 percent of GDP, translating into 0.6 standard deviations of total flows. While some policy variables are significant, the magnitude of none is strong enough to offset the negative impact of the U.S. rate before liftoff. In particular, the improvement in budget had come out strongly when using standard deviation shocks. However, using actual values, the extra impact on total flows is actually negative, indicating that the actual data shows that near-term budget had actually, on average, worsened in the previous five liftoff episodes. Having said that, the extra impact of budget improvement is substantial during the liftoff quarter, around 1.4 percent of GDP. Post liftoff, monetary policy independence and capital account openness can help, attracting net inflow of 3.4 and 1.3 percent of GDP, respectively.

For *portfolio flows*, the negative impact on flows due to the liftoff is even stronger using actual values from the five previous episodes. The extra impact on net flows due to the U.S. rate is around -3.0 percent of GDP, translating to 0.8 standard deviation of data. Though monetary policy independence and exchange rate stability can help before liftoff, they cannot offset the impact of the U.S. rate. Monetary policy independence can also help in attracting net inflow of 0.3 percent of GDP during liftoff quarter. Post liftoff, capital account openness, exchange rate stability and near-term budget improvement can help in attracting inflows, around 0.5, 0.2, and 0.1 percent of GDP, respectively.

IV. CONCLUDING THOUGHTS

The market participants are anxious about the negative spillover effect on EM capital flows from the imminent Fed liftoff. While literature has extensively studied the general determinants of capital flows, this paper adopts an approach that is more tailor-made to understand the policy challenges faced by EM at this current juncture. Looking at the previous five liftoff episodes, the paper shows that the liftoff effect is substantially higher for EM than AM. There is substantial net outflow of capital, particularly for EM portfolio flows, before liftoff in anticipation of the liftoff. Policy responses/framework can only to some extent dampen market reactions. Monetary policy independence can help. Countries with

higher monetary policy independence may have greater leeway at this current juncture. Since monetary policy independence requires time, other countries could undertake reforms to increase monetary policy independence in future. In terms of fiscal policy, reducing near-term budget deficit can give a positive signal to the market and somewhat reduce capital outflows for countries with credibility and fiscal sustainability issues. In terms of policy framework, capital account openness does not lead to more outflows during or before liftoff. However, capital account openness can help to attract capital flows after Fed liftoff.

While the paper looks at five areas of policy framework/response, this is not an exhaustive list. Recent literature points to a host of factors that can help to reduce external vulnerabilities. In particular, IMF (2014) shows that elevated current account deficits, high inflation, weak growth prospects, and relatively low reserves exacerbated market reactions during the taper tantrum episode. These factors can be addressed by policies that are not necessarily included in this paper. Recent studies have also given a lot of focus on the impact of macro prudential policies (Cerutti, Claessens and Laeven, 2015) – something not addressed in this paper. For example, Dell'Ariccia *et al.* (2012) find that macroprudential policies can reduce the incidence of general credit booms and decrease the probability that booms end up badly. Zhang and Zoli (2014) and Bruno, Shim and Shin (2014) look at the relationship between macroprudential policies and capital flow measures, and find that such policies can slow inflows.

The general finding of this paper is that, before liftoff, EM capital flows are indiscriminately hit across countries. Over time, there is more variation across countries as individual policy responses/framework can to some extent dampen market reaction. This is how things had unfolded during the taper tantrum episode (IMF, 2014) suggesting that history can be a good guidance for the future liftoff. Some of the policies that can attract capital flows (e.g. improving fiscal sustainability) can be pro-cyclical in the current juncture where EM growth is slowing down considerably. Monetary policy independence is associated with gaining credibility. This takes time and may not be done quickly in the current environment. Also, monetary policy independence is easier said than done in the current environment where EM currencies are under pressure. Hence, the findings of the paper suggest that some EM face tough policy tradeoffs in the current situation. This is yet another paper that suggests an important role for global institutions and cross-country

cooperation to deal with sharp volatility of capital flows (Forbes and Warnock, 2012) and safeguard global financial stability (IMF, 2014).

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VI. FIGURES

Figure 1 – Empirical Strategy

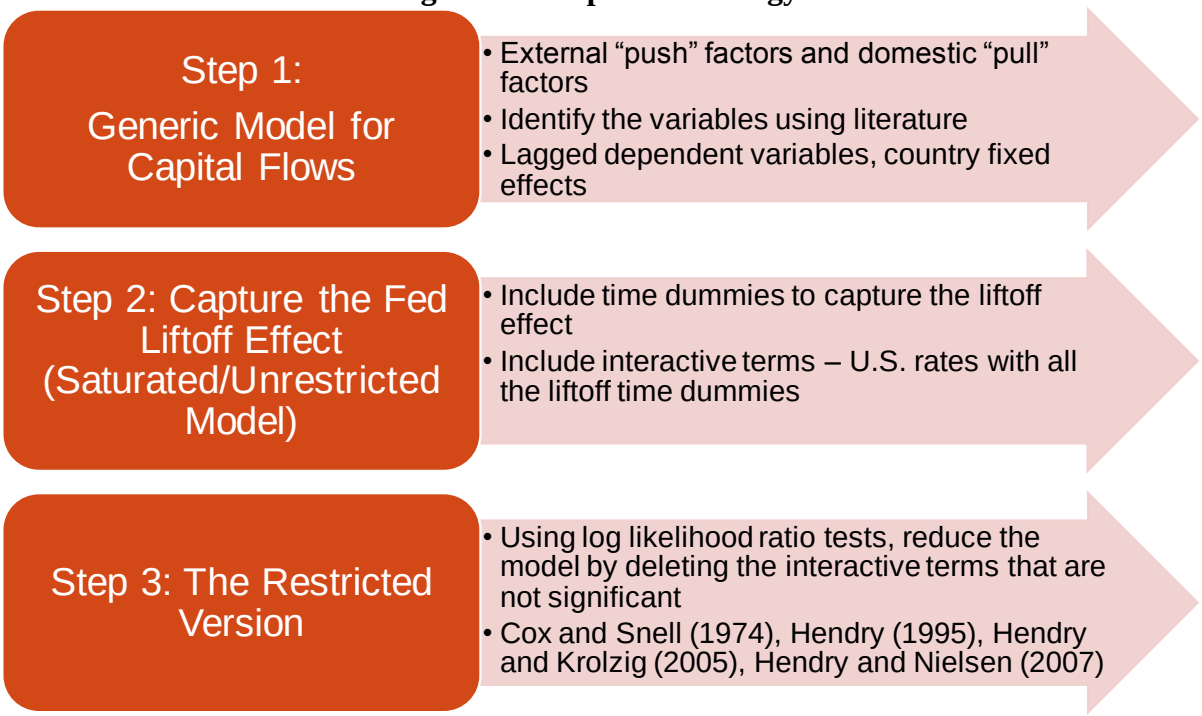


Figure 2

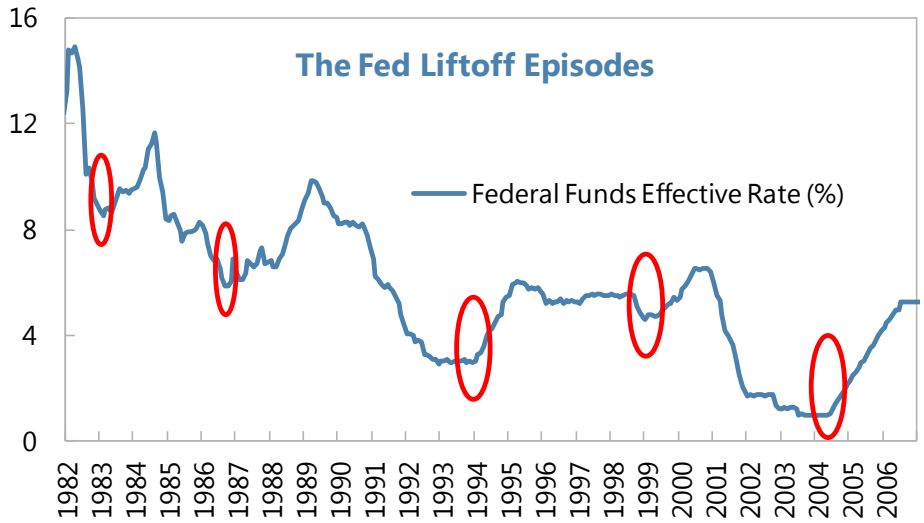
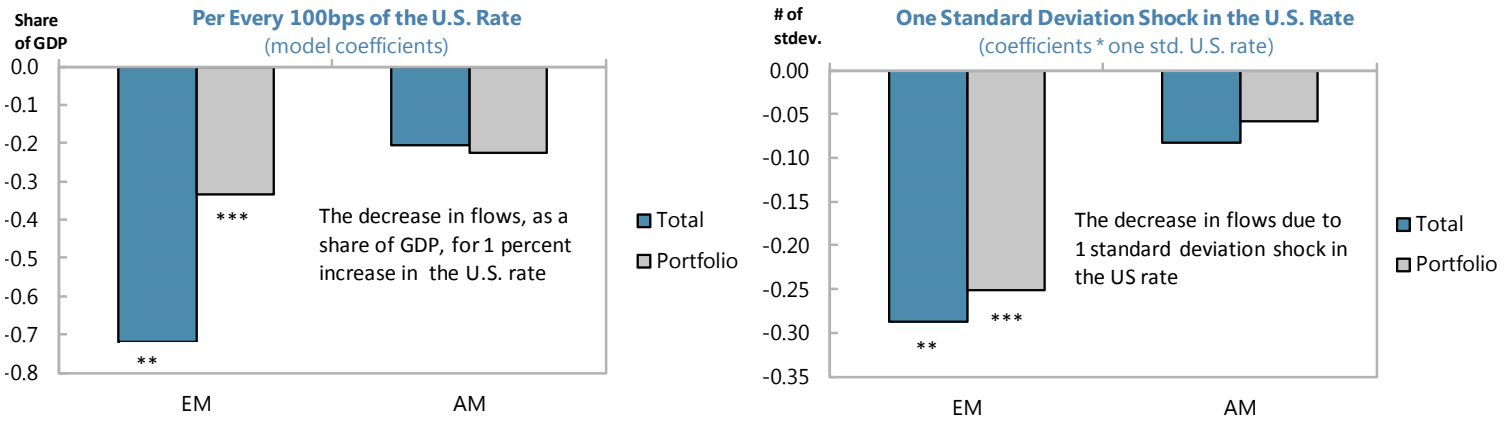


Figure 3

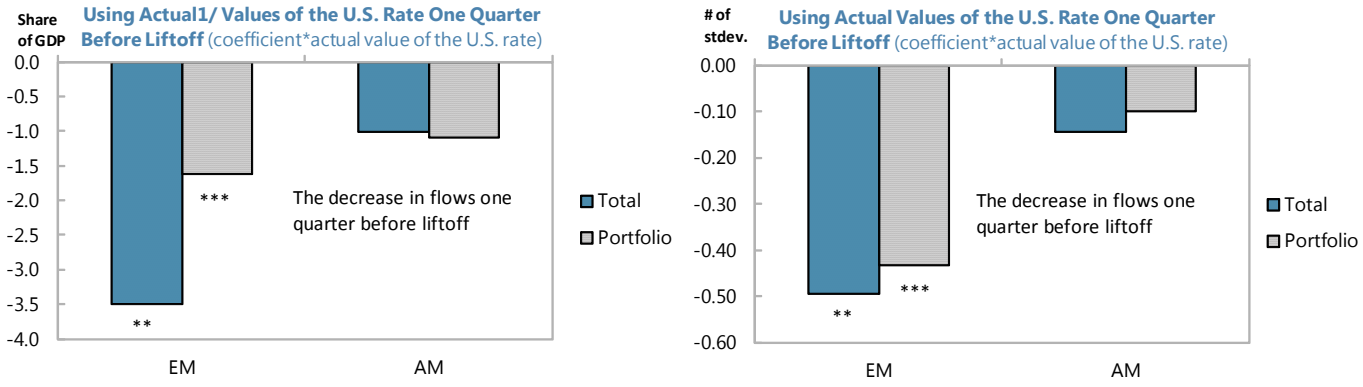
The Extra Sensitivity of Flows to the U.S. Interest Rate One Quarter Before Liftoff



Note: ***, ** and * indicate statistically significant at 1%, 5% and 10% percent, respectively.

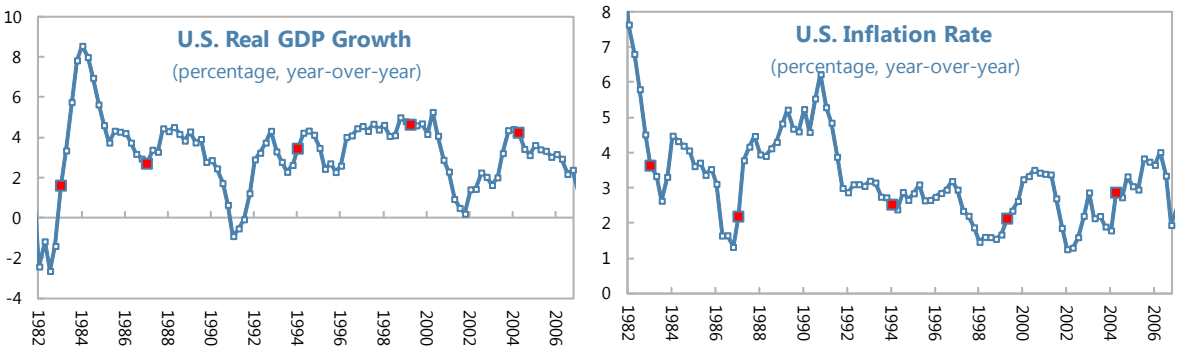
Figure 4

The Extra Sensitivity of Flows to the U.S. Interest Rate One Quarter Before Liftoff



Note: ***, ** and * indicate statistically significant at 1%, 5% and 10% percent, respectively.
1/ Average of the U.S. rate one quarter before liftoff for the five previous liftoff episodes.

Figure 5



Red squares represent liftoff quarters.

Figure 6

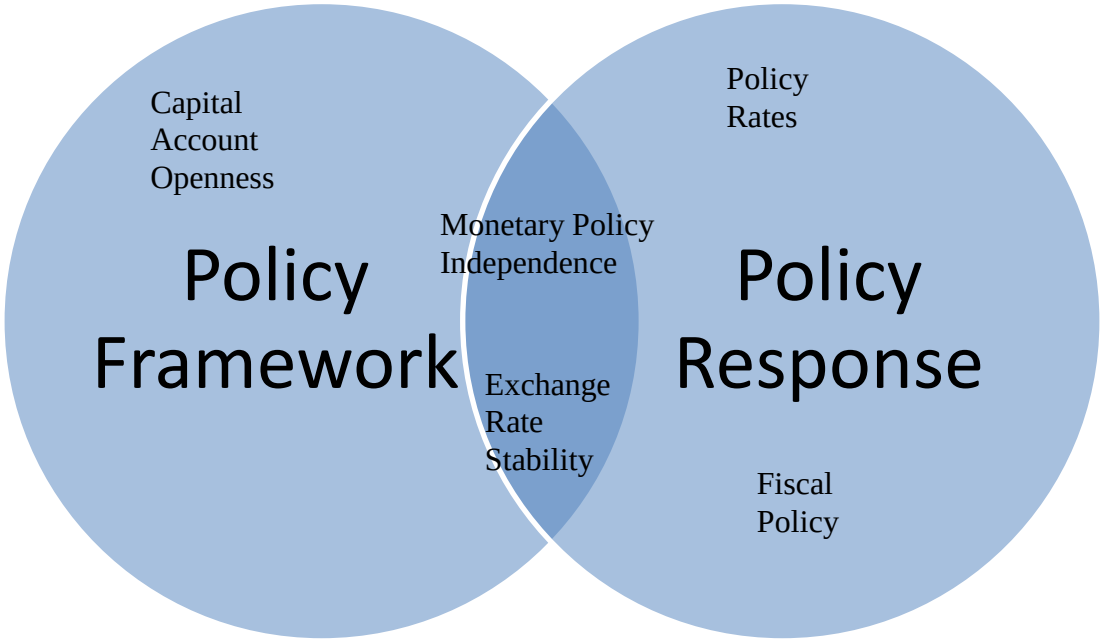


Figure 7 – Empirical Strategy

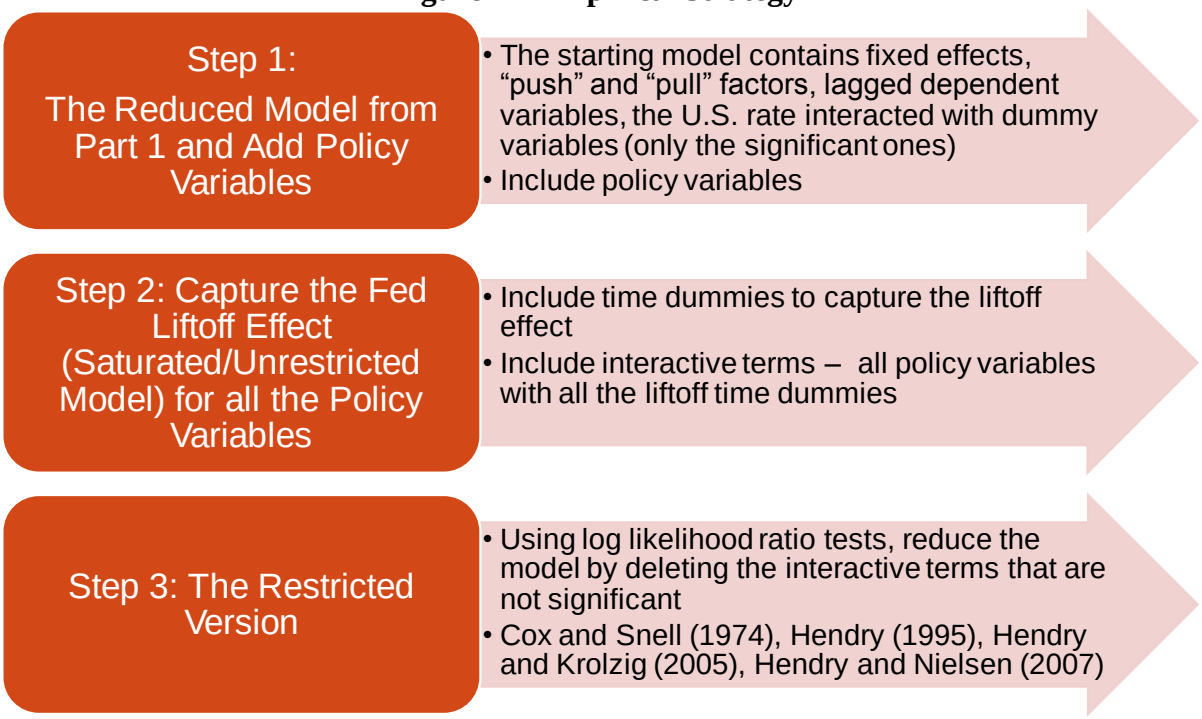
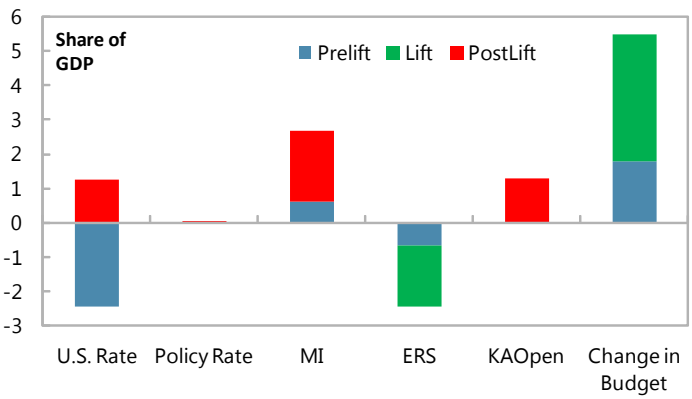


Figure 8

EM Total Flows - The Estimated Extra Impact During Liftoff Episodes Due to One Standard Deviation Shock in Each Variable
(coefficient of variable*one std. of variable)



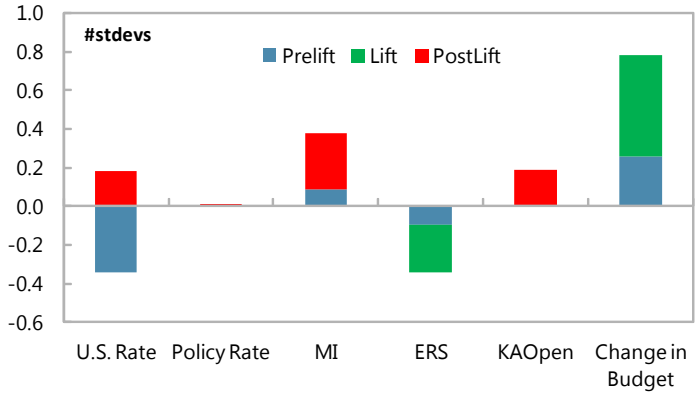


Figure 9

EM Total Flows - The Estimated Extra Impact During Liftoff Episodes Using Average Values of Each Variable
(coefficient of variable*average value of variable during previous five liftoff episodes)

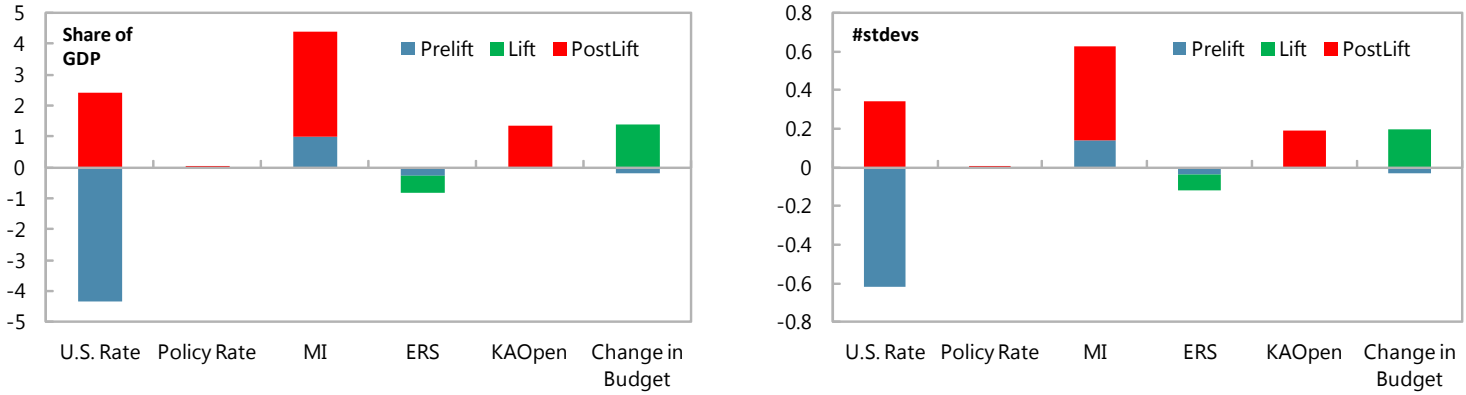


Figure 10

EM Portfolio Flows - The Estimated Extra Impact During Liftoff Episodes Due to One Standard Deviation Shock in Each Variable (coefficient of variable*one std. of variable)

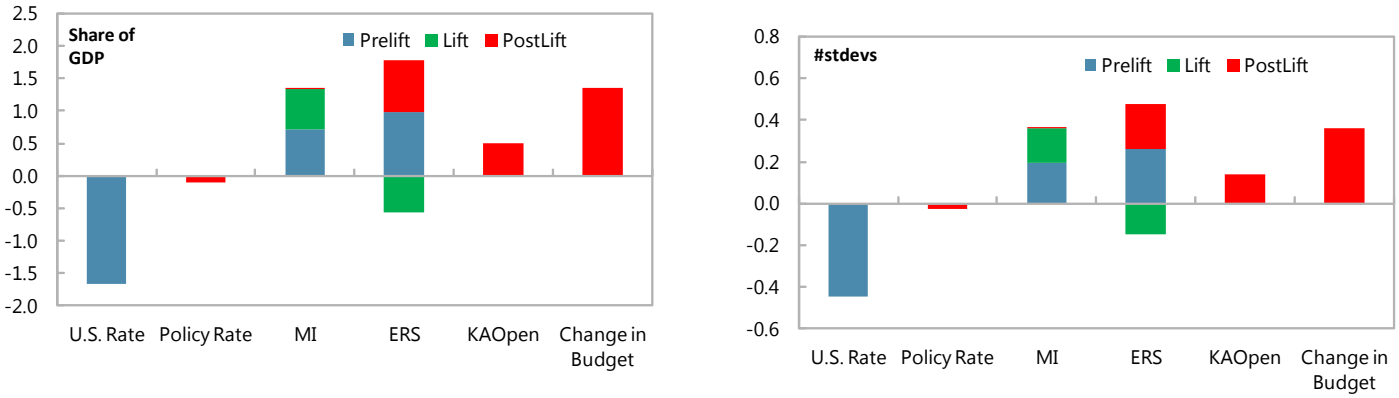
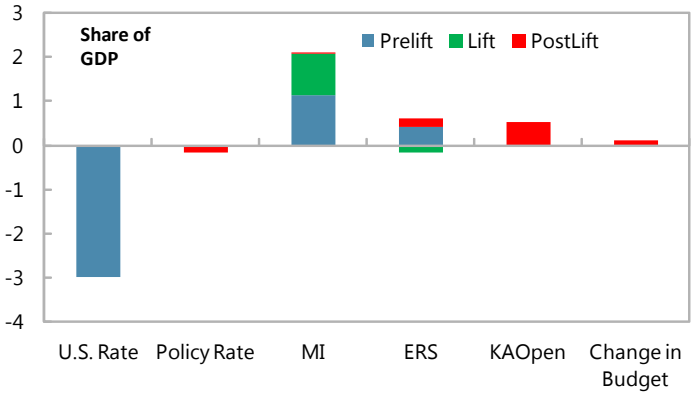
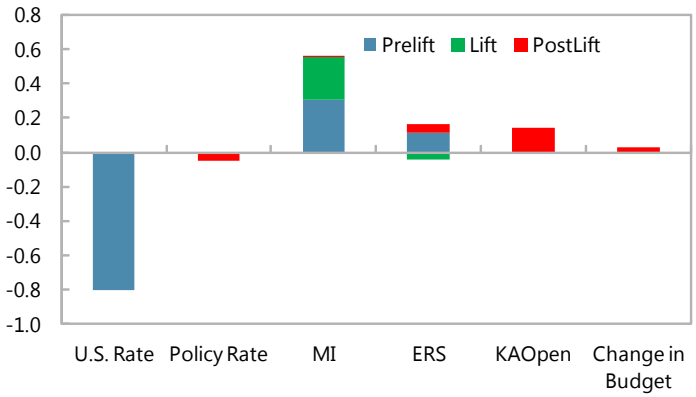


Figure 11

EM Portfolio Flows - The Estimated Extra Impact During Liftoff Episodes Using Average Values of Each Variable
(coefficient of variable*average value of variable during previous five liftoff episodes)





VII. TABLES

Table 1

Emerging Markets

Dependent Variable (in percent GDP)	Net Total Flows			Net Portfolio Flows		
	(1)	(2)	(3)	(1)	(2)	(3)
External Factors						
US Interest Rate	**-0.158**	**-0.078**	**-0.163**	**-0.048**	**-0.018**	**-0.026**
	0.131	0.157	0.134	0.092	0.110	0.090
US Consumer Prices	**0.310**	**0.247**	**0.309**	**-0.118**	**-0.060**	**-0.120**
	0.341	0.351	0.341	0.259	0.271	0.257
US GDP Growth	**-0.027**	**-0.107**	**-0.021**	**0.039**	**-0.012**	**0.017**
	0.166	0.174	0.161	0.111	0.124	0.110
Risk Aversion	**-0.095** **	**-0.143** **	**-0.109** **	**-0.026**	**-0.060**	**-0.043**
	0.048	0.059	0.051	0.032	0.037	0.032
Commodity Prices	**0.002**	**0.002**	**0.001**	**0.002**	**-0.003**	**0.002**
	0.010	0.011	0.010	0.009	0.009	0.009
Domestic Factors						
Interest Rate	**0.004** ***	**0.004** ***	**0.004** ***	**0.003** ***	**0.003** ***	**0.003** ***
	0.001	0.001	0.001	0.001	0.001	0.001
Consumer Prices	**-0.004** ***	**-0.004** ***	**-0.004** ***	**-0.001**	**-0.002** **	**-0.001**
	0.001	0.001	0.001	0.001	0.001	0.001
REER	**0.064** ***	**0.061** ***	**0.061** ***	**0.024** ***	**0.025** ***	**0.024** ***
	0.012	0.013	0.012	0.009	0.009	0.009
GDP Growth	**0.256** ***	**0.239** ***	**0.247** ***	**0.014**	**0.015**	**0.009**
	0.058	0.060	0.059	0.029	0.029	0.029
Liftoff Effect (US Interest Rate interacted with:)						
Two quarters before liftoff		**-0.384** *			**-0.095**	
		0.228			0.156	
One quarter before liftoff		**-0.890** ***	**-0.721** **		**-0.398** **	**-0.333** ***
		0.340	0.310		0.176	0.134
Liftoff quarter		**-0.319**			**0.110**	
		0.274			0.169	
One quarter after liftoff		**0.436** *	**0.517** **		**0.073**	
		0.223	0.217		0.144	
Two quarters after liftoff		**0.033**			**-0.034**	
		0.189			0.180	
Dummies for liftoff variables (individual time dummies)	N	Y	Y	N	Y	Y
Number of Lagged Dependent Variables	8	8	8	4	4	4
Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	966	966	966	973	973	973

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below.

Table 2

Advanced Markets

Dependent Variable (in percent GDP)	Net Total Flows			Net Portfolio Flows		
	(1)	(2)	(3)	(1)	(2)	(3)
External Factors						
US Interest Rate	**0.009**	**0.022**	**-0.006**	**-0.229** *	**-0.081**	**-0.101**
	0.109	0.118	0.106	0.132	0.165	0.139
US Consumer Prices	**-0.201**	**-0.166**	**-0.196**	**0.091**	**-0.066**	**-0.077**
	0.281	0.278	0.268	0.282	0.317	0.293
US GDP Growth	**-0.041**	**-0.059**	**-0.032**	**-0.013**	**-0.114**	**-0.092**
	0.101	0.102	0.097	0.111	0.139	0.122
Risk Aversion	**-0.070** *	**-0.092** **	**-0.074** *	**-0.014**	**-0.057**	**-0.041**
	0.039	0.046	0.039	0.056	0.062	0.056
Commodity Prices	**0.015**	**0.010**	**0.011**	**0.006**	**0.006**	**0.007**
	0.013	0.012	0.012	0.011	0.012	0.012
Domestic Factors						
Interest Rate	**0.118**	**0.113**	**0.123**	**0.227** ***	**0.228** ***	**0.231** ***
	0.090	0.090	0.091	0.075	0.078	0.077
Consumer Prices	**0.027**	**0.031**	**0.024**	**-0.145**	**-0.133**	**-0.138**
	0.108	0.107	0.108	0.114	0.117	0.116
REER	**0.016**	**0.009**	**0.008**	**0.018**	**0.018**	**0.018**
	0.022	0.023	0.023	0.032	0.032	0.032
GDP Growth	**0.151** **	**0.150** **	**0.154** **	**0.081**	**0.073**	**0.076**
	0.070	0.070	0.070	0.115	0.116	0.115
Liftoff Effect (US Interest Rate interacted with:)						
Two quarters before liftoff		**-0.169**			**-0.462** *	**-0.406** *
		0.155			0.256	0.228
One quarter before liftoff		**-0.207**			**-0.225**	
		0.221			0.232	
Liftoff quarter		**0.273**			**-0.340**	**-0.314**
		0.277			0.233	0.199
One quarter after liftoff		**0.293** **	**0.305** ***		**0.167**	
		0.117	0.117		0.168	
Two quarters after liftoff		**-0.223** *	**-0.217** *		**-0.667** *	**-0.660** *
		0.125	0.121		0.388	0.370
Dummies for liftoff variables (individual time dummies)	N	Y	Y	N	Y	Y
Number of Lagged Dependent Variables	8	10	10	12	12	12
Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	1512	1496	1496	1459	1459	1459

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below.

Table 3

Emerging Markets

Dependent Variable (in percent GDP)	Net Total Flows					
Policy Variables	**No Interactive Term**	**Two Quarters Before Liftoff**	**One Quarter Before Liftoff**	**Liftoff Quarter**	**One Quarter After Liftoff**	**Two Quarters After Liftoff**
Policy Rate	**0.001** ***				**0.003** ***	
	0.000				0.000	
Monetary Policy Independence	**-0.477**		**2.161** *			**7.341** ***
	0.445		1.300			2.490
Exchange Rate Stability	**0.795**	**-3.928** *		**-10.324** ***		
	1.637	2.088		1.933		
Capital Account Openness	**-0.074**					**3.976** ***
	0.788					1.162

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below. Number of lagged dependent variables = 8. The regression includes country fixed effects. Number of observations = 965.

Table 4

Emerging Markets

Dependent Variable (in percent GDP)	Net Portfolio Flows					
Policy Variables	**No Interactive Term**	**Two Quarters Before Liftoff**	**One Quarter Before Liftoff**	**Liftoff Quarter**	**One Quarter After Liftoff**	**Two Quarters After Liftoff**
Policy Rate	**0.000** ***				**0.003** ***	**-0.020** *
	0.000				0.000	0.011
Monetary Policy Independence	**-0.326**		**2.530** ***	**2.228** **	**-2.153** *	**2.182** ***
	0.396		0.700	0.926	1.227	0.663
Exchange Rate Stability	**2.044**		**5.650** **	**-3.303** ***		**4.675** ***
	1.468		2.729	1.020		1.210
Capital Account Openness	**-0.539**					**1.538** **
	0.674					0.740

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below. AR(4) included. The regression includes country fixed effects. Number of observations = 912.

Table 5

Advanced Markets

Dependent Variable (in percent GDP)	Net Total Flows					
Policy Variables	**No Interactive Term**	**Two Quarters Before Liftoff**	**One Quarter Before Liftoff**	**Liftoff Quarter**	**One Quarter After Liftoff**	**Two Quarters After Liftoff**
Policy Rate	**0.078**	**-0.328** **				
	0.115	0.143				
Monetary Policy Independence	**-0.343**					
	0.682					
Exchange Rate Stability	**-9.172**	**111.521** ***	**296.593** **		**-184.509** ***	**-54.320** **
	7.808	36.310	115.075		69.329	23.930
Capital Account Openness	**-3.225** *				**5.577** **	
	1.827				2.882	

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below. Number of lagged dependent variables = 10. The regression includes country fixed effects. Number of observations = 1170.

Table 6

Advanced Markets

Dependent Variable (in percent GDP)	Net Portfolio Flows					
Policy Variables	**No Interactive Term**	**Two Quarters Before Liftoff**	**One Quarter Before Liftoff**	**Liftoff Quarter**	**One Quarter After Liftoff**	**Two Quarters After Liftoff**
Policy Rate	**0.410** *					**0.572** *
	0.222					0.311
Monetary Policy Independence	**-0.920**					
	1.225					
Exchange Rate Stability	**-46.259**		**-392.574** *	**-525.911** ***		
	31.661		222.604	166.203		
Capital Account Openness	**-5.543**					
	3.907					

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below. AR(16) included. The regression includes country fixed effects. Number of observations = 800.

Table 7

Quarterly Change in Budget Surplus/Deficit (+/-)

Dependent Variable (in percent GDP)	EM Total Flows	EM Portfolio Flows	AM Total Flows	AM Portfolio Flows
Change in Budget	**-0.109**	**-0.072**	**-0.034**	**0.044**
	0.076	0.056	0.048	0.076
Change in Budget interacted with:				
Two quarters before liftoff	**0.491** ***			
	0.161			
One quarter before liftoff				
Liftoff quarter	**1.023** ***			
	0.329			
One quarter after liftoff		**0.370** ***	**0.418** **	
		0.084	0.173	
Two quarters after liftoff				**0.378** *
				0.214
Number of Lagged Dependent Variables	6	4	8	4
Fixed Effects	Y	Y	Y	Y
Observations	620	624	1202	1213

Note: *** indicates statistically significant at 1%, ** indicates statistically significant at 5%, and * indicates statistically significant at 10%. Point estimates in bold letters and robust standard errors below.

VIII. APPENDIX

LIST OF COUNTRIES

Emerging Markets	Country	Country Code	Advanced Markets	Country	Country Code
1	Brazil	223	1	Australia	193
2	Bulgaria	918	2	Austria	122
3	Chile	228	3	Canada	156
4	Colombia	233	4	China,P.R.:Hong Kong	532
5	Croatia	960	5	Czech Republic	935
6	Hungary	944	6	Denmark	128
7	India	534	7	Finland	172
8	Indonesia	536	8	France	132
9	Latvia	941	9	Germany	134
10	Lithuania	946	10	Greece	174
11	Macedonia, FYR	962	11	Iceland	176
12	Mexico	273	12	Ireland	178
13	Peru	293	13	Israel	436
14	Philippines	566	14	Italy	136
15	Poland	964	15	Japan	158
16	Romania	968	16	Korea, Republic of	542
17	Russian Federation	922	17	Malta	181
18	South Africa	199	18	Netherlands	138
19	Thailand	578	19	New Zealand	196
20	Turkey	186	20	Portugal	182
21	Ukraine	926	21	Singapore	576
			22	Slovak Republic	936
			23	Slovenia	961
			24	Spain	184
			25	Sweden	144
			26	Switzerland	146
			27	United Kingdom	112

DATA SOURCES

INDICATORS	SOURCES
Total private flows and portfolio flows, expressed as a share of GDP	Financial Flows Analytics database compiled from the IMF's Balance of Payments Statistics, International Financial Statistics, and World Economic Outlook databases, World Bank's World Development Indicators database, Haver Analytics, CEIC Asia database, CEIC China database, and national sources.
U.S. interest rate	Federal Reserve (FRED)
U.S. consumer prices	IFS
U.S. real GDP growth	U.S. Bureau of Economic Analysis (BEA)
S&P 500 total return index	S&P (downloaded using Haver Analytics)
VXO index	WSJ (downloaded using Haver Analytics)
Commodity price index	IMF
Domestic interest rate, domestic consumer prices, domestic real GDP, real effective exchange rate, exchange rates vis-à-vis dollar	IFS, National Sources
Capital account openness index	Chinn and Ito (2006)
Budget surplus, as a share of GDP	National sources, downloaded using Haver Analytics