Uncovered Equity "Disparity" in Emerging Markets

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Abstract

The portfolio-rebalancing theory of Hau and Rey (2006) yields uncovered equity parity (UEP) as a prediction that local-currency equity return appreciation is offset by currency depreciation. Contrary to UEP, estimations of vector autoregressive models for eight Asian emerging markets using daily data reveals a positive nexus between equity returns and currency returns. The extent of the uncovered equity "disparity" is time-varying and asymmetric as it exacerbates in crisis. We find evidence that the UEP failure is due to investors' return chasing. Robustness checks suggest that this explanation is not an artifact of changing global volatility conditions or a flight-to-quality phenomenon.

Keywords: Uncovered Equity Parity; Equity flows; Equity returns; Foreign exchange rates; Return-chasing

JEL classification: F31; G10; G11; G15

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"The increasing size and equity content of current capital flows has not yet inspired a new financial market paradigm for exchange rate theory, in which exchange rates, equity market returns, and capital flows are jointly determined." (Hau and Rey, 2006).

1. Introduction

Uncovered equity parity (UEP) is a condition which states that the difference in equity returns between two countries is equal to the expected change in exchange rates (hereafter FX) between the countries' currencies. Accordingly, international local-currency equity return differentials are perfectly offset by FX fluctuations. This testable prediction, known as UEP hypothesis, emanates from the theory of Hau and Rey (2004, 2006) which assumes imperfect FX hedging and imperfectly elastic FX supply. The key mechanism underlying UEP in this theory is the international investors' *portfolio rebalancing* strategy; namely, any surge in foreign vis-à-vis domestic equity returns induces investors to repatriate some of their foreign-equity wealth due to a desire to reduce their FX exposure which, in turn, induces the foreign currency to depreciate.[1] Thus, through capital flows, the UEP theory predicts a perfect negative relation between local-currency equity return differentials and FX returns.

UEP is relevant for at least two reasons. On the one hand, it asserts that foreign net equity flows drive FX returns, which have been notoriously difficult to predict using other macroeconomic variables (for a seminal paper, see, Meese and Rogoff, 1983). On the other hand, from the perspective of international portfolio management, it is also important for global investors, as foreign equity investments inevitably involve FX investments.

[1] The UEP hypothesis can be embedded in the standard no-arbitrage asset pricing theory of Cochrane (2005). This is the route adopted in the empirical portfolio analysis of UEP by Cenedese et al. (2015).

The goal of the paper is to further our understanding of the dynamics between capital flows, and equity and FX markets in a sample of eight emerging markets (EMs) by investigating the two underlying mechanisms leading to UEP according to the Hau and Rey (2004, 2006) theory. The study we come closest to is Curcuru et al. (2011, 2014) who also examine the mechanisms behind UEP. There are three noteworthy differences between our paper and their study as well as the other existing literature (Campbell et al., 2010; Cenedese et al., 2015; Cho et al., 2016). Firstly, we use a data set recording the transactions of *all* foreign investors in a relatively high frequency (daily) in contrast to the various bilateral monthly/quarterly data sets in existing literature, which portraits a more complete picture and reveals the masked mixed FX effects from the neighboring days in the same month. [2]

Secondly, instead of portfolio-based techniques, we utilize reduced-form vector autoregressive (VAR) and structural VAR (SVAR) modeling approaches which can easily control for reverse causality and endogeneity. Through this methodology, we can test the mechanisms towards UEP by contemplating both contemporaneous and lead-lag relationships. The theoretical framework of Hau and Rey (2004, 2006) portrays contemporaneous relationships, but delays may occur, in practice, if investors do not frequently rebalance their portfolios. For this reason, Hau and Rey (2004) conduct empirical tests of the lead-lag relationship among equity returns, equity flows and FX returns.[3] Delayed responses are implicitly acknowledged in the empirical tests of UEP (Curcuru et al., 2014).

[2] Hau and Rey (2006) only use daily equity and FX returns without capital flows, and hence can only check the prediction but not the two steps of UEP below.

[3] Delays in the response of capital flows to equity returns are plausible because bank managers of international equity portfolios are usually allowed ten days to rebalance their positions when risk trading limits are exceeded

Thirdly, after finding that surges in local-currency equity returns come hand-in-hand with local currency appreciation – a positive relationship between local-currency equity return and FX returns in EMs – we conduct various tests seeking to ascertain the specific mechanisms that lead towards what we refer to as uncovered equity "disparity" in EMs.

In the Hau and Rey (2004, 2006) theory, the UEP condition is rationalized upon a first mechanism driven by the investors' strategy known as *portfolio-rebalancing*; *e*quity investors rebalance away from (toward) countries whose equity/FX markets are performing well (poorly) which induces a negative relationship between local-currency equity returns and net equity flows. However, empirically it is still debatable in the literature whether foreign investors follow a portfolio-rebalancing or return-chasing strategy using monthly or lower frequency data (Curcuru et al., 2011, 2014). Our daily data set offers us a good opportunity to question the existence of this mechanism in UEP. Our empirical results strongly refute this mechanism both when UEP is formalized as a contemporaneous relationship and as a lead-lag relationship: net equity flows respond positively to both current and past local-currency equity returns. Subsequently, we ask the question of whether foreign equity investors *chase returns* instead. Decomposing the equity return into its expected and unexpected components, we find that net equity flows are positively driven by expected equity returns which suggest that UEP fails because international equity investors chase returns.

The second mechanism towards UEP is that a decrease (increase) in net equity flows comes hand-in-hand with local currency depreciation (appreciation). Our (S)VAR-based tests support it by suggesting a significantly positive relationship between flows and FX returns.

according to the Value-at-Risk (VaR) measure. Over ten days are allowed if there are liquidity constraints.

Altogether the evidence from our investigation indicates that it is the first (not the second) mechanism, as portrayed in the Hau and Rey (2006) theory, which is responsible for the failure of the UEP in EMs. Figure I illustrates this. The top part of the graph (dotted lines) summarizes the two theoretical mechanisms that, according to Hau and Rey's (2006) model, lead towards the UEP prediction. The bottom part of the figure (continuous lines) illustrates the mechanisms suggested by our empirical VAR-based tests for a sample of eight EMs.

Robustness checks suggest that the prevalence of *return-chasing* by investors as the main driver of uncovered equity "disparity" in EMs is not an artifact of not controlling for changes in global equity volatility (Cenedese et al., 2015; Ulku and Weber, 2014). Our daily data allows us further to document that the uncovered equity "disparity" is time-varying and asymmetric. The positive moving correlations between local-currency equity returns and FX returns exhibit an upward trend which, in the context of increasing financial market integration, reinforces the evidence in support of the *return-chasing* hypothesis. The asymmetry aspect refers to the fact that the magnitude of the positive correlations exacerbates in *down* (versus *up* periods), and in *crisis* (versus *non-crisis* periods) with the highest correlations occurring during the late 2000s Global Financial Crisis, which ascribes some role that flight-to-quality (Cho et al., 2016).

Our paper relates to several strands of the literature. It relates to the handful of studies that examine the relationship between local-currency *equity returns* and *FX returns* to test the UEP condition. The evidence for developed markets is fairly supportive (Hau and Rey, 2004, 2006; Cappiello and De Santis, 2007)[4] while, in contrast, for EMs it has been shown that

[4]One notable exception is Campbell et al. (2010) who find unsupportive evidence for commodity-dependent

local currency appreciation follows a bullish local stock market (Kim, 2011; Cho et al., 2016). In a portfolio setting for 42 countries, Cenedese et al. (2015) find that FX fluctuations are unrelated to differentials in country-level equity returns, and show that the positive excess returns to the portfolio strategy that longs (shorts) the equity indices with better (worse) prospects are not a compensation for standard risk factors nor global equity volatility risk.

Our paper relates to a strand of literature that examines the reactions of foreign investors to local-currency equity returns. In an intertemporal CAPM framework, Bohn and Tesar (1996) decompose the net purchases of U.S. investors in foreign equity markets into two types of transactions driven by the respective goals of maintaining a balanced portfolio of securities (portfolio-rebalancing) and of exploiting time-varying investment opportunities (return-chasing), while it is an empirical question which one dominates. Their evidence predominantly supports the latter; U.S. investors tend to move into (retreat from) markets where returns are expected to be high (low). Return-chasing has been confirmed by subsequent studies using U.S. bilateral flows (Froot et al., 2001; Griffin et al., 2004; Richards, 2005; Froot and Ramadorai, 2008) and U.S. portfolio holdings data (Froot et al., 2001; Froot and Ramadorai, 2008). The return-chasing hypothesis has been embedded in various theoretical models (Brennan and Cao, 1997; Guidolin, 2005; Albuquerque et al., 2007, 2009; Dumas et al., 2014). Analyzing monthly portfolio holdings data, Curcuru et al. (2011, 2014) instead find that U.S. equity investors neither chase equity returns nor buy past losers but predominantly sell past winners, a form of partial portfolio rebalancing. They argue

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countries such as Australia and Canada. Importantly, they underline the importance of conducting further research with data from EMs at frequency higher than monthly and including the late 2000s financial crisis.

that the rebalancing is not dictated by a desire to reduce FX exposure but by tactical decisions.

A third strand of literature relevant to our paper examines the response of *equity flows* to *currency fluctuations*. Hau and Rey (2004, 2006) argue theoretically that foreign equity investors repatriate part of their foreign equity investment when its relative value increases following either equity or FX market shocks. On the other hand, little evidence suggests that investors rebalance their equity portfolios in reaction to past FX movements (Curcuru et al., 2014). The main rationale for these empirical findings is that foreign equity investors hedge their equity purchases against FX risk. Surveys of investors suggest though that international equity positions are mostly unhedged (e.g., only 8% according to Levich et al., 1999). As argued by Campbell et al., (2010), Curcuru et al. (2014) and Melvin and Prins (2015), this may be because it is hard to establish *ex ante* the amount of currency exposure that is associated with foreign equity.

Finally, our study relates to a strand of literature that documents the impact of *net equity flows* on *FX returns*. Hau et al. (2010) provide evidence of a downward sloping demand curve in FX markets and show that equity flows arising from the 2001/2002 redefinition of the MSCI Global Equity index affected FX returns. Froot and Ramadorai (2005) argue that currency flows of institutional investors only cause contemporaneous price pressures in FX markets. Market microstructure studies suggest instead that FX order flows can have effects on future FX returns due to private information (e.g., Evans and Lyons, 2002a, b). Bridging macroeconomic and microstructure studies, Hau and Rey (2004) contend that foreign net equity flows and FX order flows are closely aligned, and show that equity flows have a positive impact on future FX returns. Hau and Rey (2006) and Curcuru et al. (2014) find evidence of a positive contemporaneous relation between net equity flows and FX returns.

The rest of the paper unfolds as follows. Section 2 presents the data and preliminary data analysis. Sections 3 and 4 examine the first and second mechanisms towards UEP, respectively. Section 5 compares our return-chasing explanation with other existing explanations, explores other aspects of the failure of UEP in EMs and presents various robustness tests. A final section concludes.

2. Data, Summary Statistics and Preliminary UEP Tests

2.1. Data description

For eight East Asian EMs, we collect a data set on all foreign trades taking place each day, and on end-of-day closing prices and spot rates; we use these data, respectively, to construct *net* (inflows minus outflows) *equity flows*, local-currency equity returns and *FX returns*.[5] The cross-section dimension, N=8 markets, is moderate but economically important.[6] The start date varies across i=1,…, N markets, but the time span is large for all (T_i ranges from 1463

[5] Griffin et al. (2004) additionally to the six East Asian markets consider one in South Asia (Sri Lanka), one in Eastern Europe (Slovenia), and one in Africa (South Africa) but pay special attention to the evidence from East Asian markets as they have been the focus of heated debate surrounding the potentially destabilizing influence of capital flows. It should be noted that Griffin et al. (2004) did not distinguish between the BSE and NSE in India.

[6] According to U.S. Treasury International Capital (TIC) database, over the period from 2007 to 2012 (from 1988 to 2006) these markets represent over 70 (50) per cent of the sum of the period-average bilateral equity flows of the EMs (using IMF country classifications of April 2012) vis-à-vis the U.S. scaled by domestic GDP.

days for India to 4224 days for Indonesia). The time period covers at least 13 years until December 30, 2013.

The equity flow data have two nice properties for the goal of studying the UEP mechanisms. We use data on *total* foreign net equity flows for each EM. By incorporating the trades of *all* foreign investors, the data coverage is broader than that of bilateral flows typically reflecting only U.S. investor trades (e.g., Brennan and Cao, 1997; Hau and Rey, 2004, 2006), or mutual funds (Hau and Rey, 2008), or customers of a particular custodian (Froot et al., 2001; Froot and Ramadorai, 2005, 2008). Its daily frequency allows us to capture more accurately the joint dynamics of equity flows, FX returns, and equity returns than coarser (monthly/quarterly) data. The *daily* observation frequency of our data is relatively high in contrast with the monthly or quarterly data employed in previous UEP analyses (Campbell et al., 2010; Curcuru et al., 2011, 2014; Cenedese et al., 2015; Cho et al., 2016) which should allow us to capture better the dynamic interrelations between equity returns, equity flows and FX returns.

Daily net equity flows in the eight East Asian markets were obtained via the stock exchanges of the markets, Bloomberg and CEIC databases. Details are provided in Appendix A. Following Froot et al. (2001) and Richards (2005), we do not include net purchases by foreigners of American Depositary Receipts (ADRs) or country funds in foreign markets, equity futures or other derivatives in the domestic markets. Curcuru et al. (2014) provide a snapshot of the end-2010 amounts of the international positions of U.S. investors and conclude that it is impossible to tell the real currency exposure faced by U.S. investors with publicly available data. The data problems with the derivatives are more daunting. We scale daily net purchases by foreigners with the previous day market capitalization (from Bloomberg) to express flows in percentage.

Local-currency equity returns are the daily logarithmic changes (in percentage) of the main capitalization-weighted index of stocks traded on each of the eight EMs. Ideally, UEP should be tested with the time-varying holding weights of individual stocks for every foreign investor, so that researchers can calculate the portfolio returns earned by all foreign investors in aggregate. Since the directly measured returns series based on foreign investors' holdings do not exist, the best proxy is the returns of country-level equity indices that comprise the largest and most liquid firms in each country, as foreigners tend to hold these (see Curcuru et al., 2014). We use the daily closing prices of the Bombay Stock Exchange (BSE) Sensitive 30 Index in India, the National Stock Exchange (NSE) CNX Nifty 500 index in India, the Jakarta JSX Composite index in Indonesia, the Kospi and Kosdaq indices in Korea, the PSE Composite index in the Philippines, the TWSE/TAIEX index in Taiwan, and the Bangkok SET Index in Thailand. These indices are the “headline” indices available to investors on a real-time basis. Like Richards (2005), we consider the secondary board (Kosdaq) for Korea as it has a much larger market capitalization than many main boards in Asian EMs.

All eight EMs have floating FX rates over the sample period. Daily FX returns are daily logarithmic changes (in percent) of the spot rate defined as the US$ price of EM currency; thus, a positive return indicates EM currency appreciation. We collect the rates at the closing time of all equity markets from DataStream, Bloomberg and the local exchanges.

2.2. Summary statistics and preliminary UEP tests

We summarize the distribution of daily net equity flows (NEF_{it}), local-currency equity returns (LER_{it}), and FX returns (FXR_{it}) per country in Table I through the mean, median, standard deviation, autocorrelations up to five days and pairwise contemporaneous correlations.

The net equity flows are positive on average for all eight Asian EMs; foreign equity investors purchased more EM equity than they sold on average from the mid/late 1990s to 2013. The volatility of the net equity flows (standard deviation) varies across markets from 0.0027% for Philippines to about 15 times as much (0.0402%) for Taiwan.

We confirm the stylized fact that, in contrast with daily equity/FX returns, net flows exhibit substantial positive autocorrelation with a very slow decay (see, e.g., Froot et al., 2001; Griffin et al., 2004; Richards. 2005). The mean first-order autocorrelation is 0.389. The slow decay can be ascribed to investors changing their positions gradually possibly to mitigate the market impact and to the heterogeneous information processing speeds of different investor types (Griffin et al., 2004). In contrast, only the first-order autocorrelation of equity returns is significant and positive but rather low with a mean value of 0.097. Daily FX returns are not autocorrelated (with a mean value of 0.026).

The last two columns show that the correlation between equity returns and net equity flows is substantial and positive, with median 0.304, in line with the literature on equity flows and equity returns (e.g., Froot et al., 2001; Griffin et al., 2004; Richards, 2005). We also find a statistically significant positive contemporaneous correlation between net equity flows and FX returns, albeit smaller, with median 0.125. Finally, the correlation between local-currency equity returns and FX returns is also substantial and positive ranging from 0.201 (JSX) to 0.465 (BSE and NSE), with median 0.301. This piece of evidence is clearly at odds with the

UEP prediction that a country's currency tends to appreciate when its stock market is bullish.

We organize the subsequent empirical analysis in two sections pertaining, respectively, to the mechanisms underlying the UEP hypothesis according to the Hau and Rey (2006) theory. Appendix B distils the essence of Hau and Rey (2006)'s theoretical framework and presents the theoretical framework that would rationalize the UEP under return-chasing. To be specific, we modify their approach to address the failure of UEP in EMs from the perspective of return-chasing there.

3. Local-Currency Equity Returns and Net Equity Flows

This section provides empirical evidence on the relationship between *local-currency equity returns* and *net equity flows*. In Section 3.1, we directly test the first mechanism towards achieving UEP according to the Hau and Rey (2006) theory: foreign equity investors pursue portfolio-rebalancing strategies. In Section 3.2, we test whether they instead return-chase.

3.1. Foreign equity portfolio rebalancing

According to the Hau and Rey (2006) theory, the first mechanism towards UEP requires that foreign equity investors in aggregate pursue a portfolio-rebalancing strategy. Since the total equity return comprises a local-currency equity return and an FX return, our task is twofold. We begin by testing whether foreign equity investors in EMs pursue a portfolio-rebalancing strategy regarding local-currency equity returns. Then we test whether EM equity investors engage in portfolio-rebalancing in response to currency fluctuations.

In order to elucidate how local-currency equity returns, $LER_{i,t}$, affect net equity flows,

NEF_{it}, we build on the methodology of Froot et al. (2001), Griffin et al. (2004) and Richards (2005), and estimate bivariate structural autoregressive models (SVAR) to capture their joint dynamics

$$LER_{i,t} = \alpha_1 + \sum_{d=1}^{D} \theta_{1,d} LER_{i,t-d} + \sum_{d=1}^{D} \phi_{1,d} NEF_{i,t-d} + \sum_{d=1}^{D} \gamma_{1,d} FXR_{i,t-d} + u_{i,t}^{LER} \tag{1a}$$

$$NEF_{i,t} = \alpha_2 + \sum_{d=0}^{D} \theta_{2,d} LER_{i,t-d} + \sum_{d=1}^{D} \phi_{2,d} NEF_{i,t-d} + \sum_{d=1}^{D} \gamma_{2,d} FXR_{i,t-d} + u_{i,t}^{NEF} \tag{1b}$$

for each sample country i=1,…,N using t=1,…,T_i daily observations. The main parameters of interest are $\theta_{2,0}$ and $(\theta_{2,1}, \ldots, \theta_{2,D})'$ to assess the contemporaneous and lead-lag effects, respectively, that relate to the first Hau and Rey (2006) mechanism towards UEP. The model is called 'structural' simply because the contemporaneous relation between local-currency equity returns and net flows is captured by $\theta_{2,0}$, and the error terms are assumed to be unrelated

$$\begin{bmatrix} u_{i,t}^{LER} \\ u_{i,t}^{NEF} \end{bmatrix} \approx \mathrm{N}\left[0,\ \mathbf{D}_i^{LER,NEF}\right], \text{ and } \mathbf{D}_i^{LER,NEF} = \begin{bmatrix} \sigma_{i,LER}^2 & 0 \\ 0 & \sigma_{i,NEF}^2 \end{bmatrix}.$$

In order to avoid omitted-variable bias due to the non-zero contemporaneous relation between FX returns and local-currency equity returns, $corr(LER_{i,t-d}, FXR_{i,t-d}) \neq 0$, as in Griffin et al. (2004), we include lagged FX returns in the bivariate system.[7,8] We estimate the

[7] The SVAR of Hasbrouck (1991) controls instead for the contemporaneous effect of net flows on returns since he is interested in how past flows affect returns. As pointed out by Ulku and Weber (2014), while the setup in Hasbrouck (1991) may be legitimate under a dealer system without frictions with tick data, flows may also be affected by contemporaneous returns with daily or less frequent data due to intra-period feedback trading (Brenan and Cao, 1997). We consider the Hasbrouck (1991) model in the robustness section.

SVARs by maximum likelihood (ML) individually so as to allow for full country heterogeneity. The system eigenvalues have moduli less than one which confirms the stationarity of the SVAR. Using the Hannan–Quinn Information Criterion (HQC), we identify a lag order of five days in line with Griffin et al. (2004) and Richards (2005). The Ljung-Box test is unable to reject the null hypothesis of no residual autocorrelation up to order five at the 5% significance level.

As Table II reports, the explanatory power of the equity flows Eq. (1b) ranges from 0.104 (PSE) to 0.516 (TWSE). Against the UEP hypothesis, the *t*-statistic of $\theta_{2,0}$ ranges between 7.65 (Kosdaq) to 25.81 (TWSE) across the eight Asian markets and suggests a significantly positive contemporaneous relation between local-currency equity returns and net flows. Rather than testing for contemporaneous portfolio-rebalancing, Curcuru et al. (2014) argue that U.S. investors may not continuously rebalance their portfolios and therefore, it is pertinent to test for the effect of past local-currency equity returns on the current equity flows. In contrast with Curcuru et al. (2014), our findings do not support the inter-temporal portfolio-rebalancing either since the cumulative effect of past local-currency equity returns is not negative $\sum_{j=1}^{5} \hat{\theta}_{2,j} \geq 0$. The Granger causality tests strongly reject the null hypothesis that past local-currency equity returns do not cause equity flows, $H_0: \theta_{2,1} = \theta_{2,2} = \ldots = \theta_{2,D} = 0$, with small p-values below 0.001. The contrast between these results and those in

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[8] Although it is tempting to use a tri-variate model, it is not grounded in the literature. As pointed out by Hau and Rey (2004), the ordering of the tri-variate VAR will be problematic (see page 126): In an earlier version of this paper, we have tried all possibilities of order (3*2=6), and the results are qualitatively similar to the results from our bi-variate model.

Curcuru et al. (2014) may be ascribed to the fact that our flows reflect all foreign investors, not just U.S. investors.

Figure II plots the dynamic response of net equity flows to a one-standard deviation shock in local-currency equity returns using the general impulse response functions (GIRFs) of Pesaran and Shin (1998) that are invariant to the ordering of the variables in the SVAR; hence, no assumptions are required on the sequencing of shocks. Confirming our previous results, we find a strong *positive* response of net equity flows to a same-day shock (and previous day's shock) in the local-currency equity return which is not reversed ten days after.

Next, we examine whether foreign investors in EM equity rebalance in response to FX fluctuations. For this purpose, we formulate a similar structural SVAR model for FX returns and net equity flows including local-currency equity returns as a control variable

$$FXR_{i,t} = \alpha_1 + \sum_{d=1}^{D} \gamma_{1,d} FXR_{i,t-d} + \sum_{d=1}^{D} \phi_{1,d} NEF_{i,t-d} + \sum_{d=1}^{D} \theta_{1,d} LER_{i,t-d} + u_{i,t}^{FXR} \tag{2a}$$

$$NEF_{i,t} = \alpha_2 + \sum_{d=0}^{D} \gamma_{2,d} FXR_{i,t-d} + \sum_{d=1}^{D} \phi_{2,d} NEF_{i,t-d} + \sum_{d=1}^{D} \theta_{2,d} LER_{i,t-d} + u_{i,t}^{NEF} \tag{2b}$$

with the following assumptions for the error terms

$$\begin{bmatrix} u_{i,t}^{FXR} \\ u_{i,t}^{NEF} \end{bmatrix} \approx \mathrm{N}\left[0,\ \mathbf{D}_i^{FXR,NEF}\right],\ \mathbf{D}_i^{FXR,NEF} = \begin{bmatrix} \sigma_{i,FXR}^2 & 0 \\ 0 & \sigma_{i,NEF}^2 \end{bmatrix}$$

The contemporaneous (and lead-lag) responses of the equity flows to the FX returns are captured, respectively, by the parameters $\gamma_{2,0}$ and $\left(\gamma_{2,1}, \ldots, \gamma_{2,D}\right)'$. The appropriate lag order D according to the HQC criteria is five days. Table III reports the estimation results.

The explanatory power of Eq. (28b) ranges from 0.096 (Thailand) to 0.577 (Philippines). Albeit not as strong as in the previous case, there is evidence of a positive association between contemporaneous FX returns and foreign equity flows with significance t-statistics ranging from 1.26 (Indonesia) to 16.14 (Taiwan). However, past FX returns have a muted effect on the equity flows as borne out by the small coefficient estimates and large p-value of the Granger causality test; thus, the null hypothesis that none of the previous FX returns (from day t-1 to t-5) influence the equity flows on day t cannot be rejected. Figure III plots the GIRFs that track the dynamic evolution of net equity flows NEF_t, NEF_{t+1},…, NEF_{t+10} in response to a one-standard-deviation shock to FXR_t. The shock has a significantly positive contemporaneous effect which dies off very quickly in one or two days.

To sum up, the findings indicate that foreign net equity flows (all foreign investors) to EMs respond *positively* to contemporaneous and past shocks to local-currency equity returns, and also to contemporaneous shocks to FX returns. This evidence stands against the notion that foreign equity investors pursue portfolio rebalancing strategies in response to total portfolio return changes (driven by equity or FX shocks) as suggested by the Hau and Rey (2006) theory of UEP. We find little evidence that the flows react to past currency movements, which endorses the findings for U.S. equity investors in Curcuru et al. (2014). The mild sensitivity of foreign equity flows to currency movements suggests that foreign equity investors in EMs use predominantly FX as a vehicle (Goldberg and Tile, 2008; Devereux and Shi, 2013).

3.2. Foreign equity return chasing

The above results suggest that the first mechanism behind the UEP prediction (portfolio-rebalancing) is not in place in Asian EMs. In order to provide firmer evidence on this issue, we now address the question of what drives the positive correlation between local-currency equity returns and foreign net equity flows. The literature has put forward two explanations that we can term as return-chasing versus macroeconomic news/sentiment hypotheses. Since both these two explanations stress the contemporaneous relationship, we focus on the contemporaneous relationship in this subsection, but note that the contemporaneous relationship may cause inter-temporal relationship since flows are seriously autocorrelated.

The return chasing hypothesis states that foreign investors increase their holdings of equities with relatively high expected total equity returns (Bohn and Tesar, 1996). According to the macroeconomic news/sentiment hypothesis, good (bad) news about the local-currency equity returns lead to positive (negative) returns which cause flows into (out of) equity markets (Ben-Rephael et al., 2011), or its counterpart in FX markets (Love and Payne, 2008).

Since the total equity return can be decomposed into a local-currency equity return and an FX return as formalized in Eq. (1), in order to test the return-chasing hypothesis, we further decompose the local-currency equity returns and FX returns into two components: expected and unexpected. A stronger (weaker) effect of the expected component than the unexpected component on the flows represents evidence in favor of the return-chasing (macroeconomic news/sentiment) hypothesis. It is not uncommon in the literature to proxy macroeconomic news or shocks to sentiment as the unexpected component of returns (e.g., Campbell, 1991; Engle and Ng, 1993). Although macroeconomic news or shocks to sentiment about asset returns may contain both an expected component and an unexpected component, it should be only the unexpected component that affects asset returns and capital flows (Ross et al., 1999).

The expected local-currency equity returns for day t conditional on the available information up to day t-1 are obtained as a combination of past local-currency equity returns, past net equity flows and past FX returns weighted by the parameters of the SVAR equation (1a) as

$$LER_{i,t}^{e} \equiv E\left(LER_{i,t} \middle| I_{t-1}\right) = \hat{\alpha}_1 + \sum_{d=1}^{D} \hat{\theta}_{1,d} LER_{i,t-d} + \sum_{d=1}^{D} \hat{\phi}_{1,d} NEF_{i,t-d} + \sum_{d=1}^{D} \hat{\gamma}_{1,d} FXR_{i,t-d} \quad (3)$$

and the unexpected returns are the model residuals $LER_{i,t}^{u} \equiv LER_{i,t} - LER_{i,t}^{e}$.

Likewise, the expected FX returns for day t conditional on the available information up to day t-1 are obtained as a combination of past local-currency equity returns, past net equity flows and past FX returns weighted by the parameters of the SVAR equation (2a) as

$$FXR_{i,t}^{e} \equiv E\left(FXR_{i,t} \middle| I_{t-1}\right) = \hat{\alpha}_1 + \sum_{d=1}^{D} \hat{\gamma}_{1,d} LER_{i,t-d} + \sum_{d=1}^{D} \hat{\phi}_{1,d} NEF_{i,t-d} + \sum_{d=1}^{D} \theta_{1,d} FXR_{i,t-d} \quad (4)$$

and unexpected returns are the model residuals $FXR_{i,t}^{u} \equiv FXR_{i,t} - FXR_{i,t}^{e}$. In the robustness section we obtain the (un)expected returns using reduced-form VAR models instead.

The local-currency equity return regressor in Eq. (1b), denoted $LER_{i,t}$, is replaced with two regressors – expected component $LER_{i,t}^{e}$ and unexpected component $LER_{i,t}^{u}$ with coefficients $\theta_{2,d}^{e}$ and $\theta_{2,d}^{u}$, respectively – and the SVAR model (1) is re-estimated. To avoid unnecessary distraction, we only present the estimated contemporaneous coefficients in Panel A of Table IV. Similarly, we replace the FX returns in Eq. (2b) using the expected FX components, $FXR_{i,t}^{e}$ and unexpected component $FXR_{i,t}^{u}$ with coefficients $\gamma_{2,d}^{e}$ and $\gamma_{2,d}^{u}$, respectively – and the SVAR model (2) is re-estimated. Panel B of Table IV shows the estimated the contemporaneous coefficients of the expected/unexpected FX components.

The findings indicate that net equity flows are affected by both the expected and unexpected local-currency equity returns. However, the relative size of the coefficients suggests that the average change in the flows in response to a unit increase in the expected local-equity return is much larger than the counterpart response to a unit increase in the unexpected local-equity return, and return-chasing dominates the macroeconomic news/sentiment hypothesis in local-currency equity markets. Panel B of Table IV shows that net equity flows are almost exclusively affected by the unexpected FX returns (positively) but not by the expected component. This leads us to conclude that the macroeconomic news/sentiment hypothesis dominates the return-chasing hypothesis in FX markets, and foreign equity investors chase local-currency equity returns, but they do not chase FX returns. This is not surprising given the well-known fact that FX returns are notoriously difficult to forecast. Overall, the evidence supports our conjecture that return-chasing drives the positive association between local-currency equity returns and flows (as illustrated in the bottom panel of Figure I). As a by-product, our paper contributes with additional evidence from EMs to the literature on the macroeconomic news/sentiment hypothesis (see, e.g. Love and Payne, 2008, and Ben-Rephael et al., 2011).

4. Impact of Net Equity Flows on FX returns

Finally, we examine the relation between net equity flows and FX returns to elucidate whether foreign net equity flows do positively influence FX returns, in line with the second mechanism towards the UEP prediction according to the Hau and Rey (2006) theory. Using now SVAR models we can disentangle contemporaneous from for lagged effects.

We estimate the following bivariate SVAR model for FX returns and net equity flows

$$FXR_{i,t} = \alpha_2 + \sum_{d=0}^{D} \phi_{2,d} NEF_{i,t-d} + \sum_{d=1}^{D} \gamma_{2,d} FXR_{i,t-d} + \sum_{d=1}^{D} \theta_{2,d} LER_{i,t-d} + u_{i,t}^{FXR} \tag{5a}$$

$$NEF_{i,t} = \alpha_1 + \sum_{d=1}^{D} \phi_{1,d} NEF_{i,t-d} + \sum_{d=1}^{D} \gamma_{1,d} FXR_{i,t-d} + \sum_{d=1}^{D} \theta_{1,d} LER_{i,t-d} + u_{i,t}^{NEF} \tag{5b}$$

and the parameters of interest are $\phi_{2,0}$ and $(\phi_{2,1}, \dots, \phi_{2,D})'$. The error assumptions are

$$\begin{bmatrix} u_{i,t}^{FXR} \\ u_{i,t}^{NEF} \end{bmatrix} \approx \mathrm{N}\left[0, \mathbf{D}_i^{FXR,NEF}\right], \ \mathbf{D}_i^{FXR,NEF} = \begin{bmatrix} \sigma_{i,FXR}^2 & 0 \\ 0 & \sigma_{i,NEF}^2 \end{bmatrix}.$$

The last term of each of the two equations in this SVAR model accommodates the influence of lagged local-currency equity returns following the extant literature on flows and FX rates (Hau and Rey, 2004; Froot and Ramadorai, 2005; Love and Payne, 2008).

The estimation results for the relevant Eq. (5a) for daily FX returns are gathered in Table V. We report the estimates of the parameters of interest, the cumulative effect of the past foreign net equity flows ($\sum_{j=1}^{5} \phi_{2,j}$), the adjusted-$R^2$ and the p-value of the Granger causality test for the null hypothesis that none of the past flows influences the FX returns (no causality). Alongside these statistics, we report two diagnostic tests on the residuals. Most of the influence of foreign net equity flows on FX returns is contemporaneous and positive – the estimates of coefficient $\phi_{2,0}$ range from 1.6877 (SET) to 43.5621 (BSE)[9]. The adjusted-R^2 of Eq. (3a) is low, ranging from 0.009 (PSE) to 0.135 (NSE), but such finding is neither controversial nor surprising as FX returns are challenging to predict even in-sample (see, e.g.

[9] Interestingly, we find that foreign net equity flows have larger impact in BSE (43.5621) than in NSE (21.2250) in Table V, which is in consistency with a price pressure explanation as it has been documented that NSE is more liquid than BSE (e.g, Krishnamurti et al., 2003). Perhaps due to the same reason, in Table II, III and IV, we have documented that the equity returns in NSE are more attractive to the foreign investors than the ones in BSE.

Love and Payne, 2008). There are also reversals as some coefficients of past flows are negative. The Granger-causality test is unable to reject the null hypothesis that past flows do not Granger-cause current FX returns with the exception of Taiwan.[10] In other words, we find a strong contemporaneous positive effect of foreign net equity flows on FX returns, but the impact is fully incorporated into the FX rate very quickly.

Figure IV graphs the dynamic evolution of FX returns to a one-standard-deviation shock in the foreign net equity flows using GIRFs. We find a positive significant same-day response of the FX returns to a shock in flows, but the responses of FX returns become insignificant from the next trading day for Indonesia (JSX), Korea (Kospi), Korea (Kosdaq) and Philippines (PSE). Overall, foreign net equity flows have a strong contemporaneous positive influence on FX returns, in support of the second mechanism towards UEP as portrayed in the Hau and Rey (2006) theory.

5. Additional tests

5.1. Time-varying and asymmetric uncovered equity disparity

Our analysis for eight Asian EMs based on all recorded trades of foreign investors suggests that the first mechanism towards UEP, namely, portfolio rebalancing as portrayed in the Hau and Rey (2006) model is not present in the aggregate of investors. Instead, we find evidence in favor of the return-chasing strategy. Could the UEP failure in EMs be attributed to any other phenomenon other than international investors' return chasing? To the best of our

[10] The weak evidence may be due to the information loss in net equity flows. Compared to order flows, net equity flows have no information about the signs of the trade, i.e., the initiated side of the trades.

knowledge, three other possible explanations are global volatility risk (Cenedese et al., 2015), market risk (Kim, 2011), and flight-to-quality (Cho et al., 2016). We examine them in turn.

Cenedese et al. (2015) find that, the failure of UEP partially reflects compensation for global equity volatility risk (VIX), which has the strongest cross-sectional pricing power among a battery of risk premia. It is consistent with the idea of controlling for the VIX in Ulku and Weber (2014) and motivates our first robustness test. We re-specify Eqs.(1a)-(1b) as follows

$$LER_{i,t} = \alpha_1 + \sum_{d=1}^{D}\theta_{1,d}LER_{i,t-d} + \sum_{d=1}^{D}\phi_{1,d}NEF_{i,t-d} + \sum_{d=1}^{D}\gamma_{1,d}FXR_{i,t-d} + \sum_{d=1}^{D}\lambda_{1,d}X_{i,t-d} + u_{i,t}^{LER} \tag{1a'}$$

$$NEF_{i,t} = \alpha_2 + \sum_{d=0}^{D}\theta_{2,d}LER_{i,t-d} + \sum_{d=1}^{D}\phi_{2,d}NEF_{i,t-d} + \sum_{d=1}^{D}\gamma_{2,d}FXR_{i,t-d} + \sum_{d=1}^{D}\lambda_{2,d}X_{i,t-d} + u_{i,t}^{NEF} \tag{1b'}$$

where the additional exogenous variable $X_{\mathrm{i,t}}$ denotes the VIX; and we modified in a similar manner and re-estimate equations (2a)-(2b) and (5a)-(5b). The results, reported in Table VI, do not qualitatively challenge the main findings of our analysis. More specifically, global volatility risk cannot fully explain the failure of UEP (Cenedese et al., 2015) and the return-chasing explanation still prevails after controlling for the dynamics of VIX.

Using data for 4 EMs (Singapore, Korea, Malaysia and Thailand), it is argued by Kim (2011) that the positive correlation between FX and local-currency equity returns in EMs might be explained by market risks due to incomplete institutional reforms, weak macroeconomic fundamentals, volatile economic conditions, shallow financial markets and imperfect market integration. This market risk explanation cannot satisfactorily explain the failure of UEP in our sample of eight EMs, for the following two reasons.

On the one hand, if market risk impacted on the correlation, it should have caused it to decrease, as market risk following the liberalization of financial markets ought to have decreased gradually along the path of market integration. In contrast, up to 2012 we find a clear upward trend in the positive correlation between local-currency equity returns and FX returns for all eight EMs using 250-trading-day (one calendar year) moving correlations as shown in Figure V. This upward trend is not challenged when we use 125-trading-day (half a year), 63-trading-day (one calendar quarter) or 21-trading-day (one calendar month) estimation windows. However, the upward trend supports our return-chasing explanation as it becomes increasingly safer and easier for the foreign investors to chase returns in the context of financial market integration as this reduces the aforementioned market risks. The reversal of the trend after 2012 may be due to the temporary imposition of capital controls by the EMs to manage the influx of capital flows following the Quantitative Easing (QE) programs in advanced economies, especially in the U.S. (see, e.g., Ostry et al., 2010).

On the other hand, Kim (2011) suggests that the magnitude of the correlations in relatively more developed EMs (Singapore and Korea), which is generally associated with less market risk, should be smaller than the ones in relatively less developed EMs (Malaysia and Thailand). However, over the full sample we find in the preliminary analysis that the magnitude of the correlation coefficients in the relatively more developed EMs such as Kospi, Kosdaq and TWSE (0.310, 0.293 and 0.312, respectively) are larger than in the relatively less developed EMs such as JSX, PSE and SET (0.201, 0.246 and 0.206, respectively).[11] Again, this fact supports our return-chasing explanation as the relatively more

[11] In fact, Richards (2005, p5) documents that the market capitalization (in billion USD) in Kospi, Kosdaq and

developed EMs are more attractive to the foreign investors in terms of chasing returns.

Cho et al. (2016) propose flight-to-quality as an explanation for the positive correlation between quarterly FX and local-currency equity returns. Accordingly, in order to distinguish the present explanation from the flight-to-quality, we partition our daily data into "global up" (positive MSCI World index returns) and "global down" (negative MSCI World index returns) periods but find, in both scenarios, positive correlations between FX and local-currency equity returns as shown in columns one and two of Panel A of Table VII). The results are similar when the "up" market and "down" market split of the sample is dictated by the local-currency equity returns and MSCI EM index, respectively (last four columns of Panel A of Table VII).

We check the flight-to-quality phenomenon in yet another way by dividing our sample, into three sub-samples, the period before the Asian Financial Crisis and Dotcom Crisis subsample (from various starting dates to Oct 9, 2002), two non-crisis subsamples (one from Oct 10, 2002 to Aug 8, 2007, and the other one from Jul 26, 2012 to Dec 30, 2013), and a recent Global Financial Crisis subsample (from Aug 9, 2007 to Jul 26, 2012) [12] and find similar results (see Panel B of Table VII). However, the association between FX returns and local-currency equity returns remains positive throughout and is stronger in *down* periods

TWSE (is 2.32, 9.85 and 2.08, respectively), is much higher than JSX, PSE and SET (0.38, 0.07 and 1.05, respectively), while the same ratio is only 0.89 for New York Stock Exchange in 2001.

[12] We use July 26, 2012 as the end of the GFC as it is the date when the ECB president Mario Draghi, gives his strongest defense yet of the Euro, prompting markets to rally (http://www.theguardian.com/business/2012/aug/07/credit-crunch-boom-bust-timeline).

than in up periods, and in *crisis* periods than in non-crisis periods; the strongest association occurs during the late 2000s Global Financial Crisis, which suggests that the flight-to-quality may have played some role towards the UEP failure. We conclude that the return-chasing evidence for the UEP failure uncovered in our investigation is not an artifact of not controlling for changes in global volatility (Cenedese et al., 2015) nor purely a flight-to-quality phenomenon (Cho et al., 2016).

5.2. Robustness tests

In this section, we perform robustness tests to tackle some possible concerns stemming from: 1) the reliability of our model, 2) the use of return differentials, 3) the incorporation of changes in financial wealth, 4) the regional co-movement effect, 5) the use of effective exchange rate, 6) the decomposing method to generate expected and unexpected returns, and 7) re-estimation at weekly and monthly horizons. Apart from our last robustness test we do not present the results but they can be made available by the authors on request.

5.2.1. Reliability of our model

One obvious concern of any empirical analysis is the reliability of the estimates. To tackle this concern, we perform various robustness tests with reference to the data or model specification. In particular, we now rely on equity flow data without winsorization, reverse the order of the variables in each VAR model, consider a maximum number of lags up to 40 as in Froot et al.(2001), or 1-day lagged flow data (sometimes capital flow data suffer from a slight delay as it takes time for the data providers to compile and publish data). We also control for other possible shocks by adding S&P 500 returns, or Nasdaq returns, or

Philadelphia Semiconductor index returns as in Richards (2005, p10) as exogenous variables. We use Philadelphia Semiconductor Index as almost half of our sample (both the two markets in Korea and the Taiwan market) are technology-intensive and highly dependent on the global technology cycle. We also add proxies for global developed market information (MSCI World index returns), or global emerging market information (MSCI EM index returns) as in Ulku and Weber (2014) into our VAR models as exogenous variables. In other words, we re-estimate Eq. (1a')-(1b'), (2a')-(2b') and (5a')-(5b') but in the X replace the VIX with S&P 500 returns, or Nasdaq returns, or Philadelphia Semiconductor Index, or MSCI World index returns, or MSCI EM index returns. All key results stay, essentially, unchanged.

5.2.2. Return differentials

Another concern arises with regard to raw returns we use, whereas Hau and Rey (2006) use return differentials between the U.S. and foreign stock indices. While Hau and Rey (2006) build their theory in a world with two countries and an exogenous setting of portfolio-rebalancing regarding return differentials, there are more than two countries in the real world and it is not straight forward which country should be used as the benchmark (Richards, 2005, p8), especially when in our paper we focus on *all* the foreign investors rather than only the investors from the U.S.[13] As it is shown in Panel C of Table VII, we find positive and significant correlations of similar magnitude between FX returns and LER differentials in cases when we use different benchmarks (S&P 500, Nasdaq, Philadelphia Semiconductor Index, MSCI world Index) to construct equity returns differentials, which demonstrates the

[13] For instance, Kim (2011) finds significant different results using Japan rather than the U.S. as a benchmark economy. Cho et al. (2016) also find significant different results once Japan is included.

robustness of the failure of UEP with different benchmarks. When we re-estimate all our (S)VAR models with the return differentials, we find qualitatively similar results and hence omit them for brevity.

5.2.3. Incorporation of changes in financial wealth

Since we use flow data rather than portfolio data, like most of the literature, our analysis is also subject to the criticism proposed by Curcuru et al. (2011) that flow data are influenced by changes in financial wealth. Like most of the literature about the interaction between international capital flows and domestic equity returns (Froot et al., 2001; Griffin et al., 2004; Richard, 2005), we scaled our flow data by local equity market capitalization in our main analysis. We also attempted to control for the changes in financial wealth of investors by normalizing our flows variable by trading volume instead of local equity market capitalization, or by scaling flows by the average of absolute flows of the previous 21/63/125/250 trading days. The key results are unchanged.

5.2.4. Regional co-movement effect

Since our eight sample markets are geographically close, there might be a common regional effect in the flows and returns. In unreported results, we have found strong co-movements in flows, FX returns and local-currency equity returns, with the average correlation coefficients between net flows into different markets of approximately 0.25, while the average correlation coefficients of FX returns and local-currency equity returns between different markets are 0.35 and 0.43, respectively. In unreported principal component analysis, we find that the first principal component is able to explain 37%, 49% and 56% of the variations in net flows, FX returns and local-currency equity returns, respectively, which suggests that there are regional/global co-movements within flows, FX returns, and local-currency equity returns. We take the co-movements into account by employing the fixed-effect panel-VAR regression, as we have much more observations over time than across countries in our study. In Figure VI, we present the impulse response results of our tri-variate panel-VAR system. The results confirm our previous conclusion that foreign net equity flows have a significant positive influence on FX returns, and local-currency equity returns have a significant positive influence on foreign net equity flows. However, the influence of local-currency equity returns on FX returns, and the influence of FX returns on foreign net equity flows are insignificant. Summing up, all previous results are confirmed by the panel-VAR approach.

5.2.5. Use of effective exchange rates

In addition, we alternatively recalculate the FX returns using the effective exchange rates, instead of the US dollar(obtained from the Bank for International Settlements, BIS) with respect to a global basket of currencies and find our conclusions qualitatively unchanged. This result is not surprising given the established literature on the stylized fact that foreign equity investors in EMs predominantly use the U.S. dollars as a vehicle (e.g., Goldberg and Tile, 2008; Devereux and Shi, 2013 and the references therein).

5.2.6. Decomposing method to generate expected and unexpected returns

Finally, we ensure the robustness of our results by following Richards (2005) and redefining the expected local-currency equity returns for day t+1 conditional on the available information up to day t as the fitted values from the reduced-form VAR(5) models below:

$$LER_{i,t} = \alpha_2 + \sum_{d=1}^{5} \phi_{2,d} NEF_{i,t-d} + \sum_{d=1}^{5} \theta_{2,d} LER_{i,t-d} + \varepsilon_{i,t}^{LER} \tag{6a}$$

$$NEF_{i,t} = \alpha_1 + \sum_{d=1}^{5} \phi_{1,d} NEF_{i,t-d} + \sum_{d=1}^{5} \theta_{1,d} LER_{i,t-d} + \varepsilon_{i,t}^{NEF} \tag{6b}$$

with errors $\begin{bmatrix} \varepsilon_{i,t}^{LER} \\ \varepsilon_{i,t}^{NEF} \end{bmatrix} \approx \mathrm{N}\left[0,\ \Sigma_i^{LER,NEF}\right],\ \Sigma_i^{LER,NEF} = \begin{bmatrix} \sigma_{i,LER}^2 & \rho_{i,NEF,LER}\sigma_{i,NEF}\sigma_{i,LER} \\ \rho_{i,NEF,LER}\sigma_{i,NEF}\sigma_{i,LER} & \sigma_{i,NEF}^2 \end{bmatrix}$, and the unexpected local-currency equity returns are the residuals of (4a); $LER_{i,t}$ can be decomposed into an expected part, $E_t\left(LER_{i,t} \middle| I_{t-1}\right) = \widehat{LER}_{i,t}$, and an unexpected part $\hat{\varepsilon}_{i,t}^{LER}$.[14]

Similarly, we use the following reduced-form VAR(5) model

$$FXR_{i,t} = \alpha_2 + \sum_{d=1}^{5} \phi_{2,d} NEF_{i,t-d} + \sum_{d=1}^{5} \gamma_{2,d} FXR_{i,t-d} + \varepsilon_{i,t}^{FXR} \tag{7a}$$

$$NEF_{i,t} = \alpha_1 + \sum_{d=1}^{5} \phi_{1,d} NEF_{i,t-d} + \sum_{d=1}^{5} \gamma_{1,d} FXR_{i,t-d} + \varepsilon_{i,t}^{NEF} \tag{7b}$$

with errors $\begin{bmatrix} \varepsilon_{i,t}^{FXR} \\ \varepsilon_{i,t}^{NEF} \end{bmatrix} \approx \mathrm{N}\left[0,\ \Sigma_i^{FXR,NEF}\right],\ \Sigma_i^{FXR,NEF} = \begin{bmatrix} \sigma_{i,FXR}^2 & \rho_{i,NEF,FXR}\sigma_{i,NEF}\sigma_{i,FXR} \\ \rho_{i,NEF,FXR}\sigma_{i,NEF}\sigma_{i,FXR} & \sigma_{i,NEF}^2 \end{bmatrix}$, to decompose $FXR_{i,t}$ into its expected part, $E_t\left(FXR_{i,t} \middle| I_{t-1}\right) = \widehat{FXR}_{i,t}$, and unexpected part $\hat{\varepsilon}_{i,t}^{FXR}$. The results are omitted here for brevity, as they are quite similar to the ones in Table IV using the estimated expected and unexpected parts from the SVAR equation (3) and (4).

5.2.7. Re-estimation at weekly and monthly horizons

One of the main differences in our paper from the extant literature is the use of daily data

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[14] We alternatively fit a simple AR (1) model to the local-currency equity returns and FX returns and take the fitted values (residuals) as the expected (unexpected) returns. The unreported results are qualitatively similar.

instead of monthly and/or quarterly data, which raises concerns about the direction of causality and whether the use of our data set is appropriate. One might suspect that the results of this paper are driven by the positive significant autocorrelation in flows for most of the markets in Table I (slow-moving capital phenomenon). To address this concern, we aggregate our daily data into weekly and monthly, but always find significant positive autocorrelation in flows. Using these aggregated daily data into weekly and monthly, we re-estimate our models and the results are presented in Tables VIII and IX, respectively. The uncovered interest parity is still refuted by the lower frequency data (according to Panels A, B and D), while the return-chasing explanation/rationale has been masked (according to Panel C). This finding mirrors the similar finding in Griffin et al. (2004, Figure 3). It underlines the advantage of using daily data instead of lower frequency data sets, as return-chasing is clearer in daily horizon, and not so clear when using lower frequency data.

6. Conclusions

The portfolio-rebalancing theoretical framework of Hau and Rey (2006) enables the UEP hypothesis or prediction by which local-currency equity returns and FX returns are negatively related. Previous studies only examine, directly or indirectly, the joint behavior of local-currency equity return differentials and FX returns (Kim, 2011; Cenedese et al., 2015; Cho et al., 2016) or investigate the mechanisms leading to the UEP condition but using low frequency data and a portfolio-based approach (Curcuru et al., 2014). The empirical evidence thus far has not been supportive of UEP in EMs. Using high-frequency (daily) data on net equity flows, local-currency equity returns and FX returns for eight Asian emerging markets

(EMs) covering more than 13 years up to 2013, we confirm the UEP failure in EMs and investigate the underlying mechanisms to provide an explanation.

We find evidence against the first mechanism underlying the UEP prediction in two respects. First, foreign EM equity investors in aggregate do not respond to FX movements, suggesting that they mainly use EM currencies as a necessary vehicle to invest in EM equities. Second, foreign EM equity investors, on the whole, pursue return-chasing strategies which lead to a positive correlation between the local-currency equity returns and FX returns. But we find strong support for the second mechanism underlying the UEP: there is evidence of a strong contemporaneous positive relation between net equity flows and FX returns.

Our results hold after we control for the global volatility as in Ulku and Weber (2014). We also find the failure of UEP in EMs is time-varying and asymmetric. On the one hand, we find an upward time trend in the positive correlations between local-currency equity returns and FX returns using moving correlations which, in the context of ongoing financial market integration, is consistent with the return-chasing hypothesis while inconsistent with Kim (2011)'s risk explanation. On the other hand, the failure is exacerbated in *down* and *crisis* periods, with the strongest association happening during the late 2000s Global Financial Crisis, which suggests the flight-to-quality may have played a role during down/crisis periods. Our return-chasing explanation relies neither on global volatility (Cenedese et al., 2015) nor flight-to-quality (Cho et al., 2016) and applies in general.

Our findings have important implications. With regard to foreign equity flows, policymakers' attention should not just be on either equity or FX markets separately, but on the interconnections between these two markets and capital flows. The current turmoil in the equity and FX markets in EMs, which have been accompanied by huge capital outflows from the EMs is a reminder of the importance of examining their dynamics jointly (Rey, 2013). A limitation of our study is that we only have flows of all the recorded trades of foreign investors, without knowing the nationalities of the each foreign investor, which can be a fruitful future research. From the viewpoint of international investors in EM equity, better FX hedging strategies may be helpful as clearly FX movements do not offset local-currency equity returns but add additional risks to the total EM investment portfolio.

There are, of course, many caveats to our analysis. For instance, this study shares the common weakness with most of the extant literature in this area to focus on the first moment of equity market (return) only. Therefore, our results should be viewed as suggestive. Extending our model by incorporating the second moment of equity market (risk) and possible GARCH effect, will be an important and challenging direction for future research. Another interesting direction could be to do event studies using sharp exogenous shock events such as "taper tantrum".

APPENDIX A. Equity flow data.

The final sample begins from January 1, 2008 for India (BSE) and India (NSE) with 1463 observations, September 9, 1996 for Indonesia (JSX) with 4225 observations, June 30, 1997 for Korea (Kospi) with 4281 observations, March 15, 1999 for Korea (Kosdaq) with 3656 observations, March 15, 1999 for Philippines (PSE) with 3634 observations, January 1, 2001 for Taiwan (TWSE) with 3279 observations, and December 1, 1997 for Thailand (SET) with 3938 observations. The end of the sample period is December 30, 2013 for all the markets. We winsorize the daily net equity flows at 99% and scale them by corresponding daily market capitalizations (from Bloomberg) so that the flows are in percentages. A small sub-sample of latter six markets (but not the BSE and NSE from India) has been used in Richards (2005) and Griffins et al. (2004) but in a different context for a much shorter span (around three years). Details of CEIC database can be found in http://www.ceicdata.com. Foreigners from different countries are not distinguishable.

"*Foreign investors in these markets must register with the local exchange or regulator, and brokers must report the nationality of the buyer and seller in each transaction that occurs. The resulting data capture the trading of all registered foreign investors* (Richards, 2005)". For Taiwan (TWSE), we have data from Oct 25, 2000 but only used data from January 1, 2001 due to two reasons. On the one hand, there is Saturday trading in Taiwan on the first, third and fifth Saturdays of each month in 2000. On the other hand, the 75% foreign investment ownership limit has been removed at the end of 2000. The number of observations is slightly different between Kosdaq and PSE, as Korea and Philippines have a different number of holidays and other days when the stock markets are closed.

In comparison with the data sets used in previous literature on the UEP, we employ a relatively high frequency (daily) and for a long span (more than one decade), with foreign net equity flows, which include all the recorded trades of foreign investors for eight Asian emerging equity markets, allowing a very precise examination of UEP. In contrast, many previous papers use monthly FX and equity returns data without considering capital flows, such as Cappiello and De Santis (2007), Kim (2011) and Cenedese et al. (2015). Only a few papers include capital flow data from in their analysis, but their data are less appealing in terms of testing the UEP in terms of coverage, frequency and/or sample length.

For instance, after introducing their equity and FX data, Hau and Rey (2006, p298) note that "portfolio flow data are more difficult to obtain" and use monthly bilateral equity flows between the U.S. and OECD developed countries from the U.S. Treasury International Capital (TIC) database, acknowledging the famous shortcoming that equity transactions in TIC database are recorded by the nationality of the person with whom the transaction is carried, not by the country that originally issued the security (Hau and Rey, 2006, p299).

Cho et al. (2016) try to explain the magnitude of the correlation between FX and equity returns using quarterly Balance of Payment data from the International Financial Statistics (IFS) reported by the IMF to construct net capital flows, but explicitly note "*Since we are using data over quarterly intervals, information loss would be more serious than when we use finer data, for example, over monthly intervals. Not only the number of observations is reduced, but also inter-temporal changes in variables within the quarter are netted out, making the power of statistical tests smaller. Therefore, we conjecture that if we are able to use data at higher frequency, we might be able to obtain more significant results*".

APPENDIX B. Adaptation of Hau and Rey (2006) to return-chasing.

The model is based on the same framework of Hau and Rey (2006) but with the difference that international investors chase returns rather than rebalance their portfolios. Bohn and Tesar (1996) decompose the net foreign purchases of U.S. investors portfolio-rebalancing and return-chasing, while it is an empirical question which one dominates. This appendix is not intended to be a complete description of the UEP with details, which can be found in Hau and Rey (2006). Instead, we distil the essence of their theoretical framework and modify their approach to address the failure of UEP in EMs from the perspective of return-chasing.

Return-chasing means that when the domestic holdings of equity yield dividends or changes in price, foreign investors will buy more domestic equity rather than repatriate their capital gains. Since Hau and Rey (2006) assume that all dividends are repatriated under their portfolio-rebalancing assumption, without loss of generality we assume that the amount of domestic equity the foreign investors will buy is as the same as their capital gains. Hence, we modify Hau and Rey (2006, p282) Eq. (2) as follows:

$$dQ_t = K_t^f D_t^f dt - E_t K_t^{h*} D_t^h dt + dK_t^f P_t^f - E_t dK_t^{h*} P_t^h \qquad \text{(A.1)}$$

adopting similar notation as in Hau and Rey (2006); $K_t = (K_t^h, K_t^f)$ and $K_t^* = (K_t^{h*}, K_t^{f*})$ denote the equity portfolio of home and foreign investors respectively; superscript h and f denote home and foreign equity respectively; D, E, P and dQ denote dividend flows, FX rate in foreign currency price of domestic currency, equity price and equity flows out of the home country measured in foreign currency respectively. Therefore, assuming return-chasing as opposed to portfolio-rebalancing alters the sign of the first two terms vis-à-vis the counterpart equation in Hau and Rey (2006). Linearizing the above equation yields an FX market clearing condition:

$$\kappa dE_t = (E_t - \overline{E})\overline{K}\,\overline{D}dt + (\overline{E}K_t^{h*} - K_t^f)\overline{D}dt + (\overline{E}D_t^h - D_t^f)\overline{K}dt + (\overline{E}dP_t^h - dP_t^f)\overline{K} \qquad \text{(A.2)}$$

where upper bars denote steady-state values and κ is the price elasticity of the excess (relative to the steady-state value $\overline{E}$) supply of currency. Following the reasoning in Hau and Rey (2006), we have that: i) on the one hand, equity prices have the following representation:

$$P_t^h = p_0 + p_F F_t^h + p_\Delta \Delta_t + p_\Lambda \Lambda_t \qquad \text{(A.3)}$$

$$P_t^f = p_0 + p_F F_t^f - p_\Delta \Delta_t - p_\Lambda \Lambda_t \qquad \text{(A.4)}$$

$$E_t = 1 + e_\Delta \Delta_t + e_\Lambda \Lambda_t \qquad \text{(A.5)}$$

where the F is the fundamental value, which denotes the expected present value of the future discounted dividend flows; Δ is the relative dividend flows of the two countries; and Λ represents a weighted average of past relative dividend innovations, and ii) on the other hand the home and foreign dividends follow independent Ornstein-Uhlenbeck (OU) processes:

$$dD_t^h = \alpha_D(\overline{D} - D_t^h)dt + \sigma_D dW_t^h \qquad \text{(A.6)}$$

$$dD_t^f = \alpha_D(\overline{D} - D_t^f)dt + \sigma_D dW_t^f \qquad \text{(A.7)}$$

with identical variance σ_D and the same degree of mean reversion given by α_D. The fundamental values of (home and foreign) equities are given by:

$$F_t^h = \varepsilon_t \int_{s=t}^{\infty} D_s^h e^{-r(s-t)} ds = \frac{D_t^h}{\alpha_D + r} + \frac{\alpha_D}{r(\alpha_D + r)} \overline{D} \tag{A.8}$$

$$F_t^f = \varepsilon_t \int_{s=t}^{\infty} D_s^f e^{-r(s-t)} ds = \frac{D_t^f}{\alpha_D + r} + \frac{\alpha_D}{r(\alpha_D + r)} \overline{D} \tag{A.9}$$

Hence the instantaneous changes in equity prices and the differential are:

$$dP_t^h = \frac{\alpha_D p_F (\overline{D} - D_t^h)}{\alpha_D + r} + \frac{\alpha_D p_F}{(\alpha_D + r)} dw_t^h + (\alpha_D p_\Delta - z p_\Lambda)\Delta_t + (\sigma_D p_\Delta - p_\Lambda) dw_t \tag{A.10}$$

$$dP_t^f = \frac{\alpha_D p_F (\overline{D} - D_t^f)}{\alpha_D + r} + \frac{\alpha_D p_F}{(\alpha_D + r)} dw_t^f - (\alpha_D p_\Delta - z p_\Lambda)\Delta_t + (\sigma_D p_\Delta - p_\Lambda) dw_t \tag{A.11}$$

$$dP_t^h - dP_t^f = [2(\alpha_D p_\Delta - z p_\Lambda) - \frac{\alpha_D p_F}{\alpha_D + r}]\Delta_t + (\frac{\alpha_D p_F}{\alpha_D + r}) dw_t \tag{A.12}$$

The market clearing condition ($K_t^h - K_t^{h*} = 1,\ K_t^f - K_t^{f*} = 1$) implies that

$$K_t^{h*} - K_t^f = \frac{1}{\rho}(m_\Delta \Delta_t - m_\Lambda \Lambda_t) \tag{A.13}$$

Normalizing $\overline{E}$ to 1 as in Hau and Rey (2006), and plugging (A.12) and (A.13) into (A.2), we obtain

$$\begin{aligned} \kappa dE_t &= (E_t - 1)\overline{K}\overline{D}dt + \frac{1}{\rho}(m_\Delta \Delta_t - m_\Lambda \Lambda_t)\overline{D}dt + \Delta_t \overline{K}dt \\ &+ \overline{K}[2(\alpha_D p_\Delta - z p_\Lambda) - \frac{\alpha_D p_F}{\alpha_D + r}]\Delta_t + \overline{K}(\frac{\alpha_D p_F}{\alpha_D + r}) dw_t \end{aligned} \tag{A.14}$$

and by differentiation of (A.5) we obtain

$$dE_t = (z e_\Lambda - \alpha e_\Delta)\Delta_t + (\sigma e_\Delta + e_\Lambda) dw_t \tag{A.15}$$

Combining (A.14) and (A.15) for dw_t, we have:

$$(\sigma e_\Delta + e_\Lambda) = \frac{\overline{K}}{\kappa}(\frac{\alpha_D p_F}{\alpha_D + r}) > 0 \tag{A.16}$$

Hau and Rey (2006, p313) demonstrate that the correlation between local-currency equity returns and FX returns $\varepsilon_t(dE_t dR_t^h)/dt = (\sigma e_\Delta + e_\Lambda)(f_D \sigma_D + 2(p_\Delta \sigma_D + p_\Lambda))$ with $(f_D \sigma_D + 2(p_\Delta \sigma_D + p_\Lambda)) > 0$. Hence, we conclude $\varepsilon_t(dE_t dR_t^h) > 0$ in cases of return-chasing.

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Table I. Descriptive statistics for equity flows, equity returns and FX returns.

The table summarizes the distribution of daily net equity flows (NEF_{it}) and local-currency equity returns (LER_{it}) for eight Asian markets, and the corresponding FX returns (FXR_{it}). All variables are expressed in percentage. NEF_{it} is the buy value (inflow) minus sell value (outflow) by foreign investors as a percentage of the previous-day market capitalization. FXR_{it} is the logarithmic change in the spot rate defined as US$ price of home currency so that positive values indicate EM FX appreciation. The start date for the variables is as indicated in column two. The end date is December 30, 2013. * indicates statistically significant at the 5% level.

Country	Start Date	Obs	Stock Exchange		Mean	Median	StDev	Autocorrelations AC(1)	AC(2)	AC(3)	AC(4)	AC(5)	Pairwise Correlations *NEF*	*LER*
				NEF	0.0001	0.0001	0.0027	**0.264 ***	**0.249 ***	**0.238 ***	**0.232 ***	**0.190 ***		
India	Jan 1, 2008	1463	BSE	*LER*	0.0028	0.0209	1.7312	0.070	-0.023	-0.031	-0.049	-0.031	*0.295* *	
				FXR	-0.0309	-0.0103	0.5970	0.056	-0.055	-0.002	0.042	0.076	*0.196* *	*0.465* *
				NEF	0.0026	0.0031	0.0122	**0.497 ***	**0.403 ***	**0.328 ***	**0.293 ***	**0.284 ***		
India	Jan 1, 2008	1463	NSE	*LER*	-0.0086	0.0433	1.6475	0.095	0.018	0.001	-0.044	-0.034	*0.453* *	
				FXR	-0.0309	-0.0103	0.5970	0.056	-0.055	-0.002	0.042	0.076	*0.329* *	*0.465* *
				NEF	0.0059	0.0020	0.0260	**0.189 ***	0.119	0.092	0.096	0.065		
Indonesia	Sept 9, 1996	4224	JSX	*LER*	0.0489	0.0998	1.6955	**0.144 ***	0.020	-0.026	-0.024	-0.020	0.297 *	
				FXR	-0.0390	0.0000	1.7235	-0.021	0.083	-0.011	-0.034	-0.029	0.059 *	0.201 *
				NEF	0.0042	0.0012	0.0390	**0.482 ***	**0.325 ***	**0.265 ***	**0.238 ***	**0.225 ***		
Korea	June 30, 1997	4080	Kospi	*LER*	0.0243	0.0855	1.9422	0.065	-0.043	-0.018	-0.037	-0.042	0.312 *	
				FXR	-0.0043	0.0223	1.0543	0.016	-0.106	-0.006	-0.075	-0.111	0.119 *	0.310 *
				NEF	0.0030	0.0010	0.0292	**0.421 ***	**0.264 ***	**0.228 ***	**0.221 ***	**0.203 ***		
Korea	March 15, 1999	3655	Kosdaq	*LER*	-0.0133	0.1303	2.0533	**0.144 ***	0.042	0.033	0.022	-0.021	0.197 *	
				FXR	0.0042	0.0256	0.7164	-0.021	0.034	-0.037	0.021	-0.030	0.089 *	0.293 *
				NEF	0.0010	0.0001	0.0127	**0.179 ***	**0.146 ***	0.118	0.104	0.089		
Philippines	March 15, 1999	3633	PSE	*LER*	0.0305	0.0351	1.3840	**0.126 ***	-0.002	-0.045	-0.015	-0.044	0.179 *	
				FXR	-0.0037	0.0000	0.4462	-0.029	-0.040	0.027	-0.040	-0.013	0.064 *	0.246 *
				NEF	0.0063	0.0057	0.0402	**0.515 ***	**0.339 ***	**0.263 ***	**0.222 ***	**0.185 ***		
Taiwan	Jan 1, 2001	3226	TWSE	*LER*	0.0185	0.0525	1.4134	0.057	0.017	0.013	-0.015	-0.015	0.516 *	
				FXR	0.0032	0.0000	0.2650	0.034	0.017	-0.007	0.023	0.065	0.325 *	0.312 *
				NEF	0.0010	-0.0004	0.0299	**0.564 ***	**0.382 ***	**0.293 ***	**0.252 ***	**0.217 ***		
Thailand	Dec 1, 1997	3937	SET	*LER*	0.0307	0.0336	1.6408	0.075	0.049	-0.004	-0.011	-0.002	0.371 *	
				FXR	0.0058	0.0000	0.5286	0.121	-0.034	-0.053	0.025	0.117	0.132 *	0.206 *

Table II. Impact of local-currency equity returns on foreign net equity flows

This table reports the coefficient estimates for the equity flows Eq. (1b) of the bivariate structural vector autoregression (SVAR) with lag order five estimated individually by maximum likelihood (ML), the cumulative coefficient of the past local-currency equity returns ($\sum_{j=1}^{5} \hat{\theta}_{2,j}$) and significance *t*-statistic in parenthesis, the *p*-values of Granger causality test for the hypothesis that none of past local-currency equity returns affect the current flows (no causality). The last three rows report three model diagnostics: adjusted-R^2, *p*-values of Ljung-Box test for the null hypothesis of no residual autocorrelation up to day five, and *p*-values of the ARCH-LM test for the null hypothesis of no autocorrelation in the squared residuals up to day five. For each estimated coefficient we, report in parenthesis the *t*-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
LER	0.0004 ***	0.0030 ***	0.0041 ***	0.0055 ***	0.0021 ***	0.0015 ***	0.0136 ***	0.0055 ***
	(7.68)	(11.37)	(15.20)	(14.94)	(7.65)	(8.06)	(25.81)	(17.91)
L. LER	0.0003 ***	0.0016 ***	0.0020 ***	0.0049 ***	0.0018 ***	0.0012 ***	0.0036 ***	0.0044 ***
	(4.72)	(6.67)	(5.83)	(12.60)	(6.17)	(7.87)	(6.69)	(13.23)
L2. LER	0.0000	0.0000	0.0006 **	-0.0010 ***	-0.0012 ***	0.0005 ***	0.0006	-0.0009 ***
	(-0.51)	(0.07)	(2.05)	(-2.93)	(-4.36)	(3.63)	(1.11)	(-2.83)
L3. LER	0.0000	0.0001	0.0003	-0.0002	-0.0007 ***	0.0005 ***	0.0007	-0.0007 **
	(-0.91)	(0.48)	(1.12)	(-0.47)	(-2.60)	(3.01)	(1.38)	(-2.57)
L4. LER	-0.0001	-0.0004 *	-0.0005	-0.0003	0.0000	0.0003 *	-0.0004	-0.0010 ***
	(-1.28)	(-1.79)	(-1.64)	(-0.75)	(-0.08)	(1.84)	(-0.75)	(-3.55)
L5. LER	0.0000	-0.0002	-0.0001	-0.0005	-0.0002	0.0001	-0.0005	-0.0007 ***
	(0.75)	(-1.10)	(-0.31)	(-1.35)	(-0.97)	(0.74)	(-1.05)	(-2.92)
Cumulative coefficient	0.0002	0.0011 **	0.0023 ***	0.0029 ***	-0.0003	0.0026 ***	0.0040 ***	0.0011 *
	(1.64)	(2.24)	(3.35)	(3.36)	(-0.57)	(7.68)	(3.44)	(1.69)
Granger causality test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diagnostics:								
Adj. R2	0.253	0.514	0.149	0.391	0.253	0.104	0.516	0.479
Ljung-Box test	0.881	0.230	0.996	0.057	0.351	0.510	0.916	0.081
ARCH test	0.230	0.000	0.431	0.000	0.000	0.955	0.000	0.000
corr($u^{LER}_{i;t}$; $u^{NEF}_{i;t}$)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table III. Impact of FX returns on foreign net equity flows

This table reports the coefficient estimates for the equity flows Eq. (2b) of the bivariate structural vector autoregression (SVAR) with lag order five estimated individually by maximum likelihood (ML), the cumulative coefficient of the past FX returns ($\sum_{j=1}^{5} \hat{\gamma}_{2,j}$) and significance *t*-statistic in parenthesis, the *p*-values of Granger causality test for the hypothesis that none of the past FX returns affect the current flows (no causality). The last three rows report three model diagnostics: adjusted-R^2, *p*-values of Ljung-Box test for the null hypothesis of no residual autocorrelation up to day five, and *p*-values of the ARCH-LM test for the null hypothesis of no autocorrelation in the squared residuals up to day five. For each estimated coefficient, we report in parenthesis the *t*-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
FXR	0.0007 ***	0.0058 ***	0.0006	0.0037 ***	0.0029 ***	0.0017 **	0.0421 ***	0.0035 ***
	(6.29)	(10.86)	(1.26)	(3.25)	(4.51)	(2.04)	(16.14)	(3.52)
L. FXR	0.0002 *	0.0014 ***	-0.0004	-0.0004	0.0002	0.0007	0.0032	0.0013
	(1.77)	(2.94)	(-0.77)	(-0.37)	(0.30)	(1.28)	(1.29)	(1.37)
L2. FXR	0.0001	0.0006	-0.0004	0.0006	-0.0012 *	-0.0004	0.0013	-0.0002
	(0.89)	(1.15)	(-1.10)	(0.62)	(-1.82)	(-0.82)	(0.51)	(-0.26)
L3. FXR	0.0003 *	0.0004	-0.0000	-0.0009	0.0004	0.0003	-0.0047 *	0.0000
	(1.96)	(0.67)	(-0.04)	(-0.84)	(0.49)	(0.54)	(-1.96)	(0.05)
L4. FXR	0.0001	0.0000	-0.0002	0.0001	-0.0005	-0.0002	0.0001	0.0001
	(0.79)	(0.01)	(-0.43)	(0.05)	(-0.75)	(-0.51)	(0.03)	(0.10)
L5. FXR	0.0000	0.0002	-0.0001	0.0002	0.0001	-0.0002	-0.0002	-0.0018 **
	(0.15)	(0.33)	(-0.29)	(0.25)	(0.22)	(-0.32)	(-0.09)	(-2.12)
Cumulative coefficient	0.0007 **	0.0025 **	-0.0010	-0.0010	-0.0010	0.0002	-0.0003	-0.0006
	(2.75)	(2.35)	(-1.16)	(-0.36)	(-0.67)	(0.17)	(-0.05)	(-0.33)
Granger causality test	0.145	0.053	0.829	0.844	0.546	0.551	0.310	0.207
Diagnostics:								
Adj. R2	0.209	0.431	0.168	0.391	0.371	0.577	0.273	0.096
Ljung-Box test	0.961	0.404	0.996	0.3909	0.305	0.448	1.000	0.263
ARCH test	0.272	0.000	0.325	0.0000	0.0000	0.8627	0.0018	0.0000
corr($u^{NEF}_{i;t}$; $u^{FXR}_{i;t}$)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table IV. Expected and unexpected effects of returns on net equity flows

This table shows in Panel A the estimated coefficient of the regressor $LER_{i,t}$ in the SVAR model (1) entered as two separate regressors, an expected component, and an unexpected component. The decomposition is achieved via the SVAR model (3). Panel B shows the estimated coefficient of the regressor $FXR_{i,t}$ in the SVAR model (2) entered as two separate regressors, an expected component and an unexpected component. The decomposition is achieved via the reduced-form VAR model (5). The models are estimated individually per country by maximum likelihood (ML). For each estimated coefficient we report, in parenthesis the *t*-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
Panel A. Impact of local equity returns on flows								
ExpectedLER	0.0018 ***	0.0122 ***	0.0172 ***	0.0303 ***	0.0172 ***	0.0073 ***	-0.0188	0.1128 ***
	(3.98)	(3.70)	(7.49)	(7.89)	(7.26)	(5.28)	(-0.78)	(9.68)
UnexpectedLER	0.0004 ***	0.0030 ***	0.0042 ***	0.0055 ***	0.0021 ***	0.0015 ***	0.0137 ***	0.0056 ***
	(7.13)	(10.81)	(15.21)	(14.86)	(7.67)	(8.03)	(25.85)	(18.61)
Panel B. Impact of FX returns on flows								
ExpectedFXR	-0.0003	0.0026	-0.0001	-0.0011	-0.0083	-0.0025	0.0868 **	0.0092 *
	(-0.23)	(0.45)	(-0.03)	(-0.25)	(-0.47)	(-0.39)	(2.41)	(1.68)
UnexpectedFXR	0.0007 ***	0.0058 ***	0.0006	0.0037 ***	0.0029 ***	0.0017 **	0.0423 ***	0.0041 ***
	(6.30)	(10.86)	(1.27)	(3.32)	(4.50)	(2.03)	(16.16)	(4.34)

Table V. The impact of foreign net equity flows on FX returns

This table reports the coefficient estimates for the FX return Eq. (5b) of the bivariate structural vector autoregression (SVAR) with lag order five estimated individually by maximum likelihood (ML), the cumulative coefficient of the past foreign net equity flows (and significance t-statistic in parenthesis), the p-values of Granger causality test for the hypothesis that none of past foreign net equity flows affect the current returns (no causality). The last three rows report three model diagnostics: adjusted-R^2, p-values of Ljung-Box test for the null hypothesis of no residual autocorrelation up to day five, and p-values of the ARCH-LM test for the null hypothesis of no autocorrelation in squared residuals up to day five. For each estimated coefficient, we report in parenthesis the t-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
NEF	43.5621 ***	21.2250 ***	2.9853	3.8110 ***	2.2904 ***	2.3451 **	2.5504 ***	1.6877 ***
	(5.02)	(11.52)	(1.28)	(5.00)	(5.01)	(2.41)	(16.32)	(3.72)
L. NEF	-0.4243	0.2740	-0.6430	-0.4534	0.1959	-0.1110	-0.3673 *	0.7547
	(-0.05)	(0.13)	(-0.34)	(-0.49)	(0.42)	(-0.18)	(-1.95)	(1.43)
L2. NEF	3.6588	-3.7913 *	1.0246	0.0577	-0.0997	0.2214	0.0895	-0.2845
	(0.51)	(-1.79)	(0.70)	(0.06)	(-0.15)	(0.31)	(0.51)	(-0.55)
L3. NEF	0.2993	-3.2410 *	3.2043	0.7694	1.0405 *	0.3501	-0.0247	-0.8580 **
	(0.03)	(-1.70)	(1.21)	(0.92)	(1.75)	(0.49)	(-0.14)	(-2.03)
L4. NEF	-12.6648 **	-0.3834	-2.3369	0.6496	-0.5049	0.5519	-0.3917 **	0.3250
	(-2.11)	(-0.22)	(-1.08)	(0.71)	(-0.89)	(0.67)	(-2.22)	(0.64)
L5. NEF	-3.7902	-3.5390 **	0.3108	-0.5422	-0.1243	0.9432	-0.1176	0.1753
	(-0.57)	(-2.11)	(0.20)	(-0.68)	(-0.25)	(1.41)	(-0.71)	(0.48)
Cumulative coefficient	-12.9212	-10.6807 **	1.5598	0.4811	0.5075	1.9556	-0.8118 **	0.1125
	(-0.80)	(-2.49)	(0.35)	(0.24)	(0.40)	(1.23)	(-2.06)	(0.11)
Granger causality test	0.351	0.000	0.597	0.925	0.521	0.644	0.015	0.357
Diagnostics:								
Adj. R2	0.045	0.135	0.024	0.052	0.014	0.009	0.116	0.049
Ljung-Box test	1.000	0.997	0.990	0.251	1.000	1.000	1.000	0.998
ARCH test	0.000	0.000	0.000	0.000	0.000	0.163	0.000	0.000
corr($u^{LER}_{i;t}$; $u^{NEF}_{i;t}$)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table VI. Reexamination results after controlling for the global volatility (VIX)

This table reports the coefficient estimates from the reexaminations after controlling for the global volatility (VIX). Panels from A to D correspond to Tables from II to V, respectively. For brevity, we omit the cumulative coefficient, the p-values of Granger causality test and diagnostics. For each estimated coefficient, we report in parenthesis the t-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
Panel A: Impact of local-currency equity returns on foreign net equity flows								
LER	0.0004 ***	0.0028 ***	0.0042 ***	0.0055 ***	0.0021 ***	0.0015 ***	0.0136 ***	0.0055 ***
	(7.10)	(10.23)	(15.32)	(14.98)	(7.67)	(8.08)	(25.75)	(17.88)
LER(t-1)	0.0003 ***	0.0013 ***	0.0020 ***	0.0050 ***	0.0018 ***	0.0012 ***	0.0036 ***	0.0044 ***
	(3.48)	(5.37)	(5.84)	(12.70)	(6.21)	(8.02)	(6.65)	(13.23)
LER(t-2)	-0.0000	-0.0000	0.0006 **	-0.0009 ***	-0.0012 ***	0.0005 ***	0.0006	-0.0009 ***
	(-0.79)	(-0.07)	(2.10)	(-2.78)	(-4.31)	(3.46)	(1.13)	(-2.82)
LER(t-3)	-0.0001	0.0001	0.0003	-0.0001	-0.0007 **	0.0005 ***	0.0007	-0.0007 **
	(-1.03)	(0.38)	(1.16)	(-0.33)	(-2.55)	(2.98)	(1.38)	(-2.57)
LER(t-4)	-0.0001	-0.0004	-0.0005	-0.0003	-0.0000	0.0003 *	-0.0004	-0.0010 ***
	(-1.19)	(-1.56)	(-1.63)	(-0.64)	(-0.05)	(1.86)	(-0.73)	(-3.54)
LER(t-5)	0.0000	-0.0002	-0.0001	-0.0004	-0.0002	0.0001	-0.0005	-0.0007 ***
	(0.90)	(-0.81)	(-0.30)	(-1.18)	(-0.93)	(0.72)	(-1.04)	(-2.89)
Panel B: Impact of FX returns on foreign net equity flows								
FXR	0.0007 ***	0.0054 ***	0.0006	0.0037 ***	0.0029 ***	0.0018 **	0.0422 ***	0.0035 ***
	(6.23)	(10.34)	(1.28)	(3.26)	(4.51)	(2.06)	(16.12)	(3.52)
FXR(t-1)	0.0002	0.0012 **	-0.0004	-0.0004	0.0002	0.0006	0.0033	0.0013
	(1.54)	(2.38)	(-0.74)	(-0.39)	(0.28)	(1.23)	(1.35)	(1.36)
FXR(t-2)	0.0001	0.0003	-0.0004	0.0006	-0.0013 *	-0.0004	0.0014	-0.0002
	(0.49)	(0.56)	(-1.08)	(0.64)	(-1.85)	(-0.78)	(0.57)	(-0.26)
FXR(t-3)	0.0002 *	0.0002	-0.0000	-0.0009	0.0003	0.0003	-0.0045 *	0.0000
	(1.74)	(0.44)	(-0.01)	(-0.85)	(0.47)	(0.63)	(-1.89)	(0.04)
FXR(t-4)	0.0001	0.0001	-0.0002	0.0000	-0.0005	-0.0003	0.0002	0.0001
	(0.76)	(0.10)	(-0.43)	(0.04)	(-0.80)	(-0.52)	(0.09)	(0.09)
FXR(t-5)	0.0000	0.0002	-0.0001	0.0002	0.0001	-0.0001	-0.0001	-0.0018 **
	(0.20)	(0.42)	(-0.30)	(0.24)	(0.17)	(-0.19)	(-0.02)	(-2.12)
Panel C: Expected and unexpected effects of local-currency equity returns and FX returns on foreign net equity flows								
LER^e	0.0004	0.0014	0.0172 ***	0.0298 ***	0.0171 ***	0.0075 ***	-0.0190	0.1149 ***
	(0.63)	(0.38)	(7.50)	(7.95)	(7.20)	(5.46)	(-0.80)	(9.74)
LER^u	0.0004 ***	0.0029 ***	0.0042 ***	0.0055 ***	0.0021 ***	0.0015 ***	0.0137 ***	0.0056 ***
	(6.96)	(10.19)	(15.33)	(14.90)	(7.69)	(8.05)	(25.78)	(18.57)
FXR^e	0.0001	0.0029	0.0001	-0.0011	-0.0085	-0.0024	0.0896 **	0.0092 *
	(0.13)	(0.54)	(0.03)	(-0.25)	(-0.49)	(-0.37)	(2.48)	(1.67)
FXR^u	0.0007 ***	0.0054 ***	0.0007	0.0038 ***	0.0029 ***	0.0018 **	0.0423 ***	0.0041 ***
	(6.23)	(10.34)	(1.29)	(3.33)	(4.51)	(2.05)	(16.14)	(4.34)
Panel D: The impact of foreign net equity flows on FX returns								
NEF	42.1698 ***	20.6322 ***	3.0373	3.8439 ***	2.2838 ***	2.3721 **	2.5564 ***	1.6879 ***
	(4.89)	(10.96)	(1.30)	(5.03)	(5.02)	(2.43)	(16.32)	(3.71)
NEF(t-1)	0.9713	0.8785	-0.5831	-0.4416	0.1987	-0.0980	-0.3622 *	0.7560
	(0.12)	(0.42)	(-0.30)	(-0.47)	(0.42)	(-0.16)	(-1.92)	(1.43)
NEF(t-2)	4.8298	-3.5220	1.0491	0.0803	-0.1202	0.2201	0.0943	-0.2878
	(0.69)	(-1.62)	(0.71)	(0.09)	(-0.18)	(0.31)	(0.54)	(-0.56)
NEF(t-3)	1.8655	-2.9477	3.2123	0.7434	1.0554 *	0.3561	-0.0210	-0.8638 **
	(0.18)	(-1.51)	(1.21)	(0.88)	(1.78)	(0.49)	(-0.12)	(-2.04)
NEF(t-4)	-10.6338 *	-0.1429	-2.3290	0.6570	-0.5219	0.5522	-0.3873 **	0.3200
	(-1.80)	(-0.08)	(-1.07)	(0.71)	(-0.91)	(0.68)	(-2.19)	(0.63)
NEF(t-5)	-3.3353	-3.3703 **	0.2914	-0.5244	-0.1231	0.9488	-0.1131	0.1752
	(-0.51)	(-1.96)	(0.19)	(-0.65)	(-0.25)	(1.42)	(-0.68)	(0.48)

Table VII. Robustness checks on correlations

This table shows the robustness results for eight markets. Panel A and B show the contemporaneous correlations between FX returns (FXR_{it}) and local-currency equity returns (LER_{it}) during up and down periods, and during crisis and non-crisis subsamples, respectively. Panel C shows the correlations between FX returns (FXR_{it}) and local-currency equity return differentials ($LERD_{it}$) using different benchmarks. Stars mean that the correlation coefficient is significant at the 5% level. The larger correlation coefficient in the comparison between up (crisis) and down (subsequent non-crisis) periods in Panel A and B are highlighted in bold.

Panel A: Contemporaneous correlations between FX and local-currency equity returns during global up and down periods

	Up period (MSCI World Returns > 0)	*Down period (MSCI World Returns < 0)*	*Up period (LER > 0)*	*Down period (LER < 0)*	*Up period (MSCI EM Returns > 0)*	*Down period (MSCI EM Returns < 0)*
BSE (India)	0.3962*	**0.4184***	0.2838*	**0.3627***	0.3044*	**0.3711***
NSE (India)	0.3873*	**0.4334***	0.2492*	**0.3665***	0.2989*	**0.3794***
JSX (Indonesia)	0.2039*	**0.2088***	0.1988*	**0.2365***	0.1179*	**0.1472***
Kospi (Korea)	0.2258*	**0.2707***	0.2203*	**0.2782***	0.1604*	**0.2513***
Kosdaq (Korea)	0.2273*	**0.2783***	0.1737*	**0.2538***	0.1083*	**0.2809***
PSE (Philippines)	**0.3401***	0.2383*	0.1843*	**0.1890***	**0.2404***	0.1830*
TWSE (Taiwan)	0.2530*	**0.2688***	0.1694*	**0.1879***	0.1981*	**0.2263***
SET (Thailand)	0.1584*	**0.2017***	**0.2006***	0.1437*	**0.1489***	0.1294*

Panel B: Contemporaneous correlations between FX returns and LER during Asian and Dotcom crisis, non-crises and Global Financial Crisis periods

	Asian and Dotcom Crisis (before Oct 9, 2002)	*Non-crisis (Oct 10, 2002 to Aug 8, 2007)*	*Global Financial Crisis (Aug 9, 2007 to Jul26, 2012)*	*Non-crisis (after Jul27 2012)*
BSE (India)	*NA*	*NA*	*NA*	0.5111*
NSE (India)	*NA*	*NA*	*NA*	0.5135*
JSX (Indonesia)	0.1832*	**0.3872***	**0.3895***	0.2283*
Kospi (Korea)	**0.2331***	0.1810*	**0.5394***	0.4514*
Kosdaq (Korea)	**0.1811***	0.1667*	**0.5067***	0.2271*
PSE (Philippines)	**0.2104***	0.1832*	**0.3346***	0.1792*
TWSE (Taiwan)	0.1378*	**0.2472***	**0.4187***	0.3821*
SET (Thailand)	**0.2148***	0.1235*	0.2814*	**0.2975***

Panel C: Contemporaneous correlations between FX returns and local-currency equity return differentials (LERD) with different benchmarks

	S&P500	*Nasdaq*	*Phil. Semiconductor*	*MSCI World*
BSE (India)	0.2433*	0.2322*	0.1652*	0.1905*
NSE (India)	0.2239*	0.2138*	0.1482*	0.1677*
JSX (Indonesia)	0.1254*	0.1001*	0.0628*	0.1282*
Kospi (Korea)	0.2073*	0.1731*	0.1217*	0.1942*
Kosdaq (Korea)	0.1599*	0.1254*	0.0867*	0.1178*
PSE (Philippines)	0.1139*	0.0866*	0.0494*	0.0585*
TWSE (Taiwan)	0.1712*	0.1490*	0.1014*	0.1241*
SET (Thailand)	0.1429*	0.1101*	0.0574*	0.1136*

Table VIII. Reexamination results over weekly horizon

This table reports the coefficient estimates from the reexaminations over the weekly horizon. Panels from A to D correspond to Tables from II to V, respectively. For brevity, we omit the cumulative coefficient, the p-values of Granger causality test and diagnostics. For each estimated coefficient, we report in parenthesis the t-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
Panel A: Impact of local-currency equity returns on foreign net equity flows								
LER	0.0009	0.0058 ***	0.0063 ***	0.0152 ***	0.0053 ***	0.0037 ***	0.0249 ***	0.0154 ***
	(8.21)	(9.49)	(5.34)	(12.89)	(6.86)	(9.09)	(11.90)	(12.83)
L.LER	0.0000	-0.0004	-0.0009	0.0007	-0.0012	0.0017 ***	0.0043 *	-0.0001
	(0.13)	(-0.49)	(-0.90)	(0.55)	(-1.58)	(4.30)	(1.74)	(-0.07)
L2.LER	0.0000	0.0003	0.0019 *	-0.0010	-0.0007	-0.0005	-0.0006	-0.0033 ***
	(0.07)	(0.61)	(1.78)	(-0.83)	(-1.02)	(-1.24)	(-0.34)	(-3.00)
L3.LER	-0.0001	-0.0003	-0.0001	-0.0029 **	-0.0008	-0.0002	-0.0015	-0.0014
	(-0.95)	(-0.51)	(-0.11)	(-2.24)	(-1.25)	(-0.54)	(-0.67)	(-1.53)
L4.LER	0.0003 *	0.0007	-0.0012	-0.0001	-0.0013 *	0.0002	-0.0013	-0.0018 **
	(1.90)	(1.29)	(-1.44)	(-0.10)	(-1.87)	(0.54)	(-0.75)	(-2.01)
L5.LER	-0.0001	-0.0012 **	0.0002	-0.0032 ***	-0.0005	-0.0004	-0.0021	-0.0008
	(-0.32)	(-2.08)	(0.29)	(-2.82)	(-0.87)	(-1.03)	(-1.30)	(-0.78)
Panel B: Impact of FX returns on foreign net equity flows								
FXR	0.0021 ***	0.0149 ***	0.0031 *	0.0050	0.0094 ***	0.0064 ***	0.0911 ***	0.0171 **
	(7.94)	(12.10)	(1.91)	(0.77)	(4.12)	(3.71)	(9.01)	(2.20)
L.FXR	0.0003	0.0028	-0.0014 *	0.0043	-0.0021	0.0008	-0.0176 *	-0.0018
	(0.72)	(1.58)	(-1.69)	(0.87)	(-0.84)	(0.55)	(-1.66)	(-0.72)
L2.FXR	0.0000	-0.0009	-0.0014	-0.0007	0.0013	-0.0009	-0.0094	-0.0046
	(0.00)	(-0.53)	(-1.19)	(-0.10)	(0.57)	(-0.53)	(-1.11)	(-1.22)
L3.FXR	0.0003	-0.0007	-0.0002	-0.0002	-0.0025	0.0005	-0.0019	-0.0005
	(0.73)	(-0.39)	(-0.30)	(-0.03)	(-1.09)	(0.36)	(-0.22)	(-0.12)
L4.FXR	-0.0002	-0.0015	0.0001	-0.0026	0.0051 **	0.0005	0.0043	0.0001
	(-0.59)	(-0.85)	(0.10)	(-0.48)	(2.28)	(0.32)	(0.49)	(0.02)
L5.FXR	0.0004	0.0032*	-0.0008	-0.0003	0.0011	0.0008	0.0062	-0.0032
	(0.95)	(1.82)	(-1.25)	(-0.04)	(0.52)	(0.55)	(0.67)	(-1.23)
Panel C: Expected and unexpected effects of local-currency equity returns and FX returns on foreign net equity flows								
LER^e	-0.0007	0.0071 *	0.0097 ***	-0.0080	-0.0061	-0.0111 **	-0.0027	-0.0087
	(-0.63)	(1.75)	(2.70)	(-0.69)	(-1.01)	(-2.45)	(-0.10)	(-1.11)
LER^u	0.0009 ***	0.0059 ***	0.0063 ***	0.0152 ***	0.0054 ***	0.0036 ***	0.0244 ***	0.0152 ***
	(7.94)	(8.99)	(5.32)	(12.84)	(6.74)	(8.79)	(11.25)	(12.54)
FXR^e	0.0009	0.0082	0.0137 **	-0.0058	-0.0301 **	0.0083	-0.0335	0.0276 **
	(0.29)	(0.44)	(2.57)	(-0.58)	(-2.03)	(0.78)	(-0.41)	(2.02)
FXR^u	0.0021 ***	0.0149 ***	0.0031 *	0.0050 ***	0.0095 ***	0.0062 ***	0.0904 ***	0.0234 ***
	(7.87)	(12.09)	(1.90)	(0.77)	(4.16)	(3.67)	(8.28)	(5.41)
Panel D: The impact of foreign net equity flows on FX returns								
Flows	76.5990 ***	22.3631 ***	10.1998 ***	3.1783 ***	3.2778 ***	4.6288 ***	1.8880 ***	2.8527 ***
	(4.68)	(10.02)	(2.86)	(2.87)	(4.31)	(3.97)	(8.95)	(4.89)
L.Flows	-26.4313 *	-9.6782 **	-5.6038 *	-0.1445	0.0956	0.3872	-0.4727 *	-0.1476
	(-1.85)	(-3.80)	(-1.76)	(-0.09)	(0.10)	(0.34)	(-1.70)	(-0.20)
L2.Flows	27.4909	5.4526 *	1.8768	-0.3514	-0.4702	-1.9962	0.1088	-0.8639
	(1.51)	(1.73)	(0.53)	(-0.30)	(-0.60)	(-1.49)	(0.41)	(-1.43)
L3.Flows	-4.6349	-5.6869 *	-3.9664 **	-0.6183	0.5117 *	-1.1041	-0.1511	-1.4092
	(-0.32)	(-1.92)	(-2.06)	(-0.37)	(0.55)	(-0.87)	(-0.57)	(-0.83)
L4.Flows	-2.9983	-1.1361	-0.7383	0.5439	-1.3332	0.8289	0.1072 **	0.2724
	(-0.27)	(-0.38)	(-0.29)	(0.24)	(-1.25)	(0.69)	(0.43)	(0.40)
L5.Flows	-17.5168 *	0.2580	3.2420	1.9748	-0.3442	0.4618	-0.2138	0.5471
	(-1.68)	(0.11)	(1.59)	(1.03)	(-0.47)	(0.43)	(-0.94)	(0.95)

Table IX. Reexamination results over monthly horizon

This table reports the coefficient estimates from the reexaminations over the monthly horizon. Panels from A to D correspond to Tables from II to V, respectively. For brevity, we omit the cumulative coefficient, the p-values of Granger causality test and diagnostics. For each estimated coefficient, we report in parenthesis the t-statistics based on heteroskedasticity robust standard errors. *, ** and *** indicates significant coefficient at the 10%, 5% and 1% level, respectively.

	BSE (India)	NSE (India)	JSX (Indonesia)	Kospi (Korea)	Kosdaq (Korea)	PSE (Philippines)	TWSE (Taiwan)	SET (Thailand)
Panel A: Impact of local-currency equity returns on foreign net equity flows								
LER	0.0020 ***	0.0099 ***	0.0098 ***	0.0240 ***	0.0088 ***	0.0060 ***	0.0390 ***	0.0222 ***
	(3.11)	(3.50)	(3.72)	(6.89)	(3.91)	(5.43)	(8.16)	(7.46)
L.LER	0.0002	-0.0005	-0.0017	-0.0070	-0.0057 **	0.0005	-0.0016	-0.0078 **
	(0.29)	(-0.25)	(-0.96)	(-1.11)	(-2.38)	(0.43)	(-0.31)	(-2.41)
L2.LER	0.0003	-0.0021	-0.0012	-0.0080 *	-0.0006	0.0011	-0.0019	0.0026
	(0.47)	(-0.81)	(-0.56)	(-1.85)	(-0.29)	(0.97)	(-0.44)	(0.71)
L3.LER	-0.0001	0.0021	-0.0008	-0.0037	0.0032	-0.0003	-0.0018	-0.0025
	(-0.22)	(0.69)	(-0.41)	(-1.04)	(1.40)	(-0.27)	(-0.23)	(-0.96)
L4.LER	0.0003	0.0026	-0.0016	0.0005	-0.0008	0.0003	0.0011	0.0010
	(0.36)	(0.95)	(-0.84)	(0.12)	(-0.40)	(0.29)	(0.21)	(0.33)
L5.LER	0.0002	-0.0001	-0.0005	-0.0030	-0.0010	0.0003	0.0032	-0.0031
	(0.19)	(-0.03)	(-0.19)	(-0.79)	(-0.51)	(0.22)	(0.75)	(-1.14)
Panel B: Impact of FX returns on foreign net equity flows								
FXR	0.0035 **	0.0233 ***	-0.0006	0.0187	0.0170 ***	0.0078 *	0.1369 ***	0.0728 ***
	(2.25)	(4.68)	(-0.12)	(1.58)	(2.99)	(1.81)	(7.30)	(6.33)
L.FXR	0.0012	0.0023	0.0001	-0.0167	0.0143 **	-0.0015	-0.0007	-0.0002
	(1.05)	(0.38)	(0.04)	(-1.42)	(2.17)	(-0.35)	(-0.03)	(-0.02)
L2.FXR	0.0011	-0.0016	-0.0015	-0.0134	-0.0009	0.0003	-0.0308	-0.0159
	(0.74)	(-0.27)	(-0.54)	(-1.34)	(-0.17)	(0.06)	(-1.38)	(-1.38)
L3.FXR	-0.0020	-0.0112*	0.0032	0.0014	0.0010	-0.0030	-0.0189	0.0093
	(-1.49)	(-1.98)	(1.19)	(0.10)	(0.17)	(-0.78)	(-0.76)	(0.91)
L4.FXR	-0.0000	-0.0035	-0.0005	0.0021	-0.0044	0.0011	-0.0311	-0.0072
	(-0.02)	(-0.53)	(-0.10)	(0.23)	(-0.79)	(0.30)	(-1.28)	(-0.84)
L5.FXR	0.0011	-0.0056	0.0007	0.0028	0.0016	0.0032	-0.0289	-0.0052 **
	(0.55)	(-0.70)	(0.29)	(0.33)	(0.34)	(1.00)	(-1.11)	(-0.53)
Panel C: Expected and unexpected effects of local-currency equity returns and FX returns on foreign net equity flows								
LER^e	0.0017	0.0143	0.0072	-0.0071	0.0207	0.0134 *	0.0241	-0.0022
	(1.15)	(1.55)	(0.82)	(-0.35)	(1.64)	(1.75)	(0.58)	(-0.13)
LER^u	0.0017 **	0.0108 **	0.0097 ***	0.0257 ***	0.0093 ***	0.0057 ***	0.0424 ***	0.0234 ***
	(2.64)	(2.13)	(3.67)	(7.47)	(4.21)	(5.32)	(8.62)	(7.25)
FXR^e	0.0068 **	0.0237	-0.0076	0.0596	0.0058	-0.0071	0.3466 **	0.0927
	(2.21)	(1.01)	(-0.53)	(1.64)	(0.16)	(-0.38)	(2.44)	(0.80)
FXR^u	0.0028 *	0.0239 ***	-0.0008	0.0397 ***	0.0178 ***	0.0070 *	0.1367 ***	0.0756 ***
	(1.91)	(4.61)	(-0.16)	(4.41)	(2.87)	(1.66)	(7.26)	(6.20)
Panel D: The impact of foreign net equity flows on FX returns								
Flows	71.3630 ***	16.1213 ***	-1.5253	2.5607 **	2.6742 **	4.7474 **	1.9200 ***	3.1308 ***
	(2.76)	(4.28)	(-0.19)	(2.28)	(2.23)	(2.13)	(5.76)	(6.20)
L.Flows	14.0030	-0.5413	-2.1196	-0.6341	-2.2351	0.1261	0.0186	-0.9512*
	(0.58)	(-0.14)	(-0.37)	(-0.30)	(-1.40)	(0.05)	(0.05)	(-1.89)
L2.Flows	-11.0657	-7.6721	3.7889	0.3630	1.5208	0.4479	0.1010	0.6672
	(-0.51)	(-1.55)	(0.53)	(0.27)	(1.29)	(0.19)	(0.25)	(1.10)
L3.Flows	-30.0519	-2.5177	3.3327	-0.0616	-1.9325	-0.5336	-0.6266	-0.7144 **
	(-1.30)	(-0.36)	(0.48)	(-0.06)	(-1.55)	(-0.22)	(-1.32)	(-1.05)
L4.Flows	-11.6880	3.4788	-11.1947 *	-0.4067	0.2779	0.3355	-0.2487	0.6537
	(-0.51)	(0.83)	(-1.71)	(-0.27)	(0.22)	(0.14)	(-0.72)	(0.98)
L5.Flows	-5.6023	-4.8374	8.6153	0.4548	1.1784	-0.2767	-0.6611 *	-0.6940
	(-0.27)	(-1.31)	(1.48)	(0.27)	(1.15)	(-0.13)	(-1.78)	(-1.20)

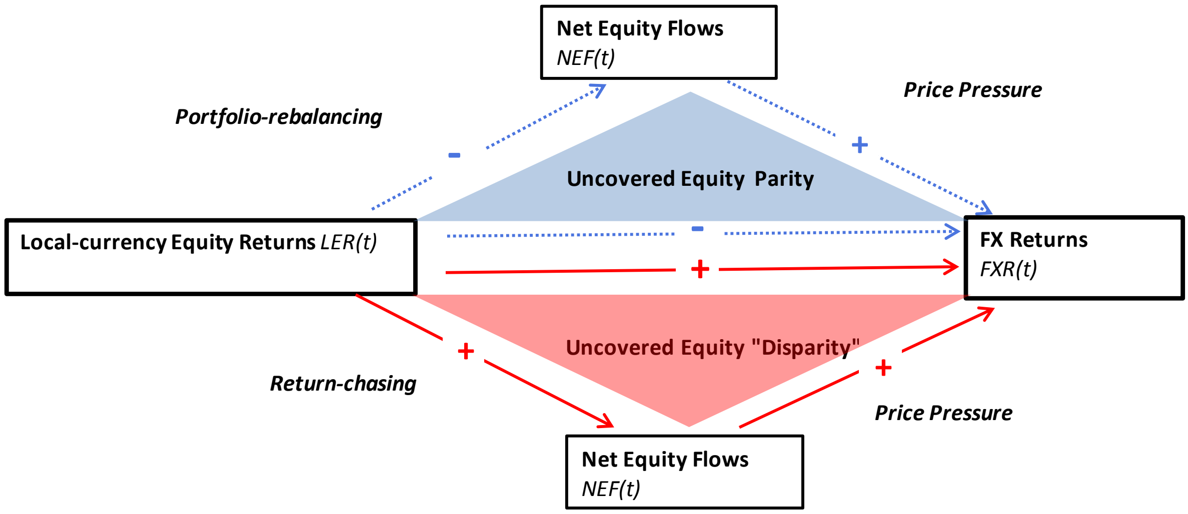

Figure I. Uncovered Equity Parity. The top part (blue) of the graph represents the mechanisms towards the Uncovered Equity Parity (UEP) condition according to the Hau and Rey (2006) theoretical framework. The bottom part illustrates the return-chasing conjecture to explain the failure of UEP. Net equity flows are inflows into the corresponding emerging market (EM) minus outflows. FX returns are daily logarithmic changes (in percent) of the spot rate defined as the US$ price of EM currency, and thus, a positive return indicates EM currency appreciation.

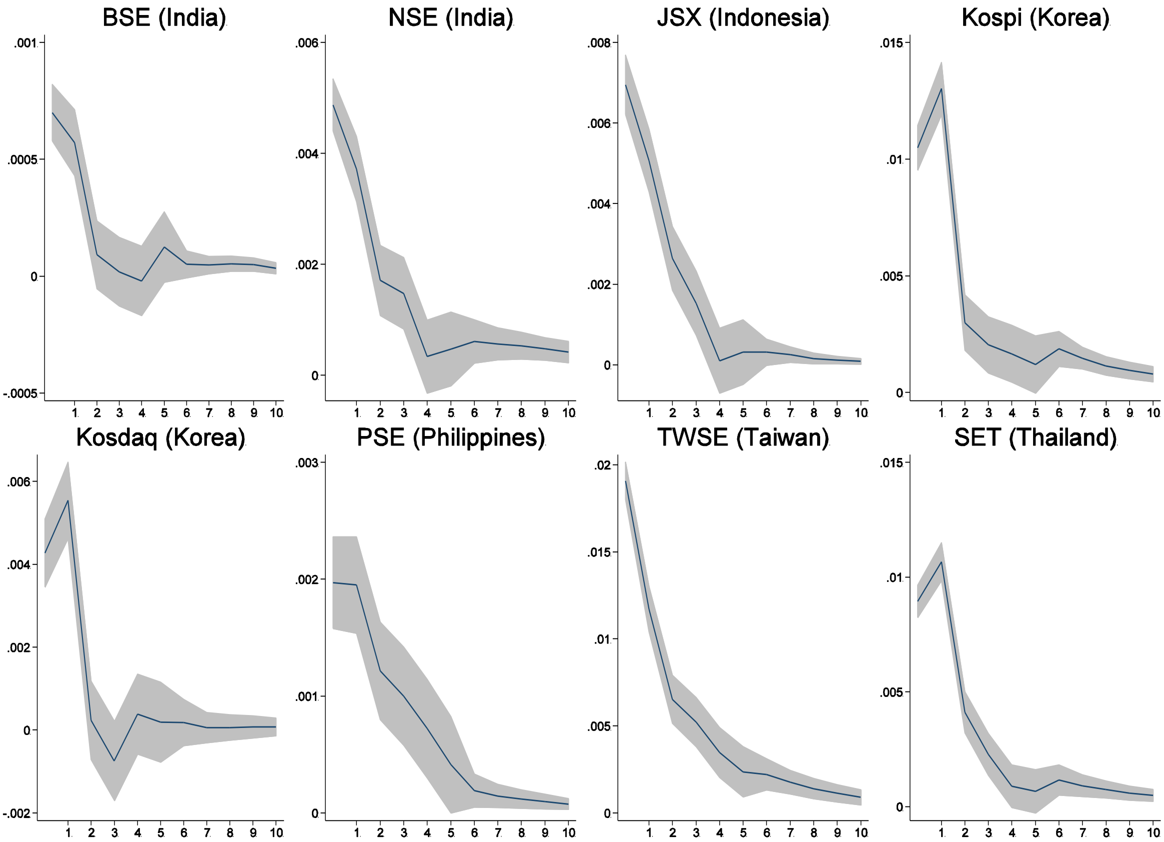

Figure II. Responses of foreign net equity flows to local-currency equity returns shocks. This figure shows the dynamic response of net equity flows to a one-standard deviation shock in local-currency equity returns using the general impulse response functions (GIRFs) of Pesaran and Shin (1998) that are invariant to the ordering of the variables. The estimates are obtained from model (1), a bivariate structural vector autoregressive (SVAR) model of foreign net equity flows and local-currency equity returns with FX returns in its past five lags as an exogenous variable. The VAR is estimated for each market separately with five lags, using daily data from various starting dates to the end of 2013. The grey area is 95% confidence intervals based on asymptotic heteroskedasticity robust standard errors.

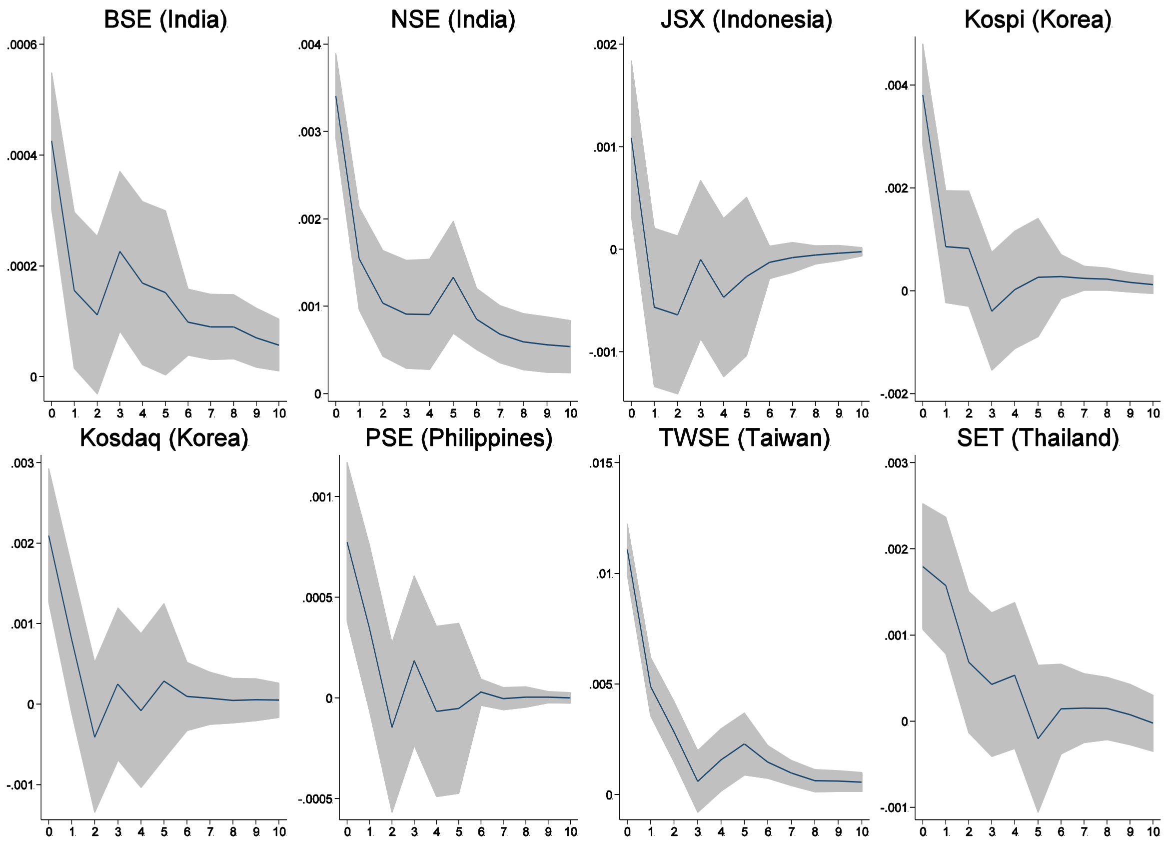

Figure III. Responses of foreign net equity flows to FX shocks. This figure shows the responses of foreign net equity flows to a one-standard-deviation innovation in FX returns using the general impulse response functions (GIRFs) of Pesaran and Shin (1998) that are invariant to the ordering of the variables. The estimates are obtained from model (2), a bivariate structural vector autoregressive (SVAR) model of foreign net equity flows and FX returns with local-currency equity returns in its past five lags as an exogenous variable. The VAR is estimated for each market separately with five lags, using daily data from various starting dates to the end of 2013. The grey area is 95% confidence intervals based on asymptotic heteroskedasticity robust standard errors.

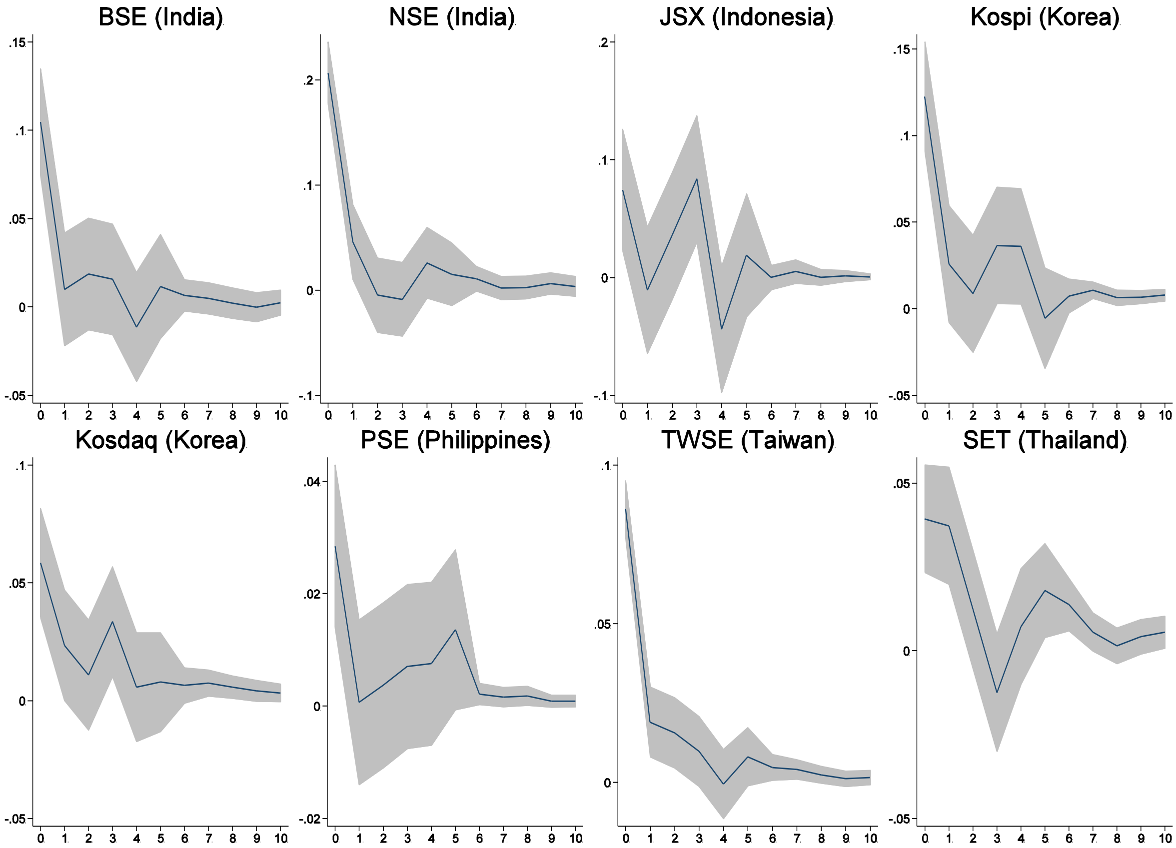

Figure IV. Responses of FX returns to foreign net equity flows shocks. This figure shows the responses of FX returns (FXR) to a one-standard-deviation innovation in foreign net equity flows using the general impulse response functions (GIRFs) of Pesaran and Shin (1998) that are invariant to the ordering of the variables. The estimates are obtained from model (5), a bivariate structural vector autoregressive (SVAR) model of foreign net equity flows and FX returns with local-currency equity returns in its past five lags as an exogenous variable. The VAR is estimated for each market separately with five lags, using daily data from various starting dates to the end of 2013. The grey area is 95% confidence intervals based on asymptotic heteroskedasticity robust standard errors. The vertical line marks the responses of FX returns (FXR) to a one-standard-deviation innovation in foreign net equity flows using general impulse response function on the next trading day. We only report the results based on the bivariate SVAR with an exogenous variable, as the results from the SVAR without exogenous variables are similar.

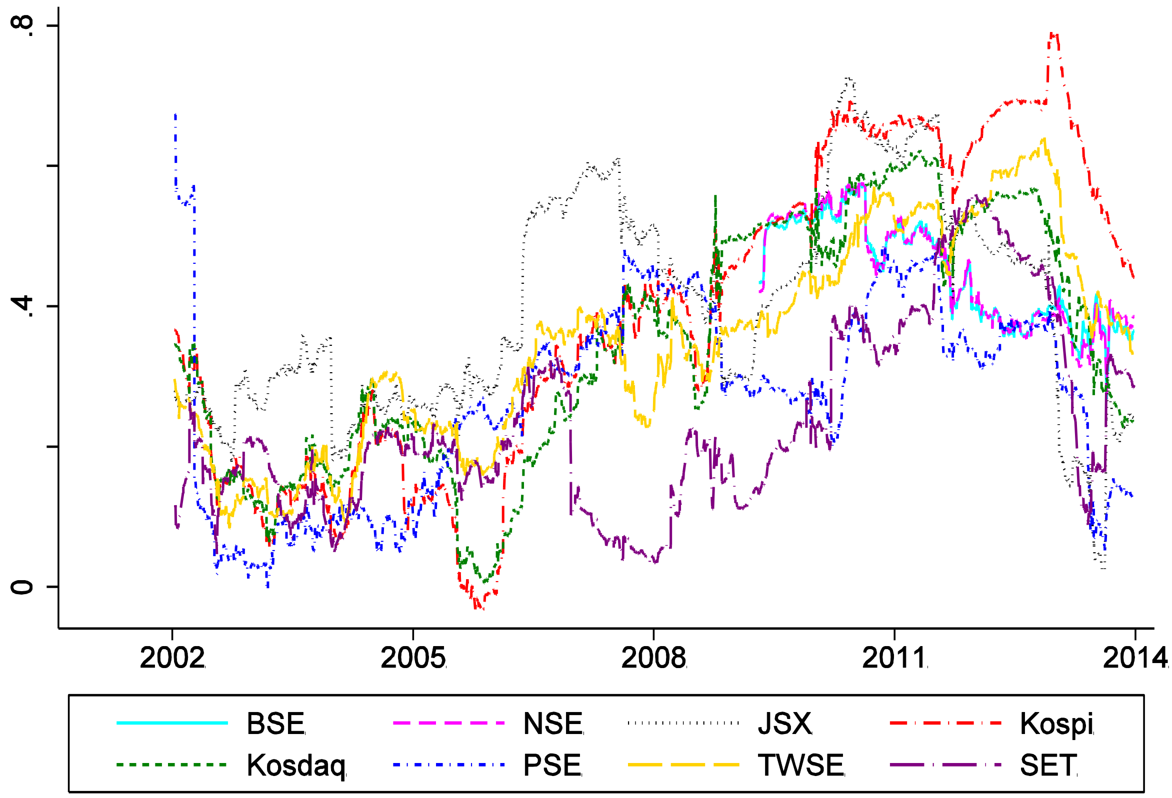

Figure V. Correlation between local-currency equity returns and FX returns. The figure plots the 250-trading-day moving correlation between the local-currency equity return and FX return for each of the eight Asian countries sampled. The equity returns are based on a broad equity index: BSE (India), NSE (India), JSX (Indonesia), Kospi (Korea), Kosdaq (Korea), PSE (Philippines) TWSE (Taiwan), SET (Thailand).

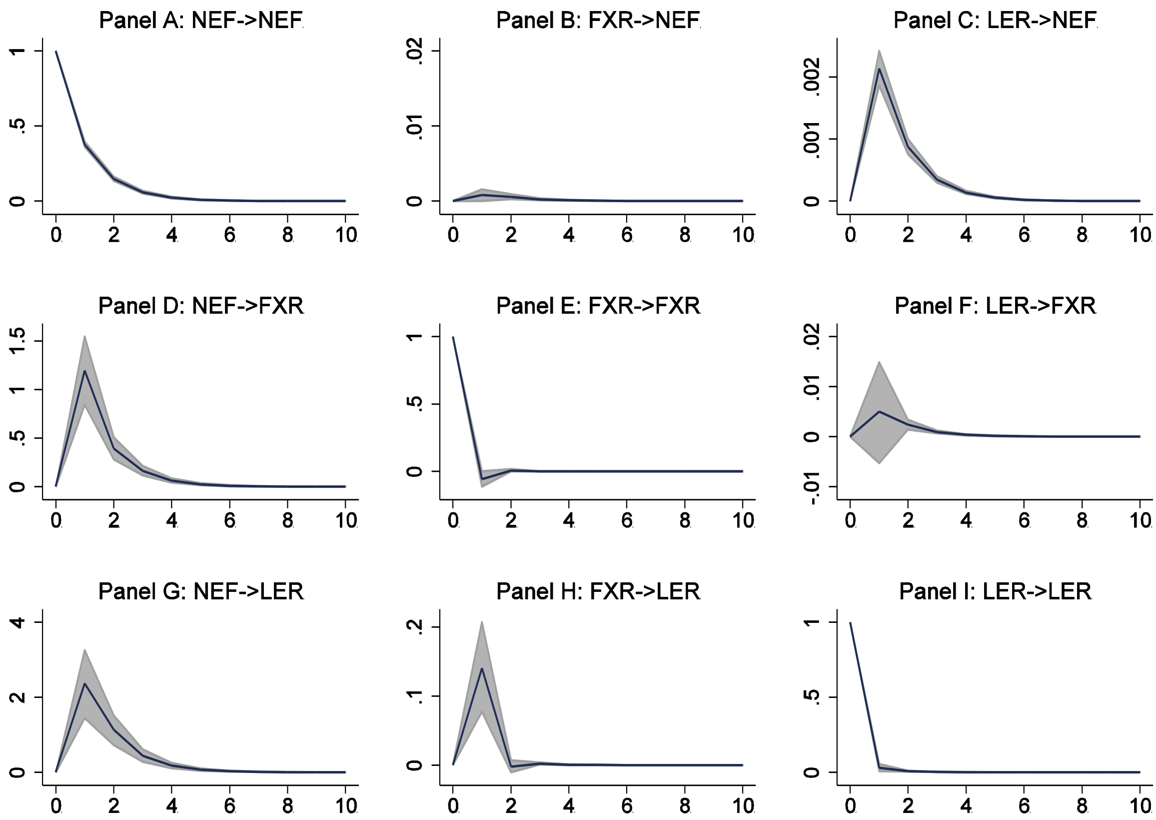

Figure VI. Impulse responses analyses of a tri-variate panel-VAR system. This figure shows the responses of flows, FX returns (FXR) and local-currency equity returns (LER) to a one-standard-deviation innovation in flows in panels A, D, and G, , respectively; the responses of flows, FX returns and local-currency equity returns to a one-standard-deviation innovation in FX returns in panels B, E, and H, respectively; and the responses of flows, FX returns and local-currency equity returns to a one-standard-deviation innovation in local-currency equity returns in panels C, F, and I, respectively. The estimates are obtained from a fixed-effect tri-variate unbalanced panel-VAR with five lags using daily data from various starting dates to the end of 2013. The grey area is 95% confidence intervals based on asymptotic heteroskedasticity robust standard errors.