Economic Integration and Exchange Market Pressure in a Policy Uncertain World

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Abstract

This study examines the influence of economic integration, both real and financial, on exchange market pressure (EMP), along with considering external monetary and economic policy uncertainties. Our analysis is based on a group of Asian emerging markets over the period 2000-2018, which covers the global financial crisis and taper tantrum episodes, which have heightened monetary and economic policy uncertainty. By bringing improvements in modeling, and EMP measurement, a time series analysis shows an overall buffering role of real and financial integration on EMP, albeit with a country-level heterogeneity. Similarly, there is a country-level heterogeneity in the foreign exchange market response to monetary and economic policy uncertainties with surging effects in most cases. These results are supported by a panel analysis and remain robust during the global financial crisis. This research highlights that the current trend of deglobalization may hamper the stabilizing benefit of economic integration given the global policy uncertainty in the foreign exchange market.

Keywords financial integration, economic integration, economic policy uncertainty, monetary policy uncertainty, exchange market pressure.

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1. Introduction

Emerging markets are vulnerable to shocks from the global financial system (Aizenman, Chinn, and Ito, 2016), which might cause exchange rate fluctuations, compelling them to intervene frequently in the foreign exchange market to mitigate the volatility of their currencies. At the same time, the furthering of real and financial integration in recent years has increased their exposure to external shocks, and created various challenges for policymakers. For example, after the global financial crisis (GFC), the major advanced economies adopted accommodating monetary policies to revive economic activity and subsequently exited such policies[3] posing many challenges to emerging economies. Low-interest rates in advanced economies encouraged investors to hunt for higher yields and invest in emerging economies resulting in huge capital inflows and strong currency appreciation pressures (Mohanty, 2014).

There has been an attempt to measure the pressures on the exchange market by summing up the observed change in the exchange rate with an estimated counterfactual of the magnitude of the change in the exchange rate associated with the observed currency intervention (Eichengreen et al. 1994, 1995; Klaassen and Jager, 2011; Patnaik, Felman, and Shah, 2017; Pentecost et al., 2001; Weymark, 1995). This measurement has been named Exchange Market Pressure (EMP).[4] It should be noted that some other studies have added another component to the measure, namely the interest rate differential to cover the possibility that the monetary authorities might raise interest rates to alleviate pressures on the exchange rate (Akram and Byrne (2015). Thus, EMP is a suitable measure to gauge the conditions in the foreign exchange market irrespective of the prevailing

[3] When the Fed Chairman Bernanke stated a return to normalization of US monetary policy in 2013 ("taper tantrum").
[4] This measure was pioneered by Girton and Roper (1977).

exchange rate regime in an economy (Girton and Roper, 1977; Patnaik et al., 2017; Weymark, 1998).

Many researchers have attempted to identify the determinants of EMP and analyse its relationship with various economic variables. For example, variables such as output growth, domestic credit, and price stability have been identified as some of the main domestic macroeconomic factors, which exert influence on EMP at various degrees (Aizenman and Binici, 2016; Feldkircher, Horvath, and Rusnak, 2014; Gochoco-Bautista, and Bautista, 2005).

Many emerging markets have imposed controls on capital flows, in their attempt to reduce the currency appreciation and impact on their economies during the GFC signaling a U-turn in financial integration. For example, Brazil has made renewed use of controls (Jinjarak et al., 2013). Since then, the use of capital controls to manage capital flows has been more widely accepted in the international community (IMF, 2012).

In this paper, we examine the role of economic integration in determining the EMP[5], which has not been examined extensively in the literature, given its importance of exerting pressure in the foreign exchange market. This factor is much relevant to the once globalization era and the current trend towards deglobalization given the US-China tariff war and the more widespread use of controls on capital flows as a policy measure to manage the volatility of capital flows (Aftab, Ahmad, Ismail, and Phylaktis, 2021). Economic integration can take a real, or financial channel to influence the EMP. Real integration causes changes in the exchange rate and foreign reserves, which both constitute the EMP measure, through the trade of goods, while financial integration

[5] Figure 1 shows the EMP of the markets in our sample. As it can be seen they are fluctuating substantially over time.

affects EMP through the cross-border capital flows. It should be borne in mind that although both real and economic integration can strengthen the currency, they can also expose the currency to external shocks, which can increase its volatility. This constitutes our first contribution to the literature.

We have come across two studies, which have looked at the impact of measures related to financial integration namely, Aizenman and Binici (2016) and Akram and Byrne (2015). Aizenman and Binici (2016) examine the role of capital flows (gross and net) as well as the impact of capital controls after controlling for internal and external factors, in explaining the EMP of OECD countries and a group of emerging economies over the period 2000-2014. Using quarterly data and a dynamic panel model they report that while the effect of net capital flows on EMP is muted, short-term gross portfolio inflows and outflows comprise important factors that account for variations in EMP. Short-term portfolio flows and long-term foreign direct investment flows have a significant impact on EMP in emerging market economies and no significant effect in OECD countries. Their results show that capital controls seem to reduce EMP significantly, the economic size of this impact is however highly dependent on institutional quality. They also find that external factors play a significant role in explaining the EMP of both OECD and emerging economies with a greater effect in the latter. Their measure of capital controls is taken from Fernández et al. (2016). This data set includes capital control restrictions on both inflows and outflows of 10 asset categories for 100 countries over the period 1995–2013 based primarily on the analysis of the IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

Similarly, Akram and Byrne (2015) investigate the impact of capital controls on EMP allowing for the impact of a range of macroeconomic factors, policy variables, and trade openness in 40 countries including both advanced and emerging economies over the period 1977-2012 using annual data. Capital controls are proxied by the Chinn and Ito (2008) capital account openness index, which is based again on capital account restrictions reported in the IMF's Annual Reports (AREAER). They report that capital controls have an important impact on the EMP in advanced economies and less so in emerging market economies. They report that the differences in the effects of capital account openness in advanced and emerging market economies may be due to the depth and development of the financial sector, strong checks and balances, and the quality of regulatory institutions in advanced countries (Eichengreen and Rose, 2014). Capital controls appear to be less relevant in times of acute market stress, which may partly be due to their slow-moving nature. They also report that trade openness surges EMP for both emerging and advanced markets. The weak export sector reduces foreign capital inflow and increases foreign exchange vulnerability.

There are two main disadvantages with the *de jure* measure of financial integration used in both of the above studies. They do not capture the degree of enforcement and do not cover regulations that act as capital restrictions but are not counted as such e.g., prudential regulations that limit the foreign exposure of domestic banks and have been used extensively by both advanced and emerging economies (Banti and Phylaktis, 2019). In addition, they are not available at a higher frequency than annual or quarterly. In our study, we provide an extensive analysis of the impact of financial and real integration on EMP. We use a *de facto* measure of financial integration and proxy it with the real interest rate differential between the domestic and the US interest rates. Our measure is based on the premise that prices of assets, with the same attributes, command the same expected return irrespective of where they are domiciled. Thus, in the absence of financial market impediments, this will lead to the equalization of prices in different markets (De Brouwer, 2005). One advantage of our measure is that it is available at a monthly frequency so it can pick variations over time more accurately. Even if the capital flows examined by Aizenman and Binici (2016) is considered as another measure of *de facto* financial integration, it is only available at a lower frequency (Lane and Milesi-Ferretti, 2003; 2017). We proxy real economic integration by the economy's exports minus imports over GDP.[6]

Bearing in mind the abundant evidence of spillover effects of the US monetary policy on the rest of the world and especially on the emerging markets and the uncertainty surrounding that policy (Chari et al., 2017), as well as the close ties between the region and the US, (Aizenman et al. 2016; Phylaktis and Ravazzolo, 2005), we consider the impact of US monetary policy uncertainty (MPU) along with the US and global economic policy uncertainty (EPU) by incorporating them in our analysis of the impact of economic integration on EMP. The extant related literature is more dominant in linking macro-economic news with the exchange rate (Almeida, Goodhart, Payne, 1998; Love and Payne, 2008). However, an unexpected component of the exchange rate is explained more appropriately by news-based measures like MPU and EPU (Beckmann and Czudaj, 2017). We use the Baker et al. (2016) index to measure EPU which is based on news items regarding uncertainty and the Husted, et al., (2020) index to measure MPU,

[6] For an extensive discussion of measures of financial and real integration see Aftab et al. (2021).

which captures news items related to monetary policy uncertainty. That constitutes our second contribution.

Our third contribution is methodological and can be segregated into three parts. Firstly, we use a new measure of EMP developed by Patnaik et al. (2017), which takes care of the weaknesses of the existing EMP measures, which are inconsistent owing to their non-matching scale approach of the components.[7] This measure offers consistent units - with a percentage change of the exchange rate that is suitable for cross-country comparisons and analysis across time. Secondly, we use an estimation approach, namely the autoregressive distributed lag modeling (ARDL) technique suggested by Pesaran et al. (2001), which is appropriate for mixed order integration variables avoiding the information loss by taking the first difference of non-stationary series (Bahmani-Oskooee, Hosny, and Kishor, 2015). Earlier studies have either ignored the unit root issue or took the first difference (Aizenman et al., 2016; Akram and Byrne, 2015; Patnaik and Pundit, 2019). Furthermore, our approach separates the short-run and long-run effects which is more appropriate in a world where policy uncertainty is very high.[8] Thirdly, this study relies on monthly data as opposed to quarterly, or annual data used in related studies, (e.g. Aizenman and Binici, 2016; Akram and Byrne, 2015) which are prone to an aggregation bias owing to the low frequency (Taylor, 2001). Furthermore, the monthly data capture the time variation of economic integration more accurately.

[7] The issue has been in combining observed changes in exchange rate and observed interventions where the former is in percentage change while the latter is in dollars.
[8] For instance, EPU is a news-based index and Hakkio and Pearce (1985) emphasise the short run effect of the news on the exchange market.

Our sample consists of ten emerging economies in Southeast Asia namely, China, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Singapore, Thailand, and Vietnam, which constitute 25.26% of the world GDP in 2019.[9] These countries were selected because of their export-oriented policies and relative openness of capital flows, which as a result will give us a better understanding of the influence of economic integration on EMP.[10]

We apply the ARDL modeling technique suggested by Pesaran et al. (2001), which allows us to estimate both the short-run and long-run effects of economic integration on monthly data over the period January 2000 to October 2018, our main results include: Economic integration reduces EMP with some country-specific variations. The effect of real integration is dominant compared to the financial integration effect in the large emerging economies like China and India, which suggests that the trade is more relevant for these countries' foreign exchange vulnerability. The inclusion of policy uncertainty substantiates the effect of economic integration. In addition, we observe the effect of economic integration in some new cases, while the adjusted R^2 improves also after the inclusion of the US policy uncertainty in the main model. Moreover, the policy uncertainty surges the EMP, particularly in the short run. As a robustness test, we apply a panel ARDL. Our results confirm the negative impact of real and financial integration on EMP at the 1 percent level of significance in the long run. Furthermore, US MPU contributes to EMP, while the US and global EPUs effect is insignificant. However, the diagnostics show that the inclusion of these policy uncertainty variables in the base model improves its efficacy as noted by the improvement in log-likelihood values and reduction in the residual sum of squares even if the

[9] https://data worldbank.org/indicator/NY.GDP.MKTP.CD

[10] It should be noted however, that our analysis is not geared towards emerging markets, but it can be applied to both emerging and advanced economies.

impact is insignificant. This underscores the relevance of policy uncertainty while exploring the economic integration effects on EMP. Moving to other diagnostics, the negatively significant ECM_{t-1} establishes the presence of cointegration (Kremers et al. 1992), which is a necessary condition in order to rely on these estimates (Pesaran et al., 2001). Moreover, the size of the coefficient suggests that over 76% of disequilibrium is adjusted within a month. This fast adjustment underlines the importance of using higher frequency data and undermines the results of earlier studies, Akram and Byrne, 2015 and Aizenman and Binici, 2016, who use annual and quarterly data respectively. Additional analysis confirms that the results remain robust during the global financial analysis.

The rest of the paper is organized as follows: Section 2 discusses the model and the variables, while section 3 explains the methodology. Section 4 presents the data and the preliminary results, followed by section 5, which reports the empirical findings. Section 6 reports some robustness checks. Finally, Section 7 concludes the paper.

2. The model and discussion of the variables

Emerging Asian economies have enhanced economic integration with the world by adopting liberalization policies (Narayan, Sriananthakumar, and Islam, 2014). Our objective is to assess the impact of economic integration on the EMP of these economies controlling for factors found in the literature to play a role in the determination of EMP (e.g. Aizenman and Binici, 2016; Akram and Byrne, 2015, Patnaik and Pundit, 2019). Our model is given below:

$$EMP_{j,t} = \alpha_o + \beta_1 FC_t + \beta_2 TT_t + \beta_3 TO_{j,t} + \beta_4 ID_{j,t} + \beta_5 ER_{j,t} + \beta_6 EA_{j,t} + \beta_7 IF_{j,t} + \beta_8 CP_{j,t} + \beta_9 OL_{j,t} + \varepsilon_t \quad (1)$$

where *j* refers to each country and *t* refers to time, *EMP* is exchange market pressure, *TO* is the trade openness, which proxies for real integration, *ID* is the interest rate differential, which proxies for financial integration, *ER* is equity return differential, *EA* is economic activity, *IF* is the rate inflation; *CP* is credit to the private sector, and *OL* is the price of oil. In addition, we include two dummy variables, *FC*, which captures the effect of the GFC and takes the value of 1 during the crisis period (i.e. October 2007 to March 2009) and 0 otherwise, and *TT*, which captures the effect of Taper Tantrum, and takes the value of 1 during the period (i.e. April 2013 to August 2013) and zero otherwise.

We provide below more discussion of our dependent and explanatory variables. Table A in the appendix summarizes the definitions and sources of the variables in our study. We start with our main variable in question.

EMP gauges the total pressure on the foreign exchange, which can be affected either by the intervention in the foreign exchange market, or by the changes in the exchange rate. In the literature, *EMP* is directly measured through a monetary model where the pursuit is measuring the magnitude of disequilibrium in the exchange rate from a targeted level of the exchange rate that can be adjusted through reserves, or exchange rate changes. The problem with existing EMP measures is that they combine exchange rate changes that are in percentage terms with interventions in the foreign exchange market, which are in dollars leading to a resultant measure with inconsistent units. This problem is settled through the EMP index that can be used to detect and forecast crises (Patnaik et al., 2017). This research uses the EMP index developed by Patnaik et al. (2017) and is also suitable for cross-country analysis. In effect, our measure is:

$$EMP_t = \Delta x_t + \rho_t I_{t,}$$

where Δx_t denotes the percentage change in the exchange rate, I_t is the intervention in the foreign exchange market in terms of billions of dollars, and ρ_t is a conversion factor, which says how much the exchange rate changes after the one-billion-dollar intervention. The size and liquidity of the foreign exchange market influence the value of the conversion factor. It is smaller for the large and more liquid foreign exchange markets than the small and less liquid foreign exchange markets. It is calculated for each country over time (Patnaik et al., 2017). [11]

TO proxies for trade openness. A surge in exports increases the foreign currency inflow and thus relieves the pressure on the domestic currency (Akram and Byrne, 2015). Furthermore, strong trade linkages mitigate an economy's default probability and therefore reduce pressure on the exchange market (Rose, 2005). We measure it through the ratio of exports minus imports divided by GDP.[12]

ID is the real interest rate differential and measures financial integration. As explained in Aftab et al. (2021), there are two types of measures of financial integration; *de jure* financial integration and *de facto* financial integration. The former is based on the actual restrictions and regulations submitted by national governments to the International Monetary Fund, and the latter relates to what is happening based on either the quantities of assets, or the prices of assets. A common proxy used for the quantity of assets is the international assets and liabilities position as a fraction of GDP. If the ratio is high, it implies that an economy is financially open to the rest of the world (Lane and Milesi-Ferretti,

[11] For more details on the conversion factor estimation, please see Patnaik et al., (2017, p.66).
[12] This variable is linearly interpolated to monthly frequency.

(2003; 2017). If *de facto* financial integration is based on the prices of assets, markets are said to be "integrated" in the global capital markets if assets with the same attributes command the same expected return when expressed in the same currency irrespective of where they are domiciled. In the absence of financial market impediments, this will lead to equalisation of prices in different markets (De Brouwer, 2005). In our study, we use this measure as a proxy for financial integration. One can use either the nominal interest rate differential, or otherwise referred to as uncovered interest rate parity, or the real interest differential, or otherwise referred to as the real interest rate parity (RIP). The nominal interest rate differential makes use of exchange rate information, which potentially may cause an endogeneity problem between the nominal differential and EMP, and as a result we make use of the real interest differential.

The real RIP is a testable implication of financial integration that avoids the explicit use of exchange rate data by assuming that the (change in) the real exchange rate is constant (i.e. the relative purchasing power parity hypothesis holds). As emphasized in Chinn and Frankel (1995), Phylaktis (1999), and Obstfeld and Taylor (2003), the RIP hypothesis is also very important because it is based on the existence of frictionless markets.[13,14] It follows then that a test of the real interest rate differential can tell us about the degree of market integration. Normally, interest rate differentials move towards convergence and synchronization across economies with an increase in financial integration. In fact, the speed of adjustment to convergence is taken as a measure of financial integration in Phylaktis (1999). Given an interest rate differential in favor of the emerging market, there will be a capital inflow to the emerging market, relieving pressures on the domestic currency (Aizenman and Binici, 2016; Balakrishnan et al., 2013).

[13] For a derivation of the RIP, see Phylaktis (1999).
[14] There is evidence, albeit for a different time period that indeed the real exchange rate is stationary for the Pacific Basin countries (Phylaktis and Kassimatis, (1994).

It should be borne in mind that although both real and economic integration can strengthen the currency, they can also expose the currency to external shocks, which can increase its volatility, as it happened during the GFC.

ER is the stock market return differential that measures the stock market performance. An increase in ER is expected to have a positive effect on EMP as per the uncovered equity parity condition that states that when the exchange rate is not hedged, an outperformance of the foreign equity market relative to the domestic equity market associates with exchange rate depreciation in the foreign market as investors rebalance their portfolio away from the foreign market in the light of their increased foreign exchange exposure (Hau and Rey, 2006). However, empirical evidence reports opposite results to this condition for emerging markets (Aftab, Ahmad, and Ismail, 2018; Fuertes, Phylaktis, and Yan, 2019). As this study is based on the emerging markets' sample, we expect a negative coefficient of ER. We measure the ER as the return differential of the sample equity market and the USA equity market return.

EA is an industrial production index that measures economic activity. Economic activity plays a crucial role in determining EMP (Alvarez-Plata and Schrooten, 2004). Successful speculative currency attacks (that result in depreciation) are preceded by low economic growth (Eichengreen et al., 1995). Thus, EA is expected to buffer the foreign exchange vulnerability.

IF is the rate of inflation that measures the overall price changes in the economy. High Inflation puts pressure on the exchange rate to depreciate and induces monetary discipline (White, 2006). Thus, an increase in IF is expected to surge EMP.

CP is the credit to the private sector, and it measures financial development. Financial development brings financial stability and buffers financial vulnerability (Jeanneau and Tovar, 2008). We expect CP to reduce EMP.

OL price of oil and measures the effect of the energy market. Oil price determines the foreign exchange market vulnerability depending on the nature of the economy whether it is a net oil exporter or an oil importer. Generally, an increase in oil price is a positive sign for the exchange market of the oil-exporting nations and a negative sign for the oil-importing nations (Gevorkyan, 2019).

3. Methodology

We estimate (1) with the ARDL modeling technique suggested by Pesaran et al. (2001). The merits of this approach include the flexibility to mix variables of various integration (e.g. I(0) and I(1)), which is the case in our sample as demonstrated in Table 1; to produce unbiased estimates in the presence of endogeneity with some regressors (Harris and Sollis 2003; Menegaki, 2019; Smith, 2020); and to estimate simultaneously the short-run and long-run effects. The error correction version of (1) is outlined below.

$$\Delta EMP_{j,t} = \beta_o + \beta_1 FC_t + \beta_2 TT_t + \sum_{i=1}^{n1} \beta_{3,i} \Delta EMP_{j,t-i} + \sum_{i=0}^{n2} \beta_{4,i} \Delta TO_{j,t-i} + \sum_{i=0}^{n3} \beta_{5,i} \Delta ID_{j,t-i}$$
$$+ \sum_{i=0}^{n4} \beta_{6,i} \Delta ER_{j,t-i} + \sum_{i=0}^{n5} \beta_{7,i} \Delta EA_{j,t-i} + \sum_{i=0}^{n6} \beta_{8,i} \Delta IF_{j,t-i} + \sum_{i=0}^{n7} \beta_{9,i} \Delta CP_{j,t-i}$$
$$+ \sum_{i=0}^{n8} \beta_{10,i} \Delta OL_{j,t-i} + \gamma_0 EMP_{j,t-1} + \gamma_1 TO_{j,t-1} + \gamma_2 ID_{j,t-1} + \gamma_3 ER_{j,t-1}$$
$$+ \gamma_4 EA_{j,t-1} + \gamma_5 IF_{j,t-1} + \gamma_6 CP_{j,t-1} + \gamma_7 OL_{j,t-1} + \xi_t \quad (2)$$

We estimate (2) using OLS. The coefficients of the first differenced variables gather the short-run effects and the long-run effects are inferred from the coefficients $(\gamma_1 - \gamma_8)$ normalized on γ_o. However, to avoid spurious results, it is mandatory to establish cointegration through the joint significance of lagged level variables. The null hypothesis of no-cointegration and the alternative hypothesis of cointegration for specification (2) are exhibited in (3).

$$F_{EMP}(EMP|TO, ID, ER, EA, IF, CP, OL)$$

$$H_o: \frac{\gamma_1}{\gamma_o} = \frac{\gamma_2}{\gamma_o} = \frac{\gamma_3}{\gamma_o} = \frac{\gamma_4}{\gamma_o} = \frac{\gamma_5}{\gamma_o} = \frac{\gamma_6}{\gamma_o} = \frac{\gamma_7}{\gamma_o} = O \text{ and } H_1: \frac{\gamma_1}{\gamma_o} \neq \frac{\gamma_2}{\gamma_o} \neq \frac{\gamma_3}{\gamma_o} \neq \frac{\gamma_4}{\gamma_o} \neq \frac{\gamma_5}{\gamma_o} \neq \frac{\gamma_6}{\gamma_o} \neq \frac{\gamma_7}{\gamma_o} \neq O \quad (3)$$

To test the null hypothesis, critical values are provided by Pesaran et al. (2001) which contain a set of lower I(0) and upper I(1) bounds. If the estimated F-static is higher than the upper critical value, cointegration is inferred. Cointegration can be also tested through the lagged error correction term (ECM_{t-1}), which is computed as follows:

$$ECM_{t-1} = EMP_{t-1} - \frac{\gamma_1}{\gamma_o} TO_{t-1} - \frac{\gamma_2}{\gamma_o} ID_{t-1} - \frac{\gamma_3}{\gamma_o} ER_{t-1} - \frac{\gamma_4}{\gamma_o} EA_{t-1} - \frac{\gamma_5}{\gamma_o} IF_{t-1} - \frac{\gamma_6}{\gamma_o} CP_{t-1} - \frac{\gamma_7}{\gamma_o} OL_{t-1} \quad (4)$$

Then lagged level variables in (2) are replaced with this term. Pesaran et al. (2001) also provide critical values to test the t-statistics attached to ECM_{t-1} like the F-statistic in establishing cointegration. Alternatively, cointegration is also established if the ECM_{t-1} coefficient is negative and significant (Kremers et al. 1992).

4. Data and Preliminary analysis

This research is based on monthly data over the period from January 2000 to October 2018 with some variations for some of the countries due to data availability.[15] Our study period is limited to data-availability constraints as Patnaik et al.'s (2017) measure of EMP for our sample countries is available till 2018. However, this period is interesting as it covers the capital flows build-up in the 2000s and subsequent collapse during the financial crisis and afterward reappearance of normality. The sample includes large emerging markets namely, China, and India along with Indonesia, Korea, Malaysia, Pakistan, the Philippines, Singapore, Thailand, and Vietnam. These countries constituted 25.26% of the world GDP in 2019, which is a large part of the global economy and as a result can be thought of as being a representative sample of countries.[16] More importantly, these markets have in addition undertaken substantial trade and capital account liberalization, which in turn has increased their economic integration with the rest of the world (Narayan et al, 2014). Thus, this sample of markets provides us with an opportunity to capture the impact of economic integration on EMP more accurately.

All data are sourced from IMF IFS, FRED Louis, Patnaik et al. (2017), Baker et al. (2016), Davis (2016), Husted et al. (2020), World Bank, and Reuters. The details of variables and sources

[15] The starting point is December 2001 in the case of Indonesia, Malaysia, Pakistan, the Philippines, Thailand and January 2008 in the case of Vietnam. The end point is March 2018 in the case of the Philippines and May 2018 in the case of Vietnam.

[16] https://data.worldbank.org/indicator/NY.GDP.MKTP.CD

are provided in Table A in the Appendix. The choice of the control variables is largely based on the extant literature and is subject to the availability of data.

The unit root is an important issue in time series data. Thus, we test it by applying the ADF test and report the estimates in Table 1. Notably, some variables are non-stationary at the level. However, all variables are stationary at the difference. Thus, the study variables are of a mixed order (For example, EMP is stationary at the level, while TO and ID are stationary at the first difference in the sample). Taking the first difference can result in information loss (Phylaktis and Ravazzolo, 2005), therefore we opt for an approach, which accommodates mixed order variables (e.g. I(0) & I(1)).

5. Empirical Results

Following the ARDL approach, we estimate (2) by imposing six lags as the maximum number of lags and selecting the optimal lag length according to the Akaike information criterion. The results are presented in Table 2. The short-run estimates are reported in Panel I and the long-run estimates in Panel II. As discussed in the methodology, for the estimates to be meaningful, one should examine either that cointegration is present, which can be tested through the F-statistic, or the $ECM_{t-1.}$ The results are presented in Panel III in Table 2 together with other diagnostic tests and show that the null hypothesis of no cointegration is rejected based on both tests and cointegration is present for all the markets in our sample.

First, we discuss the short-run estimates reported in Panel I of Table 2. The short-run effect of real integration is observed in all sample countries except in Korea, Malaysia, and Thailand with a dominant-negative coefficient that implies that trade openness reduces pressure on the foreign exchange market. Similarly, financial integration reduces EMP in many cases except India, Singapore, Thailand, and Vietnam. The control variables of the study associate significantly with explaining EMP in the short run. Specifically, improvements in stock market performance decrease EMP in many cases. Economic activity influences Korea negatively, and India, Indonesia, and Singapore positively. Inflation shows its effect in the case of Indonesia, Korea, Pakistan, Philippines by predominantly enhancing EMP. Credit to the private sector reduces foreign exchange vulnerability in India and Singapore and increases EMP in Korea and Vietnam. Oil price contributes to surging EMP in Korea and Pakistan and curbs EMP in Malaysia and Vietnam. As Korea and Pakistan are oil importers and Malaysia and Vietnam are oil exporters, this implies that an oil price increase is bad news for oil-importing countries' EMP and good news for the oil-exporting countries' EMP. There is some heterogeneous behavior of some variables at different lags in terms of coefficient signs due to the nature of transitory effects.

We next examine whether short-run effects persist in the long run and look at Panel II of Table 2. The effect of the global financial crisis is positive in Indonesia, Malaysia, and Pakistan and negative in Singapore and Vietnam. This suggests the different country-specific effects of the crisis. The effect of the Taper Tantrum episode is not noted in any case. The effect of real integration is negative in China, Korea, and Vietnam and positive in Indonesia. On the other hand, the negative influence of financial integration is notable in the case of Malaysia, Pakistan, and Singapore and positive in the case of Indonesia. In this way, economic integration decreases exposure for the economies where its effect is significant, such as China, Korea, Malaysia, Pakistan, Singapore, and Vietnam, and increases the vulnerability of emerging economies like Indonesia.

Moving to the control variables, stock market performance affects many countries negatively and that corroborates existing literature on emerging markets (e.g., Aftab et al., 2018; Fuertes et al., 2019). Improvements in economic activity have a negative effect in the case of China, Malaysia, Pakistan, Singapore, and Vietnam and a positive effect in the case of Indonesia and Korea. A negative sign implies that economic activity improvements are expected to reduce the EMP.[17] The effect of inflation is positive and significant only in the case of Korea. This corroborates the view that inflation increases economic fragility (Boyd et al., 2001). The effect of credit to the private sector is negative and significant in the case of Korea and positive and significant in the case of India, Indonesia, and Malaysia. A negative sign implies that an increase in domestic credit reduces a country's vulnerability (Samargandi and Kutan, 2016). A positive sign may also be expected where an increase in credit beyond a certain threshold is dangerous for an economy (Levine, 2005, Svirydzenka, 2016). Finally, oil price influences positively in the case of Korea and Pakistan and negatively in the case of Indonesia and Vietnam. This translates into the benefitting role of an increase in oil price for oil-producing economies. Diagnostics reported in Panel III of Table 2 show that most models have no serial dependence, have a correct functional specification and the short-run and long-run effects are stable. Thus, these statistics support the appropriateness of our estimates to draw meaningful implications.

In summary, the effect of real and economic integration is notable in both the short-run and the long run with some country-specific insights, which were not noted in the earlier relevant studies, such as Akram and Byrne (2015) and Aizenman and Binici (2016) due to the application

[17] The positive sign of economic activity may be due to noise component in the monthly measure (Pigorsch et al., 2012).

of a panel framework in their analysis. For example, Akram and Byrne (2015) report that trade openness contributes to EMP, while Aizenman and Binici (2016) suggest that it reduces EMP. Our findings expose the fact that the role of trade openness is country-specific and reduces EMP predominantly.

6. Robustness Check: Policy uncertainty and EMP

Besides economic integration, emerging markets' EMP is also influenced by the policies of major global economic powers (Aizenman et al., 2016). We thus incorporate in our analysis the US monetary and economic policy uncertainty along with global economic uncertainty as policy uncertainty is linked to unexpected changes, it may associate with the exchange market and explain the unsystematic component of the exchange rate (Beckmann and Czudaj, 2017). Theoretically, it is expected that policy changes can change EMP in a way that uncertainty associates with economic environment changes (Carrière-Swallow and Céspedes, 2013). However, the outcomes of change in policy uncertainty are mixed. It can encourage or discourage the economic agents in a way that they respond heterogeneously to the episodes of higher uncertainty. Policy uncertainty raises expected costs and reduces future investments, growth in the economy, and the value of government protections to the markets (Jeong, 2002; Pástor and Veronesi, 2013). On the other hand, characteristics like higher returns in emerging markets may buffer the policy uncertainty effect (Wang et al., 2014)[18]. Arbatli et al. (2017) find a positive association between EPU and the

[18] Madhur (2008) notes that returns are higher for emerging economies.

exchange rate for Japan[19]. The policy uncertainty is expected to increase currency vulnerability (Almeida, Goodhart, Payne, 1998; Love and Payne, 2008). However, exchange rate movements are not fully reflective of the foreign exchange market owing to central bank interventions in the foreign exchange market through changes in reserves and interest rates (Patnaik and Pundit, 2019).[20] Therefore, there is a need to take care of interventions while studying this important linkage. Considering this issue, this study uses EMP to capture foreign exchange market performance.

We use news-based measures of MPU and EPU which have gained huge attention from the policy-making bodies, investors, and the media.[21] The IMF uses EPU as a standard measure for the state of an economy and input variable for modeling a nation's economic performance (Gu, Sun, Wu, and Xu, 2017). Our research strategy is to augment our base model outlined in the specification (2) with each measure of economic uncertainty one at a time, MPU, US EPU, and global EPU to test the robustness of our results. The summary of the long-run results of these robustness tests is reported in Table 6.

6.1 The US MPU and EMP

[19] Muelle, Tahbaz-Salehi, and Vedolin (2017) show that policy uncertainty in compensated in foreign exchange market and Mumtaz and Musso (2019) document the crucial economic effect of external uncertainty. Similar studies in other markets are; Bernal, Gnabo, and Guilmin (2016) studies the EPU effect on risk spillovers in Europe, Gu et al. (2021) examine the impact EPU on stock price momentum. Kelly, Pastor, and Veronesi (2016) link EPU with option market.

[20] It should be noted that managed exchange rate is still a dominant exchange rate regime in the emerging countries (Ilzetzki, Reinhart, and Rogoff, 2019).

[21] For details, please see https://www.policyuncertainty.com/media.html

We incorporate the US monetary policy in specification (2) by taking the news-based measure of MPU developed by Hustle et al. (2020) and denoted by UM as follows:

$$\begin{aligned}\Delta EMP_{j,t} = \beta_o + \beta_1 FC_t + \beta_2 TT_t + \sum_{i=1}^{n1} \beta_{3,i} \Delta EMP_{j,t-i} + \sum_{i=0}^{n2} \beta_{4,i} \Delta TO_{j,t-i} + \sum_{i=0}^{n3} \beta_{5,i} \Delta ID_{j,t-i} \\ + \sum_{i=0}^{n4} \beta_{6,i} \Delta UM_{t-i} + \sum_{i=0}^{n5} \beta_{7,i} \Delta ER_{j,t-i} + \sum_{i=0}^{n6} \beta_{8,i} \Delta EA_{j,t-i} + \sum_{i=0}^{n7} \beta_{9,i}\, \Delta IF_{j,t-i} \\ + \sum_{i=0}^{n8} \beta_{10,i}\, \Delta CP_{j,t-i} + \sum_{i=0}^{n10} \beta_{11,i}\, \Delta OL_{j,t-i} + \gamma_0 EMP_{j,t-1} + \gamma_1 TO_{j,t-1} \\ + \gamma_2 ID_{j,t-1} + \gamma_3 UM_{t-1} + \gamma_4 ER_{j,t-1} + \gamma_5 EA_{j,t-1} + \gamma_6 IF_{j,t-1} + \gamma_7 CP_{j,t-1} \\ + \gamma_8 OL_{j,t-1} + \xi_t \qquad (5)\end{aligned}$$

The estimates of specification (5) are reported in Table 3. Owing to space constraints the results of control variables are not reported. Notably, the effect of economic integration is observed in new cases. After the inclusion of US MPU, the effects of real integration are notable in the case of India, and the effect of financial integration is observed in the case of Korea which was not the case in the earlier analysis. This may relate to capital flows in emerging markets associated with the US monetary policy stance (Chari et al., 2017). The effect of MPU is notable in many cases in the short run with a dominant positive sign. However, the effect of MPU is only observed in Indonesia in the long run and with a significant negative sign. This implies that an increase in the US MPU associates with a decline in Indonesian EMP.

However, the magnitude of the adjusted R^2 increases after the introduction of MPU in the base model in many cases. This may imply the important role of MPU along with economic integration. The diagnostics support the overall appropriateness of our estimates.

6.2 US EPU and EMP

We next include EPU, which is a news-based index of uncertainty[22] suggested by Baker et al. (2016). They report that EPU associates with higher price volatility of the stock market, a decline in employment, and investment in policy-sensitive sectors. Liang, Troy, and Rouyer (2020) find US economic policy uncertainty to affect the emerging financial markets. Similarly, Phylaktis and Ravazzolo (2005) note the effects of the US capital market as a conduit for the Pacific Basin markets' financial linkages. Thus, we incorporate US EPU- noted by UE- in our base model (2). So, in the model (5), we substitute UM with UE and refer to it as model 6.

The results of model (6) are reported in Table 4. Panel I of Table 4 shows the significant and positive short-run effect of economic policy uncertainty in Korea, Pakistan, and Singapore. This implies that an increase in US EPU contributes to the surge of the emerging markets' EMPs. The Panel II of Table 4 reports the long-run effects, where the effect of US EPU is significantly negative in the case of Singapore and positive in the case of Pakistan. A negative EPU coefficient implies that an increase in US uncertainty may trigger an increase in portfolio flows to Singapore, which decreases the pressure on the Singaporean dollar. Overall, the role of economic integration persists after the incorporation of the US EPU. There is an increase in the adjusted R^2 that shows

[22] Jurado et al. (2015) discuss the efficacy of different uncertainty measures. Similarly, Davis (2016) constructs an index for global policy uncertainty following Baker et al. (2016), based on news items covering 21 important economies that constitute eighty percent of the world GDP (see Appendix).

the relevance of the US EPU in examining the effects of economic integration on EMP in emerging economies.

6.3 The global EPU and EMP

In the current era of a globalized world, there might be a broader effect of economic policy uncertainty from many countries along with the US. Therefore, we augment (2) by incorporating the global EPU- noted by GE- as suggested by Davis (2016), which is the average of twenty-one economies (Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States). Thus, we substitute UM in model (5) with the global EPU and refer to it as model (7).

Table 5 reports the results of model (7). Again, the positive effect of global EPU is noted in Korea, Pakistan, and Singapore in the short run in (Panel I of Table 5) and that implies that an increase in the global policy uncertainty raises the foreign exchange market vulnerability of the emerging markets. The positive effect of global EPU is observed in Pakistan and Vietnam in the long run as noted in Panel II of Table 5. However, similar to the US EPU effect in Table 4, the long-run global EPU effect reported in Panel II of Table 5 is negative in the case of Singapore that may be due to expected higher returns in a highly uncertain global economy in the form of risk premiums (Bai et al., 2004; Madhur, 2008). This also highlights the significant heterogeneity of our emerging markets sample.

Comparing these results with those of model (6) in Table 4, we can see that the US EPU effect can be is noted in more cases than that of the global EPU effect and that confirms the importance of the US in the region. However, these results corroborate also the effects of economic integration.[23]

In summary, comparing these results with those of model (2), we find the effect of economic integration is notable along with the effects of policy uncertainty. Overall, we find that when we add the policy uncertainty measures, the impact of economic integration remains in most of the policy uncertainty measures incorporating specifications with a notable increase in the adjusted R^2 even when the policy uncertainty measure itself is not significant. Thus, the policy uncertainty along with economic integration is relevant in exploring the foreign exchange vulnerability of emerging Asian markets. Table 6 provides a summary of these comparative findings.

6.4 Further Robustness Check: A panel analysis

We re-estimate the base model (2) and the extended models 5-7 in a panel framework by using the panel ARDL approach suggested by Pesaran et al. (1999). As this approach considers long-run estimates homogeneity, it allows us to check our earlier time series results in a panel framework. The new results are reported in Table 7 and show that real integration and financial integration reduce EMP across the models in the long run. This substantiates our earlier country-level analysis, where real and financial integration showed the same effect in most of the significant cases. Specifically, such cases were China, India, Korea, and Vietnam for real integration effects and Malaysia, Pakistan, and Singapore for the financial integration effects. However, these results contrast with some marginal cases like Indonesia, where the effects of both real and financial integration were observed to be positive. These results are also in line with those

[23] The appropriateness of estimates is established through a battery of diagnostics reported in Panel III of Table 5.

of related studies that investigate the role of trade and financial openness using a panel framework (Akram and Byrne, 2015; Aizenman and Binici, 2016) and consolidate the view that economic integration buffers the pressure on the foreign exchange market.

The models 5-7 in Table 7 show that the US MPU contributes to EMP, while the US and global EPUs effect is insignificant. The diagnostics show that the inclusion of these policy uncertainty variables in the base model improves its efficacy as noted by the improvement in log-likelihood values and reduction in the residual sum of squares. This underscores the relevance of policy uncertainty while exploring the economic integration effects on EMP. Moving to other diagnostics, the negatively significant ECM_{t-1} establishes the presence of cointegration (Kremers et al. 1992), which is a necessary condition to rely on these estimates (Pesaran et al., 2001). Moreover, the size of the coefficient indicates that over 76% of disequilibrium is adjusted within a month. This fast adjustment underlines the importance of using higher frequency data and undermines the results of earlier studies, Akram and Byrne, 2015 and Aizenman and Binici, 2016, which use annual and quarterly data respectively.

6.5 Impact of Global financial crisis[24]

In order to test whether the global financial crisis had changed the relationship between real and financial integration and EMP, we performed the following exercise based on the approach of Banti and Phylaktis (2015). We use a dummy, which takes the value of 1 during the period of the global financial crisis -from October 2007 to March 2009, and 0 otherwise. We call this the financial crisis dummy and refer to it as FC. At the same time, we control for the non-crisis periods

[24] We thank an anonymous reviewer for this suggestion.

with an interactive term dummy, which takes the value of 0 during the crisis episode, and 1 otherwise, denoted by NFC. The results are presented in Table 8 model 2. As it can be seen both of our integration variables are statistically significant during the crisis period-FC and the non-crisis periods, NFC; in addition, in all cases the integration measures reduce the EMP collaborating the results of the main analysis in Table 7. We next introduce the uncertainty measures, in models 5-7. We can make the following observations. First, both integration measures remain statistically significant during both FC and NFC in all the models. Secondly, although the uncertainty measures affect insignificantly, the diagnostics show that the inclusion of these policy uncertainty variables in the base model improves its efficacy as noted through the improvement in the log-likelihood values and reduction in the residual sum of squares.

7. Conclusion

Emerging markets are vulnerable in the current era of global financial integration. This study has examined the influence of economic integration and external policy uncertainty in determining EMP in a group of emerging markets, have undertaken substantial trade and capital account liberalization, which in turn has increased their economic integration with the rest of the world (Narayan et al, 2014). Thus, this sample of markets provides us with an opportunity to capture the impact of economic integration on EMP more accurately. Our findings show that economic integration (real and financial) helps to mitigate EMP both in the short-run and in the long run. We also find that the US monetary and economic policy uncertainty impact EMP both in the short-run and in the long run. That stresses the relevance of external policy uncertainty for emerging markets' foreign exchange vulnerability. Overall, our findings show the heterogeneous role of economic integration and policy uncertainty in determining EMP and highlight the need for prudent customized policymaking to ensure foreign exchange stability. Specifically, this research highlights that the current trend of deglobalization may hamper the stabilizing benefit of economic integration given the global policy uncertainty in the foreign exchange market. It should be noted that although this study uses an improved recent measure of EMP developed by Patnaik et al. (2017), one can expect further improvements in the measure in the future, by making use for example, of the dataset on FX interventions provided by Adler, Chang, Mano, and Shao's (2021).

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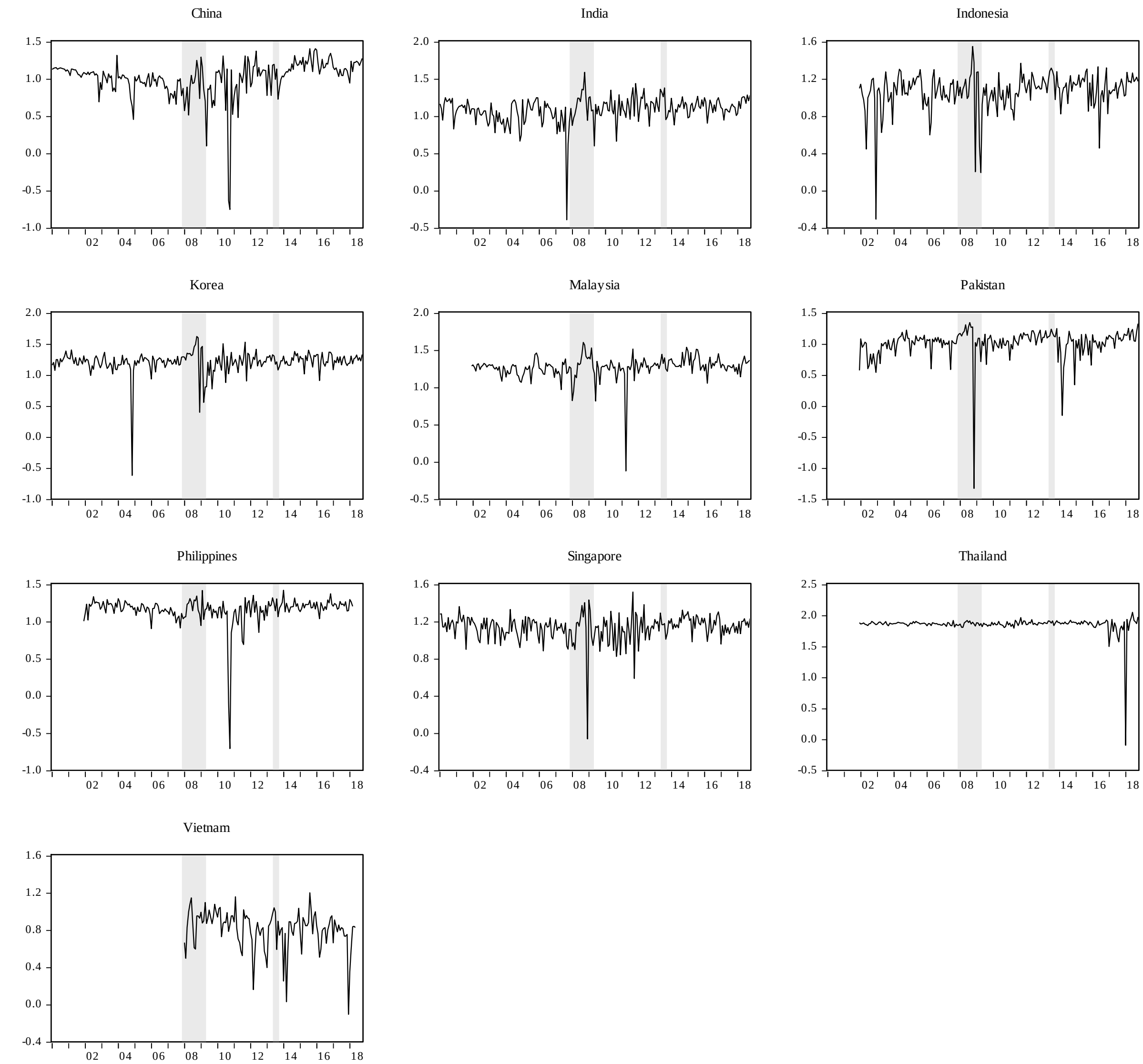

Figure 1: This figure shows the EMP of selected emerging markets over the period. The shaded areas show the Global financial crisis and Taper Tantrum episodes, respectively.

Table 1: Unit root analysis										
	China	**India**	**Indonesia**	**Korea**	**Malaysia**	**Pakistan**	**Philippine**	**Singapore**	**Thailand**	**Vietnam**
Panel I. At level										
EMP	-4.73(.00)***	-10.78(.00)***	-11.88(.00)***	-13.48(.00)***	-10.89(.00)***	-12.6(.00)***	-8.26(.00)***	-16.04(.00)***	-.45(.89)	-6.95(.00)***
TO	-1.39(.59)	-2.11(.24)	-.95(.77)	-2.08(.25)	-.85(.8)	-1.61(.47)	-1.92(.32)	-.98(.76)	-2.05(.26)	-1.19(.67)
ID	-2.36(.154)	-1.61(.48)	-2.37(.15)	-1.26(.64)	-1.42(.57)	-1.42(.57)	-2.54(.11)	-.71(.84)	-1.29(.63)	-2.04(.27)
UM	-8.12(.00)***	-	-	-	-	-	-	-	-	-
UE	-6.08(.00)***	-	-	-	-	-	-	-	-	-
GE	-3.186(.02)**	-	-	-	-	-	-	-	-	-
ER	-13.81(.00)***	-14.23(.00)***	-12.25(.00)***	-13.69(.00)***	-14.32(.00)***	-13.9(.00)***	-12.95(.00)***	-15.54(.00)***	-1.29(.63)	-9.19(.00)***
EA	-3.06(.031)**	-1.49(.53)	1.03(.99)	-1.98(.29)	-1.15(.69)	-1.34(.61)	-1.43(.56)	-1.52(.52)	-2.3(.17)	-3.75(.00)***
IF	-2.64(.08)*	-2.5(.12)	-11.38(.00)***	-2.65(.08)*	-10.28(.00)***	-5.48(.00)***	-8.75(.00)***	-6.23(.00)***	-9.69(.00)***	-4.86(.00)***
CP	-.29(.92)	-.78(.82)	-3.01(.03)**	-3.66(.00)***	.98(.99)	-1.75(.4)	3.82(1.0)	.28(.97)	-1.13(.7)	-.82(.8)
OL	-2.01(.28)	-1.54(.51)	-2.12(.24)	-1.81(.37)	-2.78(.06)*	-2.06(.26)	-2.88(.04)**	-2.04(.27)	-2.8(.05)**	-2.2(.21)
Panel I. At first difference										
EMP	-17.85(.00)***	-12.2(.00)***	-15.38(.00)***	-12.15(.00)***	-10.46(.00)***	-11.9(.00)***	-861(.00)***	-12.66(.00)***	-4.74(.00)***	-14.92(.00)***
TO	-2.57(.1)*	-2.56(.1)*	-3.18(.02)**	-3.17(.02)**	-2.87(.05)**	-2.51(.01)**	-2.72(.07)*	-2.32(.01)**	-3.11(.03)**	-3.03(.03)**
ID	-5.41(.00)***	-12.97(.000)***	-4.85(.00)***	-8.22(.00)***	-8.14(.00)***	-6.77(.00)***	-19.47(.00)***	-13.24(.00)***	-11.23(.00)***	-5.79(.00)***
UM	-15.17(.00)***	-	-	-	-	-	-	-	-	-
UE	-12.95(.00)***	-	-	-	-	-	-	-	-	-
GE	-11.17(.00)***	-	-	-	-	-	-	-	-	-
ER	-13.16(.00)***	-11.52(.00)***	-13.31(.00)***	-10.47(.00)***	-10.02(.00)***	-10.1(.00)***	-13.95(.00)***	-12.69(.00)***	-11.23(.00)***	-8.16(.00)***
EA	-5.22(.00)***	-23.53(.00)***	-6.69(.00)***	-5.68(.00)***	-4.3(.00)***	-6.42(.00)***	-3.66(.00)***	-20.66(.00)***	-4.05(.00)***	-10.85(.00)***
IF	-13.72(.00)***	-12.54(.00)***	-10.65(.00)***	-11.41(.00)***	-10.24(.00)***	-19.2(.00)***	-11.26(.00)***	-12.28(.00)***	-9.31(.00)***	-10.33(.00)***
CP	-7.42(.00)***	-2.08(.25) [-11.9(.00)***]	-4.29(.00)***	-13.65(.00)***	-12.51(.00)***	-2.04(.27) [-11.(.00)]***	-11.84(.00)***	-10.18(.00)***	-14.98(.00)***	-1.57(.49) [-8.9(.00)***]
OL	-12.02(.00)***	-12.47(.00)***	-11.869(.000)***	-13.948(.000)***	-11.054(.000)***	-10.4(.000)***	-10.41(.00)***	-12.64(.00)***	-10.64(.00)***	-6.96(.00)***

The table provides the unit root estimates. Panel I indicates some variables stationary and the others non-stationary at the level. Panel II, however, shows all variables are stationary at the first difference. The variables stationary at the second difference are in square brackets. Such variables are used in their first differenced form. ***, **, * show level of significance at 1%, 5%, and 10% respectively.

Variables abbreviations: EMP(exchange market pressure), TO(trade openness), ID(interest rate differential), UM(the US monetary policy uncertainty), UE(the US economic policy uncertainty), GE(global economic policy uncertainty), ER(stock return differential), EA(economic activity), IF(inflation rate), CP(credit to the private sector), OL(oil price)

Table 2: ARDL estimates										
	China	**India**	**Indonesia**	**Korea**	**Malaysia**	**Pakistan**	**Philippines**	**Singapore**	**Thailand**	**Vietnam**
Panel I. Short-run estimates										
ΔTOt	-5.84(1.429)	-6.39(3.48)***	2.84(.45)	6.24(1.22)	-.45(.08)	14.22(2.16)**	4.64(3.68)***	.63(.66)	-3.84(.96)	-8.84(3.49)***
ΔTOt-1	7.47(.49)		-10.1(1.19)					.13(.1)		
ΔTOt-2	-2.89(.167)		13.02(1.56)					-1.77(1.96)**		
ΔTOt-3	-6.96(2.23)**		-4.2(.51)							
ΔTOt-4	4.31(3.176)***		-16.7(2.77)***							
ΔTOt-5										
ΔIDt	-.18(2.02)**	.0002(.009)	-.05(.88)	.15(1.86)*	-.19(2.7)***	-.19(4.82)***	-.05(2.44)***	-.004(.17)	-.02(.5)	.04(1.23)
ΔIDt-1	.197(2.04)**		-.19(2.7)***	-.02(.31)						
ΔIDt-2	-.205(2.177)**		-.07(.96)	-.09(1.07)						
ΔIDt-3			.15(2.19)**	.14(1.72)*						
ΔIDt-4			-.005(.07)	.2(2.36)***						
ΔIDt-5			-.36(5.46)***	-.21(2.58)***						
ΔERt	-.307(.986)	-2.67(8.69)***	-.84(11.94)***	-1.63(4.2)***	-1.9(5.2)***	-1.6(3.84)***	-2.7(7.89)***	-2.84(8.85)***	-.34(1.36)	-1.7(4.55)***
ΔERt-1		1.41(3.27)***	-.46(.93)			1.46(3.02)***				
ΔERt-2		1.31(2.86)***	.72(1.84)*			.74(1.55)				
ΔERt-3		1.0(2.25)**				1.2(3.09)***				
ΔERt-4										
ΔERt-5										
ΔEAt	-4.07(.797)	2.217(1.89)*	1.76(4.1)***	.12(.2)	-.24(.53)	-.42(.93)	-.34(.74)	-.1(.45)	-.1(.34)	-.32(1.04)
ΔEAt-1				-1.04(1.81)*				.56(2.15)**		
ΔEAt-2								.4(1.76)*		
ΔEAt-3										
ΔEAt-4										
ΔEAt-5										
ΔIFt	-2.09(.494)	.75(.31)	-.18(.06)	5.68(1.74)*	1.77(.41)	.99(.25)	4.16(1.68)*	.85(.33)	-3.34(.75)	4.89(.66)
ΔIFt-1			9.02(2.56)***	-8.4(3.45)***		8.96(2.19)***	-9.95(1.01)			
ΔIFt-2			5.68(1.58)	-5.37(2.8)***			-2.69(2.37)			
ΔIFt-3			2.06(.62)	-4.9(3.16)***			-2.0(3.29)***			
ΔIFt-4			6.76(2.42)***	-3.98(2.9)***						
ΔIFt-5				-2.99(2.7)***						
ΔCPt	3.61(134)	-1.67(.91)	.84(.48)	2.52(2.09)**	5.04(1.16)	-.87(.69)	1.67(1.0)	-6.59(3.08)***	2.0(.83)	5.4(1.79)*
ΔCPt-1		-11.4(4.45)***								
ΔCPt-2		-11.8(4.28)***								
ΔCPt-3		-9.09(3.68)***								
ΔCPt-4		-7.31(4.13)***								
ΔCPt-5										
ΔOLt	.168(.43)	-.1(.38)	-.4(1.46)	.93(2.73)***	-.71(2.6)***	1.06(2.43)***	-.3(.96)	.28(1.21)	.08(.27)	-1.6(3.43)***
ΔOLt-1				-.86(2.49)***	-.55(1.98)**	.79(1.85)*				-.39(.84)
ΔOLt-2				.07(.2)						1.27(2.91)***
ΔOLt-3				-.92(2.76)***						
ΔOLt-4										
ΔOLt-5										
Panel II. Long-run estimates										
C	3.57(6.663)***	-1.05(12.1)***	-15.8(10.9)***	2.71(9.68)***	-4.72(13.35)	3.22(15.0)***	2.64(8.0)***	8.96(15.28)***	5.15(14.47)***	7.14(8.59)***
FC	-.074(.66)	-.02(.418)	.1(2.26)**	.08(1.16)	.16(2.91)***	.11(1.68)*	-.05(.47)	-.08(3.06)***	-.01(.4)	-.29(3.35)***

TT	.053(.377)	.035(.48)	-.02(.37)	.03(.5)	.05(.68)	.08(.87)	-.02(.08)	-.03(.68)	.02(.35)	.03(.52)
TO	-1.008(2.1)**	-.513(1.545)	2.66(5.35)***	-2.63(3.3)***	.57(.65)	.19(.28)	1.24(1.2)	-.02(.59)	-.07(.12)	-1.06(2.4)***
ID	.01(.762)	.009(1.282)	.01(1.95)**	.01(.95)	-.02(1.77)*	-.02(2.61)***	-.02(.72)	-.01(3.89)***	.01(.99)	.005(.63)
ER	.033(.05)	-4.76(4.58)***	-3.32(5.72)***	-1.7(3.98)***	-4.1(4.6)***	-3.8(3.16)***	-5.4(3.96)***	-2.59(5.54)***	-.26(.76)	-2.02(3.5)***
EA	-1.864(1.64)*	.115(.726)	1.21(3.29)***	1.87(2.49)***	-1.73(2.3)**	-.32(1.63)*	-1.09(1.27)	-.57(3.01)***	-.14(.43)	-.36(1.81)*
IF	-3.56(.43)	1.273(.357)	-3.96(.56)	3.05(3.29)***	3.71(.59)	-12.4(1.58)	6.81(1.48)	1.16(.43)	-1.68(.35)	3.87(.64)
CP	1.187(1.495)	12.462(1.769)*	.44(2.87)***	-.55(1.75)*	.75(1.8)*	-.45(.25)	.51(.91)	.07(.59)	-.13(.96)	3.05(.58)
OL	.058(.225)	.173(.996)	-.18(1.79)*	.53(2.45)***	-.13(1.51)	.45(2.93)***	.07(.21)	.09(1.42)	.13(1.14)	-.59(4.19)***
Panel III. Diagnostics										
F-stat.	5.508	20.827	14.214	7.66	22.1	27.91	5.89	29.81	26.51	8.11
ECM_{t-1}	-.669(6.673)	-.938(12.166)	-1.38(10.975)	-.961(9.731)	-.92(13.28)	-1.07(15.02)	-.53(8.04)	-1.53(15.29)	-1.05(14.5)	-1.46(8.59)
Adj. R^2	.34	.43	.57	.27	.19	.25	.39	.27	.04	.4
LM	.212	.218	.646	.384	.33	.47	.38	.03	.29	.42
RESET	4.984	4.484	8.967	9.93	.01	4.27	5.19	3.27	1.96	2.7
CUSUM	S	S	S	S	S	S	US	U	S	S
CUSUMQ	S	S	S	S	S	US	S	S	US	S

The table shows short run and long run ARDL estimates in panels I & II, respectively. ***, **, * show level of significance at 1%, 5%, and 10% respectively. T-values are in parenthesis in their absolute form. Panel III show model diagnostics. Estimated F-statistics that is considered significant if greater than the critical values (i.e. 3.5(3.13) at 5%(10%) significance levels for k=7 (Pesaran et al., 2001, Table CI(iii)-Case III, page 300). Error correction term. T-value in its absolute form is in parenthesis. It is significant if greater than the critical values, -4.57(-4.23) at 5%(10%) significance levels (Pesaran et al., 2001, Table CII(iii)-Case III, page 303). LM is the Lagrange Multiplier test of residual serial correlation. RESET is Ramsey's test for misspecification. LM and RESET follow the chi-square distribution with one degree of freedom (first-order). The critical values at the 10% (5%) level are 2.71 (3.84). CUSUM and CUSUMQ assess the stability of short run and long run estimates. S refers to stable and US refers to unstable.

Variables abbreviations: FC(the global financial crisis), TT(taper Tantrum), TO(trade openness), ID(interest rate differential), ER(stock return differential), EA(economic activity), IF(inflation rate), CP(credit to the private sector), OL(oil price)

Table 3: ARDL estimates considering the US monetary policy uncertainty

	China	India	Indonesia	Korea	Malaysia	Pakistan	Philippines	Singapore	Thailand	Vietnam
Panel I. Short-run estimates										
ΔTOt	-7.4(1.58)	-6.08(3.37)***	4.69(.74)	10.01(2.91)***	-.04(.01)	.09(.01)	4.48(3.56)***	.67(.71)	-3.98(.99)	-7.73(3.41)***
ΔTOt-1	8.65(.55)		-14.01(1.64)*			25.83(1.94)**		.14(.11)		
ΔTOt-2	-2.26(.31)		11.98(1.45)					-1.93(2.13)**		
ΔTOt-3	-6.95(2.24)**		-4.04(.49)							
ΔTOt-4	4.04(3.16)***		-13.58(2.26)**							
ΔTOt-5										
ΔIDt	-.19(2.13)**	.001(.02)	-.08(1.38)	.2(2.64)***	-.19(2.)***	-.19(5.01)***	-.05(2.15)**	-.001(.06)	-.03(.6)	.04(1.31)
ΔIDt-1	.22(2.25)**		-.19(2.72)***	-.01(.19)						
ΔIDt-2	-.19(2.07)**		-.14(1.94)**	-.08(.82)						
ΔIDt-3			.16(2.34)**	.09(1.03)						
ΔIDt-4			-.01(.06)*	.21(2.51)***						
ΔIDt-5			-.33(5.19)***	-.26(3.37)***						
ΔUMt	.03(.45)	.04(.97)	-.11(2.19)**	.06(1.16)	.09(2.14)**	.09(1.12)	-.06(1.28)	.04(1.03)	-.05(.99)	.15(1.93)*
ΔUMt-1		-.14(2.97)***	.13(2.33)**			-.01(.13)				
ΔUMt-2			.1(1.73)*			-.07(.9)				
ΔUMt-3			.16(2.66)			-.23(2.9)***				
ΔUMt-4			.12(2.06)**							
ΔUMt-5			.17(3.26)***							
Panel II. Long-run estimates										
C	3.81(6.88)***	-1.1(12.2)***	-16(11.2)***	2.71(9.68)***	-3.8(13.2)***	4.62(15.05)***	2.21(7.55)***	8.87(15.33)***	5.49(14.44)***	7.07(8.66)***
FC	-.08(.67)	-.02(.37)	.12(3.01)***	.11(2.29)**	.15(2.77)***	.14(2.15)**	-.05(.46)	-.08(3.13)***	-.01(.37)	-.29(3.47)***
TT	.04(.29)	.04(.58)	-.01(.17)	.02(.35)	.06(.85)	.04(.49)	-.04(.26)	-.03(.58)	.02(.39)	.03(.49)
TO	-1.05(2.13)**	-.55(1.62)*	2.58(5.39)***	-3.05(3.66)***	.43(.46)	-.13(.18)	2.01(1.8)*	-.02(.5)	-.05(.09)	-1.2(2.58)***
ID	.01(.59)	.01(1.47)	.01(2.06)**	.02(1.63)*	-.02(1.61)*	-.02(2.58)***	-.01(.37)	-.01(3.67)***	.01(1.01)	.01(.81)
UM	-.17(1.22)	.07(.88)	-.12(2.18)**	-.12(1.56)	-.03(.39)	.06(.54)	-.15(1.41)	.03(1.0)	.04(.81)	.11(1.59)
Control variables are included										
Panel III. Diagnostics										
F-stat	5.07	18.92	12.77	11.55	19.28	22.8	4.61	26.44	23.5	7.1
ECM_{t-1}	-.65(6.88)	-.91(12.15)	-1.45(11.25)	-1.01(10.42)	-.89(13.07)	-1.06(15.06)	-.53(7.61)	-1.55(15.33)	-1.05(14.47)	-1.49(8.66)
Adj. R^2	.35	.43	.58	.29	.21	.26	.41	.27	.04	.4
LM	.21	.01	1.39	.2	.93	.68	1.01	.02	.25	.44
RESET	4.75	4.97	8.32	9.93	.149	4.39	5.29	3.41	1.28	2.64
CUSUM	S	S	S	S	S	S	S	US	S	S
CUSUMQ	S	S	S	S	S	US	S	S	US	S

The table shows short run and long run ARDL estimates in panels I & II, respectively incorporating the US monetary policy uncertainty. ***, **, * show level of significance at 1%, 5%, and 10% respectively. T-values are in parenthesis in their absolute form. Panel III shows the diagnostics. Estimated F-statistics that is considered significant if greater than the critical values (i.e. 3.39(3.06) at 5%(10%) significance levels for k=8 (Pesaran et al., 2001, Table CI(iii)-Case III, page 300). Error correction term. T-value in its absolute form is in parenthesis. It is significant if greater than the critical values, -4.72(-4.40) at 5%(10%) significance levels (Pesaran et al., 2001, Table CII(iii)-Case III, page 303). LM is the Lagrange Multiplier test of residual serial correlation. RESET is Ramsey's test for misspecification. LM and RESET follow the chi-square distribution with one degree of freedom (first-order). The critical values at the 10% (5%) level are 2.71 (3.84). CUSUM and CUSUMQ assess the stability of short run and long run estimates. S refers to stable and US refers to unstable.

Variables abbreviations: FC(the global financial crisis), TT(taper Tantrum), TO(trade openness), ID(interest rate differential), UM(the US monetary policy uncertainty)

Table 4: ARDL estimates considering the US economic policy uncertainty

	China	India	Indonesia	Korea	Malaysia	Pakistan	Philippines	Singapore	Thailand	Vietnam
Panel I. Short-run estimates										
ΔTOt	-4.44(1.31)	-6.7(3.6)***	3.89(.62)	5.63(1.09)	.54(.09)	2.79(.21)	5.1(3.79)***	-.27(.64)	-2.84(.71)	-7.25(2.9)***
ΔTOt-1	7.15(.45)		-9.86(1.14)							
ΔTOt-2	-3.38(.197)		12.65(1.51)							
ΔTOt-3	-4.69(2.1)**		-4.33(.53)							
ΔTOt-4	5.37(3.3)***		-16.2(2.7)***							
ΔTOt-5										
ΔIDt	-.16(1.77)*	.002(.08)	-.04(.72)	.18(2.17)**	-.17(2.8)***	-.21(5.47)***	-.05(2.2)**	-.02(.81)	-.01(.24)	.01(.19)
ΔIDt-1	.198(2.03)**		-.19(2.6)***	.03(.4)						
ΔIDt-2	-.21(2.24)**		-.07(.97)	-.06(.7)						
ΔIDt-3			.16(2.18)**	.08(.92)						
ΔIDt-4			-.003(.04)	.21(2.41)***						
ΔIDt-5			-.36(5.43)***	-.27(3.2)***						
ΔUEt	-.115(1.01)	.08(.98)	-.02(.24)	.17(1.65)*	.05(.57)	.14(.99)	-.11(1.18)	.02(.21)	-.1(1.08)	.05(.41)
ΔUEt-1				.27(2.54)***		-.29(1.74)*		.17(2.09)**		
ΔUEt-2						-.52(3.41)***				
ΔUEt-3						.35(2.33)**				
ΔUEt-4						-.22(1.61)*				
ΔUEt-5										
Panel II. Long-run estimates										
C	4.329(6.999)***	-.99(12.2)***	-15.8(11)***	3.85(1.13)	-6.7(13.5)***	3.34(15.17)***	2.69(8.12)***	8.57(14.92)***	4.71(14.38)***	6.85(8.19)***
FC	-.013(.116)	-.02(.48)	.11(2.38)**	.07(1.05)	.19(3.34)***	.13(1.91)**	-.03(.25)	-.04(2.07)**)	-.001(.02)	-.33(4.2)***
TT	.053(.367)	.04(.51)	-.02(.42)	.05(.73)	.04(.6)	.01(.07)	-.02(.13)	-.04(1.0)	.01(.2)	.04(.91)
TO	-1.387(2.51)***	-.49(1.48)	2.63(5.31)***	-2.4(3.3)***	.81(.91)	.72(.94)	1.09(1.09)	-.1(2.57)***	-.07(.12)	-1.34(3.2)
ID	.026(1.433)	.007(.98)	.02(2.12)**	.02(1.54)	-.02(1.33)	-.03(3.73)***	-.01(.37)	-.01(1.76)*	.01(1.59)	-.01(.71)
UE	-.29(1.56)	.044(.55)	-.05(.94)	-.15(1.41)	-.12(1.18)	.33(2.12)**	-.21(1.34)	-.12(1.79)*	-.12(1.49)	.11(1.4)
Control variables are included										
Panel III. Diagnostics										
F-stat[a]	5.106	18.41	12.93	11.96	19.87	23.95	5.28	24.64	23.68	6.48
ECM_{t-1}[b]	-.66(7.008)	-.94(12.168)	-1.39(11.04)	-1.04(10.6)	-.91(13.4)	-1.09(15.17)	-.56(8.16)	-1.44(14.97)	-1.05(14.41)	-1.84(8.2)
Adj. R^2	.36	.42	.57	.31	.19	.28	.39	.31	.05	.48
LM[c]	.128	.225	.75	.81	.42	.27	.22	.15	.23	.63
RESET[d]	5.176	4.29	8.95	10.33	.19	4.13	5.55	3.12	1.41	3.17
CUSUM	S	S	S	S	S	S	US	S	S	S
CUSUMQ	S	S	S	U	S	US	S	S	US	S

The table shows short run and long run ARDL estimates in panels I & II, respectively incorporating the US economic policy uncertainty. ***, **, * show level of significance at 1%, 5%, and 10% respectively. T-values are in parenthesis in their absolute form. Panel III shows diagnostics. Estimated F-statistics that is considered significant if greater than the critical values (i.e. 3.39(3.06) at 5%(10%) significance levels for k=8 (Pesaran et al., 2001, Table CI(iii)-Case III, page 300). Error correction term. T-value in its absolute form is in parenthesis. It is significant if greater than the critical values, -4.72(-4.40) at 5%(10%) significance levels (Pesaran et al., 2001, Table CII(iii)-Case III, page 303). LM is the Lagrange Multiplier test of residual serial correlation. RESET is Ramsey's test for misspecification. LM and RESET follow the chi-square distribution with one degree of freedom (first-order). The critical values at the 10% (5%) level are 2.71 (3.84). CUSUM and CUSUMQ assess the stability of short run and long run estimates. S refers to stable and US refers to unstable.

Variables abbreviations: FC(the global financial crisis), TT(taper Tantrum), TO(trade openness), ID(interest rate differential), UE(the US economic policy uncertainty)

Table 5: ARDL estimates considering the global economic policy uncertainty

	China	**India**	**Indonesia**	**Korea**	**Malaysia**	**Pakistan**	**Philippines**	**Singapore**	**Thailand**	**Vietnam**
Panel I. Short-run estimates										
ΔTOt	-6.32(1.47)	-6.6(3.6)***	3.86(.61)	6.11(1.85)*	-.23(.04)	5.96(.93)	5.01(3.75)***	-.36(.89)	-3.59(.9)	-8.97(3.21)***
ΔTOt-1	8.07(.51)		-10.29(1.18)							
ΔTOt-2	-2.79(.16)		13.02(1.55)							
ΔTOt-3	-5.19(2.13)**		-4.2(.51)							
ΔTOt-4	4.3(3.18)***		-16.32(2.7)***							
ΔTOt-5										
ΔIDt	-.18(1.96)**	.0001(.0001)	-.04(.72)	.14(1.87)*	-.19(2.7)***	-.19(5.02)***	-.05(2.31)**	-.01(.36)	-.02(.41)	.02(.61)
ΔIDt-1	.19(2.02)**		-.19(2.63)***	.05(.6)						
ΔIDt-2	-.19(2.12)**		-.07(.92)	-.04(.48)						
ΔIDt-3			.16(2.19)**	.09(1.1)						
ΔIDt-4			-.002(.03)	.19(2.19)**						
ΔIDt-5			-.36(5.41)***	-.25(3.11)***						
ΔGEt	.03(.18)	.05(.43)	-.06(.46)	.29(2.08)**	.12(.96)	.52(2.61)***	-.11(.74)	-.01(.13)	.04(.28)	.14(.76)
ΔGEt-1				.49(3.44)***				.25(2.36)***		
ΔGEt-2										
ΔGEt-3										
ΔGEt-4										
ΔGEt-5										
Panel II. Long-run estimates										
C	3.87(6.79)***	-.7(12.1)***	-15.7(10.9)***	3.82(10.26)***	-4.7(13)***	2.65(15.31)***	2.52(7.99)***	8.39(15.12)***	4.97(14.39)***	7.003(8.25)***
FC	-.04(.35)	-.02(.45)	.11(2.35)**	.08(1.53)	.16(2.76)***	.04(.61)	-.05(.37)	-.05(2.21)**	-.01(.29)	-.32(4.13)***
TT	.06(.43)	.04(.51)	-.02(.43)	.06(.85)	.05(.67)	.11(1.22)	-.02(.11)	-.01(.29)	.02(.3)	.05(1.17)
TO	-1.18(2.13)**	-.47(1.38)	2.59(5.16)***	-2.36(3.4)***	.56(.64)	1.42(2.05)**	1.19(1.16)	-.07(1.83)*	-.08(.15)	-1.6(3.5)***
ID	.02(1.13)	.01(.94)	.02(2.08)**	.02(1.55)	-.02(1.71)*	-.02(3.25)***	-.01(.57)	-.01(2.39)***	.01(1.07)	-.01(.99)
GE	-.14(.6)	.05(.54)	-.06(.94)	-.14(1.31)	.003(.03)	.37(2.8)***	-.1(.49)	-.01(2.39)***	-.04(.41)	.18(1.61)*
Control variables are included										
Panel III. Diagnostics										
F-stat[a]	4.9	18.44	12.71	11.21	19.65	24.82	5.21	26.47	23.52	6.46
ECM_{t-1}[b]	-.66(6.79)	-.94(12.13)	-1.39(10.99)	-1.1(10.27)	-.92(13.24)	1.07(15.36)	-.54(8.03)	-1.46(15.13)	-1.06(14.42)	-1.87(8.26)
Adj. R^2	.35	.42	.57	.31	.19	.27	.39	.25	.04	.48
LM[c]	.12	.18	.66	.09	.33	.27	.34	.52	.26	.6
RESET[d]	5.09	4.28	8.66	9.34	.01	4.37	5.49	3.28	1.56	3.22
CUSUM	S	S	S	S	S	S	US	US	S	S
CUSUMQ	S	S	S	S	S	U	S	S	US	S

The table shows short run and long run ARDL estimates in panels I & II, respectively incorporating the global policy uncertainty. ***, **, * show level of significance at 1%, 5%, and 10% respectively. T-values are in parenthesis in their absolute form. Panel III reports diagnostics. Estimated F-statistics that is considered significant if greater than the critical values (i.e. 3.39(3.06) at 5%(10%) significance levels for k=8 (Pesaran et al., 2001, Table CI(iii)-Case III, page 300). Error correction term. T-value in its absolute form is in parenthesis. It is significant if greater than the critical values, -4.72(-4.40) at 5%(10%) significance levels (Pesaran et al., 2001, Table CII(iii)-Case III, page 303). LM is the Lagrange Multiplier test of residual serial correlation. RESET is Ramsey's test for misspecification. LM and RESET follow the chi-square distribution with one degree of freedom (first-order). The critical values at the 10% (5%) level are 2.71 (3.84). CUSUM and CUSUMQ assess the stability of short run and long run estimates. S refers to stable and US refers to unstable.

Variables abbreviations: FC(the global financial crisis), TT(taper Tantrum), TO(trade openness), ID(interest rate differential), GE(the global economic policy uncertainty)

Table 6: Summary of long-run estimates										
	China	**India**	**Indonesia**	**Korea**	**Malaysia**	**Pakistan**	**Philippines**	**Singapore**	**Thailand**	**Vietnam**
Panel 1. Base model										
TO	-		+	-						-
ID			+		-	-		-		
Adj. R^2	.34	.43	.57	.27	.19	.25	.39	.27	.04	.4
Panel II. Base model with the US monetary policy uncertainty										
TO	-	-	+	-			+			-
ID			+	+	-	-		-		
UM			-							
Adj. R^2	.35	.43	.58	.29	.21	.26	.41	.27	.04	.4
Panel III. Base model with the US economic policy uncertainty										
TO	-		+	-				-		
ID			+			-		-		
UE						+		-		
Adj. R^2	.36	.42	.57	.31	.19	.28	.39	.31	.05	.48
Panel IV. Base model with the global economic policy uncertainty										
TO	-		+	-		+		-		-
ID			+		-	-		-		
GE						+		-		+
Adj. R^2	.35	.42	.57	.31	.19	.27	.39	.25	.04	.48

This table is based on Tables 2-5 such that significant signs are reported here.
Variables abbreviations: TO(trade openness), ID(interest rate differential), UM(the US monetary policy uncertainty), UE(the US economic policy uncertainty), GE(the global economic policy uncertainty)

Table 7: Panel ARDL estimates				
	Model-2	Model-5	Model-6	Model-7
Panel I. Long-run estimates				
C	1.491(3.846)***	1.504(3.846)***	1.485(3.779)***	1.483(3.862)***
FC	.013(.551)	.015(.623)	.014(.578)	.013(.539)
TT	.004(.494)	.005(.61)	.004(.504)	.005(.555)
TO	-.058(3.241)***	-.056(3.128)***	-.059(3.129)***	-.057(2.966)***
ID	-.008(4.938)***	-.008(4.592)***	-.008(4.156)***	-.008(4.375)***
UM	-	.032(1.664)*	-	-
UE	-	-	-.011(.372)	-
GE	-	-	-	.004(.104)
Control variables are included				
Panel II. Diagnostics				
ECM_{t-1}	-.766(8.935)***	-.768(8.806)***	-.766(8.951)***	-.767(8.99)***
RSS	47.27	47.12	47.176	47.147
LL	1033.9	1038.5	1036.47	1035.82
No. of obs.	2005	2005	2005	2005
No. of countries	10	10	10	10

The table shows long run panel ARDL estimates in panels I. Model-2 is the main model while models 5,6,7 extend it by incorporating Monetary policy uncertainty, the USA economic policy uncertainty, and global policy uncertainty, respectively. Numbers of the models correspond to the specifications in the text. So, model 2 corresponds to specification 2, model 5 corresponds to specification 5 etc. T-values are in their absolute form is in the parentheses. ***, **, * show level of significance at 1%, 5%, and 10% respectively. ECMt-1 is an error correction term. Its negative and significant coefficient establishes the presence of cointegration (Kremers et al. 1992). RSS is residuals sum of squares that measures the variance of residuals, LL is log likelihood that measures the model goodness of fit.

Variables abbreviations: FC(the global financial crisis), TT(taper Tantrum), TO(trade openness), ID(interest rate differential), UM(the US monetary policy uncertainty) , UE(the US economic policy uncertainty) , GE(the global economic policy uncertainty)

Table 8: Panel ARDL estimates for the crisis and non-crisis periods				
	Model-2	Model-5	Model-6	Model-7
Panel I. Long-run estimates				
C	1.479(3.921)***	1.487(3.901)***	1.474(3.869)***	1.479(.958)***
TT	.004(.399)	.004(.493)	.004(.418)	.004(.461)
TO*FC	-.071(3.989)***	-.069(3.929)***	-.071(3.861)***	-.069(3.729)***
TO*NFC	-.058(3.268)***	-.056(3.178)***	-.058(3.098)***	-.056(2.944)***
ID*FC	-.009(2.626)***	-.008(2.24)**	-.009(2.435)***	-.009(.536)***
ID*NFC	-.008(4.65)***	-.008(4.421)***	-.008(4.013)***	-.008(4.172)***
UM	-	.029(1.503)	-	-
UE	-	-	-.006(.214)	-
UG	-	-	-	.007(.197)
Control variables are included				
Panel II. Diagnostics				
ECM_{t-1}	-.766(8.731)***	-.768(8.622)***	-.766(8.732)***	-.767(8.772)***
RSS	47.106	46.951	47.012	46.979
LL	1038.442	1042.8	1041.015	1040.372
No. of obs.	2005	2005	2005	2005
No. of countries	10	10	10	10

The table shows long run panel ARDL estimates for global crisis (FC) and non-global crisis (NFC) sub-periods in panels I. FC takes value 1 for the period October 2007 to March 2009 & 0 otherwise meanwhile NFC takes value 0 for the period October 2007 to March 2009 & 1 otherwise. Model-2 is the main model while models 5,6,7 extend it by incorporating Monetary policy uncertainty, the USA economic policy uncertainty, and global policy uncertainty, respectively. Numbers of the models correspond to the specifications in the text. So, model 2 corresponds to specification 2, model 5 corresponds to specification 5 etc. T-values are in their absolute form is in the parentheses. ***, **, * show level of significance at 1%, 5%, and 10% respectively. ECMt-1 is an error correction term. Its negative and significant coefficient establishes the presence of cointegration (Kremers et al. 1992). RSS is residuals sum of squares that measures the variance of residuals, LL is log likelihood that measures the model goodness of fit.

Variables abbreviations: TT (taper Tantrum), TO(trade openness), ID(interest rate differential), *FC (global crisis period interaction), *NFC (non-global crisis period interaction), UM(the US monetary policy uncertainty) , UE(the US economic policy uncertainty) , GE(the global economic policy uncertainty),

Appendix

Table A: Variables and sources			
No.	Variable	Description	Source
1	EMP	An index of exchange rate changes and international reserves of an economy. It measures the occurred and prevented exchange rate changes	Patnaik et al. (2017)
2	TO	It is the ratio of an economy's exports minus imports divided by GDP. It measures trade openness or real integration.	World Bank
3	ID	It is the difference between the domestic real interest rate and the US real interest rate. It measures the financial integration	IMF IFS
4	UM	It measures the monetary policy uncertainty (MPU) in the USA. It is a news-based index that gauges the terms like, "uncertainty" or "uncertain," "monetary policy(ies)" or "interest rate(s)" or "Federal fund(s) rate" or "Fed fund(s) rate," and "Federal Reserve" or "the Fed" or "Federal Open Market Committee" or "FOMC" in the Wall Street Journal (WSJ), New York Times, and Washington Post.	Husted et al. (2020)
5	UE	It measures the economic policy uncertainty (EPU) of the US market. It is a news-based index that measures the terms like 'uncertainty' or 'uncertain', the terms 'economic' or 'economy' and one or more of the following terms: 'congress', 'legislation', 'white house', 'regulation', 'federal reserve', or 'deficit' in USA Today, the Miami Herald, the Chicago Tribune, the Washington Post, the Los Angeles Times, the Boston Globe, the San Francisco Chronicle, the Dallas Morning News, the Houston Chronicle, and the WSJ.	Baker et al. (2016)
6	GE	It measures the global economic policy uncertainty (GPU). Following the same measurement approach as UE, it is GDP weighted average economic policy uncertainty of twenty-one economies (Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States) that constitute the eighty percent of world GDP. (see Baker et al. (2016) for details)	Davis (2016)
7	ER	It measures the stock market performance by taking the log returns differential of sample country stock market return and the USA stock market return in domestic currency.	Reuters
8	EA	It is an index of industrial production and it measures economic activity	World Bank
9	IF	It is inflation rate, and it measures the changes in overall general price level	IMF IFS
10	CP	It is credit to private sector, and it measures financial development.	IMF IFS
11	OL	It is the global Brent crude per barrel in local currency. It measures the influence of the energy market.	FRED St. Louis