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Global uncertainties and portfolio flow dynamics of the BRICS countries

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ABSTRACT

This paper investigates the dynamics of bond and stock market capital flows to BRICS countries under uncertainties such as global economic policy uncertainty and the US trade policy uncertainty. We use a time-varying Granger causality framework over the January 2008-November 2019 period to analyze the predictive power of uncertainties on capital flows in the form of bond and equity. The results show that the effects are heterogeneous across countries and stronger during the Global Financial Crisis period and post-2018 period while it lost its significance in the subsequent period. The negative influence of uncertainties on capital flows directed to BRICS countries is also evident in the results of non-parametric time-varying panel models. Overall, it is thought that the heterogeneous structure of the causality between uncertainty and portfolio flows into BRICS may present portfolio diversification benefits for global investors.

1. Introduction and literature review

In the most general sense, it is known that the literature has shared the view that capital flows are influenced by the combination of push and pull factors (Calvo et al., 1993). Regarding push factors, the monetary policy of developed countries, global liquidity, and global risk aversion help explaining portfolio flows (Milesi-Ferretti and Tille, 2011; Shin, 2012, among others). For instance, the recent decade is characterized with the studies aiming to understand the impact of unconventional policy measures initiated by developed countries’ monetary authorities on capital flows as they inflated the global liquidity to unprecedented levels and they correspond to drastic shifts in risk appetite (Ahmed and Zlate, 2014; Anaya et al., 2017). On the other hand, pull factors such as credit ratings, macroeconomic fundamentals, consumption and investment patterns, trade openness, quality of institutions and growth prospects can potentially affect the rate of return obtained from investing in local securities so they are informative for volume and momentum of capital flows to emerging markets (EM) economies (Fratzscher, 2012; Koepke, 2019). In fact, such factors may be the reason why there exists a heterogeneity across capital flows to EM economies in the wake of global shocks. Ahmed et al. (2017) assert that, during Taper-tantrum, differentiation in investment behavior towards EM countries are related to macroeconomic fundamentals. Similarly, Byrne and Fies (2016) document that, while capital flows are driven by the common global forces such as commodity prices, US interest rates and growth dynamics in advanced economies, they are particularly shaped by the county-specific characteristics such as financial openness and institutional framework. From a theoretical standpoint, when we consider the portfolio flows to EM economies as decisions under portfolio diversification theory, then local fundamentals would definitely impact the
expected return and variance of a particular EM country’s assets relative to others so that capital flows directed to EM economies will be distributed in line with risk-return trade-offs.

However, the role of the abovementioned determinants of capital flows is quite different depending on the type of capital flows (Koepke, 2019). Although push factors and global forces are much effective for shaping debt and equity flows, they are somewhat less influential for banking flows and foreign direct investments. Banking flows are generally established as long-term relationships between borrower and lender which can be rolled over continuously such as syndicated loans or branch networks. Hence, the unique form of debt relation in this sub-category makes it less susceptible to global risk appetite shifts, whereas global interest rates govern the capital flows directed to EM bond markets. Similarly, foreign direct investments mostly require longer-term commitment exempted from sudden changes in risk-seeking behavior (Broner et al., 2010). That group of capital flows is altered by strategic decisions, trade protectionism, exchange rate movements, and gravity effects. On the other hand, as emphasized by Koepke (2019), pull factors like domestic economic growth and vulnerability indicators definitely shape equity and bond flows as they may change the course of expected profits/revenues generated by companies and overall debt-paying ability of sovereign/private economic agents, which are key elements of pricing for these financial instruments. As a result, this study chooses to focus on capital flows channeled into local equity and debt instruments.

Apart from the advancements in measurement and monitoring of uncertainty thanks to introduction of new text-based indexation methods, more frequent occurrence of real economic and financial shocks on the global scale throughout the recent decade, an increasing number of empirical works has been aiming to assess financial consequences of policy uncertainty (Baker et al., 2016; Donadelli and Gerotto, 2019). It is argued that possible changes in policies relevant to economic governance might lead to dramatic changes in risk perception, while it makes equity markets more volatile (Pástor and Veronesi, 2013; Chen and Chiang, 2020; Luo and Zhang, 2020). The effect is not limited to equity markets, flight-to-safety behavior can diminish the liquidity, increase the credit risk and inflate the cost of borrowing in corporate and sovereign bond markets (Kaviani et al., 2017; Brogaard et al., 2020). In fact, recent COVID-19 outbreak accompanying worsening in risk perception and great heterogeneity in policy responses led to voluminous cutbacks in risky asset holdings and provided a perfect example of how uncertainties might reverse capital inflows to EM countries. After establishing its importance for capital flows through push factors, it is also explanatory to mention that policy uncertainty may alter the portfolio movements through pull factors. A growing body of literature documents on the counter-cyclical nature of uncertainty via several channels (Baker and Davis, 2013). On top of financial connectedness, due to the well-developed contemporary conjecture of foreign trade, supply and demand shocks occurred in a foreign country can be easily transformed into local macro-economic shocks. Shrinking global trade could hinder exports on the country-level given declining external demand. The drop in commodity prices due to diminished global activity caused by uncertainty would put pressure on fiscal balance and the growth performance of commodity exporters. Moreover, any spike in uncertainty threatens the investment tendencies at the corporate level resulting in stagnant capital formation and economic growth (Wang et al., 2014). The turmoil associated with rising policy uncertainties is determined to hamper credit growth and tighten financial conditions, which ultimately leads to prominent credit risk (Bordo et al., 2016). In this context, elevated levels of uncertainty are expected to coincide with eroded investor attention and pull-factors to local bonds and equities, because of the loss of attractiveness. Hence, understanding the impact of uncertainty on portfolio flows is essential to monitor and preserve financial stability provided that there are heterogeneities both in the response of capital flows determinants to policy uncertainty and the response of equity and bond flow categories to push/pull factors.

Over the recent decade, economic policy uncertainties have become a central issue for emerging market economies as they have built up some risks since the end of the global financial crisis. Higher return differentials in the emerging markets coupled with stagnant investment outlook in developed economies have attracted a considerable amount of capital flows to emerging markets in the last decade (Fig. 1). These countries have benefited from credit-backed growth opportunities thanks to these capital flows. Besides, capital flows have increased countries’ resistance to foreign exchange shocks through reserve accumulation. Thus, stable and continuous capital flows are essential for sustaining a positive outlook for the economies of these countries.

Global developments such as the COVID-19 outbreak, geopolitical tensions, trade wars, the rise of protectionism, the prolonged Brexit process, concerns about the slowdown in the global economy, which has recently increased with the outbreak, and the coming US presidential elections, have heightened the need for establishing links between policy uncertainty and capital flows to emerging markets. Furthermore, the ongoing COVID-19 increases considerable media attention regarding policy uncertainty. In a recent study, Goodell and Huynh (2020) examine the reactions of US industries to sudden COVID-related news announcements and find that legislators traded in anticipation of COVID-19 having a major impact on the financial markets. Furthermore, as the COVID-19 pandemic elevates the concerns about the eventual economic impact of this crisis, the demand for hedging and diversifying assets has taken a considerable interest (Goodell and Goutte, 2020). Rising uncertainties accompanying unfavorable domestic economic outlook have other important implications through capital flows since policy uncertainty can prompt “flight to quality” behavior, which can impair investors’ willingness to take the risk by investing in local financial assets of EM economies.

The COVID-19 pandemic also has affected the political systems of many countries resulting in a delay of legislative activities and rescheduling of elections due to fears of spreading the virus which in turn influences market conditions (for example, an incumbent party may be penalized for the slowdown in the economy). Using seven US presidential election campaigns, Goodell et al. (2020) explore the relationship between election uncertainty, economic policy uncertainty, and financial market uncertainty in a prediction-market analysis and conclude that changes in the incumbent party re-election probability is a key driver of changes in policy uncertainty.

A large and growing body of literature has investigated the impact of economic policy uncertainty (EPU) on financial markets. This literature mainly uses the EPU index developed by Baker et al. (2016) as the indicator for economic policy uncertainty. For several countries, the EPU is accessible, and the global EPU represents an average GDP-weighted EPU index of 21 countries. This
Fig. 1. Net Non-Resident Purchases of EM Stocks and Bonds (Billion USD, IIF).

Fig. 2. Intra-BRICS Trade (Billion USD, UNCTAD).

Fig. 3. Growth and External Balance Outlook in BRICS Countries (IMF).
A measure is a commonly used indicator of real-world economic policy uncertainty (Li et al., 2016; Phan et al., 2018). In a recent study, Marfatia et al. (2020) investigate the static and dynamic network of EPU across 17 developed and emerging economies and find that Greece, Russia, and Brazil are the top three net receivers of information in the global network of EPU.

Several studies in this strand are interested in the impact of EPU on the different dimensions of the financial markets such as Das et al. (2019) on emerging stock markets, Phan et al. (2018) on stock market returns, Li and Peng (2017) on the co-movement between Chinese and the US stock markets, Wang et al. (2020) on the bitcoin market, Fang et al. (2017) on the long-term correlation between the US stock and bond markets, Arouri et al. (2016) on the US stock returns, Dakhloua and Aloui (2016) on the BRIC (Brazil, Russia, India, China) stock returns, and Liu and Zhang (2015) on the stock market volatility. A summary of findings suggests that an increase in the economic policy uncertainty is associated with lower returns and higher volatility in financial markets. In terms of cross-country studies, Gourio et al. (2015) document that uncertainties defined over stock market volatilities and political risks have predictive power attributed to international capital flows by using a panel of 26 EM countries. Gauvins et al. (2014) utilize non-linear regression techniques to show that policy uncertainty significantly alters portfolio bond and equity flows. Similarly, Schmidt et al. (2015) associate episodes of abnormal capital flows with policy uncertainties.

Furthermore, trade policy uncertainty (TPU) has risen considerably in the very recent period because of the changing tariff regime between the United States and China. Although the high level of TPU may have a detrimental effect on output growth and investment through global trade channels, empirical evidence related to the separate economic effects of this type of uncertainty is highly

Table 1
Sample Periods for Bond and Equity Flows on Country Basis.

| Country   | Sample Periods                        | Bond Flows         |
|-----------|---------------------------------------|--------------------|
| Brazil    | 2008 M01 -2019 M11                    | 2008 M01 -2019 M11 |
| Russia    | 2008 M01 -2019 M11                    | 2012 M09 -2019 M11 |
| India     | 2008 M01 -2019 M11                    | 2011 M08 -2019 M11 |
| China     | 2008 M01 -2019 M11                    | 2010 M12 -2019 M11 |
| South Africa | 2008 M01 -2019 M11                | 2010 M12 -2019 M11 |
limited. Recently, Caldara et al. (2020) develop three indices of trade policy uncertainty to examine their impact on the US economy. Their firm-level results suggest that an increase in trade policy uncertainty is associated with lower investment and weaker economic activity. To examine the impact of elevated trade policy uncertainty resulting from the rise in protectionism in Mexico’s largest trade partner, the US, on the foreign direct investments into Mexico, Cebreros et al. (2019) construct a newspaper-based trade uncertainty index. Their results suggest that the rise in uncertainty leads the foreign direct investment inflows to Mexico to decline.

Over the recent decades, the size of BRICS (Brazil, Russia, India, China, and South Africa), representing almost 42% of the world population in 2018, in the world economy has increased substantially. According to World Development Indicators, the average annual growth rate of the BRICS has realized as 5% in the 2000–2018 period, compared to that of the world at 2.9%. As a consequence, the share of BRICS in world GDP has almost tripled in recent decades, from 8.1% in 2000 to 23.6% in 2018. In this impressive performance, China has played a substantial role, with an average annual growth of 9.1%. Besides, exports and imports as a share in world trade have materialized as 14.7% and 15.1% by 2018, respectively.

Given the importance of BRICS (Brazil, Russia, India, China, South Africa) countries in the global economy and the fact that increased level of uncertainty would induce more caution in the global investor behavior, this study aims to address the need for evidence concerning the impact of global economic policy uncertainty and US trade policy uncertainty on the capital flows to BRICS countries in the form of bonds and equities. The methodological approach followed in this study is a recent one developed by Rossi and Wang (2019) which utilizes Granger causality technique with time-varying properties and robustness to possible instabilities. This method helps us to analyze the spillover effects on uncertainties from developed countries such as the US to other countries in a time-varying nature.

The main findings can be summarized as follows. Variations in economic policy uncertainty as well as in US trade policy uncertainty help predict the bond and equity inflows to BRICS. However, the time-varying predictability of both uncertainties on the capital inflows has a heterogeneous structure at the country-level and concerning respect to the type of the flow. The conclusions of this study make several contributions to the current literature. First, we use a recent Granger causality approach that is robust to the presence of instabilities over a period. Second, we contribute to the limited evidence on the impact of economic policy uncertainty on bond and equity inflows to BRICS. Third, we also examine the impact of US trade policy uncertainty on the capital flows that is not studied before according to our knowledge.

The rest of this paper is structured as follows. Section 2 describes the data, while Section 3 introduces the methodology. Section 4 presents the empirical findings, and then the last section concludes the discussion.

2. Data

The data in this work is retrieved from the Emerging Portfolio Fund Research Global (EPFR) database including monthly flows for a large number of equity and debt mutual funds, ETFs, and similar investment products. By monitoring over 100,000 funds and financial assets amounting to more than $30 trillion, EPFR provides a comprehensive representation of the capital flows and fund manager asset allocations driving global markets. Furthermore, data on country allocations that is the share of the funds’ assets invested in specific countries are obtained by the EPFR. Combined with the flow data, country allocations can be used to construct a country-flow measure. In this paper, we utilize bond and equity flows for BRICS countries combined with aggregated flows to emerging and advanced market groups in the sub-categorization of bond and equity asset classes.

We specifically focus on BRICS countries given the fact that these countries are prominent EM markets regarding economic size.
and trade relations as well as they have attracted voluminous capital flows in the last decades\(^1\). Particularly, after 2011 when the final composition of BRICS countries was shaped, several institutions like New Development Bank and Contingent Reserve Arrangement are created for cooperation within these countries. They are designed to finance infrastructure and energy projects within BRICS countries. Such mechanisms also aim to protect member countries from the balance of payments and financial stability shocks. The high degree of cooperation has brought closer trade relations over time as UNCTAD (United Nations Conference on Trade and Development) data shows that intra-group trade volume among BRICS countries increased in the recent decades (Fig. 2). In relation to this, the countries contained in our sample are highly likely to be considered as closer asset classes due to economic interconnectedness and possible contagion effects. Hence, their exposures to global risk aversion are quite compatible. Apart from this, BRICS countries also represent striking outlook in sample period regarding macroeconomic fundamentals. Except for China, BRICS members’ growth outlook had somewhat deteriorated during volatile episodes like the Global Financial Crisis and the post-2016 period. Even for India and China, it is safe to say that the ongoing structural economic transformation from export and savings-oriented focus to more services and consumption-driven economic agenda has led to considerably weaker growth realizations (Fig. 3). On the other hand, these countries have managed to improve their external financing needs in the examined period contributing to the declining credit risks. In this context, such variations observed over the sample period regarding local macroeconomic

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\(^1\) BRICS is made up of five large emerging economies, representing 43% of the world’s population; 30% of world GDP; 17% of world trade in 2016. See Swamy and Narayanamurthy (2018) for details.
fundamentals make them worthwhile to examine in terms of capital flows determinants, in particular, policy uncertainties.

In addition to their unique aspects considering the determinants of capital flows, financial markets in BRICS countries hold prominence among the EM universe in terms of size and historical evolution. When calculated as averages since 2005, the outstanding value of bond instruments as a percentage of GDP is considerably high among BRICS countries, except for Russia (Fig. 4). In fact, an abundance of global liquidity, drastically lower global interest rates, and “search-for-yield” behavior among global investors have initiated voluminous debt securities in international markets by BRICS countries some of which are issued by the non-financial corporations to raise additional financing. These countries are also known with rather developed equity markets with increasing market capitalizations in recent years (Fig. 5).

On top of this, we obtained the data of global Economic Policy Uncertainty (EPU) from the website (www.policyuncertainty.com) which is constructed in line with the methodology of Baker et al. (2016). The EPU index is focused on measuring the proportion of journal articles that relate to different types of uncertainty over a certain duration. More specifically, the EPU index denotes the frequency of articles that include terms related to three categories—that is, economy (E), policy (P), and uncertainty (U). For further analysis, we also collect the trade policy uncertainty (TPU) index of the US as constructed and published by Caldara et al. (2020). This index does not only represent the number of articles in American newspapers covering common occurrences of trade policy (tariff, import duties, barriers, quotas, and anti-dumping regulations), but it also tracks terms describing uncertainties and volatilities (uncertainty, risk, or potential).

Although equity flow data starts at the same date for each country, the beginning of the bond flow data differs from country to country because of the data availability. Hence, we implement our analysis for the longest period available for each country. Table 1 presents sample periods for bond and equity flows for each country. All flow series are measured in US dollars.

### 3. Methodology

As noted in Stock and Watson (2006) and Rossi (2013), VAR models and associated methods to infer causality are subject to prominent challenges. Apart from satisfying the stationarity requirement in small-scale VARs, model specifications might be subject to instabilities arising from structural breaks and regime shifts, which would cast doubt on the validity of estimated coefficients and forecasted values (Clark and McCracken, 2006). If this is evident, then a relationship of causality between two series may not be integrated within a linear technique of time-invariance estimation. Most specifically, the significance of traditional VAR-based test statistics would not be accurate, as shown by Rossi (2005).

In this paper, we implement the Granger causality test robust to the presence of instabilities, proposed by Rossi and Wang (2019). This method is not only more effective than the CUSUM (cumulative sum control chart) test, which is poorly performed when used on the finite sample (Brown et al., 1975), but also it accounts for instabilities and redeems the statistical significance of the causality test over the various phases of the sample period. The test can also be used to detect the periods when Granger-causality exists or breaks down in the data. Furthermore, the approach helps us to examine the time-varying causal relationships between uncertainty indexes and capital flows, and hence provides a more appropriate picture of the relationship over time than a constant parameter Granger causality method. Some recent studies highlight the importance of uncovering time varying causalities via the robust Granger causality test of Rossi and Wang (2019). For instance, Cepni et al. (2020) for US trade war and emerging markets' growth,

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2 This test is typically used for monitoring change detection. See, Grigg et al. (2003) for details.
Coronado et al. (2020) for bond and oil markets, Berisha et al. (2020) for household debt and inequality.

Following Rossi and Wang (2019), we present a reduced-form VAR with time-varying parameters as follows:

\[ A_t (L) y_t = u_t \]  
\[ A_t (L) = I - A_{1,t} L - A_{2,t} L^2 - ... - A_{p,t} L^p \]  
\[ u_t \overset{\text{iid}}{\sim} (0, \Sigma) \]

Where \( A_{ij,t} \) represent \((nxn)\) coefficient matrix with time-varying properties and \( y_t = [y_{1,t}, y_{2,t}, ..., y_{n,t}] \) is \((nx1)\) vector of endogenous variables, whereas \( u_t \) stands for error terms. Here, unlike traditional unrestricted VAR models, error terms can accommodate idiosyncratic shocks which are assumed to be heteroscedastic and serially correlated. By iterating Eq. (2) and projecting \( y_t \) onto the linear space spanned by \([y_{1,t}, y_{2,t}, ..., y_{n,t}]\), following equality can be obtained:

\[ y_t = \Psi_{1,t} y_{t-1} + \Psi_{2,t} y_{t-2} + ... + \Psi_{p,t} y_{t-p} + \xi_t \]

In this context, \( \Psi_{ij,t} \) is a function of time-varying coefficient matrices and \( \xi_t \) is defined as the error term. If we specify \( \phi_t \) as an appropriate subset of the vector including \((\Psi_{1,t}, \Psi_{2,t}, ..., \Psi_{p,t})\), then in both specifications, Granger causality robust test aims to assess the validity of following null hypothesis:

\[ H_0: \phi_t = 0, \text{ for all } t = 1, ..., T \]
The above stated null hypothesis can be tested by multiple test statistics, specifically, the exponential Wald test (ExpW), mean Wald test (MeanW), Nyblom test (Nyblom), and Quandt likelihood test (SupLR), as pointed out in Rossi (2005).\(^3\) ExpW and MeanW are proposed in Andrews and Ploberger (1994). Although ExpW test is effective for the evaluation of alternatives far from the null hypothesis, MeanW is designed for the evaluation of near alternatives. On the other hand, the Nyblom test is locally very powerful to investigate the constancy of processes against random walk, as specified by Nyblom (1989). Moreover, the SupLR test statistic is based on the Sup-LR test proposed by Andrews (1993).

Estimations are conducted with VAR(1) models as indicated by SIC values. We choose 5% trimming value, as opposed to the 15% which is widely preferred in the empirical literature. This choice is driven by the argument that considering the small sample properties of our framework, we aim to preserve the highest possible number of observations to improve inferences. Estimations are repeated with other possible trimming values and results do not alter significantly.

Firstly, we analyze the effect of global policy uncertainty on bond and equity flows directed to BRICS countries by using the following two vectors of endogenous variables:

\[
\begin{align*}
\chi_1 &= [\text{COUNTRYBOND}_t, \text{EMBOND}_t, \text{DMBOND}_t, \text{GLOBALEPU}_t] \\
\chi_2 &= [\text{COUNTRYEQ}_t, \text{EMEQ}_t, \text{DMEQ}_t, \text{GLOBALEPU}_t]
\end{align*}
\]

In these representations, GLOBALEPU\(_t\) denotes the Global Economic Policy Uncertainty index proposed by Baker et al. (2016). DMBOND\(_t\), EMBOND\(_t\), and COUNTRYBOND\(_t\) show capital flows to debt securities in developed markets, emerging markets and examined specific BRICS country, respectively, which are all downloaded from the EPFR database. Similarly, DMEQ\(_t\), EMEQ\(_t\), and COUNTRYEQ\(_t\) correspond to capital flows directed to developed markets, emerging markets, and BRICS countries regarding equity flows. More specifically, VAR models with these variables are estimated for each country.

In the following step, because the recent periods are characterized by rising uncertainties about trade policies and increasing emphasis on protectionist policy measures, we choose to focus on a sub-component of policy uncertainty which is trade policy. In addition to the general impact stemming from global uncertainties, we repeat the abovementioned estimations by replacing Global Economic Policy Uncertainty with the US Trade Policy Uncertainty Index (USTPU), again developed by Baker et al. (2016) and Caldara et al. (2020), as follows:

\[
\begin{align*}
\chi_1 &= [\text{COUNTRYBOND}_t, \text{EMBOND}_t, \text{DMBOND}_t, \text{USTPU}_t] \\
\chi_2 &= [\text{COUNTRYEQ}_t, \text{EMEQ}_t, \text{DMEQ}_t, \text{USTPU}_t]
\end{align*}
\]

To further ensure the robustness of inferences, we have undertaken an additional analysis which exploits the longitudinal nature of the data set, while preserving time-varying features. To this end, a non-parametric time-varying coefficients panel data model with fixed effects is estimated. This method is conceptualized by Li et al. (2011) and operationalized by Diallo (2014).\(^4\) While accounting for the characteristics that do vary across countries and are time-invariant over time; this method can extract how the impact of

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\(3\) It should be noted that these tests do not evaluate the “causation” as a general case. The Granger causality particularly focuses on the in-sample predictive power of explanatory variables on the explained variable. In this context, the statistical testing procedure assesses whether or not contemporaneous and lagged values of covariates are jointly different from zero.

\(4\) We utilized the Stata module named xtmptimevar to obtain time-varying coefficient estimates.
uncertainties on portfolio flows fluctuate as we progress through the sample period. In specific, the following specifications are considered:

\[
\text{COUNTRYBOND}_t = f_t + \varphi_t \text{AGGREGATEBOND}_t + \sum_{j=0}^{d} \beta_{t,j} (\Delta \text{GLOBALEPU}_{t-j}) + \alpha_t + \varepsilon_t
\]  

(10)

\[
\text{COUNTRYEQ}_t = f_t + \varphi_t \text{AGGREGATEEQ}_t + \sum_{j=0}^{d} \beta_{t,j} (\Delta \text{GLOBALEPU}_{t-j}) + \alpha_t + \varepsilon_t
\]

(11)

where \text{AGGREGATEBOND}_t and \text{AGGREGATEEQ}_t represent aggregate capital flows being directed to both emerging and developed markets. Coefficient vectors \( f_t, \varphi_t, \beta_{t,j} \) are also indexed by \( t \) representing the time-varying behavior, whereas \( \alpha_t \) and \( \varepsilon_t \) stand for unobserved individual effects and error term, respectively. We include contemporaneous and lagged values of changes in GLOBALEPU to control for fluctuations in risk perception and induced uncertainties. Lag lengths are determined with a combination of inputs obtained from the specific-to-general approach and information criterion. As mentioned by Li et al. (2011), parameter estimates are retrieved by non-parametric averaged local linear estimation. To obtain the overall impact, after the estimation, we have summed the coefficients for contemporaneous and lagged GLOBALEPU variables.

Fig. 8. Time-Varying Wald Test Statistic Results: India.
4. Empirical results

Time-varying parameter Granger causality test results for capital flows directed to Brazil are presented in Table 2. The null hypothesis of the non-existence of Granger causality transmitted from global policy uncertainty to bond and equity flows in a time-varying manner can be rejected by all tests at conventional levels. This finding shows that lagged realizations of GLOBALEPU have in-sample predictive power regarding capital inflows to Brazil. On the other hand, the course of Wald statistics across the sample period document that the abovementioned associations are stronger during and immediately after the Global Financial Crisis episode and has lost significance in the subsequent period (Fig. 6). Moreover, we also implement similar estimations on the Granger causality stemming from US trade policy uncertainty. Here, as can be seen from Fig. 6, there exists a divergence between bond and equity flows, in which the former is being influenced consistently over the whole sample, while the association with the latter is only significant around the Global Financial Crisis.

For South Africa, note that almost all test statistics (except for Nyblom in one case) validate the statistical significance of time-varying causality of economic policy and trade uncertainties on equity/bond flows to South Africa (Table 3). However, as observed in Fig. 7, the effects on bond and equity flows are not similar to each other. The impact of both GLOBALEPU and USTPU on equity flows are only highly significant in post-2018, which is characterized by synchronized slowdown in global growth outlook, decreasing trade volume, worsening in predictability and rising protectionist measures, whereas bond flows to South Africa has been sensitive to such factors over the whole course of sample period.

A similar pattern emerges when results are obtained for India. Table 4 display that overwhelming majority of test statistics point out the validity of time-varying Granger causality from global uncertainties to capital inflows. As a different finding from other countries, time-varying Wald test statistic shows that equity flows are strongly affected by the course of GLOBALEPU during Taper tantrum period. On the other hand, the significance of the relation between GLOBALEPU and “inflows to both shares and debt instruments” has been heightened in recent years. In terms of USTPU, result are also divergent across asset categories which is embodied in the ongoing and discrete significance for equity and bond flows, respectively (Fig. 8).

As the fourth case, capital flows to China are considered (Table 5 and Fig. 9). Here, the mild course of time-varying Granger causality is expected as inference for the Chinese case is restricted by the existence of differential capital control legislations and the existence of highly liquid off-shore markets. However, considering that the Chinese economy has been the focal point of recent trade protectionist measures as well as increasing political risks, the recent upward movement in time-varying Wald statistics is not surprising.

Lastly, empirical results regarding the capital flows to Russia are considered. In this point, apart from Nyblom statistics for equity flows, as a general case, the time-varying Granger causality from GLOBALEPU and USTPU towards debt and equity flows is economically and statistically significant (Table 6). It is also highlighted that the impact on bond flows is exacerbated in the post-2018 period (Fig. 10).

Overall, our results suggest that there is a heterogeneity in the causality from global economic policy uncertainty, and the US trade policy uncertainty to the capital flows into BRICS. Although there are some episodes that generally the causality is strong for most of the countries, there is still significant variation during the whole period. For instance, variations in the global economic uncertainty significantly affect the bond flows into China and Russia almost all over the period, while their impact on the bond flows into India and South Africa is most pronounced after 2016. On the other hand, the relation is more pronounced for all of the four countries in the recent period. Brazil diverges from those countries that the impact of global economic uncertainty on bond inflows is most substantial in the aftermath of the global financial crisis.
Several factors may help explain the observed heterogeneity in the impact of global economic uncertainty on country-level bond inflows. Among those, pull factors, such as external and internal balance, need to be taken into consideration since the deficit in either of the two increases the demand for foreign funds in an economy. Besides, during the observation period, commodity prices have substantially fluctuated, which has implications for the external and internal dynamics of BRICS, including net commodity exporters (Brazil, Russia, and South Africa) and net commodity importers (China and India). For instance, the commodity price collapse between 2014 and 2015 has deteriorated the current account balance and fiscal performance of the commodity exporters, while the commodity importers have benefited from the lower commodity prices. Fig. 11 presents the two indicators for current account balance and fiscal performance of BRICS, which are the Deviation from Average Current Account Balance (% of GDP) in panel (a) and the Deviation from Average Cyclically Adjusted Balance (% of Potential GDP) in panel (b) respectively. The figure indicates heterogeneity in the current account balance and fiscal performance of the BRICS. During the sharp commodity price fall, India’s current account balance improves while Russia’s current account balance, a notable commodity exporter, deteriorates. On the fiscal side, for the period after 2016, we observe that the structural budget deficit of two commodity exporters, Brazil and Russia, rebounds from the bottom. The corresponding figure for China, a commodity exporter, begins to deteriorate since the commodity

For a theoretical approach regarding the relationship between current account balance and capital flows, see Lahiri and Morshed (2010). They provide evidence that there exists a complementarity between trade flows and capital flows. Earlier, Debelle and Galati (2007) examine the relationship between the current account adjustment and capital flows. Regarding the link between fiscal deficit and capital flows, Bahmani-Oskooee and Payesteh (1994) and Murthy and Phillips (1996) provide evidence that budget deficit has a role in capital inflows.
prices also start to increase after the sharp collapse. Considering the linkage between the external and internal balances and the need for foreign funds, this heterogeneous pattern in the external and internal balances may have implications regarding the heterogeneity in the impact of the global economic uncertainty on bond inflows to BRICS.

The existence of a linkage between trade integration and capital flows between the two countries is another factor in explaining the bond-flow differentials. The sign of the correlation between trade flows and capital flows may have either a mitigating or an amplifying effect on the impact of uncertainty on capital flows. To observe whether the trade integration pattern of BRICS differs significantly during the observation period, we calculate the trade intensity of those countries with respect to the US and Germany. Following Betts and Kehoe (2008), trade intensity of a country $i$ with respect to country $j$ can be formulated as the following:

$$\text{trade intensity}_{ij} = \frac{X_{ijt} + X_{iti}}{X_{int} + X_{wit}}$$

where $X$ stands for the exports of goods, and $w$ stands for the world. Fig. 12 presents the trade intensity indices of BRICS with respect to the US (panel (a)) and Germany (panel (b)). It shows a significant heterogeneity among the BRICS in terms of trade integration, especially after the 2016-period in which the impact of uncertainty on bond flows to several BRICS countries increases substantially. For instance, while the trade intensity of Brazil to Germany, the largest trade partner in Europe, significantly declines during the period, the corresponding figure for Russia rises sharply after 2016. Considering the link between trade integration and capital flows, the heterogeneity in trade integration may also explain the dynamics of the impact of uncertainty on the bond inflows to BRICS.

When we consider the causality between economic policy uncertainty and equity flows, there appear to be several differences from bond flows. For instance, the causality is not significant after 2012 for Brazil and Russia. For the equity flows into India, the taper-tantrum period is also important. Regarding the impact of the US trade uncertainty, most of the findings are consistent with the corresponding findings using the economic policy uncertainty. Among the few differences, the period when oil prices declined sharply deserves special attention. In this period, for the two net oil exporter countries among BRICS, Brazil, and Russia, the impact of the US trade policy uncertainty on the bond inflows is statistically significant. In contrast, the effect of the US trade policy uncertainty on equity flows into the two countries is not substantial during the period.

It should be noted that any impact of US trade policy uncertainty on BRICS economies should also be approached by considering the level of bilateral trade relations. Fig. 13 represents the total trade volume between the US and BRICS countries over the recent period. As expected, China is the biggest trade partner of the US within these countries. For this country, the total value of imports and exports has elevated uninterruptedly until 2016 during which protectionist measures launched amplifying the US trade policy uncertainty. Following China, the scope of trade relations with the US is larger for Brazil and India, while other BRICS members have a lower level of exports and imports. Hence, it is expected that capital flows directed to China, Brazil, and India should have yielded significant results. In fact, for these countries, US trade policy uncertainty creates significant predictive power over the course of the sample period for bond instruments. Although the significance is restored in recent years, results related to equity flows do not provide such continuous significance and might be conflicting considering the trade intensity of these countries with the US compared other BRICS members. Furthermore, regardless of the trade volume and the type of portfolio flows, the predictive power of US trade policy uncertainty is pronounced during Global Financial Crisis when bilateral trade volume between US and BRICS countries declined sharply.

6 For a recent study on the trade-finance nexus, see Belke and Domnick (2019).
In sum, the heterogeneous structure of the causality between uncertainty and portfolio flows into BRICS suggests careful investigation and considering the country-specific factor that may help to explain the country-level differences. As a robustness check, the time-varying panel data model reveals insightful results for the role of global uncertainties on capital flows directed to BRICS countries, after controlling for cross-country variations. As seen in Fig. 14, the overall impact obtained from coefficients points out the role of rising uncertainties around the Global Financial Crisis, both for equity and bond flows, while the influence on equity flows was more prominent. More strikingly, recent volatilities induced by post-2018 events are also manifested in the sense that a downward impact on capital flows reflected by coefficients has approached historically low levels in the recent periods.

5. Conclusion

The global economy is slowing down mostly due to the rise in global uncertainties such as trade wars, protectionism policies, and monetary policy normalization in advanced countries and accompanied tightening of financial conditions in emerging markets as well as concerns about the re-balancing in the Chinese economy. Such situations are perceived as potential risk factors to capital flows to EM countries. Because of increased interconnectedness and contagion risk in financial architecture, capital flows can easily exhibit “flight-to-quality” behavior as they can revolt from EM countries during higher uncertainty periods. In this paper, using the time-varying causality framework, we analyze the potential effects of global economic policy uncertainty and the US trade policy uncertainty on the bond and equity flows to BRICS countries over the January 2008 – November 2019 period. Time-variability in our methodology is critical to examine the evolution of the relationship over time, especially during the high market fluctuations periods.
a. Deviation from Average Current Account Balance (% of GDP)

b. Deviation from Average Cyclically Adjusted Balance (% of Potential GDP)

Fig. 11. Indicators of Current Account Balance and Fiscal Performance.
Source: IMF World Economic Outlook (April 2020), IMF Fiscal Monitor (April 2020). Deviations from 1999 to 2019 averages.

a. with respect to the US

b. with respect to Germany

Fig. 12. Trade Intensity Index of BRICS (2009 = 1).
Source: Authors’ calculations using OECD’s Bilateral Trade Statistics.

Fig. 13. Bilateral Goods Trade Volume of BRICS Countries with US (Billion USD, US Census Bureau).
With their relatively large size in middle-income countries, we provide evidence of the significant role of global uncertainties in predicting capital flows to BRICS economies. Time-varying Granger causality analysis shows that there are heterogeneous effects at the country-level and the effect is stronger during the Global Financial Crisis period and it also has lost its significance in the subsequent period. Moreover, the recently rising level of trade policy uncertainty in the US has a divergent effect on bond and equity flows, in which the former is being influenced steadily over the whole sample, while the latter is only significant around the Global Financial Crisis. The exception for this result is India in which the US trade policy uncertainty significantly predicts equity flows for the whole period. The overall tendency of capital flows being associated with global volatilities is also evident in non-parametric time-varying panel data results showing re-emerged negative effects on equity and debt flows in recent episodes.

In conclusion, the heterogeneous structure of the causality between uncertainty and portfolio flows into BRICS may present diversification benefits for global investors. This suggests that global investors may develop simple trading rules by taking long positions in local financial assets of the countries which are relatively less affected in periods of heightened uncertainty.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ribaf.2020.101277.

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