The Spillover Effects of Uncertainty on Brazil's Economy, Trade, and "the BRICS Effect"

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Abstract

This paper analyses the transmission of various uncertainty shocks to critical macroeconomic variables in Brazil and examines the "BRICS effect"—that is, if and to what degree BRICS membership mitigates or intensifies these effects. Using a balanced monthly dataset spanning from January 1999 to May 2023, we compare the responses of inflation, industrial production, the real effective exchange rate, trade balance, and stock market performance to various external uncertainty shocks. A vector autoregression (VAR) is utilized to capture the interdependencies among these variables. We incorporate a BRICS membership dummy variable and its interaction with external shocks to investigate the additional impact of these shocks on the Brazilian economy following its admission into BRICS. Our empirical analysis employs impulse response functions (IRFs) to trace the effects over a 15-month horizon. Our findings indicate that uncertainty shocks have economically meaningful impacts on Brazilian macroeconomic variables and that BRICS membership alters some of these responses.

I Introduction

In recent years, a significant increase in global uncertainty has captured the attention of the public and policymakers alike, incited by geopolitical tensions, erratic economic policies, and regional conflicts that destabilize the prosperity and growth of global economies. Most recently, in 2025, the United States imposed major tariffs against key trade partners and abruptly halted foreign aid to long-standing U.S. allies until further notice. These conditions amplify the threat of uncertainty shocks worldwide, particularly affecting rising and developing economies that are more susceptible to external shocks.

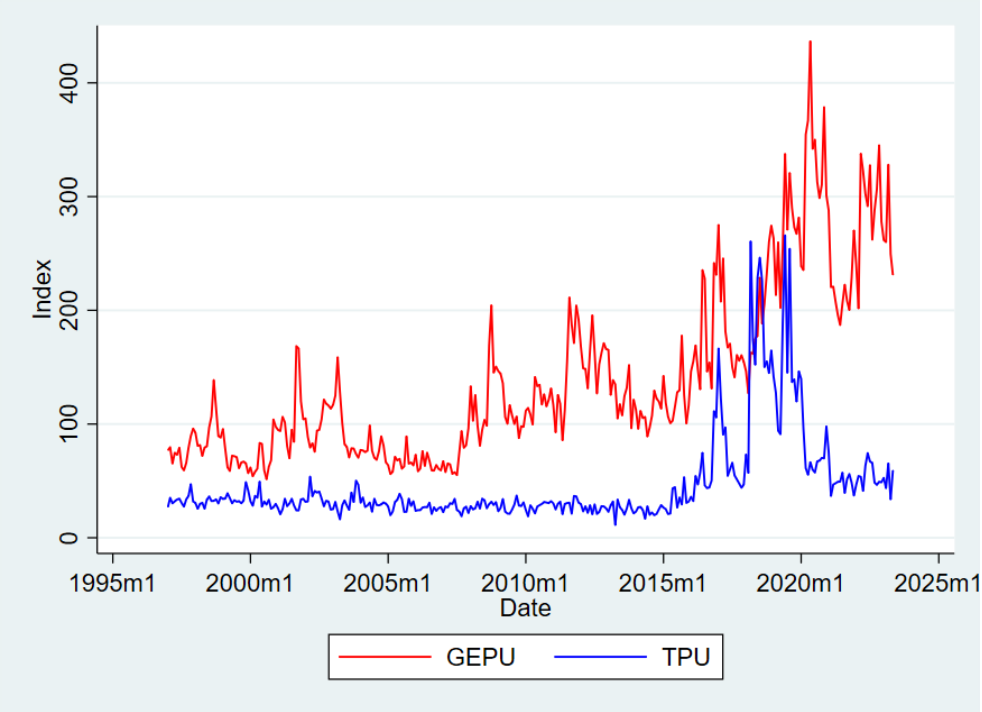
The general rise of uncertainty has been well examined, such as in Baker et al. (2016), who developed a new index of economic policy uncertainty (EPU) based on newspaper frequency in uncertainty coverage, and demonstrated that not only has policy uncertainty reached unprecedented levels, but that these shocks impact investment decisions and key macroeconomic performance measures. Given the rise of globalization, trade substitution channels, and the interdependent nature of economies worldwide, shocks originating from a distinct region can quickly spread through the global network, either directly impacting distant countries or indirectly affecting them through the interwoven web of global relations. As such, countries are becoming more vulnerable to global uncertainty shocks, particularly those driven by volatile United States policies. This is a challenge that the Global South is actively taking on.

In response, countries are becoming more active in their efforts to achieve, if not national, then regional autonomy through forming global alliances, such as BRICS. Once seen as an inconsequential entity, as of 2025 the United States has threatened this alliance with 100% tariffs (Reuters, 2025) if they choose to set up their own BRICS currency, underscoring the alliance's growing presence in the world and posing a threat to pre-existing Western institutions, which had long banked on a passive control and an existential dependence of developing countries on the U.S. Establishments like BRICS are viewed as platforms for risk sharing, strategically coordinated policy responses, and diversifying political, trade, and economic partnerships, in order to safeguard against the negative impacts of exogenous shocks while strengthening their economic growth and developing economic autonomy from traditional Global North powers.

As of 2025, BRICS is comprised of the founding major emerging economies – Brazil, Russia, India, China, and South Africa – and newly joined countries Egypt, Ethiopia, Iran, and the United Arab Emirates (sometimes referred to as BRICS+). The acronym BRIC was originally coined by

Jim O'Neill in 2001 (O'neill et al., 2001), with initial correspondence beginning on September 20th, 2006. The first official BRICS summit was hosted by Russia took place in June of 2009, which was attended by Brazil, Russia, India, and China (BRICS-Russia 2024, 2024; Stuenkel, 2014). South Africa later joined in 2010, changing the acronym to BRICS, before the additional four countries joined in January 2024. Saudi Arabia has been officially invited to join BRICS; however, it has not officially joined yet. Nevertheless, it continues to participate in BRICS summit meetings and active discussions regarding regional conflicts and policies. The bloc aims to bolster the economic endurance of its member countries and to provide an alternative to the conventional Western-dominated global landscape. Through coordinated trade, investment, and economic policies, its ambition is to establish a multipolar power dynamic centered around emerging global powers.

Figure 1: Time Series of GEPU and TPU



This paper examines how external uncertainty shocks, such as global economic policy uncertainty (GEPU) (Davis, 2016a) and trade policy uncertainty (TPU) (Caldara et al., 2020), affect Brazil's macroeconomic variables, and investigates whether BRICS membership shields or heightens the impacts of these shocks, including their direction and magnitude. We focus on key variables such as inflation (proxied by the year-on-year growth rate of CPI), industrial production (IPI), the real effective exchange rate (REER), and stock market performance (proxied by the Ibovespa index, which tracks 63 of Brazil's leading companies). In addition, we incorporate a dummy variable indicating

Brazil's BRICS membership and its interaction with each of the four uncertainty shocks analyzed in this paper. Employing a VAR framework for our empirical analysis, this study aims to infer whether Brazil's affiliation with BRICS affects the transmission of global uncertainty and how these insights can help Brazilian policymakers protect their economy and bolster national independence.

The GEPU index is derived from the Economic Policy Uncertainty index (EPU). It is a GDP-weighted-average of 21 country specific EPU indices (Davis, 2016a). It captures the frequency of terms related to economy, policy, and uncertainty, in own-country major news outlets to represent the degree of uncertainty in the global economy. The index is normalized to each country, weight-adjusted according to their relative GDP's and Purchasing Power Parity (PPP) adjusted GDP. This measure is representative of the global economy as its member countries account for roughly 71% of global output and 80% of market exchange rates, and is more thoroughly discussed in (Davis, 2016a).

The TPU index captures trade policy uncertainty by measuring the relative monthly frequency of articles in seven U.S. based newspapers, as a share of the overall news articles published that month, normalized to a value of 100 with 1960 as the base year, as identified in Caldara et al. (2020). This will be our representative of global trade disruptions which may impact the Brazilian economy, and is particularly relevant for export-driven economies.

Figure 1 shows the movement of GEPU and TPU time series on the same x-axis. GEPU shows a building and persistent growth in its index over time, capturing the general and broad uncertainty of global macroeconomic and geo-political incidents. On the other hand, TPU remains comparatively low and consistent until around 2016 to 2017, where it experiences sudden and steep spikes, before dropping to relatively low levels again in 2022. This index captures very specific and transitory disturbances, relative to GEPU.

In particular, we see GEPU spike during the late 1990s to 2002 dot-com bubble and 9/11 attacks, capturing the late 2000s global recession. It then spikes considerably during the 2007 to 2009 Global Financial Crisis (or the Great Recession), caused by the bursting of the housing bubble in the United States. Up until this point, TPU has not significantly reacted to these non-trade shocks. This of course changes around 2017 to 2019, induced by the U.S.–China tariff war and uncertainty surrounding Brexit. Since GEPU reflects general global uncertainty, it also sees significant increases.

Following this, the TPU dropped to slightly higher than pre-2016 levels. That said, the 2020 COVID-19 pandemic pushed the GEPU to reach unprecedented levels of uncertainty, reflecting

changing fiscal and monetary policy interventions, lockdown measures, and the subsequent recession entered into by the entire world. TPU increases slightly, reflecting supply chain disruptions and coronavirus-induced border closures. The GEPU remained elevated in this time, contrasting TPU, as macroeconomic variables other than trade remained unstable for an extended period of time. The jagged GEPU uncertainty following 2021 may reflect the Ukraine war and the uncertainty evident in a post-COVID world. Since no major trade-related shifts or events took place during this time, TPU does not react much, relative to GEPU.

This paper is structured as the following: Section II provides a review the relevant literature surrounding our discussion, Section III presents the data and methodology for our selected uncertainty shock identification and their implications on real and nominal economy, and Section IV discusses the conclusion and the recommendation for future studies.

II Review of Related Literature

This paper contributes to a wide array of already existing literature surrounding GEPU, TPU, VIX, and OPU, as well as research regarding developing nations.

As discussed previously, the EPU index was initially developed in Baker et al. (2016). It identifies the following aspects of global uncertainty: Who dictates economic policy decisions, which policies will be implemented and when, and what economic impacts these policies have in both the short-term and long-term according to monetary and fiscal government decisions. Using a VAR model, they find that EPU shocks cause investment and economic growth to slow while increasing unemployment. We expand this framework to analyze the impacts of this policy on Brazil and to what extent BRICS membership heightens or dampens uncertainty shocks. Caldara and Iacoviello (2022) similarly develops a geopolitical risk index (GPR), finding significant spikes around the Korean War, the Cuban Missile Crisis, and following the 9/11 attacks. They find that the GPR index is associated with lower investment and higher unemployment when coupled with high disaster probability and larger downside risks, impacting fiscal policy decisions. An extensive amount of studies in the literature analyze the macroeconomic impacts of uncertainty within a particular country (Jurado et al. (2015), Bloom (2009)); however, a limited amount of studies center around the effects on emerging economies, particularly member countries of the BRICS bloc.

The impact of trade policy uncertainty (TPU) on global trade flows, tariff fluctuations, firm-level investments, and global supply chain disruptions has been analyzed in literature such

as Bown and Crowley (2016), who found that higher TPU levels inhibit trade and foreign direct investment (FDI) as firms navigate a volatile trade landscape. We integrate this TPU shock into our Brazilian VAR model to analyze its impacts on net exports, among other key macroeconomic variables. Bloom (2009) employs a VAR framework with high-frequency macroeconomic and firm-level data to map the short- and long-term impacts of uncertainty shocks. Key findings include drastic drops in investment and employment induced by the shocks, followed by steady recovery as the shock dissipates over time. We introduce a BRICS dummy variable as a possible intermediary variable that interrupts or heightens uncertainty shocks.

Other uncertainty shocks are explored in the literature, and is a valuable source for future extensions of this paper. Oil market-based volatility, incorporating supply-side distortions, demand shocks, and speculation as oil price uncertainty determinants and their macroeconomic implications, is explored in Hamilton (2009). They utilize autoregressive models to find that oil price fluctuations significantly impact inflation and GDP growth, alongside industrial production, as a result of energy cost transmission effects. BRICS, when incorporating Saudi Arabia, accounts for nearly 50% of global oil production World Economic Forum (2024). As such, oil shocks may have a significant impact on Brazil's economy and are worth investigating. Whether BRICS plays a role in protecting economic variables in Brazil is to be examined in the coming sections. Kilian (2009) distinguishes between demand- and supply-driven shocks, suggesting that real oil price shocks may be due to supply shocks, while the crude oil market exhibits specific demand shocks.

Gulen and Ion (2016) investigate the impacts of EPU shocks on firm-level corporate investment behaviors and find that uncertainty shocks increase firm-level risk aversion, delaying capital expenditures and decreasing firm investment. We extend beyond the firm and industry level, utilizing a nation-level VAR to analyze the impacts of global EPU shocks, among other uncertainties. More relevantly, Trung (2019) employs a Panel-VAR with data from 14 emerging economies between 1995–2015 and the EPU shock, specifically trying to justify the slow recovery of the global economy following the 2008–2009 Great Recession. Their findings corroborate the literature in that United States uncertainty shocks have a statistically significant role in business cycle fluctuations in developing economies by reducing capital inflow, investment, exports, and consumer spending, causing a depreciation of emerging economy currencies. Central banks are induced into augmenting their monetary policy decisions by decreasing short-term interest rates to achieve market stability. In this paper, we focus on Brazil as it pertains to both the global EPU and uncertainty shocks, and the potential mitigating role of BRICS membership.

In the financial market literature, Khan (2023) investigates whether investors in the Indian stock market can seek to maximize returns and minimize risk by investing in BRICS economies, which are expected to be at the forefront of the global economy by the year 2050. They also test whether uncertainty spillovers from the Indian stock market have any significant impacts on the BRICS countries. They find significant results in the spillover effect, indicating that the founding BRICS countries experience high levels of volatility and may not be a viable option for portfolio diversification for Indian stock market investors. Their work is limited to five of the nine official BRICS nations (as of 2024) and, although such an expansion will not be addressed in this paper, it is a path for future research to incorporate the new Middle Eastern and North African region countries in their analysis. In terms of financial markets, our paper will incorporate the Brazilian stock market's response to various global uncertainty shocks.

In the monetary policy literature, the impact of monetary policy normalization on BRICS macroeconomic variables has been studied in a Panel VAR framework (Deng et al., 2022). Contractionary monetary policy, in the form of the Fed's interest rate hikes and quantitative tightening, is found to reduce BRICS output, shrink inflation, diminish their trade balance, and cause exchange rate depreciation for the five-country BRICS bloc. They differentiate between the two impacts, with the Fed's interest rate decisions exerting a greater magnitude of effect than balance sheet activities. To mitigate these impacts, they suggest that BRICS should bolster their international capital flows, establish greater synergy in their policy coordination, and closely monitor commodity price movements to enhance their resilience against U.S. monetary policy normalization. Deng et al. (2022), however, does not investigate whether and to what degree BRICS membership protects countries relative to their pre-BRICS status. We will examine this question as it pertains to the Brazilian economy, using a shock and BRICS membership dummy interaction term.

III Data and Methodology

The following section provides description of the variables utilized in the paper and where the data was sourced from. Additionally, we outline the methodology, and discuss how the GEPU and TPU shocks and the vector autoregressive regression (VAR) is identified.

III.1 Data

We will use the GEPU and TPU monthly indices from 1997m1 to 2023m5. Beyond this, we employ a VAR-5 which contains similar variables to those employed in the uncertainty/emerging economies literature (eg. Deng et al. (2022)). We include monthly variables spanning international trade, the financial market, and domestic real macroeconomic variables pertaining to Brazil. For all variables other than the shocks, we take the difference of the levels.

Monthly data for the following variables used to address the research question for the period 1997m1—2023m5, are listed as follows:

1. Year-on-year CPI (YOY CPI): Brazilian year-on-year CPI as a percentage. We use this as a proxy for inflation, sourced from BIS (2025a).

2. Industry Value Added (excluding construction) Index: This is our proxy for Brazil's Industrial Production Index (IPI). We collect Brazilian monthly industry production (except production), using 2015 as the base year. This retrieved from the OECD's Production, sales, work started and orders database (Organisation for Economic Co-operation and Development (OECD), 2025).

3. Real effective exchange rate (REER): Brazilian 64-country broad basket real effective exchange rate (BIS, 2025b), with 2020 as the base year.

4. Trade Balance (Net Exports): Brazilian trade balance in U.S. dollars, exchange rate converted, in billions, calender and seasonally adjusted. This is retrieved from the OECD International Merchandise Trade Statistics (OECD, 2025).

5. IBOVESPA Index (^BVSP): The main stock market index in brazil, listing major companies in the nation traded on the B3 (Brasil Bolsa Blocao). This is Sao Paulo's benchmark stock exchange index and captures the most traded stocks' performance index (Capital.com, 2025). Values are taken at close, aggregate monthly (Yahoo Finance, 2025).

6. BRICS Membership Dummy: A binomial dummy variable representing the BRICS status membership of Brazil. We adopt 0 for pre-BRICS periods and 1 after joining the bloc. Joining BRICS is measured when they had their first official summit in June 2009 (Stuenkel, 2014). It is important to note that since joining BRICS, Brazil has remained a member of the organization without leaving the organization.

7. Global Economic Policy Uncertainty Index (GEPU): It is a GDP-weighted average of monthly national EPU indices for 21 countries including Brazil, Mexico, Canada, Chile, China, Colombia, France, Germany, Greece, India, the Netherlands, Italy, Japan, Russia, South Korea, Spain, Ireland, Sweden, the United Kingdom, the United States, and Australia (Davis, 2016b). This index captures the relative frequency of each countries domestic newspaper articles containing similar terms to economy, policy, and uncertainty. Davis (2016b) initially re-normalizes each national EPU index for the included countries to a mean of 100 over the period 1997 to 2015. They then utilize the resulting balanced panel data of monthly EPU indices to generate the GEPU index value relative to each month. This is attained by computing a GDP-weighted average of the original 21 country EPU indices. GDP data is retrieved from the IMF's World Economic Outlook Database. We select the GEPU index built using the PPP-adjusted GDP, as opposed to current-price GDP.

8. Trade policy uncertainty index (TPU): This index is built using automated text searches of the electronic archives of seven major newspapers Caldara et al. (2019). These newspapers include Boston Globe, Chicago Tribune, Guardian, Los Angeles Times, New York Times, Wall Street Journal, and Washington Post. The TPU index is measured by computing the monthly frequency of news articles containing discussion surrounding trade policy uncertainty for each individual newspaper. This monthly frequency is a share of the total number of news articles published. The index is then normalized to 100 , beginning in 1960.

III.2 Methodology

In this section, we outline the the model used to examine the real effects of the different uncertainty shocks using a vector autoregressive model (VAR) given:

$$Y_t = \alpha + A_1 Y_{t-1} + ... + A_p Y_{t-p} + \varepsilon_t$$

where A_0 is the unconditional mean, $A_1, A_2, ...A_p$ are coefficient matrices given that p is equal to 12 lags, following the methodology of Bloom (2009) and Jurado et al. (2015). $Y_t, \varepsilon_t,$ and α all follow a 1xn vectors where n is the number of variables. Here, y_{it} are endogenous variables in our model, including our uncertainty shock (U_{it}), industrial production (IND_{it}), real effective exchange rate (in terms of Brazilian Real, $REER_{it}$), inflation (year-on-year CPI rate, $YoY\ CPI_{it}$),

trade balance (net exports, $TRADE_{it}$), and major stock market index ($STOCK_{it}$).

As such, we will have the following recursive ordering our the six variables. In the context of U.S. uncertainty shocks on developing economies, we follow the ordering outlined by Trung (2019). We also followed the VAR model used in the paper of Baker et al. (2016). Specifically, we used a Cholesky decomposition using the our different U.S. based uncertainty shocks and Brazilian monthly data from 1999m1 to 2023m5. Using the Akaike Information Criterion (AIC), we adopt two lags for each variable mentioned above, over a 36 step horizon. The following is the recursive ordering:

$$\begin{pmatrix} \text{Uncertainty Shock} \\ \text{IPI} \\ \text{REER} \\ \text{YoY CPI} \\ \text{Trade Balance} \\ \text{Stock Market} \end{pmatrix}$$

For the second part of our empirical analysis, we create an interaction variable between the shock and the BRICS membership dummy variable, ordering it following the shock variable. This will allow us to look at the marginal impact of joining Brazil joining BRICS, onto Brazil's macroeconomic variables. The following is the recursive ordering:

$$\begin{pmatrix} \text{Uncertainty Shock} \\ \text{Shock} \times \text{Membership Dummy} \\ \text{IPI} \\ \text{REER} \\ \text{YoY CPI} \\ \text{Trade Balance} \\ \text{Stock Market} \end{pmatrix}$$

IV Results

Given the methodology discussed. We have the following results shown in Figure **??**, presenting the real economic variables' response to the GEPU and TPU policy uncertainty shocks, as well as

the potential BRICS-effect.

Figure 2: Real Economic Variables' Response to a GEPU Shock

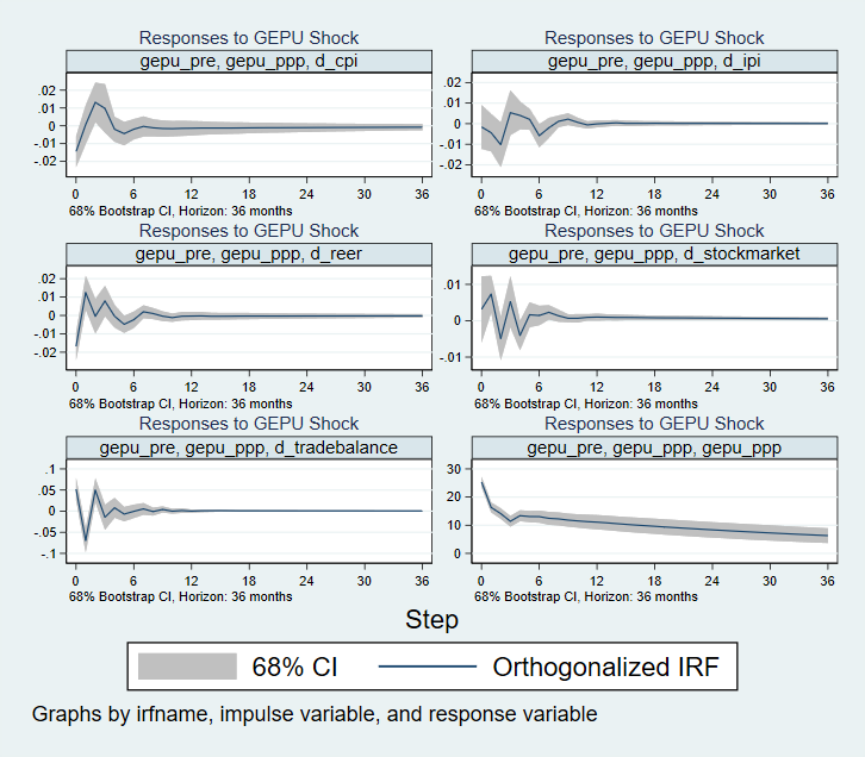
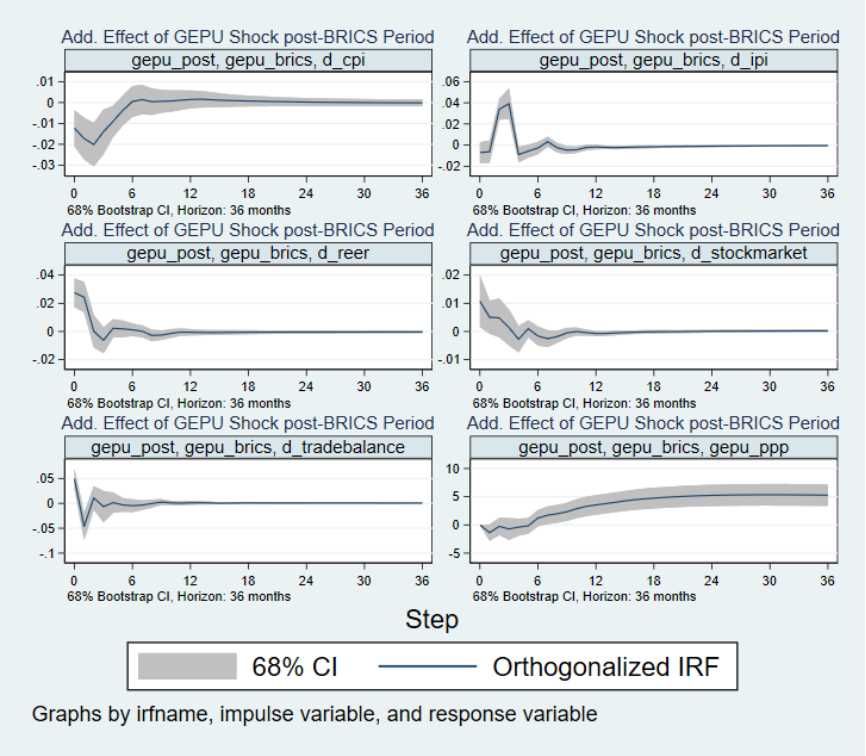


Figure 2 presents the model-implied response of the Brazilian macroeconomic variables to a one standard deviation shock in GEPU. We choose a 65% confidence interval, aligning with some empirical macroeconomic empirical research as it represent a one standard deviation from the mean. Industrial production (IPI) does not contain a statistically significant response to the GEPU shock. This indicates that Brazil's trade volumes and investment may be resilient to GEPU shocks in the short-run horizon, potentially as a result of internal consumptions and robust policy interventions.

Real effective exchange rate on the other hand falls steeply by 0.015 percentage points. Brazil may be experiencing capital outflows as a result of this global uncertainty shock, mirroring flight-to-safety behavior in international markets where investors are shoring assets in more relatively safe nations that may be less exposed to risk. This pressure on Brazilian currency (the real) causes the real effective exchange rate to depreciate, potentially leading to declining FDI flows into the nation. As such, foreign currency reserves in Brazil.

Brazil's economy is a heavily commodity-reliant one, increasing Brazil's exposure to global demand and policy changes. Inflation (YoY CPI) significantly declines by 0.015 percentage points.

Figure 3: Additional Effect of GEPU Shock post-BRICS



GEPU shocks here induce a deflationary effect on Brazil's economy, potentially through the mechanisms of the aggregate demand channel. As global uncertainty increases and firms and households increase precautionary savings. As such, they reduce investment and spending which weakens prices and economic growth.

While a depreciation in the REER can potentially make Brazil more attractive to foreign trade, increasing import prices, it appears it is dominated by demand-side vulnerabilities. This overall drives down inflation, consistent with past literature findings. It is important to note the REER eventually rises after the first two periods, indicating a recovery period resulting from potential monetary policy and fiscal interventions to stimulate the Brazilian economy. Trade balance (net exports) has an initially positive, indicating a rise of exports, relative to imports.

As previously discussed, a drop in REER makes Brazilian exports more globally competitive, dis-incentivizing imports. This shift seems to dominate the drop in consumption induced by rising global uncertainty. This movement curiously simultaneously exists with a drop in inflation. This may indicate a sluggish pass-through of exchange rate to consumer purchasing and prices. In future research, it is worthwhile to dis aggregate trade balance into exports and imports to explore the interactions therein. Stock markets do not appear to possess any statistically significant results.

Figure 4: Real Economic Variables' Response to a TPU Shock

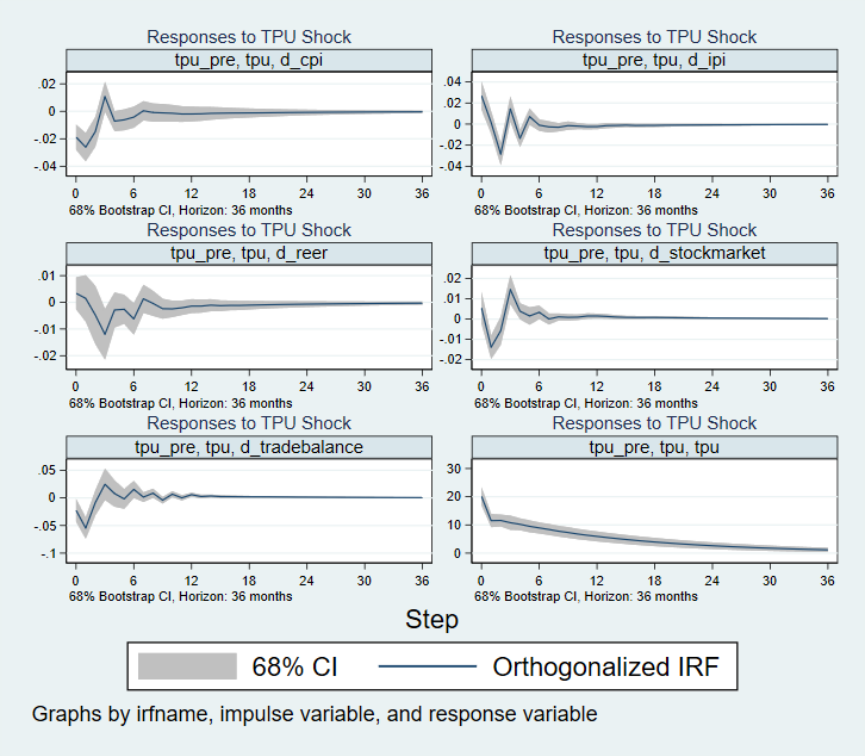
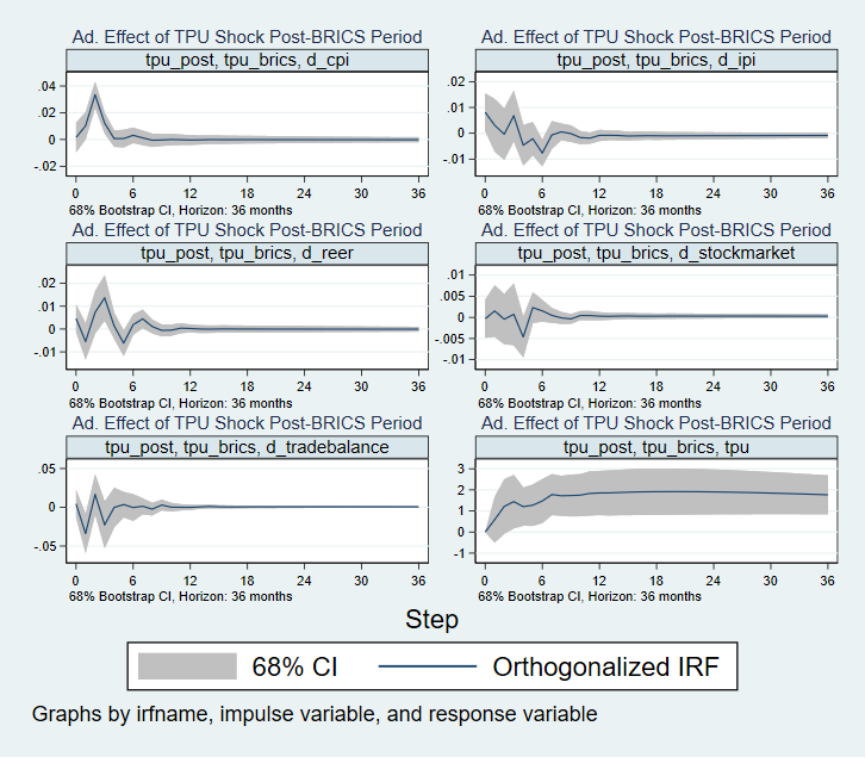


Figure 3 depicts the marginal or additional effect of the GEPU shock on the Brazilian economy, given its entrance into BRICS. It can be interpreted as the following: if the movement of the variable in figure 2 is initially negative and in figure 3 becomes positive, then the variables become less negative, relative to the original negative decrease. We observe that inflation becomes more negative given the BRICS membership status of Brazil. Brazil has become more globalized and directly integrated in the global economy, diversifying its trade partners. As such, it becomes more exposed to global demand shocks.

We also observe that the real effective exchange rate becomes 0.03 percentage points less negative (depreciates less) given Brazil's BRICS membership, relative to its initial 0.015 percentage point drop. This is potentially a result of access to BRICS-specific liquidity mechanisms which improve investor confidence in the Brazilian economy. Moreover, financial contagion is mitigated through potentially stronger reserve backing, stabilizing the exchange rate.

Brazilian trade balance becomes more positive post-BRICS, in response to global uncertainty. Brazil has become more globalized and directly integrated in the global economy, diversifying its trade partners. While its REER is less negative, it may still be cheaper relative to the world. As such, its exports are lucrative. Its participation in BRICS increases Brazil's trade and demand

Figure 5: Additional Effect of TPU Shock post-BRICS



from the global south through its connection to partners such as China and India. Its dependence on traditional G7 countries is lessened. Exports to BRICS countries may be stable, while imports from other countries drop.

Meanwhile, the Brazilian stock market is more positive post-BRICS, relative to its insignificant effect in the overall IRF. This may indicate the stock market investors and foreign players view Brazil as being backed by an economically robust bloc of countries (BRICS) which signals stability and reliability. This may inhibit capital flight from Brazil.

Moving on to Trade Policy Uncertainty, figure 4 presents the response of macroeconomic BRICS variables to a positive one standard deviation shock in TPU (adverse shock). In contrast to the insignificant response of IPI to a GEPU shock, IPI booms in the short run in response to a trade policy shock. Simultaneously, trade balance is relatively insignificant. This may be due to firms intensifying production and domestic inventory accumulation in response to and anticipation of trade uncertainty. This may explain why exports do not rise strictly, relative to imports. Moreover, short-run restrictions such as contracts, shipment orders, and other transport frictions delay the translation of production into a rise in exports, relative to imports.

Similar to GEPU, however, inflation declines as a result of the TPU shock, while REER is insignificant. This deflationary policy result may be due to increased precautionary spending and investment from firms and consumers due to risk in global trade. Hence, contraction in aggregate demand effect dominates.

Contrary to the significantly mitigated effects due to BRICS for GEPU in figure 3, figure 5 contains no significant mitigation or amplification of shocks due to BRICS. This may be due to the fact that GEPU specifically reflects general uncertainty globally, including monetary and fiscal policy, as well as decisions of global institutions. As such, BRICS may shield member countries like Brazil from global risk due to greater policy coordination and less reliance on G7 and western global and financial institutions.

That said, this bloc is not a trade-specific one and does not include free trade agreements nor customs unions. Moreover, the global trade economy is intrinsically globalized. As such, BRICS may not safeguard against sudden and adverse trade shocks any more or less than without this membership. As such, this divergence in results likely emerges from the macroeconomic nature of the GEPU shocks, compared to the industry-specific and bilateral forces of TPU shocks which may be more difficult to detect in macroeconomic variables. In future works, disaggregating the trade balance into exports and imports may paint a clearer picture of this mechanism.

Consecutively, we present the results of a forecast variance error decomposition exercise for each variable can be presented in tables 1 and 2:

Table 1: GEPU Shock Forecast Error Variance Decomposition (%)

Horizon	Industrial Production	REER	YoY CPI	Trade Balance	Stock Market
h = 9	0.005081	0.017472	0.012507	0.036995	0.009482
h = 18	0.005212	0.017547	0.012898	0.037047	0.009924
h = 27	0.005217	0.017576	0.013134	0.037065	0.010255
h = 36	0.00522	0.017595	0.013289	.037078	0.010474

Table 2: TPU Shock Forecast Error Variance Decomposition (%)

Horizon	Industrial Production	REER	YoY CPI	Trade Balance	Stock Market
h = 9	0.047473	0.007697	0.036308	0.016145	0.032739
h = 18	0.047947	0.008513	0.036777	0.01659	.033401
h = 27	0.048101	0.008706	0.036958	.016677	0.033617
h = 36	0.048145	0.008762	0.037011	.016703	0.033678

In the ninth period following an increase in global economic policy uncertainty, this uncertainty explains approximately 0.0051% of the variation in Brazilian industrial production, which

is dwarfed by that explained by trade policy uncertainty (0.0474%). The proportion of variation explained by both uncertainties gradually increases, converging to a steady state of 0.0052% and 0.0484% by the 36th period. Moreover, GEPU accounts for 0.0175% of the variation in the REER in the ninth period, compared to 0.0077% by TPU. This converges time and stabilizes around 6.890.0176% and 0.0088% by the 36th period, respectively.

Inflation (YoY CPI) is explained a proportion of 0.125% by GEPU and 0.0363% by TPU, converging to around the same range as they initially started with (0.0133% and 0.037% in the 36th period, respectively). GEPU explains a greater proportion of variation in trade balance (net exports) of 0.0370% relative to TPU (0.0161%). Finally, uncertainty in the stock market is explained by 0.0095% by GEPU and 0.0327% by TPU. These proportions are quite consistent over time, indicating that Brazilian macroeconomic variables adjust relatively quickly to uncertainty shock.

Overall, these proportions are quite consistent over time, indicating that Brazilian macroeconomic variables adjust relatively quickly to uncertainty shock by the 9th period, before converging to a nearby steady state in the 36th period.

V Conclusion and Recommendation

In this paper, we have analyzed the spillover effect of various uncertainty measures on Brazilian macroeconomic variables using a Cholesky-identified VAR methodology and monthly data spanning January 1999 to May 2023. We find that GEPU induces wide and persistent effects on the Brazilian economy, notably depreciating inflation and REER, while appreciating the trade balance. Meanwhile, TPU shocks depreciate inflation while increasing industrial production.

Importantly, we attempt to measure the "BRICS Effect", that is, the role a BRICS membership has on mitigating or amplifying the response of Brazil's macroeconomic variables to these uncertainty shocks. We do this by incorporating a shock and BRICS dummy interaction variable into our VAR analysis. Our results show a mitigation in the response of REER (opposite direction relative to figure 2), while amplifying the effect on trade balance, inflation, and the stock market. Surprisingly, we find no significant effect in the mitigation of TPU shocks. This highlights the advantage BRICS has in shielding member countries from general global uncertainty shocks, and its limitations in providing the same protection given trade policy uncertainty shocks.

Given our methodology and findings are accurate and robust, these findings provide ev-

ident and important implications for Brazil's policymakers. Integrating into the BRICS bloc has proved to be effective in increasing Brazil's resilience to global economic uncertainty shocks. Possible mechanisms through which this is done is through diversified policy and global relationships, increased financial stability, and a diminishing reliance of global south countries, including Brazil, on western institutions and financial channels. As such, the Brazilian economy is able to utilize BRICS-specific mechanisms, such as the Contingent Reserve Arrangement (CRA), a channel aimed at providing support for member countries against global financial strains, to bolster its resilience against external global shocks (Ferragamo, 2024).

That being said, BRICS does not provide any additional effects given a TPU shock, signaling a potential vulnerability of bloc members particularly susceptible to global trade risk. As such, Brazil must seek greater diversification of bilateral trade, bolstering supply chain stabilization, allowing for quick adaptation and flexibility of its institutions to trade shocks. In particular, Brazil should prioritize expanding its logistical infrastructure and diversify its economy away from a majorly commodity-reliant one. In this manner, Brazil can more strongly position itself, alongside its BRICS member countries, as a leader in the global environment, capable of a greater degree of resilience in the face of varying global uncertainty measures.

In future work, there is much space for improving on our identification strategy, particularly based on the fact the GEPU measures are fed by uncertainty emitting from macroeconomic variables, raising questions to the true exogeneity of these shocks. That said, it can be argued that these shocks are the most exogenous, relative to Brazil's macroeconomic variables. Moreover, we can analyze the effect of more exogenous shocks, such as U.S.-based monetary policy shocks. We can also expand the sample size of countries beyond Brazil, potentially incorporating more BRICS member countries.

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