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International Drivers of Policy Uncertainty in Emerging Economies

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Abstract

We investigate whether the international context can affect the economic policy uncertainty in a group of seven emerging market countries. Using a variety of global variables and a Bayesian Panel Vector Autoregression that connects domestic and international variables, we find that the conditions of the global goods market are essential drivers of policy uncertainty. Especially, a central role is played by global uncertainty, with significant and persistent effects coming from both global policy uncertainty and the volatility of global financial markets.

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1 Introduction

Economic policy uncertainty (EPU) is a crucial source of economic fluctuations. From a theoretical point of view, frequent reversals of macroeconomic policies can have substantial welfare costs, as suggested, e.g., by Aguiar and Gopinath (2007). Not surprisingly, there is now a vast literature on conducting monetary policy, which encompasses topics such as the desirable properties of interest rate rules, the role of announcements and communication, and the consequences of inflation targeting.[1] However, the scope of EPU is quite large, and it can be related to many other policies. To cite a few examples, one can expect potential business cycle costs associated with EPU related to (i) the timing and composition of fiscal consolidation (Bi et al., 2013); (ii) uncertain debt targets (Richter and Throckmorton, 2015); (iii) fiscal and monetary interaction (Bartolomeo and Giuli, 2011); and (iv) future tariffs (Caldara et al., 2019). But one can arguably defend that uncertain bailout to prevent a major crisis or uncertain currency devaluation policy may also induce considerable welfare costs. Indeed, as suggested empirically by Baker et al. (2016), an increase in policy uncertainty can result in a decline in investment, GDP, and employment in advanced economies (AEs).

For emerging markets (EMs), the concern about future policies is a well-known and recurring problem (see, e.g., Rodrik, 1991; Calvo, 2005; Aguiar and Gopinath, 2007). Mainly due to its political and institutional structures, policymakers in such countries may find it challenging to commit to certain policies, especially in the long term. As a consequence, such economies are more prone to suboptimal, time-inconsistent policies in the spirit of Kydland and Prescott (1977); Calvo (1978). Nonetheless, a recurrence of time-inconsistent behavior from policymakers is expected to induce greater uncertainty about future policies.[2]

The ongoing US–China trade war and the uncertainty surrounding the Brexit episode has spurred fear over the macroeconomic policy conduction in EMs. How will policymakers respond to this international context? The reputational issues that some of these countries face may result in bad forecasts of future policies, but this would increase incentives for the private sector to postpone intertemporal decisions precautionarily, ultimately leading to a reduction in economic growth.

This paper empirically investigates whether the international context matters for the policy uncertainty in EMs. It uses a Bayesian Panel Vector Autoregressive (VAR) model with data from seven EMs to assess the impact that some international shocks have on the uncertainty surrounding economic policies in these countries. The EPU is proxied by the index of economic policy uncertainty proposed by Baker et al. (2016). The higher the value of the index, the higher the degree of policy uncertainty. We find that positive shocks to industrial production growth, demand for EMs goods, and commodity prices typically lead to less EPU in the countries in our sample. However, global uncertainty seems to play a more crucial role, as suggested by our findings on the higher and more persistent responses of the EPU indexes to shock on the Global Policy Uncertainty (GPU) index and the VIX index.[3]

[1] See Creal and Wu (2017); Husted et al. (2019) on recent treatment on how monetary policy conduction can be related to EPU.

[2] Not surprisingly, Mendoza (2001) shows that dollarization can generate benefits in economies lacking credibility and with imperfect financial markets. That is, such economies can be better off by delegating some macroeconomic policies to some external agent.

[3] The VIX, which is implied by the volatility of the S&P500 index, is used as proxy for uncertainty about global financial markets.

The present paper is related to a growing literature analyzing the effects of uncertainty on economic activity. In a seminal paper, Bloom (2009) estimates a simple reduced-form VAR and finds that the US industrial production reduces by approximately 1% in response to an uncertainty shock. This problem is further explored by Bachmann et al. (2013) for the US and by Carrière-Swallow and Céspedes (2013) for the US and a group of EMs. Choi (2018) finds that US financial uncertainty shocks may have a substantial impact on the output of 18 EMEs, but such shocks do not seem to have a significant impact on US output. Literature has also been studying the effects of economic policy uncertainty shocks on economic activity. Baker et al. (2016) find that an EPU shock in the spirit of Rodrik (1991) and Born and Pfeifer (2014) can induce a reduction of 1.1% in industrial production in the US. Evidence for EMs' economic policy uncertainty is somewhat scarce. Choi and Shim (2019) compare the effects of financial uncertainty shocks vs. economic policy uncertainty shocks in a group of six EMs and find that financial uncertainty shocks have a larger impact on output than policy uncertainty shocks.[4] It is important to note that these papers are focused on the effects of EPU on economic activity. In this sense, the present paper contributes to the literature by assessing the effects of changes in some global and domestic variables have on EPU in a sample of EMs.

The paper is organized as follows: Section 2 presents the econometric strategy. Section 3 discusses the results, and Section 4 presents the concluding remarks.

2 Econometric Methodology

This section presents the econometric methodology employed in the paper. Section 2.1 describes the data-set, and Section 2.2 presents the econometric methodology.

2.1 Data

We use nine variables in each idiosyncratic VAR, with data from Brazil, Chile, China, Colombia, India, Mexico, and Russia. The industrial production of both AEs and EMs are taken from the Global Economic Monitor (GEM), as well as the retail price index. The commodity price index, divided by the US CPI index, is the IMF Primary Commodity Price Index. The VIX index is taken from the FRED database. The Global Economic Policy Uncertainty index is taken from Baker et al. (2016). All country-specific EPUs are gathered from the Policy Uncertainty team.[5] The interest policy rate is proxied by the 'Less Than 24 Hours: Central Bank Rates' from OECD for most of the countries. Otherwise, it is proxied by the 'Call Money/Interbank Rate.' Finally, the CPI index is taken from IFS.

The time-series are country-dependent. It spans from 1997M01 to 2019M06 for Brazil, Mexico, and Russia; from 1997M02 to 2019M06 for Chile; from 1998M01 to 2019M06 for China; from 2000M01 to 2019M06 to Colombia; and from 2003M01 to 2019M06 for India. Thus, we have a total of 1,769 observations in our unbalanced panel data.

[4]The selected countries are Brazil, Chile, China, India, Korea, and Russia.

[5]Global and country-specific EPU data is retrieved from the Economic Policy Uncertainty website, `http://www.policyuncertainty.com`. The website uses the method proposed by Baker et al. (2016) to construct most of the idiosyncratic indices. Particular cases are the indices for China, developed by Baker et al. (2013), for Chile, developed by Cerda et al. (2016), and for Colombia, developed by Gil and Silva (2018).

2.2 Bayesian Panel VAR

We modeled seven systems of equations containing one block of idiosyncratic variables and one block of international variables. That is, each sub-system $i \in \{1, \cdots, 7\}$ includes variables from the emerging economy e and variables from the rest of the world, denoted by I. The vector $\boldsymbol{Y}'_{it} = [Y^{I\prime}_t \; Y^{e\prime}_t]$ concatenates the vector Y^e_t, which contains the idiosyncratic variables, and the vector Y^I_t, which contains the global international variables.

The international vector is given by the following:

$$Y^I_t = \begin{bmatrix} GPU^I_t \\ vix^I_t \\ p^I_t \\ ret^I_t \\ g^I_t \end{bmatrix},$$

where GPU^I_t is the log of the measure of global economic policy uncertainty, vix^I_t is the log of the measure of global market volatility, p^I_t is a measure of (relative) commodity prices, ret^I_t is the annual growth rate of the Retail Sales Volume index in AEs, and g^I_t denotes the annual growth of industrial production in AEs.

The idiosyncratic vector is given by the following:

$$Y^e_t = \begin{bmatrix} EPU^e_t \\ i^e_t \\ \pi^e_t \\ g^e_t \end{bmatrix},$$

where EPU^e_t is the log of the economic policy uncertainty measure, i^e_t is the policy related interest rate, π^e_t is the quarterly inflation, and g^e_t is the annual growth rate of industrial production in the emerging country e. [6]

The implied equations have the following reduced form:

$$\boldsymbol{Y}_{it} = \sum_{l=1}^{L} B'_{i,l} \boldsymbol{Y}_{it-l} + \Gamma'_i \boldsymbol{Z}_{it} + \boldsymbol{\epsilon}_{it}, \text{ for } t = 1, \cdots, T_e \tag{1}$$

in which $\boldsymbol{Y}_{it}$ is a vector with $K = 9$ variables in the sub-system i and $\boldsymbol{Z}_{it}$ is a vector of constants. The vector $\boldsymbol{\epsilon}_{it}$ contains the innovations in the reduced form VAR, which are assumed to be distributed by $N(0, \boldsymbol{\Sigma}_i)$. In addition, L is the lag length and T_e is the sample size for each country. Concatenating $B_i = \begin{bmatrix} B'_{i,1} & \cdots & B'_{i,L} \end{bmatrix}$, we can define $\boldsymbol{\beta}_i = vec(B)$ and $\boldsymbol{\gamma}_i = vec(\Gamma_i)$, which are useful for expressing our prior scheme.

2.3 Priors

Given the hypothesis of the normality of the error term, the coefficients in equation i will also be normally distributed. Additionally, we assume a normal hierarchical prior—which implies a later normal conjugate posterior—given by:

$$p(\boldsymbol{\beta}_i | \bar{\boldsymbol{\beta}}, \boldsymbol{\Lambda}_i) = N(\bar{\boldsymbol{\beta}}, \boldsymbol{\Lambda}_i) \tag{2}$$

[6]The policy rate and inflation are used as control variables to take into account idiosyncratic features of the economy, so we will not focus too much on such variables.

in which $\bar{\boldsymbol{\beta}}$ is the common (weighted average) mean of the panel and $\boldsymbol{\Lambda}_i$ is the associated variance matrix. For the latter, we assume a prior in the spirit of Jarociński (2010), given by $\boldsymbol{\Lambda}_i = \lambda \boldsymbol{L}_i$, in which $\boldsymbol{L}_i$ reflects the scale of the data. The parameter λ plays a central role in this prior scheme. If $\lambda \to 0$, then $\boldsymbol{\beta}_i \to \bar{\boldsymbol{\beta}}$, and we have a homogeneous coefficient in the panel. If, however, $\lambda \to \infty$, then $\boldsymbol{\beta}_i$ is completely idiosyncratic. The prior for λ is assumed to be an inverted gamma prior:

$$p(\lambda|s, v) = IG_2 \propto \lambda^{-\frac{v+2}{2}} \exp\left(-\frac{1}{2}\frac{s}{\lambda}\right) \tag{3}$$

To set the variances in $\boldsymbol{\Lambda}_i$, we use dummy observations as in Bańbura et al. (2010), with the overall prior tightness parameter set to 1.

Moreover, following Bahaj (2019), we assume that $\bar{\boldsymbol{\beta}}$ may be associated with a "panel" covariance matrix. Thus, we assume that the prior for the idiosyncratic covariance matrix of the residuals is also drawn from a common distribution, given by:

$$p(\boldsymbol{\Sigma}_i|\bar{\boldsymbol{\Sigma}}, \kappa) \sim iW(\bar{\boldsymbol{\Sigma}}, \kappa) \tag{4}$$

in which κ reflects the degree of pooling. If $\kappa \to \infty$, then $\boldsymbol{\Sigma}_i \to \bar{\boldsymbol{\Sigma}}$, or it becomes completely idiosyncratic if $\kappa \to 0$. $\bar{\boldsymbol{\Sigma}}$ is the assumed "panel" Wishart prior expressed by:

$$p(\bar{\boldsymbol{\Sigma}}) \sim |\bar{\boldsymbol{\Sigma}}|^{-0.5(K+1)} \tag{5}$$

This prior scheme implies a posterior for $\bar{\boldsymbol{\Sigma}}$ given by a harmonic mean of the idiosyncratic $\boldsymbol{\Sigma_i}$.

Finally, we assume non-informative priors for γ_i, given by $p(\boldsymbol{\gamma}_i) \propto 1$, and for $\bar{\boldsymbol{\beta}}$, given by $p(\bar{\boldsymbol{\beta}}) \propto 1$.

The algorithm to compute the posterior probability of the parameters of interest is similar to that of Jarociński (2010) and is presented in the online appendix. Following Gelman (2006)'s advice, we set the hyperparameters $s = 0$ and $v = -1$. Moreover, since inferring κ for the data is challenging and involves non-standard distributions, we follow Bahaj (2019) and set it to $K + 3$, which guarantees the existence of a well-behaved distribution for $\bar{\boldsymbol{\Sigma}}$. We run the Gibbs sampler for 110,000, discarding the first 10,000 iterations as burn-in, and saving every 50-th iteration. The convergence is tested by inspecting the inefficiency factors, which we present in the appendix. The inference on the impulse response functions is based on the weighted average, panel statistic, $\bar{\boldsymbol{\beta}}$, and the panel covariance matrix, $\bar{\boldsymbol{\Sigma}}$.

The identification is given by a timing hypothesis in that the emerging economy will not affect the global economy, for at least a month – which can be interpreted as a kind of small open economy (SOE) hypothesis. Moreover, the emerging country's industrial production is assumed to take one month to respond to the other variables. The recursive identification is achieved by the ordering in $\boldsymbol{Y}_{it}$, which can be interpreted as an extended version to an SOE context of the identification scheme followed by Baker et al. (2016) and Choi and Shim (2019). In such an identification scheme, uncertainty indices, and policy uncertainty indices, in particular, are taken as predetermined within the period, both in the international and domestic contexts. In a later section, we present results based on an alternative scheme in which uncertainty is treated as an endogenous process, meaning that uncertainty may react contemporaneously to economic variables.[7]

[7] Carreiro et al. (2018) provides evidence that macroeconomic uncertainty could be considered as exogenous in the US economy, while financial uncertainty may arise as an endogenous response to some macroeconomic developments. The extent to which such results can be informative to EMs is unknown, especially when it comes to policy uncertainty.

3 Results

We consider models with 2 to 14 lags and select the one that minimizes the Bayesian Deviance Information Criterion (DIC) proposed by Spiegelhalter et al. (2002). The DIC, a generalization of the Akaike information criterion, penalizes model complexity while rewarding the fit to the data. The chosen model, which minimizes the DIC criterion at 7560.5, has 10 lags. We first analyze whether policy uncertainty matters for the industrial production in EMs. The results are shown in Figure 1a. Since the EMs industrial production responses show an oscillating pattern around the zero that makes it challenging to interpret impacts over time, we also present the accumulated responses in Figure 1b.

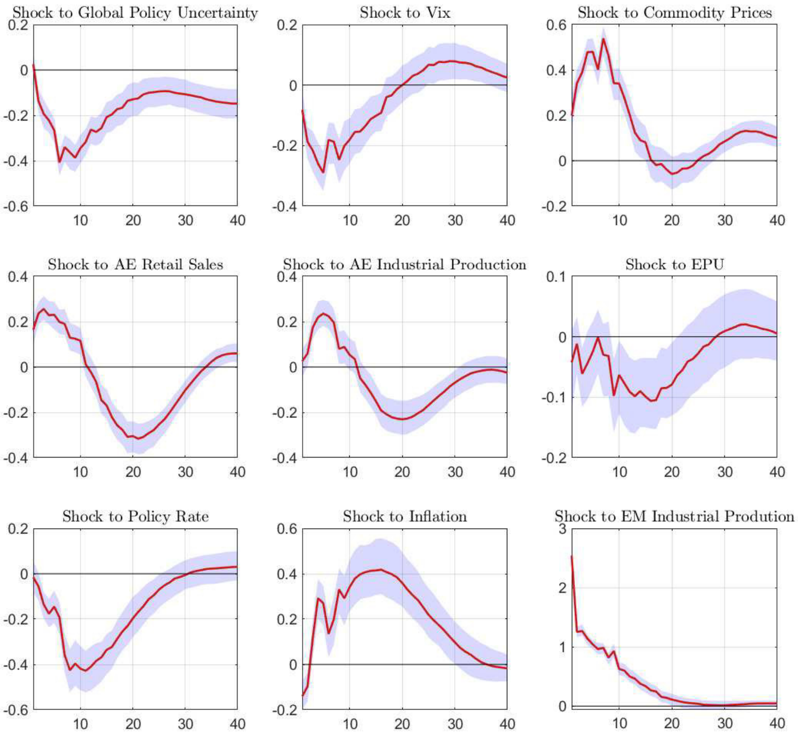
The first significant result is that all shocks examined seem to have a considerable persistent impact on industrial production in EMs. Notably, a shock on EPU is associated with a persistent reduction in industrial production growth, which lasts about 20 months. This constitutes evidence that policy uncertainty does matter for the business cycles in emerging markets, even after controlling for both international and domestic contexts. In contrast, Choi and Shim (2019) found that these shocks are of little importance to the industrial production in EMs. However, the authors considered VARs with few lags, which may explain why they did not identify the persistence and the hump-shaped behavior of the industrial production of EMs after the shock. Moreover, they did not take into account some of international variables that we have shown to be relevant for EMs' industrial production.

The second significant result is that global uncertainty, and especially global policy uncertainty, plays a large and quite persistent negative effect on EMs. These shocks may have a great impact immediately and in the long run. Moreover, the volatility of global financial markets can have a negative impact that is twice as large as shocks to EPU over the horizon. Notice, however, that the transmission of these shocks may lead to a slowdown in the growth of the industrial production in EMs, but the GPU seems to last longer and is way more intense than the global market uncertainty. This result will be confronted in a later section in which we have changed the order of the variables.

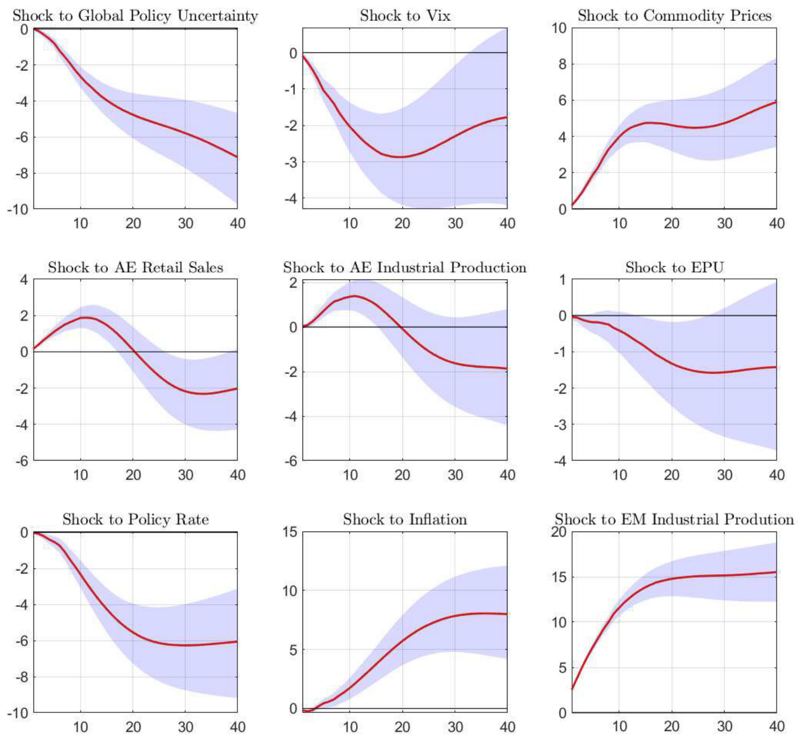
The other considered shocks have the expected positive effects. In the very short-run, the industrial production in EMs responds positively to higher commodity prices and shocks in the AE's retail sales and AE's industrial production. It responds negatively to a shock to the policy rate. As Figure 1b suggests, only higher commodity prices seem to have a permanent positive effect on industrial production in EMs.

Next, we evaluate whether international shocks play any role in the behavior of the EPU in EMs, which is the main objective of the paper. The results are in Figure 2a and Figure 2b. Loosely speaking, regarding trades, the Figures suggest that, when the market conditions for EMs' production improve, the EPU is likely to be reduced. However, in longer horizons, only the AE retail sales shocks may have persistent effects on EMs' EPU. In the very short run, unexpected shocks to both AEs' retail sales, AEs' industrial production, and commodity prices are likely to reduce the EPU in EMs, especially the industrial productions. However, the AE's retail sales seem to be the only variable capable of impacting EPU in the long term.

We are aware that our main results—which suggest that an improvement in the demand and commodity prices may lead to higher industrial production and lesser EPU in EMs—may be due to the chosen dataset. As pointed out by an anonymous referee, it is hard to think that such a result could be generalizable to the EMs not present in our sample. However, we cannot speculate much on this matter until new data on EPU



(a) Responses of the Industrial Production



(b) Accumulated responses of the Industrial Production

Figure 1: Responses of the Industrial Production to shocks in different variables - 68% error band is presented.

become available for a larger number of emerging economies. Thus, confronting these results with results based on a larger dataset could be done in future work.

Global uncertainty also plays a central role in the dynamics of EPU in EMs, and in particular global policy uncertainty. A shock in this variable may significantly increase the EPU index, with a significant degree of persistence. Moreover, a higher level of global market volatility also produces higher EPU, as indicated by the response of the EPU to a shock to the VIX index.

In summary, the demand and prices for the EM's productions seem to play a non-negligible role in policy uncertainty in EMs. However, uncertainty related to future global economic policies and international markets appears to induce more substantial uncertainty in the policy outcomes of EMs.

3.1 Alternative Ordering Scheme

In this section, we assume that the uncertainty process may be endogenous within a month. We continue to assume our SOE hypothesis, such that $\boldsymbol{Y}'_{it} = [Y^{I\prime}_t \; Y^{e\prime}_t]$. However, we changed the order of the variables in Y^I_t and in Y^e_t. The alternative ordering is given by:

$$Y^I_t = \begin{bmatrix} ret^I_t \\ g^I_t \\ p^I_t \\ vix^I_t \\ GPU^I_t \end{bmatrix},$$

And the idiosyncratic vector is now given by the following:

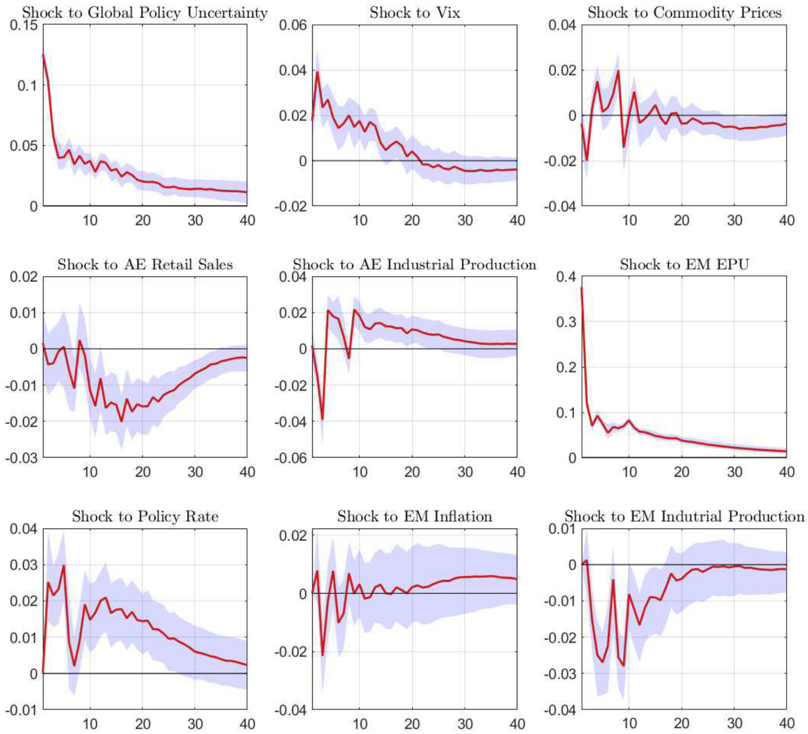
$$Y^e_t = \begin{bmatrix} g^e_t \\ i^e_t \\ \pi^e_t \\ EPU^e_t \end{bmatrix},$$

Thus, we have inverted the ordering in vector Y^I and switched only the positions of the EPU and the industrial production growth in Y^e. Such ordering is in the spirit of the robust exercises in Baker et al. (2016) and Choi and Shim (2019), but in our SOE context. The results are expressed in panels (a) to (d) in Figure 3.

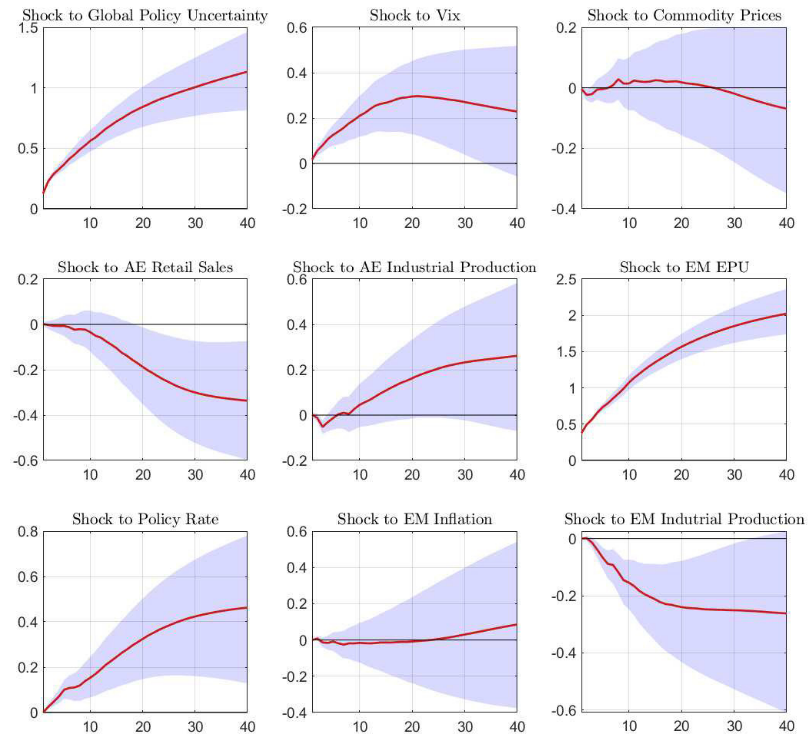
The results are qualitatively similar to those obtained using our baseline identification scheme. For the industrial production in EMs, conditions in the international goods markets and commodity prices are still relevant sources of fluctuation. Both VIX and GPU have similar long-run negative impacts, although the global economic uncertainty has an even more significant negative impact. It is important to note, however, that the EPU still shows a negative, persistent, and hump-shaped dynamic effect on industrial production growth.

Turning to the EPU responses, at panels (c) and (d), the results are quite in line with the previous ordering scheme, with the exception that the persistence of the AE industrial production shock is more short-lived and the VIX and GPU now have similar long-run impacts.

Finally, in the appendix, we present the idiosyncratic accumulated responses for the baseline ordering scheme. Although some EMs slightly deviate from the 'typical' case, the results are reasonably similar between countries. One exception would be Colombia's industrial production growth, which seems not to be responsible for raising EPU. Moreover,



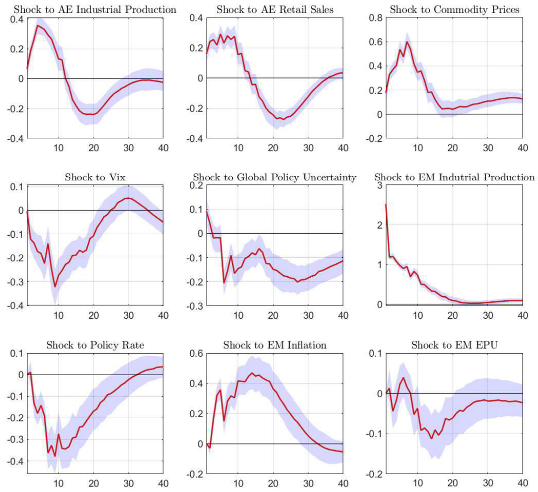
(a) Responses of the EPU



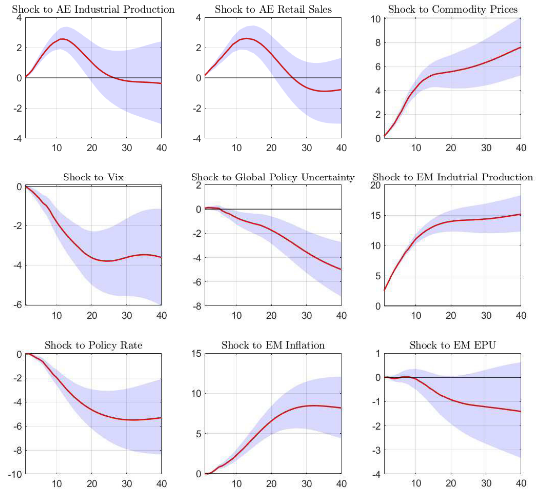
(b) Accumulated responses of the EPU

Figure 2: Responses of the EPU to shocks in different variables - 68% error band is presented.

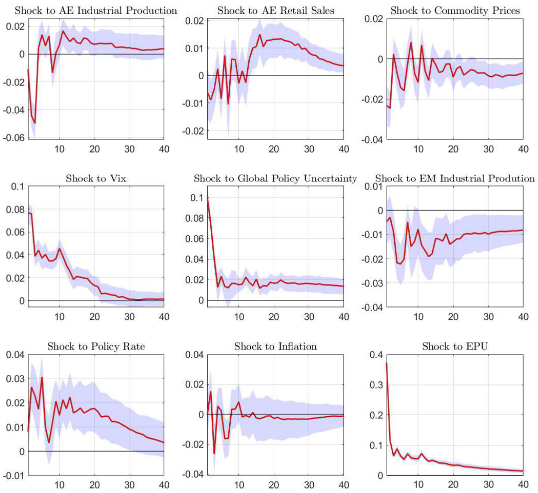
there seems to be a significant degree of heterogeneity in the responses of the EPU to shocks to commodity prices.



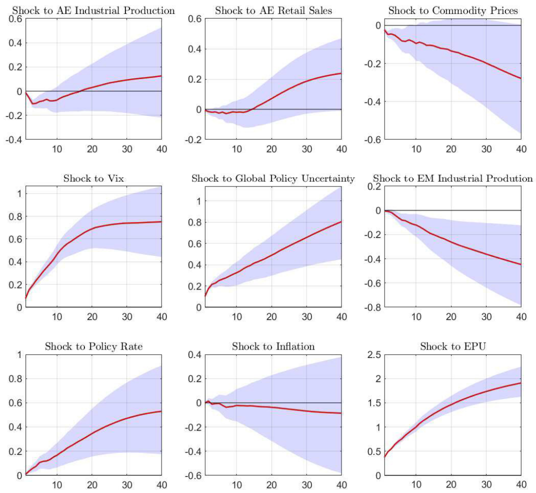
(a) Responses of the Industrial Production



(b) Accumulated responses of the Industrial Production



(c) Responses of the EPU



(d) Accumulated responses of the EPU

Figure 3: Impulse response functions under alternative ordering scheme - 68% error bands are presented.

4 Concluding Remarks

This paper investigated whether some global variables, which capture a variety of global factors, play any role in the EPU of some emerging economies. We find that global conditions for prices and the demand for goods produced by EMs are significant causes of uncertainty about future policies, but uncertainty about future global policies and future market conditions are central. Given that our findings suggest that a higher EPU is associated with a reduction in EM production growth, the results in the paper suggest that policymakers should take care of events like the US-China trade war and the Brexit, perhaps improving communication with the economic agents.

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