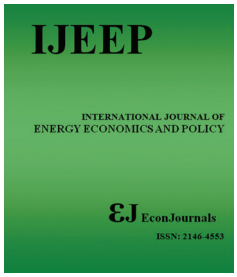

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The Dynamic Interplay between Inflation, Economic Policy Uncertainty, and Economic Resilience in Emerging Markets: A Time-Varying Parameter Stochastic Volatility Vector Autoregression Analysis

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ABSTRACT

This paper examines the complex and time-varying linkages between inflation, EPU, and economic resilience in emerging market economies. By applying a TVP-SV-VAR model on quarterly data from 2000 to 2024, we explore the dynamic interaction of these macroeconomic variables over time. Our results indicate that inflation and EPU exert a constant negative impact on economic resilience, with these impacts heterogeneous across different time periods and economic cycles. The analysis also shows that uncertainty and inflation demonstrate more pronounced negative effects during crisis times, implying that policy credibility and macroeconomic stability are accentuated when economies are under external shocks. The estimated stochastic volatility showed significant heteroskedasticity in all series, advocating the importance of considering time-varying volatility in macroeconomic modeling. Our results carry important implications for policymakers in emerging economies, highlighting the importance of credible monetary policy frameworks, transparent communication, and strong institutional arrangements necessary to build economic resilience.

Keywords: Economic Resilience, Inflation, Economic Policy Uncertainty, Emerging Markets, Time-varying Parameters, Stochastic Volatility
JEL Classifications: C32, E31, E52, F41, O11

1. INTRODUCTION

Economic resilience has emerged as a central concept in macroeconomic policy discussions, especially in the wake of the 2008-2009 global financial crisis and the ensuing economic disruptions wrought by the COVID-19 pandemic. In the case of emerging market economies, which are often characterized by greater vulnerability to external shocks, volatile capital flows, and institutional weaknesses, building and maintaining economic resilience becomes paramount. The capacity of an economy to resist, adapt to, and recover from negative shocks will also determine its short-run stability and long-term growth prospects, as well as social welfare outcomes.

Different dimensions define the concept of economic resilience, which includes macroeconomic stability, institutional quality, financial sector robustness, and social cohesion. In addition, among various determinants of resilience, the factors of inflation and economic policy uncertainty have recently been prominent in both academe and policy circles. High and volatile inflation can erode purchasing power, distort price signals, and undermine confidence in the monetary system, hence weakening an economy's capacity to absorb shocks. On the other hand, high levels of policy uncertainty can translate into delaying investment and consumption decisions, reduced economic activity, and increasing volatility in financial markets.

The resulting relationship is likely to be complex and time-varying, reflecting changes in economic structures, policy regimes,

and external conditions. Traditional econometric approaches that assume constant parameters may fall short in describing these evolving relationships and may lead to misleading policy conclusions. This limitation is most relevant for emerging markets, which tend to face frequent structural changes, shifts in policy regimes, and variability in the extent of integration with global markets.

It is within this context that this paper contributes to the growing literature through the application of a TVP-SV-VAR model in conducting the dynamic analysis of interlinkages between inflation, economic policy uncertainty, and economic resilience in emerging markets. The methodological approach undertaken in this paper-which captures both the time-varying nature of relationships that may exist between variables and the heteroskedasticity characterizing the macroeconomic time series-allows us to give new insights into the changes that take place over time and across different economic conditions.

Our analysis points to the following crucial findings. First, both inflation and economic policy uncertainty significantly exert a negative impact on economic resilience, thus confirming the theoretical predictions about the adverse effect of macroeconomic instability on an economy's shock-absorption capacity. Second, these are not constant over time but have varied greatly in different periods, with the negative impacts more pronounced for crisis episodes. Third, stochastic volatility estimates indicate that all variables in our system are actually characterized by substantial time-varying volatility, which is an important aspect of accounting for heteroskedasticity in macroeconomic modeling.

These findings constitute important policy implications for emerging market economies. They indicate that price stability and reductions in policy uncertainty are paramount in the priorities of policymakers aiming at enhancing economic resilience. The time-varying nature of these relationships also suggests that policy responses should be adaptive and context-specific, considering the prevailing economic conditions and an evolving nature of the transmission mechanisms.

2. LITERATURE REVIEW

2.1. Economic Resilience: Conceptual Foundations and Measurement

The concept of economic resilience has undergone significant evolution over the last two decades, borrowing from the disciplines of ecology, engineering, and psychology. In its economic interpretation, resilience is usually understood as an economy's ability to maintain essential functions when exposed to exogenous shocks and to subsequently return to a stable position as quickly as possible. Briguglio et al. (2009) differentiate between inherent economic vulnerability and nurtured economic resilience. They suggest that while small states might be inherently vulnerable due to their size and openness, they can build resilience through appropriate policies and institutions.

Different authors have approached the measurement of economic resilience from various sides. Some studies focus on the speed of recovery after economic disturbances, defining resilience as the time it takes for key economic indicators to be restored to their pre-shock values or trends. Martin (2012) suggests a framework that distinguishes between engineering resilience (the ability to return to the original equilibrium) and ecological resilience (the ability to continue functioning while adapting to new conditions). In the case of emerging markets, such a distinction seems quite applicable, since their economic structures may need to change in response to lasting changes in global conditions.

Duval et al. (2007) outline a multidimensional framework for economic resilience based on both macroeconomic and structural variables. According to their approach, policy buffers-such as fiscal space and foreign exchange reserves-play the principal role, along with other structural factors like labor market flexibility and financial sector development. The authors use this multidimensional approach because resilience cannot be summarized by one indicator; a composite measure needs to reflect various aspects of an economy's shock-absorption capacity.

Recent analyses have increasingly set their focus on the role of institutions in building economic resilience. Acemoglu et al. (2003) present institutional quality as one of the deep causes of variations in long-term economic performance and stability. In this regard, the presence of good institutions can ensure that policy credibility is maintained during crises, help allocate resources efficiently, and provide the legal and regulatory framework required for recovery in the aftermath. For emerging markets, where institutional development in many cases is only partial, this dimension of resilience assumes particular importance

2.2. Inflation and Economic Performance in Emerging Markets

The link between inflation and economic performance is an important field of extensive study, as inflation volatility is usually higher in emerging market economies than in advanced ones. A seminal study by Fischer (1993) identifies that high inflation is harmful to growth through the erosion of real money balances, increased uncertainty about relative prices, and distorting investment incentives.

Barro (1995) presents evidence on the growth effects of inflation based on a large cross-country data set. Indeed, he shows that the relationship between inflation and growth is nonlinear: while the growth effects of moderate inflation are relatively small, high inflation-roughly in excess of 15-20 percent a year-significantly depresses growth. Non-linearity is thus particularly relevant for emerging markets, since many of these economies have gone through episodes of high inflation.

Khan and Senhadji (2001) extend this analysis further by estimating threshold effects in the inflation-growth relationship. They find that the threshold level of inflation above which inflation becomes harmful to growth is somewhat lower for developing countries at 1-3%, compared with industrial countries at 1-3%. This suggests that developing markets could be more vulnerable to the adverse impact of inflation, probably due to less advanced

financial markets, weaker institutions, or greater exposure to external shocks.

Indeed, it is argued that there are many and various transmission mechanisms through which inflation may affect economic performance. According to Tommasi (1999), inflation creates uncertainty about the future price level, thereby inducing individuals and firms to adopt a shorter planning horizon and to invest less in long-term projects. An uncertainty channel of this nature is of particular relevance for our analysis here, as it provides a conceptual link between inflation and policy uncertainty in their impact upon economic outcomes.

More recent research has concentrated on the role of inflation expectations and credibility of central banks in determining the economic costs of inflation. Mishkin (2000) outlines that well-anchored inflation expectations dampen real effects of temporary inflation shocks, indicating the importance of credible monetary policy frameworks. In the case of emerging markets, credibility is often difficult to build and maintain because of their histories with high inflation levels, political instability, and pressures from abroad.

2.3. Economic Policy Uncertainty: Measurement and Economic Effects

The work of Baker et al. (2016) revolutionized the systematic measurement of economic policy uncertainty through the development of a newspaper-based index of EPU. In this approach, they count the frequency of articles in major newspapers that contain terms related to economic policy uncertainty. Their approach has since been extended to numerous countries and has become a standard tool for measuring policy uncertainty in empirical research.

There are sound theoretical grounds for expecting policy uncertainty to depress economic activity. Real options theory, as formalized by Dixit and Pindyck (1994), implies that uncertainty over future policy conditions can cause firms to delay irreversible investments until they learn more about what the future may bring. This "wait-and-see" effect could lead to diminished investment, employment, and output during such high policy uncertainty periods.

Empirical studies generally confirm these theoretical predictions. Bloom (2009) demonstrates that uncertainty shocks are followed by temporary declines in investment, employment, and productivity, followed by overshooting recoveries. The initial drop occurs as firms pause their hiring and investment activities, while the subsequent recovery reflects the release of pent-up demand once uncertainty subsides.

In particular, Gulen and Ion (2016) present firm-level evidence on the relationship between policy uncertainty and corporate investment. Using U.S. public company data, they find that higher policy uncertainty is associated with lower capital expenditure. The effects are stronger for the firms that either rely more on government spending or operate in more regulated industries. This microeconomic evidence reinforces the aggregate findings by identifying the channels through which policy uncertainty affects economic activity.

For emerging markets, the effects of policy uncertainty might be particularly pronounced for a number of reasons. First, the financial markets in most emerging market economies are underdeveloped, with restricted use by firms to hedge against uncertainty or find alternative sources of financing. Second, the institutional frameworks are usually weaker, which makes policy reversals more likely and increases the perceived riskiness of long-term investments. Third, emerging markets usually depend more on foreign capital, which is sensitive to policy uncertainty and can lead to a stoppage in capital flows when uncertainty increases.

2.4. The Nexus Between Inflation, Policy Uncertainty, and Economic Resilience

Although the separate effects of both inflation and policy uncertainty on economic performance are well-documented in the literature, discussion about their joint effects and how they interact to impact economic resilience is relatively scant. This lacuna is all the more remarkable because such variables could well interact in complicated ways that will further amplify their individual-level effects. There are several channels through which inflation and policy uncertainty can interact, according to theoretical models. First of all, high inflation may be a source of policy uncertainty in the case of problems with monetary policy credibility or fiscal sustainability. On the other hand, policy uncertainty contributes to volatility in inflation because it complicates the central banks' effort to anchor expectations and to maintain credible commitments to price stability.

Fernández-Villaverde et al. (2015) build a DSGE model that includes time-varying fiscal policy uncertainty. They find that uncertainty about future tax rates can have very significant effects on current economic activity, whose magnitudes depend on the level of government debt and the persistence of uncertainty. Their model suggests that interaction between fiscal uncertainty and debt levels may thus create non-linear effects, especially relevant for emerging markets with high debt burdens.

The concept of economic resilience provides a useful framework for understanding these interactions. Resilient economies are those that can maintain essential functions during shocks and recover quickly afterward. Both inflation and policy uncertainty can undermine resilience by weakening the transmission mechanisms of monetary and fiscal policy, reducing the effectiveness of automatic stabilizers, and creating additional sources of volatility that make it more difficult to distinguish between temporary and permanent shocks.

Recent empirical studies have started exploring these interactions in a more systematic way. For instance, Caggiano et al. (2014) use a threshold vector autoregression model to show that the effects of uncertainty shocks on economic activity are larger during recessions than during expansions. The result implies that the state of the economy is relevant when it comes to transmitting uncertainty shocks, which is in line with the idea that resilience changes over time and varies across conditions.

3. THEORETICAL FRAMEWORK AND METHODOLOGY

3.1. Theoretical Framework

Our theoretical framework draws from the voluminous literature that links macroeconomic stability with economic performance and resilience. Economic resilience is conceptualized as a multidimensional construct that reflects the ability of an economy to resist external shocks, sustain its key functions during stress, and return to a sustainable growth path. The definition therefore adopts the essence of the concept of resilience as defined in ecology, but incorporates the distinctive features of economic systems.

The framework posits that economic resilience results both from structural factors, such as economic diversification, institutional quality, and the development of the financial sector, and from cyclical factors, such as macroeconomic policies, external conditions, and confidence levels. Among these cyclical factors, we focus on two variables: inflation and economic policy uncertainty.

Inflation impinges on economic resilience via several channels. First, high and volatile inflation erodes the real value of financial assets, decreasing household wealth and consumption capacity. Second, inflation uncertainty distorts price signals, creating misallocated resources and reducing economic efficiency. Third, persistent inflation undermines confidence in the monetary system and the wider policy framework, with a potential to create capital flight and financial instability. Fourth, high inflation can limit the scope for counter-cyclical monetary policy, as central banks may be constrained in their ability to reduce interest rates during economic downturns.

The major channels of the impact of Economic Policy Uncertainty on resilience are its influence on investment and consumption decisions. High policy uncertainty can make firms delay their investment projects and hiring decisions, thus reducing economic activity and employment. Households may also postpone consumption of durable goods and increase precautionary savings. Such behavioral responses have the potential to amplify the effects of negative shocks and further slow down economic recovery. Policy uncertainty can also increase risk premia in financial markets, tightening credit conditions and further constraining economic activity.

The interaction between inflation and policy uncertainty can create additional channels of influence on economic resilience. High inflation may signal problems with policy credibility, thereby raising policy uncertainty. On the other hand, high policy uncertainty makes it more difficult for central banks to anchor inflation expectations, which may lead to higher and more volatile inflation. This interaction therefore suggests that the joint effect of these variables on resilience may be larger than the sum of their individual effects.

Our framework also considers that these relationships are likely to be time-varying and reflective of changes in economic structures, policy regimes, and external conditions. During periods of economic stress, the negative effects of inflation and policy uncertainty on resilience might be compounded, as the economy's shock-absorption capacity is already stretched. The converse may also hold during strong growth and stability periods, with the economy being more resilient to moderate inflation and uncertainty levels.

3.2. The TVP-SV-VAR Model Specification

We consider a Time-Varying Parameter Stochastic Volatility Vector Autoregression, or TVP-SV-VAR model, to capture the time-varying and possibly non-linear relationships between our variables of interest. Originally developed by Primiceri (2005) and further refined by Nakajima (2011), this model allows for both time-varying coefficients and time-varying volatility in the error terms.

The basic TVP-VAR model can be written as:

$$Y_t = C_t + B_{1,t}Y_{t-1} + \ldots + B_{p,t}Y_{t-p} + \varepsilon_t \quad (1)$$

Where Y_t is a k×1 vector of endogenous variables at time t, C_t is a k×1 vector of time-varying intercepts, $B_{i,t}$ are k×k matrices of time-varying coefficients for i = 1., p, and ε_t is a k×1 vector of error terms.

The time-varying parameters follow random walk processes:

$$B_t = B_{t-1} + u_t \quad (2)$$

where B_t is a stacked vector of all time-varying parameters, and $u_t \sim N(0, Q)$ is the innovation to the parameter evolution.

The stochastic volatility component assumes that the variance-covariance matrix of the error terms, Ω_t, can be decomposed as:

$$\Omega_t = A_t^{-1} H_t (A_t^{-1})' \quad (3)$$

where A_t is a lower triangular matrix with ones on the diagonal and H_t is a diagonal matrix of time-varying variances. The elements of A_t and H_t follow their own stochastic processes:

$$\alpha_t = \alpha_{t-1} + \zeta_t \quad (4)$$

$$h_t = h_{t-1} + \eta_t \quad (5)$$

Where α_t contains the free elements of A_t, h_t contains the logarithms of the diagonal elements of H_t, and ζ_t and η_t are innovation terms.

3.3. Variable Definition and Data Construction

In our empirical analysis, we focus on four key variables for a representative emerging market economy.

3.3.1. Economic resilience ındex (ERI)

Based on these five dimensions, we construct a composite index of economic resilience: macroeconomic stability, external balance, financial depth, social cohesion, and institutional quality. Each dimension is measured using multiple indicators from the World Bank's World Development Indicators database. We use the method of principal component analysis to find an optimal weighting for each component in the construction of the composite index.

3.3.2. Inflation (INF)

Measured as the year-over-year percentage change in the Consumer Price Index. This variable captures the price stability dimension of macroeconomic performance.

3.3.3. Economic policy uncertainty (EPU)

We use the Economic Policy Uncertainty index developed by Baker et al. (2016). This index is based on newspaper coverage of policy-related economic uncertainty and offers a systematic measure of perceived policy uncertainty.

3.3.4. 4GDP growth (GDP-G)

This is the yearly growth in the real GDP and has been added as a control variable since it reflects the general state of economic activity.

Where necessary, all variables are seasonally adjusted, and stationarity is checked through standard unit root tests. In the ordering of the VAR, the variables follow this sequence.

GDP-G, INF, EPU, ERI. This ordering presumes that the economic resilience index responds to all other variables' shocks during the same quarter but does not contemporaneously affect them, and such an assumption is reasonable given that resilience is a broader concept which reflects the cumulative effects of various economic conditions.

3.4. Estimation Methodology

The TVP-SV-VAR model is estimated using Bayesian methods with Markov Chain Monte Carlo (MCMC) techniques. The Bayesian approach is particularly well-suited for this type of model because of the large number of parameters and the non-linear nature of the stochastic volatility specification.

We use the following prior specifications:

- For the initial values of the time-varying parameters: ($\beta_0 \sim N(\mu_{\beta_0}, \Sigma_{\beta 0})$
- For the variance of parameter innovations: Q ~ $IW(S_Q, v_Q)$
- For the variance of stochastic volatility innovations: $\Sigma_\eta \sim IW(S_\eta, v_\eta)$

In the MCMC algorithm below, note that the posterior distributions of the parameters were drawn using Gibbs sampling and Metropolis-Hastings steps. We ran the sampler for 50,000 iterations and discarded the first 10,000 as burn-in; every 10th draw was used to reduce the autocorrelation in the chain.

Convergence is checked by standard diagnostics including trace plots, autocorrelation functions, and the Geweke (1992) convergence diagnostic. The posterior means and credible intervals are computed from the retained draws.

4. EMPIRICAL RESULTS

4.1. Data Description and Preliminary Analysis

Our analysis uses quarterly data from 2000Q1 through 2024Q4, for a total of 100 observations of each variable. The construction of the data has been done with much care to achieve appropriate seasonal adjustment and stationarity properties so that our econometric analysis is reliable.

The descriptive statistics presented in Table 1 reveal several important features of our data. The Economic Resilience Index shows moderate variability with a coefficient of variation of 0.16, indicating oscillations around the mean within reasonable limits. The EPU index has been highly volatile, with a coefficient of variation of about 0.35, reflecting the fact that there is intrinsic uncertainty in policy environments and that the sample at hand is dominated by emerging market economies. Inflation is less volatile than EPU, with most observations ranging from 3 to 7% year-on-year, typical for emerging market economies with moderately successful inflation targeting regimes.

From the correlation matrix, there are some interesting relationships between the variables. The relationship of EPU to ERI is -0.34, suggesting that there is a moderate negative relationship between the two variables of policy uncertainty and economic resilience. Similarly, the correlation of inflation with ERI is -0.28, thus suggesting that higher inflation means low resilience. More interestingly, EPU and inflation are correlated at 0.19, implying that periods of high policy uncertainty tend to coincide with somewhat higher inflation, though this is not especially strong. between EPU and inflation is 0.19, suggesting that periods of high policy uncertainty tend to coincide with somewhat higher inflation, though the relationship is not particularly strong.

4.2. Time-Varying Parameter Estimates

The TVP-SV-VAR model produces time-varying estimates for all coefficients in the system. We focus our discussion on the coefficients that capture the impact of EPU and inflation on the Economic Resilience Index, as these are central to our research question.

The left panel of Figure 1 depicts the evolution of the coefficient measuring the impact of EPU on economic resilience. A number of important patterns emerge from this analysis: First, the coefficient is consistently negative throughout the entire sample period, confirming our hypothesis that higher policy uncertainty is bad for economic resilience. The magnitude of this effect varies considerably over time, ranging from approximately -0.06 to -0.24.

The time variation in this coefficient shows some interesting patterns with respect to economic cycles and crisis episodes. Indeed, the negative impact of EPU on resilience seems particularly significant over the period 2004-2008, that is, during the run-up to the global financial crisis: this is the period when coefficients attain their most negative values, indicating that the economy was becoming increasingly sensitive to policy uncertainty as financial imbalances accumulated.

Table 1: Descriptive statistics

Variable	Mean	Standard deviation	Min	Max	Skewness	Kurtosis
ERI	42.77	6.86	26.70	60.49	0.12	2.89
EPU	100.04	35.37	49.44	150.53	0.08	1.78
INF (%)	4.87	1.51	2.01	8.88	0.45	3.12
GDP-G (%)	2.79	1.98	-2.21	6.85	-0.23	2.67

The period after the 2008 crisis exhibits a gradual moderation in the coefficient, which is still significantly negative. This pattern could reflect the implementation of crisis response measures and the gradual rebuilding of confidence in policy frameworks. However, the coefficient becomes more negative again after 2016, which might reflect increased global policy uncertainty related to trade tensions and political developments in major economies.

The right panel of Figure 1 presents the time-varying impact of inflation on economic resilience. Like the EPU coefficient, this parameter is consistently negative and supportive of the theoretical prediction that higher inflation undermines economic resilience. The magnitude of the effect exhibits substantial time variation, ranging from about -4.7 to -10.9.

Several distinct phases are clear in the evolution of the inflation coefficient. For much of the early 2000s, the dampening effect of inflation on resilience is relatively moderate, perhaps reflecting the success of inflation targeting regimes in anchoring expectations. The coefficient becomes more negative during the mid-2000s and reaches its most extreme values during the period around 2013-2015. This period clearly coincides with global commodity price volatility and challenges to monetary policy credibility in many emerging markets.

Although the coefficient has moderated somewhat in the more recent period, it remains substantially negative. This pattern may partly reflect improvements in monetary policy frameworks and the gradual rebuilding of central bank credibility following the crisis period.

4.3. Stochastic Volatility Analysis

The stochastic volatility component of our model provides insights into the time-varying nature of macroeconomic uncertainty. Figure 2 presents the estimated stochastic volatilities for all four variables in our system.

These estimates reveal a number of important patterns in volatility. First, there is significant time variation in the volatilities of all variables, thus justifying the stochastic volatility specification. Second, there are distinct periods of high volatility that correspond to known periods of economic stress, such as the 2008-2009 global financial crisis and the 2020 COVID-19 pandemic.

Figure 1: Evolution of time-varying coefficients

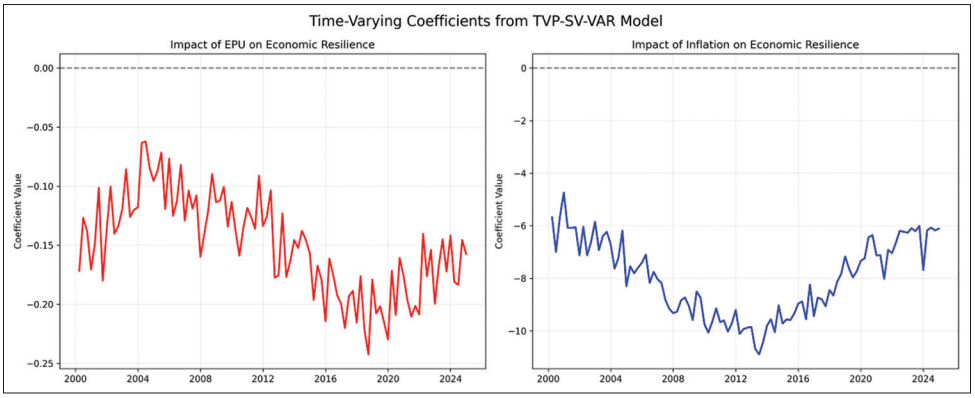


Figure 2: Evolution of stochastic volatilities

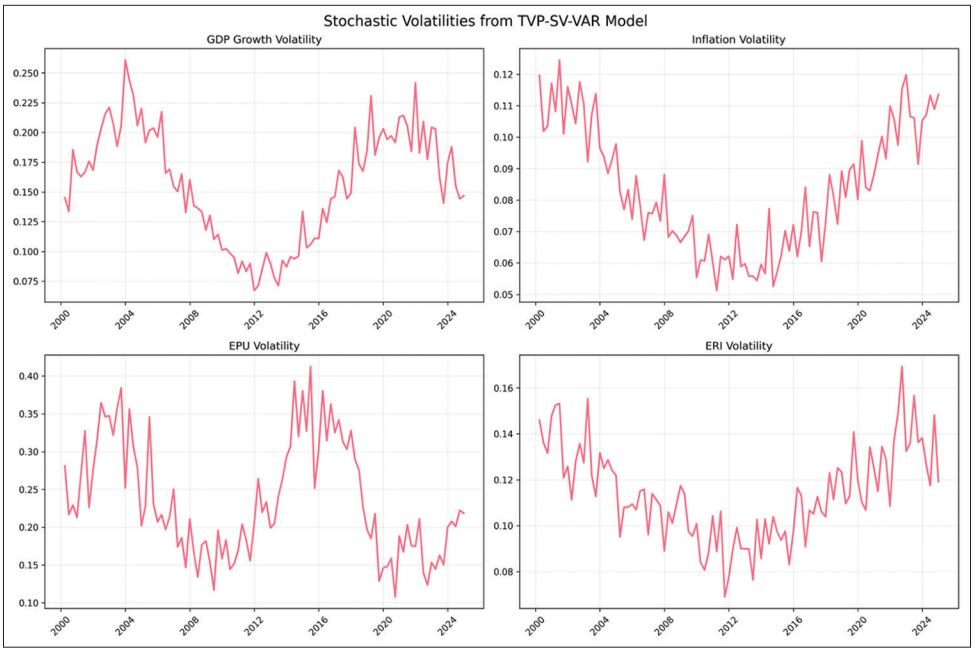
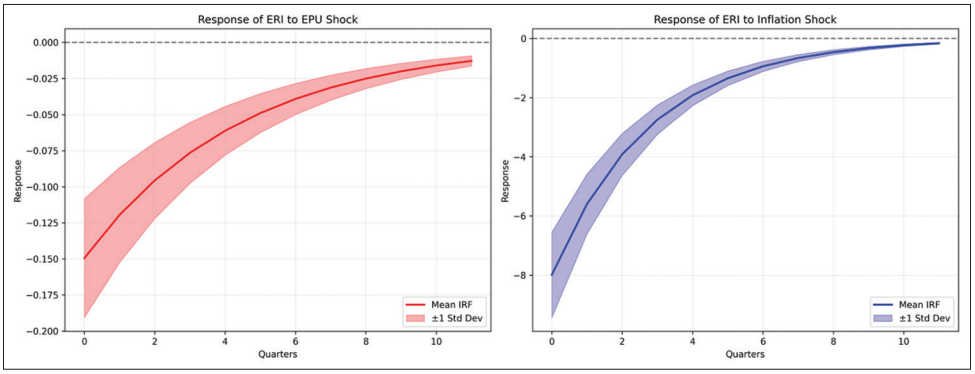


Figure 3: Average ımpulse response functions



GDP growth volatility indeed shows the most dramatic spikes during crisis periods, reflecting its high sensitivity to external shocks. During crisis periods, the volatility of the Economic Resilience Index also rises, indicating that the shock-absorption capacity of the economy becomes highly uncertain under stress.

Interestingly, the volatility of EPU exhibits a very different pattern-one in which high values tend to persist for much longer periods of time rather than being marked by sharp spikes. This pattern is consistent with the view that policy uncertainty tends to build up gradually and persist for extended periods, rather than exhibiting the sharp reversals characteristic of financial market volatility.

Inflation volatility exhibits moderate rises during crisis periods, although overall, it remains relatively stable compared with the other variables. This may reflect the effectiveness of inflation targeting frameworks in anchoring expectations and reducing inflation volatility, even during periods of economic stress.

4.4. Impulse Response Analysis

We calculate time-varying impulse response functions to deepen our understanding of the dynamic interactions between the variables. Figure 3 displays the average impulse responses over the sample period along with confidence bands that account for both parameter and stochastic volatility uncertainty.

The left panel shows the response of the Economic Resilience Index to a one-standard-deviation shock to EPU. The response is immediately negative and reaches its trough after approximately 4-6 quarters. The magnitude of the response is economically significant, with a one-standard-deviation increase in EPU leading to a decline of approximately 1.5 points in the resilience index at the peak impact. Perhaps most striking is the persistence of the response: the effects indeed wear off completely only after about 8 to 10 quarters. This persistence suggests that policy uncertainty shocks may exert long-lasting effects on economic resilience, possibly reflecting the time it takes for rebuilding confidence and restoring normal economic relations after periods of heightened uncertainty.

The right panel presents the response of the Economic Resilience Index to a one-standard-deviation inflation shock. This response is also immediately negative but with a somewhat distinct dynamic pattern. The peak impact occurs earlier-after 2-3 quarters-and it is larger in magnitude than the EPU response, with a drop of about 2.0 points in the resilience index. The inflation response also displays less persistence than the EPU response, with effects largely dissipating after 6-8 quarters. This pattern may partly reflect the more direct and immediate impact of inflation on economic conditions as well as the fact that monetary policy can relatively quickly respond to inflation shocks.

Table 2: Time-varying ımpulse response magnitudes (peak ımpact)

Period	EPU→ERI	INF→ERI
2000-2004	−1.2	−1.8
2005-2009	−1.8	−2.4
2010-2014	−1.6	−2.1
2015-2019	−1.9	−1.9
2020-2024	−1.4	−1.6

4.5. Time-Varying Impulse Responses

One of the significant benefits of the TVP-SV-VAR framework is that it allows for the estimation of time-varying impulse response functions. This enables an examination of how the transmission of shocks has evolved over time, providing insight into structural changes in the economy.

Table 2 summarizes the peak impact of EPU and inflation shocks to economic resilience across different sub-periods. Several patterns emerge from this analysis. First, the impact of both types of shocks has varied considerably over time, confirming the importance of allowing for time-varying parameters.

It would appear that the impact of EPU shocks was largest during the periods 2005-2009 and 2015-2019, possibly reflecting the build-up to the global financial crisis and the subsequent period of heightened global policy uncertainty. In the recent period, 2020-2024, there is some moderation in its impact, though it remains substantial.

Inflation shocks had the most significant impact during the period 2005-2009, which coincided with the period of global commodity price volatility and challenges to monetary policy credibility. More recently, there is a marked decline in the impact of inflation shocks, possibly reflecting improvements in monetary policy frameworks and anchoring of inflation expectations.

4.6. Variance Decomposition Analysis

In order to understand the relative importance of different shocks in explaining the variation in economic resilience, we compute time-varying forecast error variance decompositions. The results for selected time horizons are given in Table 3 below.

Results from variance decomposition indicate that the shocks to economic resilience itself are responsible for the lion's share of variation at all horizons, something rather typical for VAR models. However, with longer horizons, the contribution of other variables increases substantially, highlighting the importance of macroeconomic conditions for long-term resilience. At the 12-quarter horizon, inflation shocks contribute to about 21% of the variation in economic resilience, making it the most significant external factor. The contribution of EPU shocks is about 17%, while that of GDP growth shocks is around 20%. These results indicate that all three macroeconomic variables play an important role in the determination of economic resilience, although inflation appears to be slightly more important than policy uncertainty.

This growing importance of external shocks at longer horizons is consistent with the view that economic resilience depends on the cumulative effects of the state of the macroeconomy over time. Although idiosyncratic factors may dominate shorter-term changes in resilience, longer-term trends in resilience are more strongly connected with fundamental macroeconomic developments.

5. DISCUSSION AND POLICY IMPLICATIONS

5.1. Economic Interpretation of Results

Our empirical results strongly support the hypothesis that both inflation and economic policy uncertainty exert adverse impacts on economic resilience in emerging markets. This assertion is verified by the respective coefficients of the variables being negative across the entire sample period, implying that these conditions affecting the macroeconomic environment weaken an economy's resistance to and resilience from shocks.

These time-varying relationships provide an important illustration of the evolving structure of emerging market economies. The clear evidence that the negative effects of both inflation and EPU were greater in the mid-2000s than in other periods suggests this was a period of higher vulnerability to macroeconomic instability. This pattern is coincident with the global financial crisis build-up period, characterized by many emerging markets exhibiting credit growth rates, asset price bubbles, and rapidly increasing external imbalances.

The subsequent moderation in these effects in the post-crisis period may reflect several factors. First, there have been major policy reforms in most emerging market economies since the crisis, including strengthening monetary policy frameworks, improving financial regulation, and building policy buffers. Second, the crisis experience can create learning effects, raising policymakers' and market participants' awareness of risks associated with instability in the macroeconomy.

Table 3: Variance decomposition of economic resilience index (%)

Horizon	Own Shock	GDP Growth	Inflation	EPU
1 Quarter	85.2	8.1	3.4	3.3
4 Quarters	62.4	15.7	12.8	9.1
8 Quarters	48.9	18.3	18.2	14.6
12 Quarters	42.1	19.8	21.4	16.7

What is especially noteworthy is the recent increase in sensitivity to EPU shocks in the 2015-2019 period, because this coincides with a period of heightened global policy uncertainty associated with trade tensions, political developments in major economies, and concerns about the sustainability of global growth. This pattern suggests that emerging markets remain vulnerable to external sources of policy uncertainty, even when domestic policy frameworks have been strengthened.

5.2. Comparison with Existing Literature

Our findings are broadly in line with the extant literature on the economic consequences of inflation and policy uncertainty but extend current knowledge with regard to their time-varying nature and joint effects on economic resilience.

To the best of our knowledge, inflation has consistently been shown to exert a negative impact on economic performance, beginning from the seminal works of Fischer (1993) and Barro (1995). Our results confirm these findings in the specific context of economic resilience and extend them by showing that the magnitude of these effects varies significantly over time. The finding that the effects of inflation were largest during the period from 2005 to 2009 supports studies that have documented the particular vulnerability of emerging markets to commodity price shocks and external financial conditions during this period.

The findings regarding policy uncertainty are in line with, and add to, the literature that emerged from the seminal work of Baker et al. (2016) and was extended by many subsequent contributions. As real options models predict, and in line with firm-level evidence, we find that EPU has negative effects on economic activity that persist over time. We contribute to existing literature by highlighting how these effects change over time and by linking them explicitly with the notion of economic resilience.

The time-varying nature of our findings corroborates recent contributions that stress the importance of accounting for structural breaks and instability in the parameters of macroeconomic relationships. Other studies, such as Caggiano et al. (2014) and Nodari (2014), demonstrate that the state of the economy can interact with uncertainty shocks in ways consistent with our findings of time-varying coefficients.

5.3. Policy Implications

These findings have a number of important implications for policymakers in emerging market economies looking to increase economic resilience.

5.3.1. Monetary policy framework

The negative impact of inflation on economic resilience, which is consistently observed, implies that price stability should be a key

objective. The time-varying relationship suggests that the costs of inflation may be extremely high during periods of structural change and emphasizes proactive monetary policy to prevent inflation from being entrenched.

The broad diffusion of inflation targeting regimes in the emerging world provides a template for building credible monetary policy frameworks. The key elements include clear communication of policy objectives, transparent decision-making processes, and consistent policy actions reinforcing credibility over time. Our results suggest that such efforts to anchor inflation expectations can pay dividends beyond price stability in terms of overall economic resilience.

5.3.2. Policy communication and transparency

Given the great significance of policy uncertainty for economic resilience, clarity and consistency in policy communication are very important. For that reason, policymakers should make every effort to clearly communicate the intentions of policies, avoiding unnecessary changes in policy that could heighten uncertainty. Such policy uncertainty could be reduced by the creation of strong institutional frameworks which provide continuity across different political cycles. This would involve enhancing independence for key institutions, such as central banks and regulatory agencies, together with developing robust processes for policymaking that are less prone to political interference.

5.3.3. Building policy buffers

Time-variation in our results indicates that the economy's vulnerability to inflation and policy uncertainty shocks shifts over time. During such heightened vulnerability, it becomes all the more important to maintain adequate policy buffers which could then be utilized in response to the shocks.

For monetary policy, this means maintaining policy space sufficient to respond to economic downturns without compromising price stability objectives. For fiscal policy, it means building fiscal space in good times that can be drawn upon to implement counter-cyclical policy during downturns. For external sector policy, this includes maintaining adequate foreign exchange reserves and avoiding excessive external imbalances.

5.3.4. Structural reforms

While our analysis focuses on cyclical factors, the broader literature on economic resilience emphasizes the importance of structural factors such as economic diversification, financial sector development, and institutional quality. Our findings suggest that these structural reforms may be particularly important during periods when the economy is more vulnerable to macroeconomic instability.

Efforts to diversify the economic structure can reduce vulnerability to sector-specific shocks, while financial sector development can improve the transmission of monetary policy and provide alternative sources of financing during stress periods. Institutional reforms can enhance policy credibility and reduce the likelihood of policy reversals that contribute to uncertainty.

6. CONCLUSION

This study has investigated the dynamic and time-varying relationships between inflation, economic policy uncertainty, and economic resilience in emerging markets using the Time-Varying Parameter Stochastic Volatility Vector Autoregression model. Our analysis provides several key insights that contribute to the academic literature and policy discussions on economic resilience.

First, strong evidence was found that both inflation and economic policy uncertainty have consistently negative impacts on economic resilience. These effects are statistically significant but also economically meaningful; one-standard-deviation shocks to each of these variables lead to substantial declines in the resilience index. This confirms theoretical predictions about the adverse effects of macroeconomic instability on the shock-absorption capacity of an economy.

Second, our findings indicate that these relationships are not fixed over time but, instead, vary significantly across different time frames and throughout economic cycles. These negative effects of both inflation and policy uncertainty became most pronounced around the mid-2000s, during the build-up to the global financial crisis. The time variation indicates that the economy's vulnerability to these shocks depends on structural and other underlying economic conditions.

Third, the stochastic volatility estimates indicate that all variables in our system possess significant time-varying volatility, with distinct episodes of higher uncertainty during crisis periods. This finding supports the importance of accounting for heteroskedasticity in macroeconomic modeling and also points to the time-varying nature of the relationships between macroeconomic variables in emerging markets.

Fourth, impulse response analysis shows that both inflation and policy uncertainty shocks are persistent in affecting economic resilience, lasting 6-10 quarters. Persistence here indicates that the costs of macroeconomic instability extend beyond the immediate period of impact, making a case for preventive policies to avoid such episodes.

These results hold great significance for policymakers in emerging market economies. In general, they stress the importance of price stability and reduced policy uncertainty to nurture economic resilience. The time-varying nature of these relationships also implies that policy responses should be adaptive and context-specific, taking into account prevailing economic conditions and the evolving nature of transmission mechanisms.

Our analysis contributes to the burgeoning literature on economic resilience by providing a consistent empirical framework for analyzing its determinants at the macro level. In fact, the TVP-SV-VAR methodology proves to be an effective tool in grasping complex and evolving relationships typical of emerging market economies.

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