

# ***Measuring Political Risk in the Stock Market : An Empirical Study of Economic Policy Uncertainty and the Volatility Index***

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**Abstract.** This paper investigates how Economic Policy Uncertainty (EPU) and the Volatility Index (VIX) in financial markets relate in both the long and short term. After examining the stability, causality, and long-term equilibrium between these two variables, a vector error correction model is constructed to quantify their dynamics. Impulse-response functions indicate that a positive shock to VIX initially has a muted impact on EPU, but the effect strengthens over time and eventually stabilizes, and variance-decomposition analysis suggests that shocks of VIX attributes to the forecast-error variance in EPU to some extent after several periods. As for robustness check, VIX is supplanted by Geopolitical Risk (GPR), and the results corroborate previous findings: the cointegrating relationship persists, and the VECM again produces significant error-correction coefficients. The findings contribute to understand how economic policy uncertainty influences market dynamics, and also provides practical insights for policymakers and investors to better handle risks linked to policy uncertainty.

**Keywords:** economic policy uncertainty, volatility index, co-integration, market volatility

## **1. Introduction**

In recent years, the impact of political uncertainty on financial markets has garnered significant attention from both academics and practitioners. Extensive research has demonstrated that political uncertainty not only affects stock prices but also has profound implications for market volatility, investment decisions, and firm value. This literature review synthesizes key findings from relevant studies to explore the multifaceted effects of political uncertainty on financial markets.

Scott R. Baker, Nicholas Bloom, Steven J. Davis and Kyle Kost [1] construct Equity Market Volatility(EMV) trackers to measure the drivers of stock market volatility based on 11 major U.S. newspapers, which reveal that the impact of policy on stock market volatility has been upward over time. Monetary policy, tax policy and regulation play critical roles in stock market volatility, while specific policy to stock market volatility fluctuates remarkably over time. Scott R. Baker et al. [2] investigate economic policy uncertainty in 23 countries, and the average EPU rises significantly with national election approaching. For those highly polarized government, policy uncertainty appears to be extremely high and volatile. To be more specific, Kam Fong Chan and Philip Gray [3] note that the political uncertainty arises sharply during the Presidential honeymoon period (the first 100 calendar days in their inaugural year), which has a significant impact on profitability,

investment and value anomalies in financial market indirectly. However, Scott R. Baker et al. [4] find out that stock market jumps tend to be more positive than negative triggered by policy. Compared with non-policy events, policy effectively reduce the future stock-volatility.

Dai et al. [5] conclude the impact of political uncertainty in terms of asset prices - the empirical evidence generally shows a negative effect of political uncertainty on stock prices, and conversely a positive effect on stock return volatility and correlations. In other financial markets such as equities and bonds, political uncertainty has pricing implications, especially in important political moments. Huiqiang Wang et al. [6] take the 1995-1996 Taiwan Strait Crisis as a example to examine the impact of political uncertainty on financial markets. By using natural experiment and counterfactual model, the research put up their findings that the actual stock market performance underperformed its benchmark due to political uncertainty. Similarly, Jonathan Brogaard et al. [7] use the U.S. federal elections as the proxy for global political uncertainty to study how global political uncertainty effect the asset prices. Before the election, equity returns in non-U.S. markets fall while sovereign bond returns rise, and the market price for risk rises in response to elections. Concluded from cross-sectional analysis, the U.S. election effect on non-U.S. equity markets increases with the exposure to global investors from a country or firm.

Employing a VAR model, Gregory [8] examines the bi-directional causal linkage between the U.S. market risk premium and a political uncertainty index. The research results show that political uncertainty will have a mild and lagged positive impact on market risk premiums, while conversely, risk premiums will have a larger and more lasting negative effect on political uncertainty. The study also found that market risk premium has become a crucial determinant of political uncertainty, forcing policy makers to consider the stock market situation when making decisions.

To measure the political uncertainty at firm-level, Rui Fan, Oleksandr Talavera and Vu Tran [9] analyse millions tweets relevant with both S&P 500 firms and Trump. Before Trump's Inauguration in 2017, the greater disagreement among such tweets, the higher stock price volatility and trading volume. To mitigate the impact of political uncertainty, the research of Laura A. Wellman [10] identified a crucial strategy: maintaining contact with legislators to continuously obtain political information throughout the legislative process. On average, companies with political connections invest significantly less than those without connections, regardless of whether the uncertainty during this period is low or high.

Although existing literature has made significant progress in exploring how political uncertainty affects financial markets, gaps still exist. On the one hand, most studies have focused on short-term fluctuations and the impact of specific events, and there is still a lack of empirical work that truly explores the long-term equilibrium relationship between EPU and VIX. It becomes particularly important to understand how policy uncertainty continues to affect market dynamics, especially at different stages of the economic cycle. On the other hand, when examining the causal relationship between these two factors, existing research has not delved deep enough into their dynamic adjustment process, which makes it difficult for policy makers and investors to accurately assess the long-term impact of policy uncertainty on market volatility. Another issue is that many studies only focus on individual countries or regions, lacking a global perspective to systematically compare and analyze this relationship.

In order to fill these gaps, this article aims to enrich the existing literature through empirical analysis. In terms of specific operation, it is to use the vector error correction model to take a good look at the long-term equilibrium relationship between EPU and VIX, and how they are dynamically adjusted. In addition, Granger causality test and impulse response analysis were also included to dig deeper into the causal chain and economic intuition behind EPU and VIX. This study not only

advances the understanding of the relationship between economic policy uncertainty and market volatility, but also provides policymakers and investors with a broader perspective on risk management.

## **2. Data**

As two core factors reflecting financial market volatility, this paper selects Economic Policy Uncertainty (EPU) and the Volatility Index (VIX) as the primary explanatory variables. The data series for both are sourced from Yahoo Finance, with EPU covering monthly data from January 1985 to December 2024 and VIX spanning monthly data from February 1990 to May 2023.

### **2.1. Data processing**

Due to the potential presence of some extreme data in the monthly data from 1990 to 2023, this paper processed the original data using the IQR (Interquartile Range) method. After obtaining the first quartile (Q1, the value at the 25% position) and the third quartile (Q3, the value at the 75% position), calculate the interquartile range (IQR, which is Q3 minus Q1), then use this IQR to determine the range of outliers. According to standard practice, any EPU and VIX data points below  $Q1 - 1.5IQR$  or above  $Q3 + 1.5IQR$  will be considered outliers and excluded in subsequent regressions.

### **2.2. EPU(economic policy uncertainty)**

EPU is essentially an indicator used to quantify the degree of economic policy uncertainty. The reason why it is crucial in the field of economics is mainly reflected in the following three aspects:

#### **2.2.1. Policy impact on business and investment decisions**

EPU reflects the unpredictability of government policies, regulatory changes, and fiscal interventions. This uncertainty often significantly hinders a company's investment decisions, resulting in significant investments being postponed. And investment is the core driving force of productivity and economic expansion, so this hesitation and wait-and-see attitude will further affect the entire economic growth.

#### **2.2.2. Market sentiment and consumer behavior**

EPU can affect market sentiment and consumer behavior. When economic policies are unclear, ordinary people tend to be more cautious and cautious when spending money, which can slow down economic sectors that rely on consumption. Moreover, a high EPU will also increase the perceived risk in the market, manifested as an increase in risk premium and intensified asset price volatility.

#### **2.2.3. Macroeconomic stability**

From a macro perspective, EPU will also affect the actual effects of monetary and fiscal policies. When the effectiveness of policies is highly uncertain, it becomes particularly difficult for central banks and governments to implement policies. Once businesses and consumers are uncertain about the direction of future policies and have doubts, their response to interest rate cuts or fiscal stimulus

may not be as expected. In this way, in order to stabilize the economy and manage inflation during the economic downturn, much more effort will be needed than usual.



Figure 1. Time trend line chart of EPU from Jan. 1985 to Dec. 2024

### 2.3. Volatility Index (VIX)

The Volatility Index (VIX) is calculated based on the pricing data of S&P 500 options, mainly used to reflect the degree of expected volatility in the market for the next month. It is a key indicator for measuring short-term market sentiment and risk judgment. It can tell us very well at what level the risk assessment of current market participants is and what their emotional tendencies are.

#### 2.3.1. Market sentiment and investor fear

As a gauge of investor sentiment, the VIX reflects shifting attitudes towards risk. Circumstances will bring an upward trend of VIX, which typically corresponds with escalating market unease, for example, adverse economic developments, international political friction, or financial system disruptions. On the flip side, a downward trajectory implies a more optimistic investor outlook and a reduced perception of market hazards.

#### 2.3.2. Risk management and hedging

VIX is mainly used by investors and financial institutions for risk management and hedging. As an indicator for measuring market volatility, it can provide more predictive guidance for portfolio reallocation. When VIX is high, people usually rely on such safe haven assets as treasury bond and gold to prevent the market from falling sharply; Conversely, when VIX is at a low level, funds tend to flow towards higher risk assets such as stocks or high-yield bonds.

#### 2.3.3. Predictive value for economic conditions

VIX can also serve as a warning signal for economic conditions. If VIX continues to rise, it often means that investors have foreseen that the economy may slow down or even experience a recession.

In addition, VIX can also affect the pricing of financial derivatives and other investment products, as it reflects the market's expectations of future volatility.

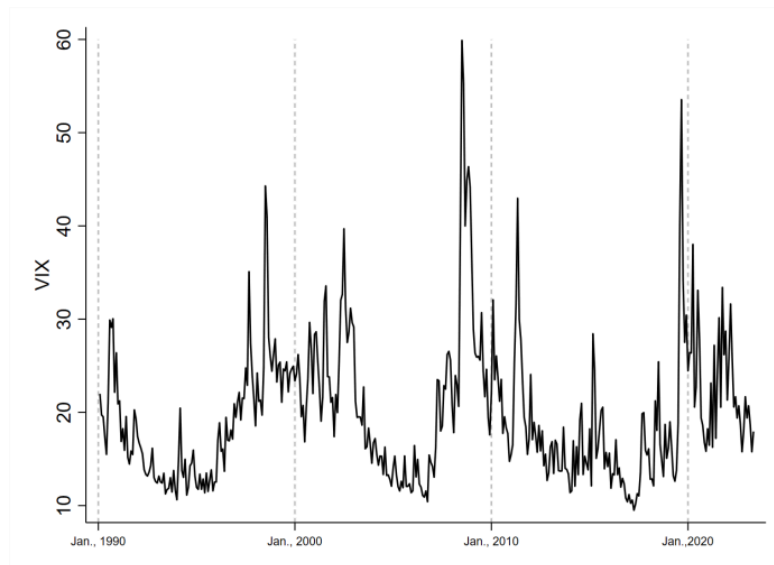


Figure 2. Time trend line chart of VIX from Feb. 1990 to May. 2023

## 2.4. Con-movement

Since the starting and ending times of the EPU and VIX data are different, the analysis is conducted over the period during which both datasets exist, namely from February 1990 to May 2023. And for the robustness and normality of the data regression, the outlier data obtained by applying the IQR method have been removed.

There is a significant common trend between EPU and VIX, the most obvious part of which is: 1997-1999 (Russian Crisis), 2002(911), 2008-2012(subprime mortgage crisis, eurozone crises and U.S. midterm election), 2019-2020 (trade war between China and U.S.& COVID-19).

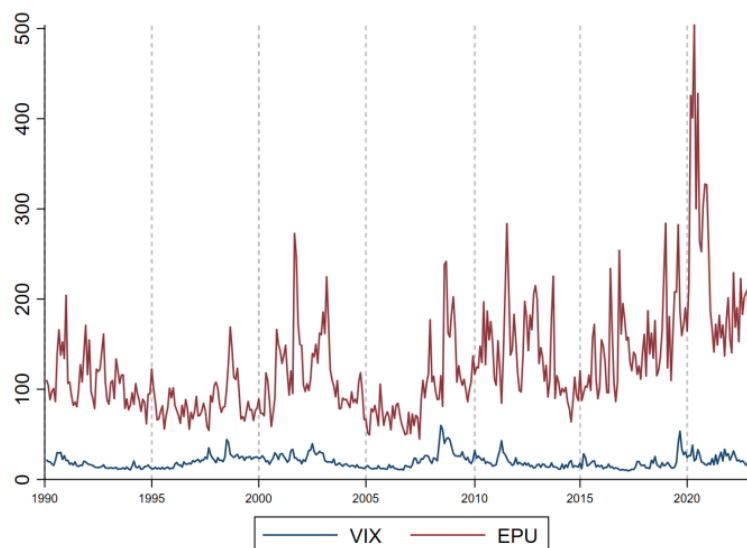


Figure 3. Combined time trend line chart of EPU and VIX from Feb. 1990 to May. 2023

### 3. Empirical analysis

#### 3.1. Descriptive analysis

Table 1 presents the descriptive statistics of the research variables, spanning from February 1990 to May 2023, with 480 observations for EPU and 400 observations for VIX.

The lowest value of the Economic Policy Uncertainty Index is 44.78, and the highest value reaches 503.96, with a mean of 123.96 and a standard deviation of 56.89. It can be seen that the data span is large and the fluctuations are quite intense.

Looking at the volatility index again, based on 400 observations, the mean is 19.72 and the standard deviation is 7.53, which is relatively stable overall, but there are also some fluctuations. The minimum value of VIX is 9.51, and the maximum value is 59.89. Compared with EPU, the trend of change is significantly smoother.

These descriptive statistics provide a foundation for understanding the basic characteristics of the entire dataset, and are also necessary for further analysis and interpretation of research results.

Table 1. Descriptive statistics

|                       | (1) | (2)    | (3)      | (4)   | (5)    |
|-----------------------|-----|--------|----------|-------|--------|
| VARIABLES             | N   | mean   | sd       | min   | max    |
| Number(time variable) | 480 | 240.5  | 138.7083 | 1     | 480    |
| EPU                   | 480 | 123.96 | 56.89    | 44.78 | 503.96 |
| VIX                   | 400 | 19.72  | 7.53     | 9.51  | 59.89  |

#### 3.2. Stability

In order to test the stationarity of the EPU and VIX sequences, this paper used ADF test and judged the results according to the AIC criterion. Based on the preliminary results presented in Table 2, EPU is non-stationary (p-value of 0.0580), while VIX is stationary with a p-value of 0.0029.

Table 2. ADF test results

|     | lags | t      | p      | critical value(5%) | stability |
|-----|------|--------|--------|--------------------|-----------|
| EPU | 17   | -3.353 | 0.0580 | -3.425             | unstable  |
| VIX | 4    | -4.320 | 0.0029 | -3.424             | stable    |

After the EPU is first-differenced (D.EPU), as depicted in Table 3, the results of the EPU becomes stable. This transformation is crucial for subsequent cointegration analysis, as only stable series can be effectively analyzed for long-term relationships.

Table 3. ADF test results (EPU first-differenced)

|       | lags | t      | p      | critical value(5%) | stability |
|-------|------|--------|--------|--------------------|-----------|
| D.EPU | 16   | -6.119 | 0.0000 | -3.425             | stable    |

### 3.3. Co-relationship

#### 3.3.1. Granger causality test

To explore whether these two indices interplay each other, Granger causality test is employed. This approach is especially valuable in time series analysis for identifying predictive relationships between variables. Specifically, in this cases, it assesses whether historical EPU data informs current VIX values, beyond the VIX's own historical data, and vice versa. For testing whether EPU Granger-causes VIX, assume the equation:

$$VIX_t = \alpha_0 + \sum_{i=1}^k \alpha_i VIX_{t-i} + \sum_{j=1}^k \beta_j EPU_{t-j} + \varepsilon_t$$

where  $VIX_t$  and  $EPU_t$  are the values of VIX and EPU at time  $t$  respectively, and  $k$  is the number of lags included in the model, with the null hypothesis that EPU does not Granger-cause VIX.

The results as shown in Table 4 suggests to reject the null hypothesis that past values of VIX do not Granger-cause EPU, which indicates that past values of VIX contain information that helps predict future values of EPU. This suggests that market volatility might serve as an early indicator of changes in economic policy uncertainty.

Table 4. Granger causality test results

| Test       | F(3,390) | Prob>F | Obs | R-squared |
|------------|----------|--------|-----|-----------|
| VIX -> EPU | 4.17     | 0.0063 | 397 | 0.6260    |

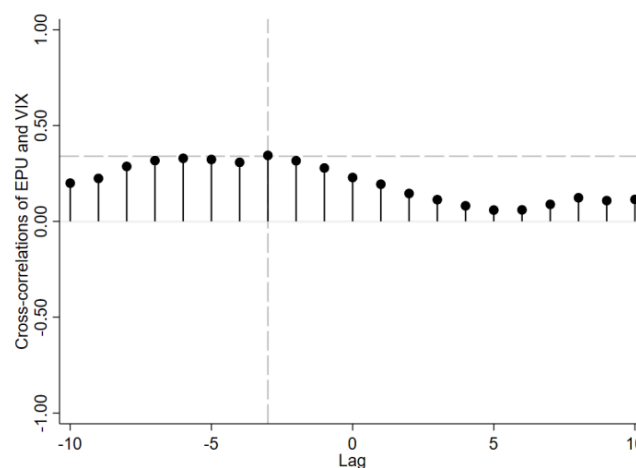


Figure 4. Cross-correlogram of EPU and VIX

The cross-correlogram indicates that VIX tends to precede EPU by approximately three months. This suggests that shifts in market volatility, as measured by the VIX, may occur before changes in economic policy uncertainty (EPU). The potential for using VIX as an early indicator of shifts in economic policy uncertainty appears to be significant, which could be valuable for policymakers and investors alike.

### 3.3.2. Pearson correlation coefficient

As VIX may influence EPU to some degree, Table 5 presents the Pearson Correlation Coefficient Results. The correlation coefficient between EPU and VIX is 0.2289, indicating a positive but weak linear relationship.

Table 5. Pearson correlation coefficient results

| Variables | Pearson Correlation | P-value |
|-----------|---------------------|---------|
| EPU       | 1.0000              |         |
| VIX       | 0.2289              | 0.0000  |

### 3.3.3. E-G test

The Pearson correlation coefficient test highlights the potential of using VIX as an early indicator of shifts in economic policy uncertainty. Table 6 shows the results of the E-G test, which is used to determine if there is a cointegration relationship between EPU and VIX. Assumed the null hypothesis (H0) is that VIX does not Granger-cause EPU, the test result rejects the null hypothesis, concluding that VIX does Granger-cause EPU.

Table 6. E-G test results

| H0                             | F    | P      | Conclusion                 |
|--------------------------------|------|--------|----------------------------|
| VIX does not Granger-cause EPU | 4.81 | 0.0009 | VIX does Granger-cause EPU |

From these findings, dynamic relationship between EPU and VIX is primarily explored, which lay a foundation to construct the Vector Error Correction Model (VECM) to better predict and manage the risks associated with economic policy uncertainty.

### 3.4. VECM

Based on the cointegration relationship established between EPU and VIX, the VECM model is employed to analyze the short-term dynamics and long-term equilibrium relationship of them, which is particularly useful when dealing with cointegrated time series, as it allows for the simultaneous examination of both short-term adjustments and long-term equilibrium relationships. The results presented in Table 7 provide a comparison of various information criteria for different lag results. Considering that the model is not overly complex while still captures the necessary dynamics between the two indexes, the optimal lag of the VECM is 1.

Table 7. Information criteria for different lag lengths

| Lag | LL       | LR     | FPE     | AIC     | HQIC     | SBIC     |
|-----|----------|--------|---------|---------|----------|----------|
| 0   | -3404.83 |        | 210012  | 17.9307 | 17.9389  | 17.9514  |
| 1   | -3031.61 | 746.43 | 30082.1 | 15.9874 | 16.0121  | 16.0497* |
| 2   | -3021.85 | 19.524 | 29183.5 | 15.9571 | 15.9983* | 16.0608  |
| 3   | -3019.43 | 4.8364 | 29427.7 | 15.9654 | 16.023   | 16.1106  |
| 4   | -3008.87 | 21.133 | 28428.3 | 15.9309 | 16.0049  | 16.1175  |

Table 7. (continued)

|   |          |        |         |         |         |         |
|---|----------|--------|---------|---------|---------|---------|
| 5 | -3005.04 | 7.6516 | 28454.7 | 15.9318 | 16.0223 | 16.1599 |
|---|----------|--------|---------|---------|---------|---------|

After determining the optimal lag length to be one through the application of various information criteria as detailed in Table 7, we proceeded to perform the Johansen co-integration test to determine the number of co-integrating relationships. If a co-integrating relationship exists, we proceed with the VECM. The co-integration equation derived from the test is:

$$EPU_t = -0.8358VIX_t - 0.01481$$

where  $EPU_t$  and  $VIX_t$  separately represent the data of the two indices monthly. This equation suggests that there is a stable relationship between EPU and VIX, where an increase in VIX is associated with a decrease in EPU. The negative coefficient of VIX (-0.8358) indicates that as VIX increases, EPU tends to decrease, and vice versa. The constant term in the equation (-0.01481) provides the intercept of the cointegration relationship.

$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$  The VECM is specified as follows:

where  $\Pi$  is the cointegration matrix which captures the long-term equilibrium relationship,  $\Gamma_i$  are matrices of short-term adjustment coefficients, and p is the number of lags in the underlying VAR model.

Then the VECM model is constructed as shown in the table 8 :

Table 8. VECM regress

|              | (1)                   | (2)                   |
|--------------|-----------------------|-----------------------|
| VARIABLES    | D_epu                 | D_vix                 |
| L._cel       | -0.200***<br>(0.0275) | 0.0975***<br>(0.0270) |
| Constant     | 0.000226<br>(0.0315)  | 0.000465<br>(0.0309)  |
| Observations | 399                   | 399                   |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

where  $cel_{t-1}$  represents the error correction term (ECT) of the previous period (t-1). The coefficients of the lagged differences in these variables reflect short-term fluctuations. In the equation of EPU, the coefficient of the error correction term is negative (-0.200), which means that once EPU deviates from the long-term equilibrium with VIX, it tends to move downwards and pull this deviation back. Conversely, the positive coefficient (0.0975) in the VIX equation indicates that VIX tends to self correct when deviating from equilibrium. Although both EPU and VIX have their own fluctuations in the short term, the main logic driving their changes is still towards the long-term equilibrium determined by their cointegration relationship. This is very useful for policy makers and investors, as they can make more reliable decisions based on the dynamic changes between these economic indicators.

### 3.5. Unit root test

Figure 4 uses unit circle to assess the stability of the constructed VECM model. For a model to be stable, all the inverse roots of the characteristic equation should lie inside the unit circle, indicating their modulus is greater than 1. Since both roots in the plot are outside the unit circle, the VECM model has stability that will respond to shocks but will eventually return to its long-run equilibrium. The stability test passed.

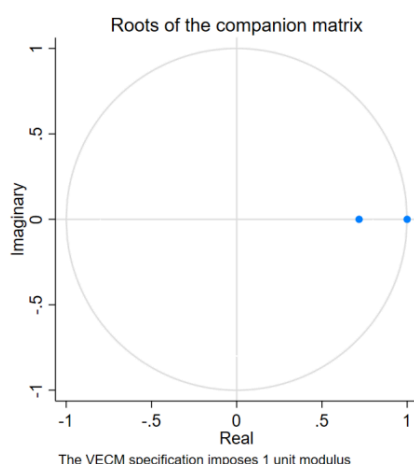


Figure 5. Inverse roots of AR characteristic polynomial

### 3.6. Impulse response

Next, use the Impulse Response Function (IRF) graph to illustrate the dynamic response of the EPU to a shock in VIX. The Y-axis shows the magnitude of the response variable's change ranging from 0 to 0.04, and X-axis is labeled as 'Step', representing the time horizons of the shock. The curve starts at time step 0, showing an increasing response of the dependent variable over time to the shock.

At the initial stage, the response variable's reaction to the shock in VIX is close to zero, which suggests that the EPU is not very responsive to changes in VIX. Over time, the magnitude of the response variable's increase becomes more pronounced, indicating that the EPU's reaction to the VIX shock intensifies after some time has passed. In the long run, the response variable reaches its maximum value, indicating a significant positive impact of VIX shocks on EPU in the long run.

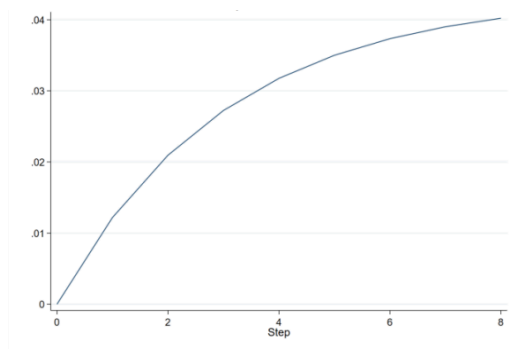


Figure 6. Impulse response function of EPU to VIX

From the impulse response diagram, a positive effect was observed: VIX has a positive effect on EPU, and this effect continues to strengthen over time. The market's response to volatility is becoming increasingly strong, as can be seen from the changes in EPU itself. This result actually tells us that market participants need some time to adjust their expectations and behaviors in the face of rising uncertainty. At the beginning, people may be cautious, which may be what they mean, but as the impacts of uncertainty become clearer, the reactions will also amplify. For policy makers, it may be necessary to pay more attention to market fluctuations when considering relevant economic and political policies in the future.

### 3.7. Variance decomposition

Figure 7 shows how the forecast error variance of EPU is decomposed into parts that are due to shocks in VIX over time. The X-axis denotes the time periods of the shock, while the Y-axis indicates the proportion of the forecast error variance of the response variable attributable to shocks in the impulse variable.

At the beginning, the variance change in EPU caused by VIX was almost zero. This also means that when market volatility is first impacted, its impact on EPU can be basically ignored. As time slowly passed, the curve began to rise, and the effect of VIX on EPU gradually strengthened. At the end, the curve fell around 0.1. In other words, about 10% of the variance in economic policy uncertainty can be explained by the impact of VIX.

The impact of VIX on EPU is gradually amplified step by step. The underlying meaning behind this is that panic in the market will continue to spread for a considerable period of time, making the role of VIX in economic policy uncertainty increasingly important. It is necessary for investors to keep this number in their minds. A significant portion of the variance in EPU is driven by VIX. Knowing this, risk assessment and portfolio management can be done better during periods of intense market volatility.

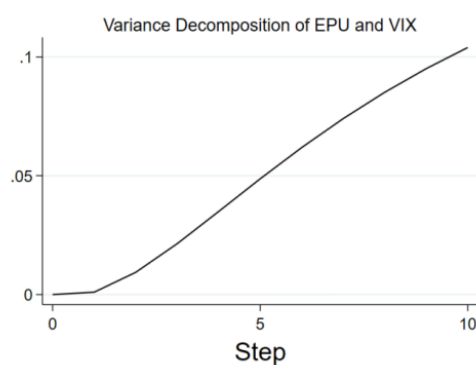


Figure 7. Variance decomposition of EPU and VIX

### 4. Robustness check

To verify the reliability and consistency of the relationship of EPU and VIX, this research uses the Geopolitical Risk (GPR) index as an alternative to the Volatility Index (VIX) for robustness checks, which provides a broader measure of uncertainty that encompasses not only financial market expectations but also geopolitical events. Monthly GPR data from February 1990 to May 2023 is used for the accommodation of EPU range.

#### 4.1. Stability

After determining the lag order of GPR (lags=3) through information criteria, ADF test was conducted with a result of t-value (-0.624) less than the critical value(-2.874) , hence GPR is stationary.

Table 9. ADF test results

|     | lags | t      | p     | critical value(5%) | stability |
|-----|------|--------|-------|--------------------|-----------|
| GPR | 3    | -6.204 | 0.000 | -2.874             | stable    |

#### 4.2. Co-relationship

According to the information criterion, the optimal lag order between EPU and GPR is 2 or 5. Taking these two lag orders into Granger causality test separately, p-value is much larger than the significance level of 0.05, so there is no Granger causality between them.

Then Johansen test is shown in the table 10 for co-integration, and the trace statistics is larger than their critical values, which reject the null hypothesis: there is no co-integration between the two variables. This means that the EPU and GPR have at least one long-term equilibrium relationship, even though EPU itself is unstable. Therefore, a Vector Error Correction Model (VECM) could be considered for further analysis to examine the short-term dynamic relationships and long-term adjustment mechanisms between these two variables.

Table 10. Johansen test results

| Rank | Eigenvalue | Trace Statistic | Critical Value(5%) |
|------|------------|-----------------|--------------------|
| 0    |            | 95.6098         | 15.41              |
| 1    | 0.15725    | 27.5162         | 3.76               |

#### 4.3. VECM

As there exists co-integration relationship between the EPU and GPR, the result of VECM is shown in the table 11.

Table 11. VECM regress

|              | (1)                   | (2)                     |
|--------------|-----------------------|-------------------------|
| VARIABLES    | D_EPU                 | D_GPR                   |
| L._cel       | -0.00235<br>(0.00383) | -0.0282***<br>(0.00331) |
| LD.EPU       | -0.296***<br>(0.0482) | 0.0325<br>(0.0416)      |
| LD.GPR       | -0.0162<br>(0.0577)   | 0.149***<br>(0.0499)    |
| Constant     | 0.292<br>(1.939)      | -0.0242<br>(1.674)      |
| Observations | 398                   | 398                     |

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

where the co-integrating relationship between these two variables is represented by the error correction term (ECT, denoted as  $\_ce1$ ), which captures the deviation from their long-term equilibrium. In the short-term dynamics, the coefficients of the lagged differences of the variables provide insights into how each variable adjusts towards equilibrium. Specifically, for  $D\_EPU$ , the coefficient of  $LD\_EPU$  is significantly negative at -0.296. This indicates that when EPU veers off its long-term equilibrium with GPR, to correct this deviation, EPU tends to decrease. Conversely, the coefficient of  $LD\_GPR$  is significantly positive at 0.149, suggesting that GPR tends to increase to correct deviations from equilibrium. The  $ECT(\_ce1)$  plays a crucial role in the adjustment process. In the  $D\_GPR$  equation, a negative coefficient of -0.0282 indicates a stronger and statistically significant adjustment towards the long-term equilibrium.

The research results tell us that both EPU and GPR variables do have fluctuations and fluctuations in the short term, but the main driving force behind their changes actually comes from the pullback towards long-term equilibrium under cointegration. Political and economic policies will be effectively impacted by external uncertainties.

In this robustness test, the volatility index (VIX) was replaced with the geopolitical risk (GPR) index. The new results obtained have confirmed the previous analysis once again. Even if the variables are replaced, the impact of market volatility on economic policy uncertainty (EPU) remains robust, and the conclusion that should hold is still valid. In this way, the relationship between market volatility and EPU is reliable and consistent - this has been confirmed by robustness tests.

## 5. Conclusion

An empirical analysis covering February 1990 to May 2023 was used in this article to explore the relationship between EPU and VIX. These two variables exhibit clear linkage characteristics in both the short and long term. The gap left by previous literature mainly lies in the lack of detailed examination of long-term equilibrium and short-term dynamics, which is filled by VECM. The interaction and synergy between them were measured using Granger causality test, Pearson correlation coefficient test, and E-G cointegration test, so that we can have a more detailed understanding of how the two affect each other. From the impulse response function and variance decomposition analysis, it can be found that the impact of VIX on EPU is gradually amplified, highlighting one thing: market volatility has a long-term effect on economic policy uncertainty that cannot be ignored.

Economic policy uncertainty is significantly affected by market fluctuations, which is confirmed by the findings of this study, and the longer the time, the more pronounced this impact becomes. VIX is widely regarded as a reliable indicator of panic, reflecting investors' expectations and emotions towards future volatility. Once geopolitical or economic policies change, VIX will be pushed up. At this point, investors often make adjustments by reallocating their portfolios and redirecting funds towards safer assets. This operation, in turn, has a substantial impact on the overall economy by influencing investment decisions and consumer spending. Take the 2008 financial crisis as an example. After the sharp rise of VIX, businesses and consumers became particularly cautious about the future economic environment, and EPU rose sharply, which in turn exacerbated economic uncertainty.

Monitoring market fluctuations is something that policy makers should focus on in order to maintain stability and investor confidence. To cultivate market confidence and encourage long-term investment, the government needs to rely on clear communication, a coherent regulatory framework, and proactive response to potential risks. For investors, it is beneficial to understand the dynamic relationship between EPU and VIX, as risk assessment and portfolio management can be done more effectively based on this.

The dynamics of economic policies and their potential impact on financial markets need to be continuously monitored - this point is emphasized in the results of this study. Investors and policy makers should remain highly vigilant about factors that may affect EPU, such as geopolitical events, legislative changes, and various macroeconomic indicators. In this way, in the face of changes in the economic and political environment, their response can be more effective, and a more resilient and stable financial system can gradually be established.

Although this study provides some insights into the relationship between EPU and VIX, there are still several shortcomings that need to be acknowledged. Firstly, monthly data is relied upon in this article, which may result in some short-term fluctuations that cannot be accurately captured like higher frequency data such as daily or weekly data. Another issue is that due to the limited availability of EPU and VIX data, the research can only be confined to the context of the United States. For future work, it may be helpful to extend the analysis to other countries or regions to assess the global impact of economic policy uncertainty on market volatility. In this way, we can gain a more comprehensive picture of how political and economic uncertainties are stirring up global financial markets. Lastly, the historical data used in this article is only up to May 2023. If updated data can be obtained in the future, such as new policy changes from the Trump administration, as well as emerging trends and events such as regional conflicts, they can be considered together.

In summary, there is a significant correlation between economic policy uncertainty and market volatility, which is emphasized in this study. The importance of considering EPU in risk management and policy decisions has been highlighted. In the future, based on these discoveries, addressing the shortcomings mentioned earlier and exploring more new dimensions in this relationship is a direction that can be further advanced.

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