Does Economic Policy Uncertainty Depress Stock Returns? Evidence from a Quantile Impulse Response Perspective

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Abstract. This paper investigates the relationship between economic policy uncertainty shocks and stock returns using a quantile impulse response approach, which can captures the asymmetric effects that conventional impulse response does not explain. We find little evidence in support of a general consensus that the economic policy uncertainty consistently depresses stock returns in different stock market conditions, and thus it could improve stock returns in bearish market condition. Our finding shed new light on the economic policy uncertainty-stock returns nexus.

Introduction

The effect of economic policy uncertainty shocks on stock returns has recently interested academic researchers and practitioners. Theoretically, the economic policy uncertainty regarding government intervention in the economy and markets affects consumption, production, economic growth and company investments, and stock prices are likely to respond significantly to changes in the economic policy uncertainty index. Thus, the general consensus is that economic policy uncertainty has a negative effect on the level of growth and investment. Major recent studies provide evidence that the increase in economic policy uncertainty is generally associated with a decline in stock returns (e.g., Dzielsinski, 2012; Pastor and Veronesi, 2012). However, the stock return reactions may differ depending on whether a market is bullish or bearish. Given that the effect of economic policy uncertainty shocks may differ according to stock market conditions, we investigate how economic policy uncertainty shocks influence stock returns by considering the effects of stock returns at upper and lower quantiles.

The aim of this paper is to study the effects of economic policy uncertainty on stock returns, focusing on whether economic policy uncertainty shocks immutably depress stock returns in various stock market conditions. The main motivation for this stems from two important but often neglected stylized facts. First, there is growing evidence that stock prices display asymmetric behavior over the stock market conditions (see, e.g., Boucher, 2007; De Meyer, 2010; Huang, 2012; Morley and Piger, 2012). Second, economic policy uncertainty appears to rise much sharply in bad than in good times. Evidence of countercyclical economic policy uncertainty with abrupt increases in recessions is documented by Bloom (2009), Orlik and Veldkamp (2014), and Jurado et al. (2015). In light of these evidences, it may very well be that economic policy uncertainty shocks have different effects on stock returns in bullish and bearish stock markets.

To achieve that, we employ a quantile vector autoregressive approach to construct impulse response function. This methodology has been used to explore the asymmetric and nonlinear effects between financial and economic variables (see, e.g., Cecchetti and Li, 2008; Schuler, 2014; Lee and Kim, 2015). The quantile impulse response function is widely applicable and is beneficial in that it captures the asymmetric dynamic responses that the conventional impulse response does not explain. In addition, the impulse responses in multiple quantiles can be deemed a scenario analysis that is a
forecast of a variable under a scenario of a specific economic shock. Therefore, we use a quantile impulse response approach to investigate the effect of economic policy uncertainty shocks on stock returns during different circumstances, with particular interest in bearish market and bullish market.

Our empirical result shows that the effects of economic policy uncertainty shocks on stock returns are different depending on stock market conditions. Unlike previous studies, which often draw a conclusion that an increase in economic policy uncertainty reduces significantly stock returns, we find that the economic policy uncertainty shocks do not consistently depress stock returns, and thus the economic policy uncertainty shocks could improve stock returns in bearish stock markets.

The remainder of this paper is organized as follows. Section 2 discusses the methodology. Section 3 describes the data and their descriptive statistics. Section 4 provides empirical results, and Section 5 concludes.

Methodology

Let $y_t = (y_{1t}, y_{2t}, \ldots, y_{Nt})'$ be a $N \times 1$ vector of endogenous variables. The reduced quantile VAR model is then represented by

$$ y_t = c(\tau) + \sum_{i=1}^{p} B_i(\tau) y_{t-i} + e_t(\tau), \quad \text{for } t = 1, \ldots, T $$

where

$$ y_t = \begin{pmatrix} y_{1t} \\ \vdots \\ y_{Nt} \end{pmatrix}, \quad c(\tau) = \begin{pmatrix} c_1(\tau_1) \\ \vdots \\ c_N(\tau_N) \end{pmatrix}, \quad B(\tau) = \begin{pmatrix} \beta_{1,11}(\tau_1) & \beta_{1,12}(\tau_1) & \cdots & \beta_{1,1N}(\tau_1) \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{N,1N}(\tau_N) & \beta_{N,2N}(\tau_N) & \cdots & \beta_{N,NN}(\tau_N) \end{pmatrix}, \quad e_t(\tau) = \begin{pmatrix} e_{1t}(\tau_1) \\ \vdots \\ e_{Nt}(\tau_N) \end{pmatrix}. $$

Note that since each equation of (1) has the same right-hand side, the coefficient matrices $B_i(\tau)$ and $c(\tau)$ can be estimated on an equation-by-equation basis for each vector $\tau = (\tau_1, \ldots, \tau_N)$ using the conventional quantile regression (Cecchetti and Li, 2008). Assuming the errors $e_t(\tau)$ satisfy the quantile restrictions $Q_{\tau}(e_t(\tau)|y_{t-1}, \ldots, y_{t-p}) = 0$, the population responses of $y_t$ at quantiles $\tau = (\tau_1, \ldots, \tau_N)$ are characterized by

$$ Q_{\tau}(y_t, y_{t-1}, \ldots, y_{t-p}) = c(\tau) + \sum_{i=1}^{p} B_i(\tau) y_{t-i}. $$

To make sure that the economic policy uncertainty shock is orthogonal to the other stochastic elements in our models; we give these error terms $e_t$ as a structure restriction. For the binary VAR framework, we impose the following restrictions:

$$ e_t = \begin{pmatrix} e_t^{\text{Economic policy uncertainty}} \\ e_t^{\text{Stock return}} \end{pmatrix} = \begin{pmatrix} \alpha_{11} & 0 \\ \alpha_{21} & \alpha_{22} \end{pmatrix} \begin{pmatrix} e_t^{\text{Economic policy uncertainty shock}} \\ e_t^{\text{Stock return shock}} \end{pmatrix}. $$

According to the above structural shocks identified, we orthogonalize the covariance matrix of the residuals using a Cholesky decomposition and calculate the associated quantile-specific impulse response function. The 95% confidence interval of impulse response function is obtained using the bootstrapping approach.

Data

The monthly data used in this study are the economic policy uncertainty index and S&P500 price index with span the period from January 1986 to July 2016. The economic policy uncertainty index
comes from Baker et al. (2015). The S&P500 price index is obtained from Yahoo finance website and is adjusted by the US CPI. The real stock returns are constructed using \[ r_t = 100 \times \ln\left( \frac{p_t}{p_{t-1}} \right), \]
where \( p_t \) is the real S&P 500 price index at period \( t \).

Figure 1. Dynamics of economic policy uncertainty and S&P 500 return.

Fig. 1 shows the evolution of the economic policy uncertainty index and the S&P500 returns. According to this figure, it can be seen that the peaks of the economic policy uncertainty index to be associated with well-known events and with abrupt changes in stock market returns. Table 1 presents descriptive statistics of our data series. The augmented Dickey-Fuller (ADF) test indicates that all data series are stationary at 95% confidence level. According to the Shapiro-Wilk test results, normality of the unconditional distribution was strongly rejected for all data series, which further validates the rationality of using the quantile regression method to estimate the VAR model.

Table 1. Descriptive statistics.

<table>
<thead>
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<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Std. Dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>ADF test</th>
<th>Shapiro-Wilk test</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPU</td>
<td>57.2026</td>
<td>107.2252</td>
<td>245.1267</td>
<td>32.3947</td>
<td>3.7662</td>
<td>-3.5903</td>
<td>0.9286</td>
<td>0.9529***</td>
</tr>
<tr>
<td>S&amp;P500</td>
<td>-24.8033</td>
<td>0.4213</td>
<td>11.7465</td>
<td>4.4539</td>
<td>-1.0162</td>
<td>6.2996</td>
<td>-18.1586***</td>
<td>0.9529***</td>
</tr>
</tbody>
</table>

Notes: ADF test is adopted for testing the null hypothesis of a unit root in the series. Intercept is included in the testing equation and lag length of the unit root models is selected by Schwarz Information Criterion (SIC). *** represent 99% significance level.

Empirical Results

In this section, the vector \( \boldsymbol{\tau} \) is assumed to be \( \boldsymbol{\tau} = (0.5, \tau_2)' \), in which we specify quantile \( \tau_1 = 0.5 \) to represent an economic policy uncertainty general condition, and allow \( \tau_2 \) to vary to represent the various stock market states. Particularly, we present \( \tau_2 = \{0.01, 0.05, 0.1\} \) to represent bearish market, while \( \tau_2 = \{0.9, 0.95, 0.99\} \) to represent bullish market. By using a quantile structural VAR model to calculate the quantile impulse response function, we can capture the impacts of economic policy uncertainty shocks under different stock market states. In each quantile VAR model, the optimal order for the VAR (p) process is chosen by Akaike’s information criterion.

Fig. 2 reports the impulse response functions in 20 months of stock returns to one-standard deviation economic policy uncertainty shocks. As shown in Panel C, at the general market condition, an unexpected positive shock to economic policy uncertainty causes a negative effect on real stock return. This result is consistent with the previous empirical findings of researchers such as Arouiri et al. (2016). The absence of significant shock effect leads us to think that the economic policy uncertainty shocks on stock returns may be different depending on whether the stock markets are in bullish or bearish phases.
Panel B in Fig. 2 shows the responses of stock returns to economic policy uncertainty shocks in bullish market conditions. Shocks to economic policy uncertainty have a significant negative effect on stock return in the first two months in bullish markets. The main underlying reasons behind this phenomenon is that economic policy uncertainty may increase risks in bullish stock market, in particular by reducing the value of protections provided by the government for financial markets and by drawing up the macroeconomic policy affecting inflation and expected risk premiums to avoid stock market bubble risks, while all rational investors operating in stock markets pay close attention to what happens in the economy as a whole and adjust their expectations and investment decisions accordingly. This means that economic policy uncertainty shocks appear to be a matter of concern for investors in bullish stock market.

Turning now to the bearish market conditions, in the Panel A in Fig. 2, the responses of stock returns to economic policy uncertainty shocks are presented. We observe that there is a significant positive effect of economic policy uncertainty shocks on stock returns, which at first sight might seem to be counter-intuitive. However, this empirical evidence can potentially be explained by the following reasons. First, because the investors are forward-looking, an increase in economic policy uncertainty in the bearish market period could signal an improvement in the economy in the near future, which will provoke speculators to increase investments, and as a result, this will bidding up the stock prices. Second, in a bearish market period, government sectors should draw and execute bailout package to prevent the occurrence of systemic financial risk, such as the unprecedented bailout package for the US banking sector of 2008 and the stimulus package of 2009. After bailout packages, the stock market responded favorably, considering that in the later part of the financial crisis the market was experiencing positive returns. Third, an increase in economic policy uncertainty may lead to lower short-term interest rates, which in turn cause a rise in stock prices given the well-accepted theoretical that there exists negative relationship between interest rates and stock returns (Hashemzadeh and Taylor, 1988). Especially under the bearish market condition, this effect should be magnified to attract more speculators and boost the stock markets.

Conclusions

The focal point of this study is to shed light on whether the economic policy uncertainty shocks depress stock returns in different stock market conditions. We use quantile impulse response approach to investigate the reaction of US stock market to economic policy uncertainty shocks. Results show that the economic policy uncertainty shock does not consistently depress stock returns. In general and bullish market conditions, the economic policy uncertainty reduces stock returns, but in bearish market condition, it could improve stock returns.
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References


