THE IMPACT OF ECONOMIC POLICY UNCERTAINTY ON INDUSTRIAL PRODUCTION IN THE UNITED STATES: PRE-PANDEMIC EVIDENCE

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ABSTRACT

Although the Covid-19 pandemic (the Great Lockdown), which began in March 2020, is not over yet (mainly due to new SARS-CoV-2 variants, such as Delta), there is already a growing body of evidence that suggests that the Covid-19 pandemic has contributed to an increase in economic policy uncertainty in the United States and the rest of the world. In this paper, I examine the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic. Using vector autoregression, I found that industrial production in the United States responds negatively to a positive economic policy uncertainty shock in the United States. This suggests that US economic policymakers need to prevent economic policy uncertainty in the United States.

Keywords: *Covid-19, economic policy, industrial production, uncertainty, United States, vector autoregression, VAR model*

INTRODUCTION

Although the Covid-19 pandemic (the Great Lockdown), which began in March 2020, is not over yet, there is already a growing body of evidence that suggests that the Covid-19 pandemic has contributed to an increase in economic policy uncertainty in the United States and the rest of the world [1]. The Covid-19 pandemic was a supply and demand shock for the United States and the rest of the world [2]. The US and other companies had to adjust to the Covid-19 shock. Many of them put investment and employment on hold, which made the situation worse. This led to the need for economic policy action in the United States and the rest of the world.

Economic policy uncertainty in the United States and the rest of the world was at its highest at the start of the Covid-19 pandemic [3], [4]. There is a growing body of evidence that suggests that economic policy uncertainty has a negative impact on the economy [5]. This study examines the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic. There is a growing body of literature on the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic.

The rest of this paper is divided into five sections: LITERATURE REVIEW (i.e., section 2), MATERIALS AND METHODS (i.e., section 3), RESULTS (i.e., section 4), DISCUSSION (i.e., section 5) and CONCLUSION (i.e., section 6). In Section 2, I review the literature on the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic. In Section 3, I present the materials and methods used in this research. In Section 4, I present the results of this research. In Section 5, I discuss the results of this research, and in Section 6, I conclude this paper.

LITERATURE REVIEW

This section focuses on the growing body of literature on the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic. After the Great Recession, which lasted from January 2008 to June 2009 in the United States [6], there was a need among policymakers and researchers to monitor economic policy uncertainty in the United States. Some researchers and policymakers believe that economic policy uncertainty contributed to the slow recovery of the US economy from the Great Recession [7].

In the literature, we find different economic policy uncertainty indices. Baker et al. [7] developed economic policy uncertainty indices for twelve countries (Canada, China, France, Germany, India, Italy, Japan, Russia, South Korea, Spain, the United Kingdom and the United States). The website https://www.policyuncertainty.com/ lists economic policy uncertainty indices for 27 countries (Australia, Belgium, Brazil, Canada, Chile, China, Colombia, Croatia, Denmark, France, Germany, Greece, Hong Kong, India, Ireland, Italy, Japan, Mexico, the Netherlands, Pakistan, Russia, Singapore, South Korea, Spain, Sweden, the United Kingdom and the United States). In this paper, I use the Economic Policy Uncertainty Index for the United States.

Baker et al. [7] found that a positive economic policy uncertainty shock has a negative impact on industrial production in the United States, which is consistent with the findings of Colombo [8]. In her paper, she found that a positive economic policy uncertainty shock in the United States has a negative impact on industrial production in the euro area and in the United States. Caggiano et al. [9] found that the negative impact of a positive economic policy uncertainty shock on industrial production in the United States is larger in bust times than in boom times. Caggiano et al. [10] found that a positive economic policy uncertainty shock in the United States has a negative impact on industrial production in Canada in bust times. They also found that the negative impact of a positive economic policy uncertainty shock in the United States on industrial production in the United Kingdom is larger in bust times than in boom times.

MATERIALS AND METHODS

In this paper, I use a vector autoregressive model to examine the impact of economic policy uncertainty on industrial production in the United States before the Covid-19 pandemic. In doing so, I use monthly data from January 1985 to February 2020. Figure 1 shows economic policy uncertainty in the United States during this period. As you can see from the figure, economic policy uncertainty in the United States was highest after the Great Recession.

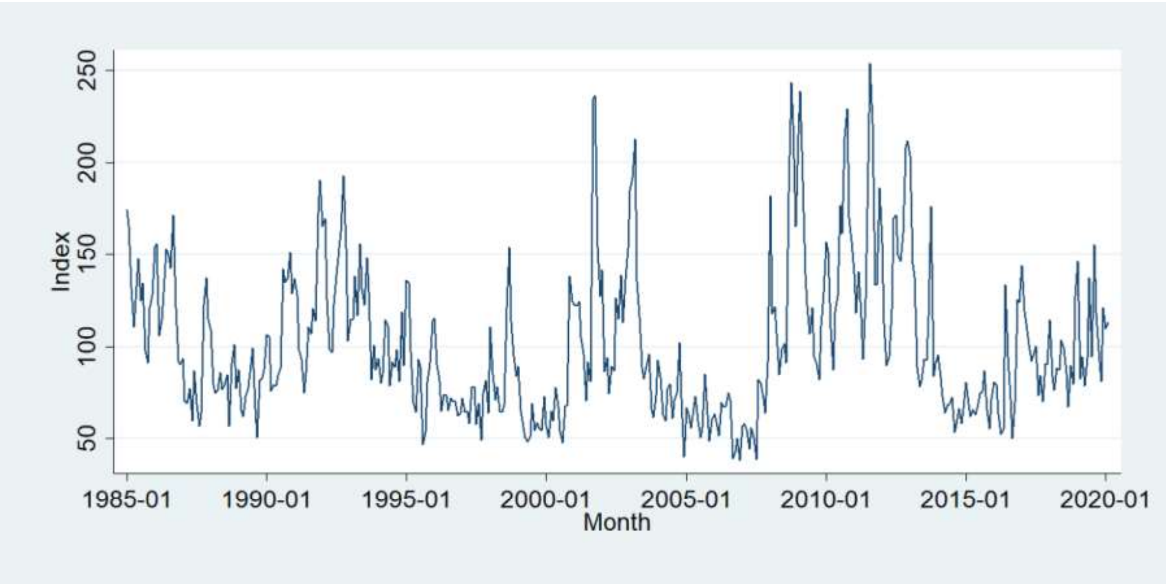

Fig. 1. *Economic policy uncertainty in the United States from January 1985 to February 2020 [7], https://www.policyuncertainty.com/*

Figure 2 shows the frequency distribution histogram of the economic policy uncertainty index for the United States from January 1985 to February 2020. As you can see from the figure, the index was mostly lower than 100.

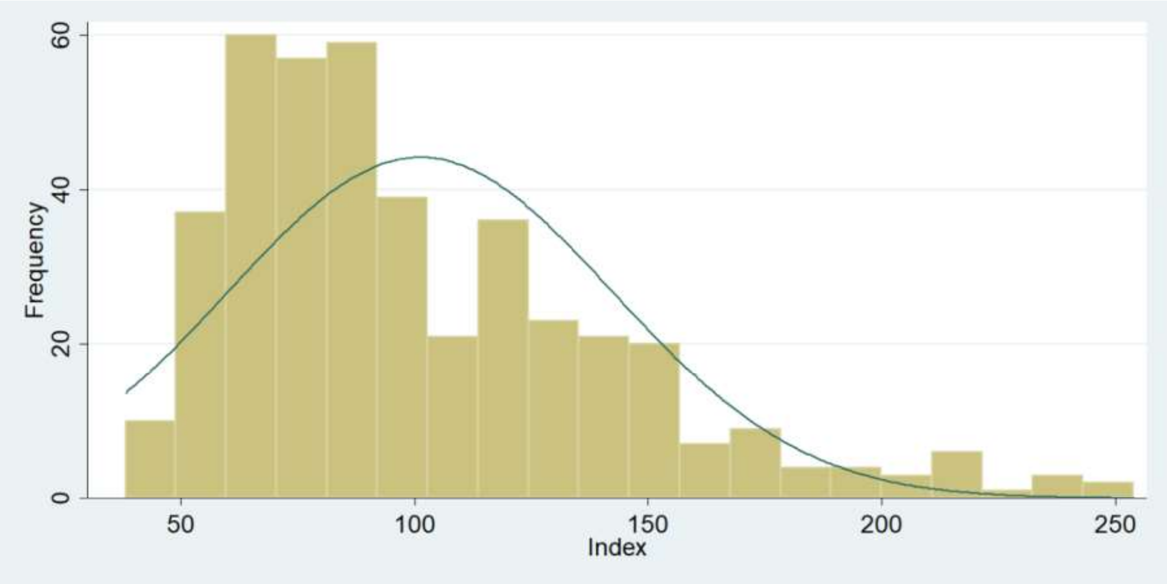

Fig. 2. *Frequency distribution of the economic policy uncertainty index for the United States from January 1985 to February 2020 [7, https://www.policyuncertainty.com/, author's calculations]*

In this paper, I use data on the effective federal funds rate, the employment rate (for the United States), the economic policy uncertainty index (for the United States), the industrial production index (for the United States) and the NASDAQ Composite Index. I obtained data on the study variables from the Federal Reserve Bank of St. Louis. See Table 1 for a (short) description of the study variables.

Table 1. *Description of study variables*

Variable	Description	Source
Effective federal funds rate	**Effective federal funds rate,** percent, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis
Employment rate	**Employment rate: aged 25-54: all persons for the United States,** percent, monthly, seasonally adjusted	Federal Reserve Bank of St. Louis
Economic policy uncertainty index	**Economic policy uncertainty index for the United States,** index, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis
Industrial production index	**Industrial production: total index, index 2012=100,** monthly, seasonally adjusted	Federal Reserve Bank of St. Louis
NASDAQ Composite Index	**NASDAQ Composite Index,** index 5 February 1971=100, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis

Source: Author's calculations.

The VAR model includes the effective federal funds rate at time t, denoted by FFR_t, the natural logarithm of the employment rate at time t, denoted by ER_t, the economic policy uncertainty index (for the United States) at time t, denoted by EPU_t, the natural logarithm of the industrial production index (for the United States) at time t, denoted by EPU_t, and the natural logarithm of the NASDAQ composite index at time t, denoted by $NASDAQ_t$. Table 2 shows descriptive statistics for the study variables. Like Baker et al. [7], I use the Cholesky decomposition.

Table 2. *Descriptive statistics for study variables*

Variable	n	M	SD	Min	Max	Kurtosis	Skewness
FFR_t	422	3.56	2.78	.07	9.85	1.86	.26
ER_t	422	4.37	.02	4.31	4.41	2.52	–.57
EPU_t	422	101.23	41.10	38.21	253.92	4.19	1.15
IP_t	422	4.44	.21	4.03	4.71	1.91	–.64
$NASDAQ_t$	422	7.39	.94	5.56	9.15	2.05	–.23

Source: Author's calculations.

The Akaike’s Information Criterion (AIC) and the (Akaike’s) Final Prediction Error (FPE) criterion suggest that a VAR model with four (autoregressive) lags has the best fit, whereas the Hannan and Quinn’s Information Criterion (HQIC) and the Schwarz’s Bayesian Information Criterion (SBIC) suggest that a VAR model with two lags has the best fit (see Table 3).

Table 3. *Selection-order criteria*

Selection-order criteria
Sample: 1985m9 - 2020m2 Number of obs = 414

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-1741.59				.003177	8.43764	8.45687	8.48626
1	2418.3	8319.8	25	0.000	6.7e-12	-11.5377	-11.4223	-11.246
2	2533.07	229.54	25	0.000	4.4e-12	-11.9714	-11.7599*	-11.4365*
3	2561.12	56.09	25	0.000	4.3e-12	-11.9861	-11.6784	-11.2081
4	2595.61	68.975*	25	0.000	4.1e-12*	-12.0319*	-11.6281	-11.0109
5	2609.37	27.537	25	0.330	4.3e-12	-11.9777	-11.4777	-10.7135
6	2627.81	36.876	25	0.059	4.5e-12	-11.9459	-11.3499	-10.4387
7	2642.24	28.864	25	0.270	4.7e-12	-11.8949	-11.2027	-10.1445
8	2658.35	32.207	25	0.152	4.9e-12	-11.8519	-11.0635	-9.85843

Endogenous: epu lognasdaq ffr loger logip
Exogenous: _cons

Based on the AIC and the FPE criterion, I decided to select a VAR model with four lags. It is given by five equations:

$$EPU_t = \beta_{10} + \beta_{11}EPU_{t-1} + \beta_{12}EPU_{t-2} + \beta_{13}EPU_{t-3} + \beta_{14}EPU_{t-4} + \gamma_{11}FFR_{t-1} + \gamma_{12}FFR_{t-2} + \gamma_{13}FFR_{t-3} + \gamma_{14}FFR_{t-4} + \delta_{11}ER_{t-1} + \delta_{12}ER_{t-2} + \delta_{13}ER_{t-3} + \delta_{14}ER_{t-4} + \varepsilon_{11}IP_{t-1} + \varepsilon_{12}IP_{t-2} + \varepsilon_{13}IP_{t-3} + \varepsilon_{14}IP_{t-4} + \theta_{11}NASDAQ_{t-1} + \theta_{12}NASDAQ_{t-2} + \theta_{13}NASDAQ_{t-3} + \theta_{14}NASDAQ_{t-4} + u_{1t},$$

$$NASDAQ_t = \beta_{20} + \beta_{21}EPU_{t-1} + \beta_{22}EPU_{t-2} + \beta_{23}EPU_{t-3} + \beta_{24}EPU_{t-4} + \gamma_{21}FFR_{t-1} + \gamma_{22}FFR_{t-2} + \gamma_{23}FFR_{t-3} + \gamma_{24}FFR_{t-4} + \delta_{21}ER_{t-1} + \delta_{22}ER_{t-2} + \delta_{23}ER_{t-3} + \delta_{24}ER_{t-4} + \varepsilon_{21}IP_{t-1} + \varepsilon_{22}IP_{t-2} + \varepsilon_{23}IP_{t-3} + \varepsilon_{24}IP_{t-4} + \theta_{21}NASDAQ_{t-1} + \theta_{22}NASDAQ_{t-2} + \theta_{23}NASDAQ_{t-3} + \theta_{24}NASDAQ_{t-4} + u_{2t},$$

$$FFR_t = \beta_{30} + \beta_{31}EPU_{t-1} + \beta_{32}EPU_{t-2} + \beta_{33}EPU_{t-3} + \beta_{34}EPU_{t-4} + \gamma_{31}FFR_{t-1} + \gamma_{32}FFR_{t-2} + \gamma_{33}FFR_{t-3} + \gamma_{34}FFR_{t-4} + \delta_{31}ER_{t-1} + \delta_{32}ER_{t-2} + \delta_{33}ER_{t-3} + \delta_{34}ER_{t-4} + \varepsilon_{31}IP_{t-1} + \varepsilon_{32}IP_{t-2} + \varepsilon_{33}IP_{t-3} + \varepsilon_{34}IP_{t-4} + \theta_{31}NASDAQ_{t-1} + \theta_{32}NASDAQ_{t-2} + \theta_{33}NASDAQ_{t-3} + \theta_{34}NASDAQ_{t-4} + u_{3t},$$

$$ER_t = \beta_{40} + \beta_{41}EPU_{t-1} + \beta_{42}EPU_{t-2} + \beta_{43}EPU_{t-3} + \beta_{44}EPU_{t-4} + \gamma_{41}FFR_{t-1} + \gamma_{42}FFR_{t-2} + \gamma_{43}FFR_{t-3} + \gamma_{44}FFR_{t-4} + \delta_{41}ER_{t-1} + \delta_{42}ER_{t-2} + \delta_{43}ER_{t-3} + \delta_{44}ER_{t-4} + \varepsilon_{41}IP_{t-1} + \varepsilon_{42}IP_{t-2} + \varepsilon_{43}IP_{t-3} + \varepsilon_{44}IP_{t-4} + \theta_{41}NASDAQ_{t-1} + \theta_{42}NASDAQ_{t-2} + \theta_{43}NASDAQ_{t-3} + \theta_{44}NASDAQ_{t-4} + u_{4t}, t = 5, \ldots, 422.$$

$$IP_t = \beta_{50} + \beta_{51}EPU_{t-1} + \beta_{52}EPU_{t-2} + \beta_{53}EPU_{t-3} + \beta_{54}EPU_{t-4} + \gamma_{51}FFR_{t-1} + \gamma_{52}FFR_{t-2} + \gamma_{53}FFR_{t-3} + \gamma_{54}FFR_{t-4} + \delta_{51}ER_{t-1} + \delta_{52}ER_{t-2} + \delta_{53}ER_{t-3} + \delta_{54}ER_{t-4} + \varepsilon_{51}IP_{t-1} + \varepsilon_{52}IP_{t-2} + \varepsilon_{53}IP_{t-3} + \varepsilon_{54}IP_{t-4} + \theta_{51}NASDAQ_{t-1} + \theta_{52}NASDAQ_{t-2} + \theta_{53}NASDAQ_{t-3} + \theta_{54}NASDAQ_{t-4} + u_{5t}, t = 5, \ldots, 422.$$

RESULTS

Since the Great Recession, there has been growing interest among policymakers and researchers in examining the impact of economic policy uncertainty on industrial production (in the United States and the rest of the world). The Covid-19 recession, which lasted from March to April 2020 in the United States [6], has intensified this interest. In this paper, I focus on the period before the Covid-19 outbreak in China (in December 2019).

Figure 3 shows the dynamic (linear) responses of the study variables to a one-standard deviation shock to the EPU.

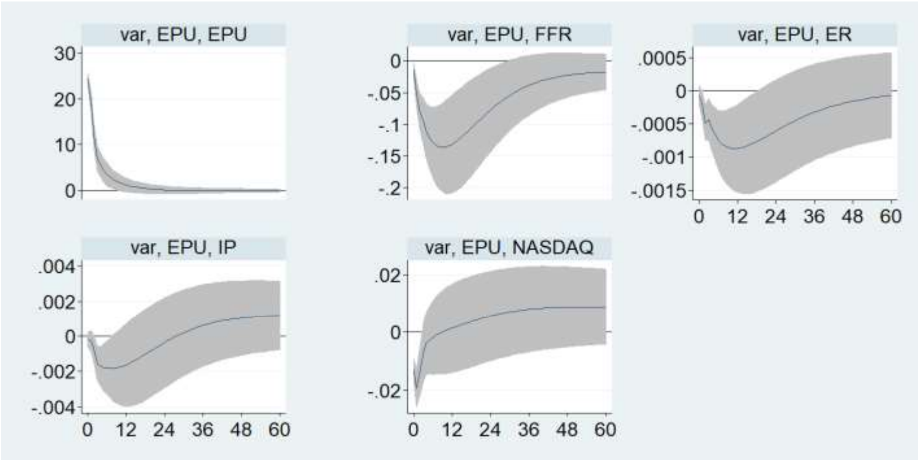

Fig. 3. *Dynamic (linear) responses of the study variables to a one standard shock to the EPU*

Note: The confidence level is 90%.

Source: Author's calculations.

As you can see from Figure 3, a one-standard deviation shock to the EPU leads to a decrease in the effective federal funds rate (for the United States), the employment rate (for the United States), the industrial production index (for the United States) and the NASDAQ Composite Index, which is consistent with the literature. A one-standard deviation shock to the EPU also leads to an increase in the economic policy uncertainty Index (for the United States).

Table 4 shows the eigenvalue stability condition.

Table 4. *Eigenvalue stability condition*

Eigenvalue stability condition

Eigenvalue	Modulus
.9968138	.996814
.9858465 + .00899349i	.985888
.9858465 - .00899349i	.985888
.9195536 + .05509513i	.921203
.9195536 - .05509513i	.921203
.70864	.70864
.6137795	.61378
-.3513223 + .4863578i	.599976
-.3513223 - .4863578i	.599976
.3623437 + .3066042i	.474657
.3623437 - .3066042i	.474657
.02952759 + .4542512i	.45521
.02952759 - .4542512i	.45521
-.1356939 + .4016064i	.423911
-.1356939 - .4016064i	.423911
-.4165383	.416538
-.3765135	.376514
.1905507 + .3052336i	.359829
.1905507 - .3052336i	.359829
-.3136453	.313645

All the eigenvalues lie inside the unit circle
VAR satisfies stability condition.

Source: Author's calculations.

As you can see from Table 4, the VAR model is stable, which means that it gives reliable results.

DISCUSSION

This paper confirms (previous evidence which suggests) that industrial production in the United States responds negatively to a positive economic policy uncertainty shock in the United States. According to Baker et al. [7], a positive economic policy uncertainty shock in the United States leads to a decrease in industrial production in the United States, which is consistent with the results of this paper.

CONCLUSION

This paper adds to the growing body of literature on the impact of economic policy uncertainty on industrial production. In this paper, I have shown that industrial production in the United States responds negatively to a positive economic policy uncertainty shock in the United States. This suggests that US economic policymakers need to prevent economic policy uncertainty in the United States.

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