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Examining the Effects of Economic Policy Uncertainties on the Stock Market Index: Analysis by Nonlinear ARDL Method for G7 Countries[1]

Abstract. Uncertainties are important factors that influence the decisions made by societies. Economic uncertainties closely affect society's consumption and investment behaviour. Rising stock markets increase investors' confidence, resulting in more purchases and higher stock prices and, in this context, an increase in consumer spending. When stock prices decrease, company investments are also negatively affected as consumer spending declines. Thus, increases and decreases in stock prices affect the general economy as they affect business confidence and consumers. The study analyses the effect of uncertainty in economic policies on stock markets, leading to a decrease in investor confidence in the economy. Such effects in G7 countries were examined using the nonlinear autoregressive distributed lag (ARDL) model for the period 1998:M05–2020:M09. This method was able to capture symmetries and asymmetries in the relationship between economic policy uncertainties and the stock markets. The results showed that heightened uncertainty in economic policy in Japan has a significantly negative effect on the stock market index, but in Germany and Italy, it has a significantly positive effect. Rising interest rates have negatively affected the stock market index in the United States, Canada, Japan, Italy, and the United Kingdom. The increase in the industrial production index is positively related to the stock market index in the United States, Canada, Japan, Italy, and France. Additionally, uncertainties in economic policy have asymmetric impacts on the stock market index in the United States, Canada, Japan and Italy, and symmetrical impacts in Germany, France and the United Kingdom.

Keywords: 7 developed economies (G7), investor, interest rates, industrial production indices, stock exchange, economic policy uncertainty, nonlinear ARDL

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ИССЛЕДОВАТЕЛЬСКАЯ СТАТЬЯ

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Влияние неопределенности экономической политики на индекс фондового рынка: анализ с помощью нелинейной модели авторегрессии и распределенного лага для стран G7

Аннотация. Неопределенность — один из факторов, влияющих на приятие решений. Экономическая неопределенность оказывает непосредственное влияние на потребление и инвестиционное поведение населения. Рост фондовых рынков ведет к укреплению доверия инвесторов, что способствует увеличению количества покупок, повышению цен на акции и увеличению потребительских расходов. Падение цен на акции также отрицательно влияет на инвестиции компаний, приводя к снижению потребительских расходов. Таким образом, изменение цен на акции влияет как на доверие бизнеса и потребителей, так и на экономику в целом. В статье исследуется влияние неопределенности экономической политики на фондовые рынки, приводящее к снижению доверия инвесторов к экономике. Нелинейная модель авторегрессии и распределенного лага была использована для анализа этих взаимоотношений в странах Большой семерки за период с мая 1998 г. по сентябрь 2020 г. Примененный метод позволил выявить симметрию и асимметрию взаимоотношений между неопределенностью экономической политики и фондовыми рынками. Результаты показали, что повышенная неопределенность экономической политики оказывает существенное негативное влияние на индекс фондового рынка в Японии, а в Германии и Италии — существенное положительное. Рост процентных ставок негативно повлиял на индексы фондового рынка в США, Канаде, Японии, Италии и Великобритании. Рост индекса промышленного производства имеет прямую зависимость от индекса фондового рынка США, Канады, Японии, Италии и Франции. Кроме того, неопределенность в экономической политике оказывает асимметричное воздействие на индекс фондового рынка в США, Канаде, Японии и Италии и симметричное воздействие в Германии, Франции и Великобритании.

Ключевые слова: Большая семерка (G7), инвестор, процентные ставки, индексы промышленного производства, фондовая биржа, неопределенность экономической политики, нелинейная модель авторегрессии и распределенного лага

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Introduction

Economic uncertainties, coupled with bigger threats to all social classes in a society, pose important challenges for financial authorities and agents (Liu, 2010). In this context, there are two different approaches regarding the concept of uncertainty in economic policies. These approaches suggest that government reshuffles, violence, military coups, internal conflicts, and political assassinations are major factors contributing to uncertainties in economic policy (Campos & Nugent, 2002).

The decisions of financial authorities seem to be the main reason for economic uncertainties. In this context, a "wait and see" approach proclaims that investors avoid areas of economic uncertainty by postponing their investment decisions[1]. However, this in turn has negatively affected the ability of businesses and consumers to access credit. Consumption and investment decisions of economic agents have been delayed, putting a strain on household expenses and causing a fall in production and employment rates (Bernanke, 1983; Bloom, 2009). After the 2008 global crisis, not many countries could ensure long-term sustainable economic growth, and new problems have arisen since then. Since the crisis, the phenomenon of economic and political uncertainty has been one of the key issues attracting attention and forming the basis for discussions on economy and policy. The phenomenon has also had a long-term effect on cyclical fluctuation levels. From the perspective of the "wait and see" policy, uncertainties originating in financial markets have kept consumers and investors busy (Baker et al., 2016; Rice

[1] As uncertainties increase, financial institutions that offer loans increase interest rates due to their increased risk-related costs. Increased fund costs due to increased interest rates have negative effects on companies' investment decisions (Cerda et al., 2018).

et al., 2018). Likewise, Brexit uncertainty between the European Union and the United Kingdom, uncertainty in US economic policies under Trump, Russia's search for a place in the global economy, the monetary policy mistakes of the United States and the European Central Bank, and trade tensions in the global economy have resulted in an uncertain global economic environment. All these important events have caused uncertainty on the global economic scene. Such intricately connected channels as stocks, risk premiums, consumption, investments, public expenditures, net exports, and employment can help mitigate the contractionary and delaying effects of uncertainties on growth and development in economic and political areas in the global world (Lee, 2015; Soric & Lolic, 2017).

Crises in the exchange rate mechanism of the European Monetary System and the 2008 global financial crisis, which appear to have directly increased uncertainty in economic policies, have created negative perceptions among the public. This concept is actually a determinant of market concerns. The concept of uncertainty in economic policies has become the most relevant topic of recent years in the literature in terms of both policy makers' discourses and the formulation and implementation of economic policies.

Baker et al. (2016) first developed and published the concept of measuring uncertainty, critical to decision-making for the economy, in an attempt to develop an economic policy uncertainty (*EPU*) index in the United States. The *EPU* index has been built by aggregating many different components. It was constructed to measure, from 1985 onwards, such concerns as uncertain economic conditions, economy, Congress, budget deficits, Federal Reserve, legislation, regulation, and the White House, as reflected in articles of 10 leading United States newspapers. The EPU index has been used by a large number of sectors, from the real estate market (Ongan & Gocer, 2017) to volatility in financial markets (Baker et al., 2019), from foreign trade (Bank of England, 2019)[1] and demand for money (Husted et al., 2017) to investment and employment (Baker et al., 2015)[2].

The G7 group consists of seven countries: Germany, the United States, the United Kingdom, Italy, France, Japan and Canada; the European Union is also represented in the G7. This study aims to examine the effects of EPU on stock markets in G7 countries using current econometric analysis methods. The reason for studying G7 countries is that uncertainties in their economic policies may adversely affect global stock markets because they play an important role in the international market (Chiang, 2019). First, a set of primary studies conducted on this topic is introduced. Second, the research method is described. Third, the findings are interpreted and evaluated. The results support the notion that examining the impact of EPU on stock market indices and the relationship between EPU and stock markets is of prime importance.

1. Literature Review

Since EPU was introduced, there has been a rising interest in examining the impact of uncertainty in economic policy on stock market returns and prices. This section examines studies that have contributed to the existing literature on this topic.

Sum (2012) analysed the influence of economic policy uncertainty on stock returns, taking into account the US example. He found negative relationships between economic policy and returns in the stock market. Sum (2013) also assessed the impact of economic policy uncertainties on returns in ASEAN (Indonesia, Malaysia, Philippines, Singapore, and Thailand) stock exchanges (SEs). He found a negative correlation between the US Economic Policy Uncertainty Index and the returns of ASEAN country SEs. Meanwhile, Ko and Lee (2015) in their study of 11 countries in Asia, Europe, and North America, found that an increase in economic policy uncertainty reduces stock prices.

Using a twenty-four-month sliding window in the period 1995:02–2013:02 in China and 2003:02–2013:02 in India, Li et al. (2016) found bidirectional causal relationships between EPU and stock returns in several sub-periods, but not between EPU and stock returns. They concluded that the relationship between stock returns is generally weak for these two developing countries.

Arouri and Roubaud (2016) attempted to clarify the relationship between economic policy uncertainty and stock returns and volatility in China, India, and US SEs. They found that, unlike in China, the rise in policy uncertainty in the United

[1] Bank of England. (2019). How has trade policy uncertainty affected the world economy? Retrieved from: https://www.bankofengland.co.uk/bank-overground/2019/how-has-trade-policy-uncertainty-affected-the-world-economy (Date of access: 25.09.2020).

[2] Baker, S. R., Bloom, N., & Davis, S. J. (2015). Higher policy uncertainty curbs business investment and employment growth. USAPP — American Politics and Policy Blog. Retrieved from: http://eprints.lse.ac.uk/75959/1/blogs.lse.ac.uk Higher%20policy%20uncertainty%20curbs%20business%20investment%20and%20employment%20growth.pdf (Date of access: 01.10.2020).

States and India leads to significantly reduced stock returns.

Wu et al. (2016) studied the causal relationship between economic policy uncertainty and stock market prices. They found no causal relationship between economic policy uncertainty and stock market prices in Canada, China, France, Germany, and the United States. In India, Italy, and Spain, they found a one-way causality relationship varying from stock market prices to economic policy uncertainty, but in the United Kingdom, they found no one-way causality relationship varying from economic policy uncertainty to stock market prices.

Further, Chen et al. (2017) in their study of the Shanghai and Shenzhen SEs revealed that economic policy uncertainty in China negatively affects overall stock market returns.

Christou et al. (2017) examined the relationship between economic policy uncertainties and stock market returns in Australia, Canada, China, Japan, Korea, and the United States. They found that stock market returns were negatively affected by economic policy uncertainties.

Tsai (2017) investigated the impact of the economic policy uncertainty index on the crash risk of the stock markets in some developed and developing countries, such as China, Japan, Europe, and the United States. The study found that the uncertainty levels vary across countries. The economic policy uncertainty index is quite effective in China, but its impact is quite low in the United States. Contagion effects of the economic policy uncertainty index are stronger in emerging markets such as Japan. However, economic policy uncertainty in Europe is not affected.

Kang et al. (2017) attempted to assess the impact of economic policy uncertainty on the stock returns of oil and gas companies. They found that economic policy uncertainty shocks have a negative impact on stock returns.

Fang et al. (2018) examined the relationship between economic policy uncertainty and crude oil and stock market returns and revealed a positive impact of economic policy uncertainty.

Guo et al. (2018) attempted to investigate the relationship between economic policy uncertainty and stock market returns in G7 and BRIC countries. For all countries except France and the United Kingdom, they found that economic policy uncertainty has reduced stock market returns.

Alqahtani and Taillard (2019) examined the influence of uncertainty shocks in US economic policy on the stock market returns of the Gulf Cooperation Council (GCC) countries. The study found that the economic policy uncertainty index in the United States negatively affects Bahrain stock markets but positively affects Qatar stock market.

Jin et al. (2019) found that economic policy uncertainty causes a serious decrease in stock prices in China.

Bahmani-Oskooee and Saha (2019a) examined the effect of EPU on stock prices by applying a linear autoregressive distributed lag (ARDL) model with monthly data for 13 countries (Australia, Brazil, Canada, Chile, China, France, Germany, India, Japan, Korea, Netherlands, UK and USA) for the period from January 1985 to December 2016. According to the empirical findings, EPU has a short-term negative effect on stock prices, but not long-term effects. Bahmani-Oskooee and Saha (2019b) also analysed the monthly data for the period from January 1985 to October 2018 and the effect of EPU on the stock prices of Canada, Japan, Korea, United Kingdom and the USA with a nonlinear ARDL model. According to their findings from the analysis, EPU has an asymmetric short-run effect on Canadian, UK and US stock prices, and a significant negative asymmetric long-term effect in all countries except Japan.

Alqahtani and Martinez (2020) examined the relationship between economic policy uncertainty and GCC SEs. They found that economic policy uncertainties, especially those originating in the United States, negatively affect stock prices in Bahrain and Kuwait in the long run.

Chiang (2020), using data from January 1990 to October 2018, concluded that EPU had a negative impact on Japanese stock prices.

Smales (2020) examined whether financial market uncertainty (implied volatility) is related to policy uncertainty in G7 economies with monthly data for the period from January 1997 to June 2019. In line with empirical findings, the study concluded that as economic policy uncertainty increases (and the economy weakens), financial market uncertainty (implied volatility) increases.

Rehman et al. (2021), using weekly data for the period 1995–2015, analysed the sensitivity of sectoral returns in the USA to EPU and investor sentiment (decrease and rise) quantitatively with a non-parametric causality approach. According to the findings they obtained from the analysis, EPU and investor sentiment were the driving factors for the US sectoral returns.

Batabyal and Killins (2021) studied monthly data for the period 1985–2015 and estimated the effect of *EPU* on Canadian stock returns using both ordinary least squares (OLS) and ARDL methods. According to their findings, EPU causes significant short- and long-term negative asymmetric effects on Canadian stock returns in both estimation methods.

Huang and Liu (2022) examined the asymmetric effects of economic policy uncertainty on the stock returns of G7 countries by applying the quantile regression approach with monthly data for the 1997–2020 period. According to their findings, changes in EPU cause a negative effect on G7 stock returns, and this effect is greater when EPU increases than when *EPU* decreases. In other words, they concluded that they have asymmetric effects.

Wen et al. (2022) examined the heterogeneous and asymmetrical effects of monetary policy uncertainty on stock returns in G7 and BRICS countries using the quantitative tranche approach. According to the findings they obtained from the analysis, higher uncertainty reduces stock returns in any stock market crash.

Many studies examine the effect of EPU on stock prices for different countries and country groups. Due to their important role in the global economy, the G7 group of the most developed economies in the world is discussed in this research. As can be seen from the literature review above, there are not many studies on G7 countries using different methods examining the effect of EPU on stock prices, and most of them examine some of the G7 countries. Thus, the present study covers all the countries within the G7 country group.

2. Data Set

This study seeks to reveal the effects of uncertainties in economic policies on stock markets via stocks in the 1998:M05–2020:M09[1] period and via the economic policy uncertainty index series. Additionally, interest rates (IRs) and industrial production indices (IPIs) are included in the models as a set of potential control variables. Data on SEs are retrieved from Trading Economics[2] and Investing[3]; data on the economic policy uncertainty index are retrieved from Policy Uncertainty[4]; data on short-term IR and on IPI are retrieved from the Organisation for Economic Co-operation and Development's website[5] and FRED[6]. The IPI series data are deseasonalised data. SE, EPU, and IPI series are used in the analysis by applying logarithmic transformations.

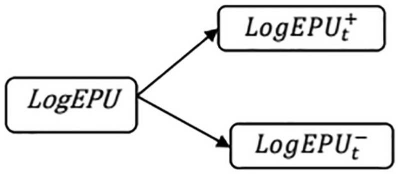

Fig. Partial sum process

3. Econometric Methodology

This study attempted to reveal the asymmetric effects of economic policy uncertainties on stock markets. To this end, it used the nonlinear ARDL (NARDL) model that Shin et al. (2014) developed. The model has the capacity to decompose the independent variable into positive and negative cumulative shocks while keeping the dependent variable constant. The model was adapted for this study as follows:

$$\begin{aligned}\Delta LogSE_t &= \alpha_0 + \sum_{j=1}^{p}\alpha_{1j}\Delta LogSE_{t-j} + \\ &+\sum_{j=0}^{q}\alpha_{2j}\Delta LogEPU^{+}_{t-j} + \sum_{j=0}^{r}\alpha_{3j}\Delta LogEPU^{-}_{t-j} + \\ &+\alpha_4 LogSE_{t-1} + \alpha_5 LogEPU^{+}_{t-1} + \\ &+\alpha_6 LogEPU^{-}_{t-1} + e_t, \end{aligned} \tag{1}$$

Here, $LogEPU^+$ and $LogEPU^-$ respectively increased and decreased in the *EPU* index. They were calculated using the following equations:

$$LogEPU_t^{+} = \sum_{j=1}^{t}\Delta LogEPU_j^{+} = \sum_{j=1}^{t}\max\left(\Delta LogEPU_j, 0\right), \tag{2}$$

$$LogEPU_t^{-} = \sum_{j=1}^{t}\Delta LogEPU_j^{-} = \sum_{j=1}^{t}\min\left(\Delta LogEPU_j, 0\right), \tag{3}$$

The *EPU* index was divided into sub-parts (Figure).

$LogEPU_t^+$ was associated with positive cumulative shocks in the EPU series, and $LogEPU_t^-$ was associated with negative cumulative shocks in the EPU series. Eq. 1 with *IR* and *IPI* variants was extended:

[1] The period selection is based on the widest period available to countries.

[2] Trading Economics. Retrieved from: https://tradingeconomics.com/countries (Date of access: 01.10.2020).

[3] Investing. Retrieved from: https://www.investing.com/indices/world-indices (Date of access: 01.10.2020).

[4] Policy Uncertainty. Retrieved from: https://www.policyuncertainty.com (Date of access: 01.10.2020).

[5] Organisation for Economic Co-operation and Development. Retrieved from: https://data.oecd.org/ (Date of access: 01.10.2020).

[6] FRED. Industrial Production: Total Index. Retrieved from: https://fred.stlouisfed.org/series/INDPRO. (Date of access: 01.10.2020).

$$\Delta LogSE_t = \alpha_0 + \sum_{j=1}^{p} \alpha_{1j} \Delta LogSE_{t-j} +$$
$$+ \sum_{j=0}^{q} \alpha_{2j} \Delta LogEPU^{+}_{t-j} + \sum_{j=0}^{r} \alpha_{3j} \Delta LogEPU^{-}_{t-j} +$$
$$+ \sum_{j=0}^{s} \alpha_{4j} \Delta IR_{t-j} + \sum_{j=0}^{m} \alpha_{5j} \Delta LogIPI_{t-j} +$$
$$+ \alpha_6 LogSE_{t-1} + \alpha_7 LogEPU^{+}_{t-1} + \alpha_8 LogEPU^{-}_{t-1} +$$
$$+ \alpha_9 IR_{t-1} + \alpha_{10} LogIPI_{t-1} + e_t, \quad (4)$$

In Eq. 4, the long-run impacts of EPU^{+}_{t} EPU^{+}_{t} and EPU^{-}_{t} indices on SE were determined using the signs and significances of normalised ($-\alpha_7$ / α_6) and $-(\alpha_8$ / $\alpha_6)$, respectively. Furthermore, the long-run impacts of *IR* and *IPI* were determined by the signs and significances of normalised ($-\alpha_9 / \alpha_6$) and $-(\alpha_{10}$ / $\alpha_6)$, respectively. Eq. 4 was estimated separately for seven developed countries, and the findings were compared.

4. Empirical Findings

Before running the nonlinear ARDL model, we needed to determine whether the series was stationary. If so, we needed to understand whether the series had long-run cointegration relationships. For the stationary series, we applied the Vogelsang and Perron (1998) unit root test with structural break because our sample period covered the 2008 global financial crisis. The results of this test are reported in Table 1.

Test results in Table 1 show that some series were I(0) and others were I(1). The detected structural break dates of the model perfectly correspond to the period of the 2008 global financial crisis and the COVID-19 pandemic. Hence, we can test the cointegration relationships between the series. To this aim, we applied bounds testing developed by Pesaran et al. (2001). The results of bounds testing are reported in Table 2.

Test results in Table 2 show that the series were cointegrated at least at the 10 % significance level because the calculated F- statistic was above the upper bound. The test results of the nonlinear ARDL model and diagnostics are reported in Table 3.

As the normalised long-term coefficients in Table 3 suggest, an increase in economic policy uncertainty in the United States affects the stock market index negatively, and a decrease in these uncertainties affects the stock market positively. However, these effects are not statistically significant. An increase in IRs reduces the stock market index, whereas an increase in IPI positively affects the stock market index. According to WLR test, the null hypothesis of symmetry is rejected, and the effect of positive and negative economic policy uncertainties (*EPU*$^+$ and *EPU*$^-$) on the stock market is asymmetric.

As the normalised long-term coefficients obtained for Germany show, increases and decreases in economic policy uncertainties also positively affect the stock market index. This suggests that more fundamental macroeconomic factors rather than news in newspapers are more important in affecting the stock market index in Germany. While rising IRs reduce the stock market index, rising IPIs have a positive effect on the stock market index. However, although these effects are in line with our expectations, they are not statistically significant. According to WLR test, the null hypothesis of symmetry is not rejected, and the effect of positive and negative economic policy uncertainties (*EPU*$^+$ and *EPU*$^-$) on the stock market is symmetrical.

As the normalised long-term coefficients obtained for Canada show, increasing uncertainty in economic policy decreases the stock market index in line with our expectations, whereas decreasing uncertainty increases the stock market index. However, these effects are symmetrical but not statistically significant. Whereas rising IRs reduce the stock market index, the rise of the manufacturing industry index has a positive effect on the stock market index. These effects are consistent with our expectations and statistically significant.

As the normalised long-term coefficients obtained for Japan show, increasing uncertainty in economic policy reduces the stock market index in line with our expectations, and this result is also statistically significant. A decrease in uncertainty in economic policy increases the stock market index; however, this effect is not statistically significant. Whereas rising IRs reduce the stock market index, rising IPIs have a positive effect on the stock market index. These effects are consistent with our expectations and statistically significant. According to WLR test, the effects of the increase and decrease of uncertainties in economic policies on the stock market index are asymmetrical.

As the normalised long-term coefficients obtained for Italy show, the decrease in uncertainty in economic policy increases the stock market index, and this effect is statistically significant. Whereas rising IRs reduce the stock market index, the rise of IPI has a positive effect on the stock market index. These effects are in line with our expectations. According to WLR test, the effects of increases and decreases in economic policy uncertainties on the stock market index are asymmetric.

Table 1

Vogelsang and Perron (1998) unit root test with structural break results

Variable	US		Germany		Canada		Japan		Italy		France		UK	
	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates	Test Statistics (Prob.)	Structural Break Dates
LogSE	−2.36 (0.93)	2011:M09	−2.72 (0.82)	2009:M02	−3.25 (0.53)	2003:M03	−2.89 (0.74)	2012:M10	−3.84 (0.21)	2008:M01	−2.51 (0.89)	2012:M05	−3.08 (0.63)	2009:M02
Δ*LogSE*	-16.30^{***} (0.00)	2008:M10	-15.96^{***} (0.00)	2002:M09	-14.57^{***} (0.00)	2020:M03	-15.82^{***} (0.00)	2008:M10	-17.02^{***} (0.00)	2020:M04	-15.31^{***} (0.00)	2020:M03	-16.73^{***} (0.00)	2020:M03
$LogEPU^{+}$	−0.04 (0.99)	2006:M12	−1.62 (0.99)	2005:M04	−0.93 (0.99)	2013:M09	−1.12 (0.99)	2007:M06	−1.37 (0.99)	2014:M08	−1.77 (0.99)	2005:M08	−1.44 (0.99)	2005:M08
$\Delta LogEPU^{+}$	-19.29^{***} (0.00)	2008:Md09	-21.28^{***} (0.00)	2000:M11	-19.38^{***} (0.00)	2008:M10	-18.61^{***} (0.00)	2008:M10	-20.39^{***} (0.00)	2000:M11	-23.04^{***} (0.00)	2000:M11	-19.45^{***} (0.00)	2000:M11
$LogEPU^{-}$	0.23 (0.99)	2010:M07	−1.32 (0.99)	2005:M09	−2.17 (0.96)	2011:M12	−1.24 (0.99)	2008:M01	−1.38 (0.99)	2013:M04	−2.02 (0.98)	2003:M03	−0.99 (0.99)	2004:M11
$\Delta LogEPU^{-}$	-20.38^{***} (0.00)	2000:M11	-22.30^{***} (0.00)	2000:M11	-21.53^{***} (0.00)	2000:M11	-20.96^{***} (0.00)	2000:M11	-20.68^{***} (0.00)	2017:M08	-24.31^{***} (0.00)	2000:M11	-21.51^{***} (0.00)	2000:M11
IR	−3.17 (0.57)	2008:M10	-5.50^{***} (0.00)	2008:M10	-4.26^{*} (0.08)	2008:M09	−1.56 (0.99)	2012:M10	-5.82^{***} (0.00)	2008:M10	-5.51^{***} (0.00)	2008:M10	-9.06^{***} (0.00)	2008:M10
Δ*IR*	-11.99^{***} (0.00)	2020:M04	–	–	–	–	-12.48^{***} (0.00)	2007:M02	–	–	–	–	–	–
LogIPI	−3.14 (0.60)	2009:M05	−3.08 (0.63)	2009:M04	−3.05 (0.65)	2013:M06	−3.60 (0.32)	2020:M02	-4.39^{*} (0.05)	2008:M06	-4.90^{**} (0.01)	2008:M04	-4.90^{**} (0.01)	2008:M08
Δ*LogIPI*	-12.94^{***} (0.00)	2008:M09	-20.17^{***} (0.00)	2020:M04	-15.41^{***} (0.00)	2020:M06	-15.57^{***} (0.00)	2011:M03	–	–	–	–	–	–

Note: ***, ** and * denote statistical significance at the 1 %, 5 %, and 10 % levels, respectively. The optimal lags were automatically selected using the Schwarz Information Criterion. Δ denotes the first differences of the series.
Source: Calculated by the authors (using sources mentioned in the Data Set section).

Table 2

Results of bounds testing

	k	*F* stat.	Critical Values					
			I0 Bound			I1 Bound		
			10 %	5 %	1 %	10 %	5 %	1 %
US	4	5.46^{**}	3.03	3.47	4.40	4.06	4.57	5.72
Germany	4	4.53^{*}	3.03	3.47	4.40	4.06	4.57	5.72
Canada	4	4.90^{***}	2.20	2.56	3.29	3.09	3.49	4.37
Japan	4	6.45^{***}	2.20	2.56	3.29	3.09	3.49	4.37
Italy	4	5.66^{***}	2.20	2.56	3.29	3.09	3.49	4.37
France	4	4.89^{***}	2.20	2.56	3.29	3.09	3.49	4.37
UK	4	3.31^{*}	1.90	2.26	3.07	3.01	3.48	4.44

Note: k is the number of regressors. ***, **, and * denote cointegration at the 1 %, 5 %, and 10 % significance levels, respectively.
Source: Calculated by the authors (using sources mentioned in the Data Set section).

Table 3

Nonlinear ARDL model estimation results

	US	Germany	Canada	Japan	Italy	France	UK
Variable	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**	**Coef. (Prob)**
$LogSE_{t-1}$	0.74^{***} (0.00)	0.72^{***} (0.00)	0.32^{***} (0.00)	0.52^{***} (0.00)	0.83^{***} (0.00)	0.58^{***} (0.00)	0.89^{***} (0.00)
$LogEPU^{+}_{t-1}$	0.003 (0.82)	-0.04^{***} (0.00)	0.007 (0.85)	0.05^{***} (0.00)	–0.006 (0.56)	0.004 (0.82)	–0.005 (0.56)
$LogEPU^{-}_{t-1}$	–0.008 (0.70)	-0.04^{***} (0.00)	–0.001 (0.98)	–0.006 (0.64)	-0.02^{*} (0.09)	–0.008 (0.64)	–0.003 (0.72)
IR_{t-1}	0.02^{*} (0.06)	0.008 (0.85)	0.08^{***} (0.00)	1.00^{***} (0.00)	0.11^{***} (0.00)	0.03 (0.59)	0.06^{***} (0.00)
$LogIPI_{t-1}$	-0.41^{*} (0.09)	–0.03 (0.60)	-0.52^{***} (0.00)	-0.51^{***} (0.00)	-0.67^{***} (0.00)	0.42^{***} (0.00)	–0.08 (0.22)
$\Delta LogSE_{t-1}$	—	0.33^{***} (0.00)	—	—	—	0.47^{***} (0.00)	—
$\Delta LogSE_{t-4}$	0.39^{***} (0.00)	—	0.82^{***} (0.00)	-0.20^{***} (0.00)	0.39^{***} (0.00)	0.31^{**} (0.01)	0.38^{***} (0.00)
$\Delta LogSE_{t-9}$	—	-0.23^{**} (0.01)	—	—	—	—	-0.62^{***} (0.00)
$\Delta LogSE_{t-11}$	—	–0.06 (0.43)	—	—	—	—	—
$\Delta LogEPU^{+}_{t}$	-0.09^{***} (0.00)	-0.19^{***} (0.00)	-0.08^{**} (0.04)	—	—	—	0.04^{***} (0.00)
$\Delta LogEPU^{+}_{t-3}$	—	—	0.04 (0.31)	—	—	0.06^{**} (0.04)	—
$\Delta LogEPU^{+}_{t-7}$	—	0.09^{***} (0.00)	—	0.05^{**} (0.02)	—	—	—
$\Delta LogEPU^{+}_{t-9}$	-0.05^{***} (0.00)	0.05^{***} (0.00)	—	-0.12^{***} (0.00)	—	—	-0.07^{***} (0.00)
$\Delta LogEPU^{-}_{t}$	—		-0.12^{**} (0.03)	–	-0.03^{***} (0.00)	—	—
$\Delta LogEPU^{-}_{t-2}$	—	-0.06^{***} (0.00)	–0.06 (0.14)	–	—	—	–0.01 (0.29)
$\Delta LogEPU^{-}_{t-4}$	—	-0.05^{***} (0.00)	0.10^{***} (0.00)	0.05^{**} (0.02)	-0.04^{**} (0.01)	0.11^{***} (0.00)	-0.08^{***} (0.00)
ΔIR_{t}	-0.12^{***} (0.00)	—	0.04^{**} (0.04)	2.11^{***} (0.00)	—	—	—
ΔIR_{t-2}	—	0.16^{*} (0.05)	—	2.23^{***} (0.00)	0.75^{***} (0.00)	—	0.08^{***} (0.00)
$\Delta LogIPI_{t}$	0.72^{**} (0.02)	—	0.05^{**} (0.01)	—		0.84^{***} (0.00)	
$\Delta LogIPI_{t-2}$	0.58^{**} (0.01)	—	-0.03^{**} (0.03)	—	1.25^{***} (0.00)		-0.32^{***} (0.00)
Constant	3.65^{***} (0.00)	2.44^{***} (0.00)	8.62^{***} (0.00)	6.08^{***} (0.00)	4.43^{***} (0.00)	1.21 (0.11)	1.31^{***} (0.00)
Normalized Long Run Coefficients							
$LogEPU^{+}_{t}$	–0.004 (0.82)	0.05^{**} (0.01)	–0.02 (0.86)	-0.10^{***} (0.00)	0.007 (0.57)	–0.006 (0.82)	0.006 (0.56)
$LogEPU^{-}_{t}$	0.01 (0.71)	0.06^{***} (0.00)	0.003 (0.98)	0.01 (0.64)	0.02^{*} (0.09)	0.01 (0.65)	0.03 (0.72)
IR_{t}	-0.02^{**} (0.03)	–0.01 (0.85)	-0.24^{**} (0.01)	-1.93^{***} (0.00)	-0.14^{**} (0.01)	–0.05 (0.59)	-0.09^{***} (0.00)
$LogIPI_{t}$	0.56^{*} (0.05)	0.04 (0.60)	1.62^{**} (0.01)	0.99^{***} (0.00)	0.80^{***} (0.00)	0.72^{**} (0.02)	0.09 (0.18)
Diagnostic Tests							
R^2	0.97	0.93	0.82	0.99	0.93	0.96	0.99
R^2	0.97	0.92	0.77	0.99	0.92	0.94	0.98
DW	2.27	1.96	1.72	1.82	1.90	2.07	1.86
χ^2_{SC}	4.52 (0.10)	3.62 (0.15)	3.69 (0.12)	2.94 (0.45)	4.25 (0.12)	3.85 (0.25)	1.28 (0.86)
χ^2_{W}	76.94 (0.38)	20.77 (0.18)	39.68 (0.09)	18.16 (0.19)	18.27 (0.07)	9.38 (0.58)	7.08 (0.93)
χ^2_{RR}	0.47 (0.49)	2.88 (0.09)	7.94 (0.66)	0.12 (0.72)	1.24 (0.26)	2.06 (0.16)	0.74 (0.39)
χ^2_{NOR}	0.43 (0.80)	2.20 (0.33)	2.16 (0.33)	1.79 (0.44)	1.37 (0.10)	1.66 (0.43)	0.41 (0.27)
W_{LR}	–0.01 (0.00)	–0.01 (0.27)	–0.02 (0.02)	–0.12 (0.00)	–0.01 (0.00)	–0.02 (0.05)	0.002 (0.20)

Note: ***, **, and * denote statistical significance at the 1 %, 5 %, and 10 % levels, respectively. W_{LR} and W_{SR} are long- and short-run Wald tests. Critical t-table values are 2.32, 1.64, and 1.28 for 1 %, 5 %, and 10 %. # denotes t- statistic. DW: Durbin — Watson autocorrelation test, χ^2_{SC}: Breusch — Godfrey LM test for autocorrelation. χ^2_{NOR}: Jarque — Bera test for normality. χ^2_{RR}: Ramsey RESET test for functional form misspecification. χ^2_{W}: White heteroscedasticity test. All model specification test results are reliable. W_{LR}: long-run Wald test statistics.
Source: Calculated by the authors (using sources mentioned in the Data Set section).

Table 4

Summary of long-term analysis results

	US	Germany	Canada	Japan	Italy	France	UK
$LogEPU_t^+$		+		–			
$LogEPU_t^-$		+			+		
IR_t	–		–	–	–		–
$LogIPI_t$	+		+	+	+	+	

Source: Calculated by the authors (using sources mentioned in the Data Set section).

As the normalised long-term coefficients obtained for France show, increasing uncertainties in economic policies decrease the stock market index in line with our expectations, whereas decreasing uncertainties increase the stock market index. However, these effects are not statistically significant. Similarly, an increase in IRs has a decreasing but statistically insignificant effect on the stock market. An increase in IPI, on the other hand, has a positive and statistically significant effect on the French stock market in line with our expectations. According to WLR test, the effects of the increase and decrease of uncertainties in economic policies on the stock market index are asymmetrical.

As the normalised long-term coefficients obtained for England show, increasing or decreasing uncertainty in economic policy has no statistically significant effect on the stock market index. This implies that the UK stock market index is based on more fundamental macroeconomic factors than news in newspapers. The increase in IRs affects the stock market negatively, in line with our expectations. The rise of IPI has no statistically significant effect on the UK stock market. According to WLR test, the effects of increases and decreases in uncertainty in the United Kingdom's economic policy on the stock market index are symmetrical. The results of the long-term analysis in Table 3 are summarised in Table 4.

As can be seen in Table 4, increasing uncertainty in economic policy affects the stock market index negatively only in Japan. A decrease in economic policy uncertainty positively affects the stock market index in Germany and Italy. Rising IRs have a negative impact on the stock market index in the United States, Canada, Japan, Italy, and the United Kingdom. An increase in the manufacturing industry index positively affects the stock market index in the United States, Canada, Japan, Italy, and France. The findings of the present study are partially compatible with the results obtained by Bahmani-Oskooee and Saha (2019a; 2019b) and Batabial and Killins (2021), in the literature using the similar method.

5. Conclusions

This study explored the relationship between economic policy uncertainties and the stock markets in G7 countries in the period 1998:M05–2020:M09. The study method, known as the nonlinear ARDL, was able to capture symmetries and asymmetries in the relationship between economic policy uncertainties and the stock markets. The results show that an increase in uncertainty in economic policy negatively affects the stock market index only in Japan. A decrease in economic policy uncertainty positively affects the stock market index in Germany and Italy. Rising IRs have a negative impact on the stock market index in the United States, Canada, Japan, Italy, and the United Kingdom. An increase in IPI positively affects the stock market index in the United States, Canada, Japan, Italy, and France. The impact of uncertainties in economic policy on the stock market index is symmetrical in Germany, France, and the United Kingdom, and asymmetrical in the United States, Canada, Japan, and Italy.

The findings support the idea that investors who trade in stocks in the United States and Canada should think about uncertainties in interest rates and industrial production indices; investors in the German market should think about uncertainties in economic policy; investors in Japan should think about the increase of uncertainties in economic policy, IRs and IPI; investors in Italy should think about the decrease in uncertainties in economic policy, IRs and IPI; investors in France should think about uncertainties in IPI; investors in the United Kingdom should think about IRs.

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