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The Effects of Policy Uncertainty on Stock Prices: Revisiting with Selected Countries

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Abstract. Released by Policy Uncertainty, the economic policy uncertainty (EPU) index is built on newspaper reports that contribute to uncertain conditions. The present study examines the impact of the EPU index on stock price indices on a selected group of countries. Variations in stock price indices are explained in a similar fashion as in previous studies but this study employs a new dataset. To obtain the speeds of adjustment to long-run equilibrium and short-run elasticities in every country, the framework of error correction was applied. This paper concludes that increased uncertainty has unfavorable short-run effects in all countries in the dataset. The present study also reports negative relation in the long run between high uncertainty and stock prices in some countries.
Keywords: Policy uncertainty, Stock prices, ARDL

1. Introduction

Changes related to economic activities and policies always draw the attention of academia and businesses since the results may have significant impacts on the markets. Bernanke (1983) makes the point that negative effects on the overall economy can be due to reluctant spending and investment decisions of businesses, consumers, and investors. Bernanke also mentions that firms may delay future investment plans and hiring during high economic uncertainty, all of which can produce a contraction in the economy.

Many researchers and investors show deep interests about policy uncertainty following major events such as financial crisis, increased tensions between countries, and partisan disputes in nations. General expected reaction of stock market to bad news is fall in prices, and rise in prices to good news. One of the most remarkable undesirable effects was due to the recent global pandemic. Due to caused uncertainty, most indicators had reached their peak values and had a record negative impact on stock prices around world. But as usual, the markets get back to their normal levels and stock prices increase once the uncertainty is relieved. This unclear trading nature is also driven by some other factors.

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Pastor and Veronesi (2012) states that the reason why the market behaves negatively for a period is because when, for example, the US government cannot decide on a budget and worst outcome is expected by market participants.

Quantification of unclear factors into a one amount over time can help one evaluate its effect on stock prices. Baker, Bloom, and Davis (2016) build the EPU index that catches uncertainty from news outlets, policy, and other economic indicators. The authors systematically employ three different elements to collect factors and turn them into a new single index. They use 10 large newspapers' coverage to constructed by policy-related economic uncertainty for their first component. The expiration of the federal tax code is investigated by their second component and finally the third one investigates economic forecasters' disagreement that comes from Federal Reserve Bank of Philadelphia's Survey.

Earlier studies employ the newly established policy uncertainty index and evaluate the effects on other macro values. Risk premia reaction and market returns by uncertainty index studies are done by Pastor and Veronesi (2012), Aye, Balcilar, Demirer, and Gupta (2018), and Das and Kumar (2018). Durmaz (2023) studies the effect of uncertainty index and its subindices on closed-end funds. Oil prices and uncertainty index relationships are explored by Bahmani-Oskooee et al. (2018), Istiak and Alam (2019) and Pham and Nguyen (2022). Bahmani-Oskooee et al. (2016) also look at the effect of policy uncertainty on the US money demand.

The purpose of this paper is to estimate long- and short-run effects of policy uncertainty on stock prices. For this, I use a new Economic Policy Uncertainty Index (EPU) developed by Baker, Bloom, and Davis (2016) on the frequency of newspaper reports, which represents changes in policy-related economic uncertainty. The analysis is based on time series data for monthly but different time periods for a total of 11 countries (10 of which are OECD members). These 11 countries are: Belgium (BEL), Colombia (COL), Croatia (HRV), Denmark (DNK), Greece (GRC), Ireland (IRL), Italy (ITA), Mexico (MEX), Spain (ESP), Sweden (SWE), and Singapore (SGP).

The present study employs the autoregressive distributed lag (ARDL) established in Pesaran, Shin, and Smith (2001). This ARDL bounds testing procedure is to overcome the spurious regression problem of stochastic trends' presence that is usually seen in economic time series. Since most macro variables in a given model are combinations of I(0) and I(1), prestage unit root tests are unnecessary. This therefore makes this methodology advantageous over other approaches to cointegration.

2. Literature Review

Identifying stock price determinants is one of the important subjects of financial economics. Fama and French (1993) identifies five common risk factors in stock and bond returns of which three are stock market factors: overall market factors and factors related to company size and book-to-market value. A review article by Bahmani-Oskooee and Saha (2015) points out some of the main determinants of stock prices for most of the countries such as exchange rates, monetary aggregation, consumer price indices, domestic production, and interest rates, among others. The same study by Bahmani-Oskooee and Saha (2015) go over many studies in detail for the mentioned factors. Ma, Wang, and He (2022) find a relationship between increased stock volatility and high economic policy uncertainty. Tsai (2017) shows that Chinese EPU has the most impact on the global stock market. In a selected country study, Škrinjarić and Orlović (2020) report spillover effects between risk, return, and EPU in some of the countries.

Anari and Kolari (2001) use stock price and commodity price data from six industrial countries to demonstrate a positive, long-term Fisher effect for stock returns. Bahmani-Oskooee and Saha (2016) introduce nonlinearity into the adjustment process and demonstrate that the impact of exchange rate changes on stock prices is asymmetric and short-term. Degiannakis, Filis, and Arora (2018) estimate causal effects between oil and stock markets depend heavily on whether research is performed using aggregate stock market indices, sectorial indices, or firm-level data and whether stock markets operate in net oil-importing or net oil-exporting countries. Additionally, conclusions vary depending on whether studies use symmetric or asymmetric changes.

Another study by Bahmani-Oskooee and Saha (2019) investigates stock prices and uncertainty relationship in 13 countries. Caporale, Hunter, and Ali (2014) use data from the banking crisis, between 2007 and 2010, and examine the nature of the link between stock market prices and exchange rates in six advanced economies.

Granger, Huangb, and Yang (2000) apply recently developed unit root and cointegration models to determine the appropriate Granger relationship between stock prices and exchange rates and conclude that the exchange rates guide the stock price. Kutty (2010) examines the relationship between Mexican stock prices and exchange rates and confirms that there is a short-term but no long-term relationship between these two variables. Kollias, Mylonidis, and Paleologou (2012) study daily data to explore the link between stock prices and exchange rates for two European composite stock market indices. Jiang, El Khoury, Alshater, and Yoon (2024) examine the relationship between stock prices and exchange rates in the Australian context.

Lean, Narayan, and Smyth (2011) find that exchange rates and stock prices have primarily impacted each other in content, which is reflected in the short-term intertemporal linkages between these financial variables. Xie, Chen, and Wu (2020) claim that stock price may be used in estimation of exchange rates, however the opposite is not useful. Salisu and Vo (2021) show how stock prices behave with the exchange rates given the extreme fluctuations in interest rates. In their nonlinear approach, Nusair and Olson (2022) indicate differential long-term relationship between stock prices and exchange rates in G7 countries.

Tsagkanos and Siriopoulos (2013) report a normal relationship between stock prices and exchange rates, which is long-run in EU and short-run in USA, during the financial crisis between 2008 and 2012 in EU and USA. Tian, El Khoury, and Alshater (2023) study the spillover effects of exchange rates on the stock prices in emerging economies and conclude a nonlinear and negative relationship between these two. Chang, Chang, and Wang (2024) examine the relationship between stock prices and exchange rates in Taiwan and find a negative Granger causality.

Previous research shows that adverse effects of exchange rates happen to be more common in developing countries than developed countries (Durmaz 2015; Bahmani-Oskooee and Durmaz 2016). The purpose of this paper is to test the impact of economic policy uncertainty on stock prices in selected countries. Inclusion of countries depends on the availability of data collection on pertinent variables. Thus, Section 2 presents a model which includes the EPU index as one of the determinants of stock prices and discusses the applied methodology. Section 3 then presents the findings, and the summary is in Section 4. Lastly, Appendix A and B provide the data definitions and sources.

3. The model and methodology

The present paper follows the works of Boonyanam (2014) and Moore and Wang (2014). Borrowing earlier studies is a straightforward way to evaluate policy uncertainty effects on stock prices. I also add a new variable as an additional determinant.

$$LnSI_t = a + bLnNEX_t + cLnPI_t + dLnCPI_t + dLnM2_t + fLnEPU_t + \in_t \quad (1)$$

where SI represents the stock price indices, NEX is the nominal effective exchange rate, PI is the Industrial Production Index, which is a measure of output, CPI measures the price level which is the Consumer Price Index, next is M2, measure of nominal money supply, and lastly, I introduce EPU, measure of economic policy uncertainty index. Firms that are listed with certain stocks that are import or export focused could have a negative or positive sign for an estimate of coefficient b. Since a devaluation of the domestic currency will increase the exports of export-intensive firms, these firms should see their profits and stock prices increase as a result.

However, another expected result is that currency devaluation may increase the import costs and decrease the profits of import-reliant firms, which would decrease the stock prices of such firms. A positive sign is expected for an estimate of coefficient c because more economic activity would increase stock prices. Due to a lack of availability of monthly GDP data, the industrial productivity index is used. The coefficient of CPI, d, may also be positive or negative.

Arguments by Fama (1981) and Chen et al. (1986) point out that inflation is expected to result in high input prices with reduced profits which would decrease stock prices. But Anari and Kolari (2001) show that while stock prices and inflation are negatively correlated in the short run, this correlation could flip positive in the long run. The practice of an inflation hedge by holding stocks longer periods may yield a positive relationship between inflation and stock prices. Similarly, an estimate of e could be positive or negative as well. Since increases in the money supply causes inflation, Fama (1981) points out that it could negatively affect stock prices. On the other hand, lower interest rates after a money supply increase could lead to more investment opportunities and growth in the economy which result in increased stock prices.

To conclude, an estimate of f is negative. An increase in uncertainty is expected to result in a negative reaction from investors that would decrease stock prices. Figure 1 plots the behavior of the EPU index over the period of the datasets of included countries.

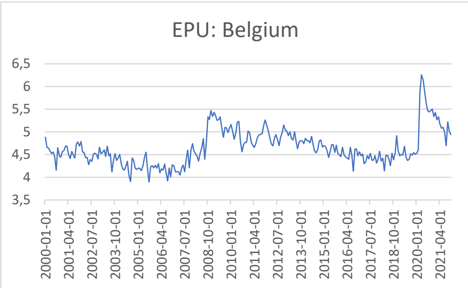

Figure 1a plots the behavior of the EPU index for Belgium.

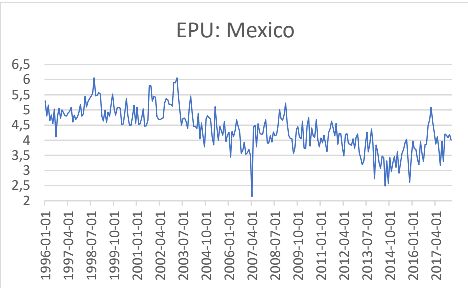

Figure 1b plots the behavior of the EPU index for Mexico.

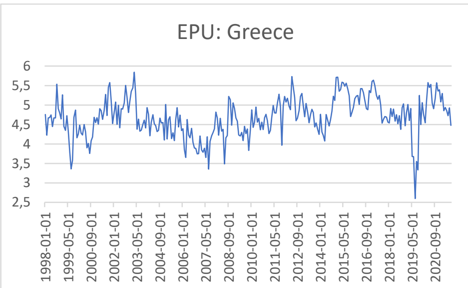

Figure 1c plots the behavior of the EPU index for Greece.

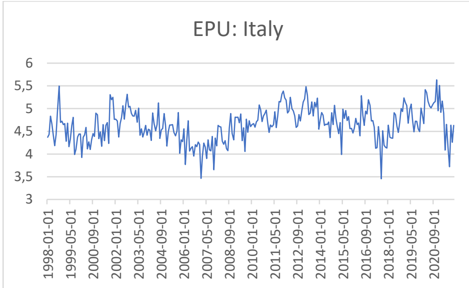

Figure 1d plots the behavior of the EPU index for Italy.

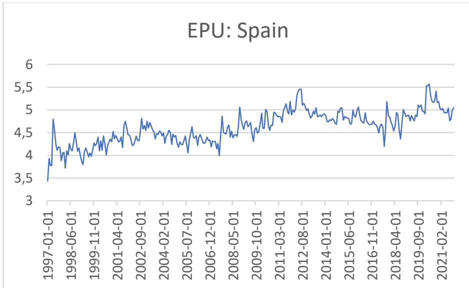

Figure 1e plots the behavior of the EPU index for Spain.

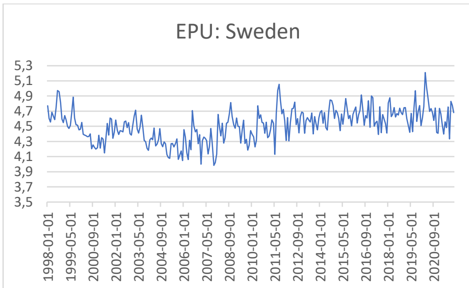

Figure 1f plots the behavior of the EPU index for Sweden.

Figure 1. EPU Plot for some countries (source: author)

Long-run effects of used independent variables to explain stock price variations will be obtained by estimating equation (1) by an applied methodology. Using equation (1), I will construct an error-correction model to point out the differences in short-run and long-run effects. The present paper follows the previous studies and applies Pesaran et al.'s (2001) ARDL bounds test method by converting equation (1) into (2):

$$\Delta LnSI_t = \alpha_0 + \sum_{j=1}^{k1} \beta_j \, \Delta LnSI_t + \sum_{j=0}^{k2} \phi_j \, \Delta LnNEX_{t-j} + \sum_{j=0}^{k3} \delta_j \, \Delta LnPI_{t-j} + \sum_{j=0}^{k4} \gamma_j \, \Delta LnCPI_{t-j} + \sum_{j=0}^{k5} \theta_j \, \Delta LnM2_{t-j} + \sum_{j=0}^{k6} \varphi_j \, \Delta LnEPU_{t-j} + \psi_1 LnSI_{t-1} + \psi_2 LnNEX_{t-1} + \psi_3 LnPI_{t-1} + \psi_4 LnCPI_{t-1} + \psi_5 LnM2_{t-1} + \psi_6 LnEPU_{t-1} + \varepsilon_t \quad (2)$$

After estimating coefficients of first-differenced variables, their signs and magnitudes will determine short-run effects. In equation (2), the estimates ψ_2, ψ_3, ψ_4, ψ_5, and ψ_6 measure the normalized value of long-run effects which is ψ_1. In order to have sound estimated long-run effects, Pesaran et al. (2001) propose two different cointegration tests. The first cointegration test is an F-test that will specify the designed joint significance of lagged level variables. For the other test, a t-test will be applied to prove the importance of ψ_1 in equation (2). The order of integration of variables is found by new critical values of nonstandard distributions of these two recommended tests. It is common in most empirical studies that one of the properties of most macro variables is a combination of I(0) and I(1). The present paper is also no different from those studies. Thus, I take advantage of employing this approach and skip pre-unit-root testing on the used variables. One more advantage this methodology also presents is the ability to estimate short-run and long-run effects in a single step.

4. The results and discussion

This section discusses the error correction model (2) for the countries listed in Table 1 using the monthly data over the time period listed in the same table. The time period depends on the availability of the dataset from the sources provided in the Appendix. The present study imposes a maximum of ten lags and, to select an optimum model, it uses Akaike's Information Criterion (AIC). The associated levels of significance provided in the table notes to recognize an estimate with an asterisk * if it is significant at a 10% level of significance, and ** if it is significant at a 5% level of significance. This paper separates reports into three parts per table by short-run estimates in Panel i, long-run estimates in Panel ii, and diagnostics in Panel iii.

I choose to include only five countries in Table 1 that have all the variables with at least one significant lagged coefficient. This implies that variables have short-run effects on stock prices. The present study's focus is on the economic policy uncertainty measure (EPU), which has shown short-run effects on all five countries' stock prices. It has the correct significant negative sign which suggests that economic uncertainty indeed negatively impacts stock prices in the short run in five cases. As expected, an increase in unclear economic policy indeed leads a fall in the stock markets of Belgium, Greece, Italy, Mexico, and Spain. These results are all in line with the previous literature findings (Tsai, 2017; Fortunato et al, 2020; Wang et al, 2020; Abid, 2020). Economic policy uncertainty is an important factor in explaining financial movements in developing countries such as Mexico, and in European countries as well. The next discussion inquires whether the short-run effects continue in the long run or not.

Table 1. Estimate of multivariate model (2)

	Belgium	Greece	Italy	Mexico	Spain
Panel i: Short Run					
ΔlnEPU$_t$	-0.09 (0.02)**	-0.10 (0.03)**	-0.03 (0.01)**	-0.02 (0.01)*	-0.15 (0.02)**
Lag 1			-0.06 (0.02)**		0.01 (0.03)
Lag 2			-0.05 (0.02)**		0.05 (0.02)**
Lag 3			-0.02 (0.02)		
Lag 4			-0.01 (0.03)		
Lag 5			0.01 (0.02)		
Lag 6			-0.02 (0.01)*		
Panel ii: Long Run					
Constant	10.53 (3.71)**	2.70 (30.0)	14.11 (6.72)**	-4.65 (22.14)	0.13 (6.50)
LnNEX$_t$	-3.04 (0.95)**	7.15 (7.61)	-0.62 (1.19)	-1.01 (0.97)	2.08 (2.14)
LnPI$_t$	0.26 (0.58)	0.82 (2.00)	1.12 (0.84)	-2.75 (3.82)	0.34 (0.61)
LnCPI$_t$	-10.30 (1.84)**	-6.68 (3.43)*	-3.51 (1.74)**	-2.26 (2.07)	1.78 (1.56)
LnM2$_t$	4.50 (0.73)**	0.34 (1.48)	0.80 (0.57)	1.92 (1.02)*	-0.43 (0.53)
LnEPU$_t$	-0.22 (0.07)**	-1.03 (0.38)**	-0.35 (0.16)**	-0.32 (0.18)*	-0.71 (0.25)**
Panel iii: Diagnostics					
F test	1.98	0.91	2.22	1.12	3.22
ecm$_t$	-0.12 (0.03)**	-0.10 (0.03)**	-0.11 (0.03)**	-0.05 (0.02)**	-0.09 (0.02)**
LM	9.02	8.14	6.76	11.53	8.26
RESET	0.33	2.2	4.24 **	2.93 *	1.05
R-Bar-Squared	0.21	0.26	0.29	0.11	0.17
CS (CS2)	S (S)	S (US)	S (S)	US (US)	S (US)

Source: author

a. Numbers inside the parentheses after coefficient estimates are standard errors. Symbols * and ** indicate significance levels at the 10% and 5% levels, respectively.
b. The upper bound critical value of the F-test for cointegration where there are four exogenous variables is 3.52 (4.01) at the 10% (5%) level of significance. These come from Pesaran et al. (2001, Table CI, Case III, p. 300
c. The critical value for significance of ECM_{t-1} is −3.66 (−3.99) at the 10% (5%) level when k = 4. These come from Pesaran et al. (2001, Table CII, Case III, p. 303)
d. LM is the Lagrange Multiplier statistic to test for autocorrelation. It is distributed as χ^2 with 1 degree of freedom. The critical value is 3.84 (5%)
e. RESET is Ramsey's test for misspecification. It is distributed as χ^2 with one degree of freedom. The critical value is 3.84 (5%)
f. source: author's own estimations.

Panel ii of Table 1 displays that economic policy uncertainty is found to be a statistically significant negative coefficient in the long run in all five countries. The effect does not appear to be temporary and is carried out in the long run. The findings of this paper are consistent with our expectation and past studies' suggestions. Given the high Debt to GDP ratios of Greece, Italy, and Spain, this paper's outcome is applicable. In addition, as Bloom (2014) points out that because emerging countries experience more uncertainty than others, this paper's outcome is consistent.

Another variable included in the study, the nominal exchange rate, is statistically significant only in Belgium, which means it has a negative long-run effect on the stock prices. LnCPI has significant negative long-run effects in Belgium, Greece, and Italy. In these countries an increase in general prices is expected to have a long-run negative effect on stock prices. The LnM2 coefficient carries significant positive long-run effects in Belgium and Mexico. An increase in M2 will lead a long-run positive effect on Belgium and Mexico's stock prices. The industrial production index, LnIPI, is the only variable that does not have any significant long-run effect in any of the five cases.

The present study moves to establish a cointegration in the following to have meaningful and applicable long-run effects. The reported F-test results are insignificant in all countries and thus fail to indicate cointegration. However, by using the normalized long-run estimates from Panel B and the long-run model introduced in equation (1), I produce the error term for an alternative test for cointegration. After designating this error term, ecm, I replace the linear combination of lagged level variables with ecm_{t-1} in equation (2). After imposing the same optimum number of lags, I gather from Panel i, it allows us to estimate the newly introduced measurement.

A supportive cointegration conclusion shall have a significant negative coefficient for the ecm_{t-1}. One has to be careful at this level since the t-test here has a new distribution that is normally applied to evaluate the significance of these estimates. The ARDL approach suggests that included variables in a study may be a combination of I(0) and I(1). Pesaran et al. (2001, P. 303) offer a pre-calculated upper and a lower bound critical value for the necessary t-test. By checking that the provided values of all the countries in the study have significant negative coefficients, I conclude that the long-run effects are acceptable.

Finally, Panel iii reports key diagnostic statistics. Beginning with the Lagrange Multiplier (LM) statistic to test for autocorrelation, it reports a $\chi 2$ distribution with one degree of freedom. The present study tests for first order serial correlation and concludes that in all five cases it is insignificant, free of autocorrelation problem. To check for model misspecification, Panel iii reports Ramsey's RESET statistics. RESET also follows a $\chi 2$ distribution with one degree of freedom. Only Italy and Mexico are found to be significant. The last tests, CUSUM and CUSUMSQ, are applied to the residuals of each model to verify the stability of both the short-run and long-run coefficient estimates. The last column of Panel iii indicates CS and CS^2, where S indicates stable estimates and US indicates unstable ones. Except Mexico, all countries are stable by at least one test.

5. Summary and conclusion

It is common to observe abrupt declines in the behavior of the stock market in any given economy when facing harsh times such as war, political turmoil, recessions, election period, and notably an uncertain situation. Fluctuations in the daily amount of good and bad news typically has an effect on stock prices.

The present paper addresses these unfavorable impacts of economic policy uncertainty on stock prices, and analyses whether they are temporary or long lasting on the stock prices of 11 countries. Further discussions all rely on the broad economic policy uncertainty indices collected from Policy Uncertainty Group, based on Baker et al.'s (2016) study. The Policy Uncertainty Group forms these economic policy uncertainty indices by heavily combing through the newspapers' use of some crucial keywords in associated countries. Most of these newspaper-based words are policy-related macroeconomic variables. Finally, the Policy Uncertainty Group quantifies all these to build the economic policy uncertainty index.

This study concludes that economic policy uncertainty negatively affects stock prices in the short run in all 11 countries: Belgium, Colombia, Denmark, Greece, Ireland, Italy, Mexico, Spain, Sweden, Croatia, and Singapore. Economic policy uncertainty also negatively effects stock prices in the long run in Belgium, Greece, Italy, Mexico, Spain, and Singapore. This paper relies on an ARDL bounds testing approach by Pesaran et al. (2001) in order to form an error-correction model and cointegration, in order to evaluate short- and long-run effects. Additionally, employing economic policy uncertainty index into used models in the present paper helped improve predictability not in the short run but also in the long run and with better explanatory capacity.

This paper's results present some significant policy implications that may be valuable for investors, researchers, and managers. Since the outcome suggests mostly temporary impacts, in the presence of uncertainty, long-term holding of stocks may be a sensible option rather than rushing to sell in the face of volatility. Some abrupt dips in the market may be interpreted as a potential buying opportunity.

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APPENDIX – A (source: author)

No	alpha-3 code	Countries	Time Period in the study	Stock Market Indices
1	BEL	Belgium	January 2000 – November 2021	BEL 20 (^BFX)
2	COL	Colombia	July 2000 – August 2021	FTSE Colombia (WICOL)
3	HRV	Croatia	January 2003 – August 2021	CROBEX (CRBEX)
4	DNK	Denmark	January 2000 – June 2021	Copenhagen 20 (^OMXC20)
5	GRC	Greece	January 1998 – August 2021	FTSE/ATHEX Large Cap (ATF)
6	IRL	Ireland	January 1999 – October 2021	ISEQ All Share (^ISEQ)
7	ITA	Italy	January 1998 – November 2021	FTSE MIB (FTMIB)
8	MEX	Mexico	January 1996 – February 2018	IPC MEXICO (^MXX)
9	SGP	Singapore	January 2003 – June 2021	FTSE Straits Times Index
10	ESP	Spain	January 1997 – November 2021	IBEX 35 (IBEX)
11	SWE	Sweden	January 1998 – November 2021	OMX Stockholm 30 (OMXS30)

APPENDIX – B

Variable Definitions and Data Source
Monthly data over the covered periods listed in Appendix A.

Data come from the following sources:
a. Stock Prices Indices: Yahoo Finance
b. Economic Policy Uncertainty (http://www.policyuncertainty.com).
c. IFS, International Financial Statistics of the IMF.
d. OECD Statistical Database.
e. FRED – Federal Reserve Economics Data, St. Louis Fed.
f. Bank for International Settlements, (https://www.bis.org/statistics/eer.htm?m=2676)

Variables:
SI = Stock Price Index of the country, source a.
EPU = Policy Uncertainty Index, source b.
PI = Industrial Production Index of the country (measure of economic activity), base year = 2010, source c.
CPI = Consumer Price Index of the country, base year = 2010, source c.
M2 = Nominal Money Supply. The data come from source c for all countries
NEX: Nominal Effective Exchange Rate, source f.

APPENDIX – C (source: author)

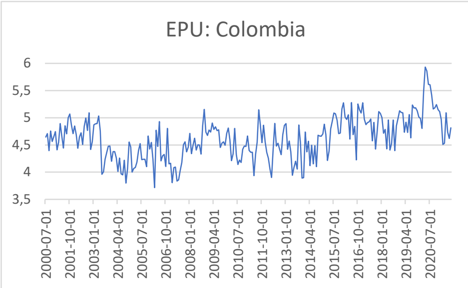

Figure 2a plots the behavior of the EPU index for Colombia.

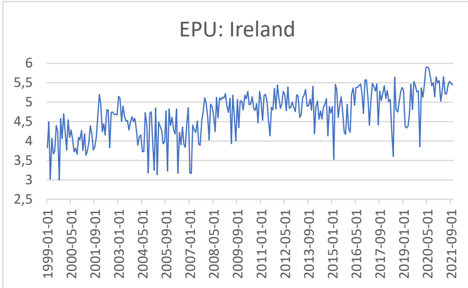

Figure 2d plots the behavior of the EPU index for Ireland.

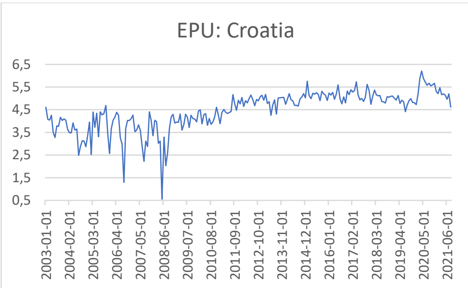

Figure 2b plots the behavior of the EPU index for Croatia.

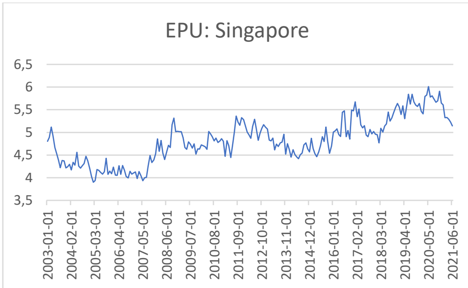

Figure 2e plots the behavior of the EPU index for Singapore.

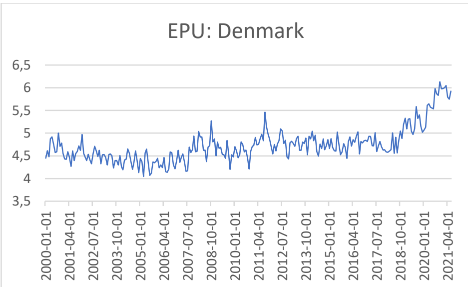

Figure 2c plots the behavior of the EPU index for Denmark.

Figure 2. EPU Plot for additional countries