

Are Stock Prices Related to Political Uncertainty Index in OECD Countries? Evidence from Bootstrap Panel Causality Test

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Abstract

This study applies bootstrap panel causality, proposed by Kónya (2006), to investigate causal link between political uncertainty and stock price for seven OECD countries over the monthly period of 2001.01 to 2013.04. This modeling approach allows us to examine both the cross-sectional dependency and the country-specific heterogeneity. Our empirical results indicate that not all the countries are alike and that the theoretical prediction that stock prices fall at the announcement of a policy change is not always supported. Specifically, we find evidence of the stock price leading hypothesis for Italy and Spain, while the political uncertainty leading hypothesis cannot be rejected for the United Kingdom and the United States. In addition, the neutrality hypothesis was supported in the remaining three countries (Canada, France, and Germany), while the feedback hypothesis, however, is never found.

Keywords: Stock Price; Political Uncertainty Index; Bootstrap Panel Causality Test

JEL Classifications: C23, G12, G18

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1. Introduction

Stock prices are among the most important indicators for capital budgeting and portfolio management decisions as they directly reflect companies' financial health and future prospects. The modern finance theory suggests that stock price is determined as the sum of expected future dividends, discounted at the appropriate risk-adjusted discount rates. While it is now common that changes in market participants' expectations about expected cash flows and/or discount rates are likely to drive stock prices over time, the movements in stock prices seem to be too big to be explained by the actual subsequent events. A number of studies have investigated the extent to which stock returns are explained by patterns in expected cash flows (Shiller, 1981; Marsh and Merton, 1986; Kothari and Shanken, 1992; Pincus et al., 2007; Hirshleifer et al., 2009; Maio and Santa-Clara, 2013). In most of these studies, expectations of cash flows are frequently proxied by dividend yields, dividend-to-price ratio, and earnings variables (earnings-to-price ratio, and dividend-to-earnings ratio). For instance, Shiller (1981) develops an efficient model to examine the factors that accounts for the fluctuations in stock prices and to question whether the latter can be attributed to new information related to real subsequent dividends. The author finds that the volatility of stock prices is much larger than that of the real dividend and points out that the standard deviation of the movements in real dividends is a biased measure of the uncertainty regarding the future dividends. Kothari and Shanken (1992) conduct a cross-sectional analysis of aggregate stock return variation using portfolios formed on the basis of annual return performance and find that nearly 90% of the portfolio return variation is explained by dividend and expected return variables. More recently, Maio and Santa-Clara (2013) examine the predictive ability of dividend yield for future stock returns and dividend growth, and document that the variance decomposition associated with aggregate dividend yield has important influence on the cross-section of stock

returns. Their results remain intact when other forecasting horizons, econometric techniques and an alternative decomposition based on excess returns are used.

The past literature has also provided abundant evidence that time variations in stock prices are closely linked to changing structure of risk factors, business cycles, and macroeconomic aggregate fluctuations (Fama and French, 1989; Schwert, 1990; Ferson and Harvey, 1991; Cochrane, 2008; Kang et al., 2011). The main rationale behind this strand of research is that all investors operating in stocks markets around the world give a close watch to what happens in the economy as a whole and adjust their expectations and investment decisions. For example, Fama and French (1989) show that expected returns on common stock and long-term bonds contain a term premium that is related to business conditions. This finding amounts to say that expected returns tend to be higher during times of economic recessions, and lower during economic expansions. On the other hand, other studies such as Schwert (1990) and Ferson and Harvey (1991) explain the time-variation in stock prices (returns) using the Arbitrage Pricing Theory developed by Ross (1976). They mainly document a significant short-run link between stock market returns and changes in macroeconomic variables including, among others, inflation, interest rates, industrial production, and the term structure of interest rates. Kang et al. (2011) use the conditioning variable from the cointegrating relation among several macroeconomic variables to derive a conditional version of the consumption capital asset pricing model (CCAPM) and show that the latter performs as well as Fama and French's (1993) three-factor model in explaining the cross-section of the Fama and French 25 size and book-to-market sorted portfolios.¹

The impact scheduled and unscheduled macroeconomic news announcements on

¹ This set of macroeconomic variables includes dividend yield, term spread, default spread, and short-term interest rate.

stock returns have been another important topic in the financial economic literature. Flannery and Protopapadagis (2002) assess that these market-wide risk measures affect aggregate stock returns and should be considered as priced factors because they significantly influence the stock price generating processes and, in turn, return distributions.² Likewise, the majority of other studies find evidence to suggest that prices and volatility in various financial markets react substantially and quite instantaneously to macroeconomic news announcements (e.g., Äijö, 2008 for options-implied return distributions; Nikkinen et al., 2006 for stock markets; Balduzzi et al., 2001 for bond markets; Andersen and Bollerslev, 1998 for foreign exchange markets). In particular, Ederington and Lee (1993) study the impact of scheduled macroeconomic news announcements on interest rate and foreign exchange futures markets and find that these announcements are responsible for most of price adjustments and volatility patterns in these markets.

In this article, we join the above-mentioned literature by investigating the causal links between economic policy uncertainty and stock prices for seven countries of the Organization for Economic Co-operation and Development (OECD). Our study is broadly related to studies that examine the determinants of stock price variations over time, and more closely related to studies that concern the interactions between stock returns and macroeconomic variables. For this purpose, we use the economic policy uncertainty index introduced by Baker et al. (2012), which reflects information about media coverage of political uncertainty, tax expiration codes and disagreement among economic forecasters. To the extent that the uncertainty regarding the government intervention in the economy and markets affects consumption, production, economic growth, and company investments, stock prices are likely to respond significantly to

² Flannery and Protopapadagis (2002) identify six candidates for priced factors for stock returns including three nominal (CPI, PPI, and a Monetary Aggregate) and three real (the Balance of Trade, the Employment Report, and Housing Starts).

changes in the economic policy uncertainty index. The higher the level of uncertainty, the more volatile is the stock market.

Questions regarding whether economic policy uncertainty affects stock prices have recently interested academic researchers and practitioners.³ The main motivation arises from the fact that economic policy uncertainties may have greatly contributed to the recent long-swings trend and important instability of stock prices (Baker et al., 2012; Brogaard and Detzel, 2012). Major recent studies tackling this issue provide evidence that the increase in economic policy uncertainty is generally associated with a decline in stock returns and a rise in stock volatility (e.g., Ozoguz, 2009; Dzielinski, 2012; Pástor and Veronesi, 2012; Bhagat et al., 2013; Pástor and Veronesi, 2013; Antonakakis et al., 2013; Kang and Ratti, 2013). For instance, Ozoguz (2009) employs the state probabilities estimated from two-state regime-switching models of aggregate market return and of aggregate output as measures of uncertainty and finds evidence of a negative link between the level of uncertainty and asset valuations. Dzielinski (2012) proposes a new measure of economic uncertainty based on the frequency of internet search and shows that stock returns decrease in the week following an increase in this search-based uncertainty measure, but realized stock volatility increases. The study by Pástor and Veronesi (2012) also concludes on a negative relationship between stock market returns and government policy uncertainty as measured by the variance of policy changes. Antonakakis et al. (2013) look at the dynamic correlations among S&P 500 market returns, implied volatility, and policy uncertainty index of Baker et al. (2012), and find a negative conditional correlation between market returns and policy uncertainty over time. Moreover, the increase in market volatility leads to higher policy uncertainty. Finally, Kang and Ratti (2013) document that oil price

³ The impact of economic policy uncertainty on economic growth, inflation, investment and employment has, however, been long discussed in the past literature (e.g., Marcus, 1981; Bernanke, 1983; Dixit, 1989; Rodrik, 1991; Bloom et al., 2007; Bloom, 2009; Bhagat et al., 2013).

shock and economic policy uncertainty are interrelated and influence stock returns in the United States. In particular, real stock returns decline in response to an unexpected increase in policy uncertainty.

Our article differs from previous literature in two novel ways. First, unlike previous studies which often consider a single country perspective, we examine the existence of cross-sectional dependency between stock prices and political uncertainty as well as heterogeneity across sample OECD countries. As we know that ignoring cross-section dependency leads to substantial bias and size distortions (Pesaran, 2006), implying that testing for the cross-section dependence is a crucial step in a panel data analysis. Second, our panel causality approach is more advantageous than standard panel approaches in that it enables to examine the country-specific causality by accounting for heterogeneity and cross-sectional dependency. This is particularly important because the standard panel approaches generally provide a statistics that evaluates the causality for the whole panel, but are unable to reveal which cross-sectional unit is potentially driving the results. Our results, drawn from a panel of seven OECD countries over the monthly period of 2001.01 to 2013.04, suggest that the causal relationships between political uncertainty and stock prices differ across countries. While we find evidence the unidirectional causality running from stock prices to political uncertainty for Italy and Spain, and from political uncertainty to stock prices for the United Kingdom and United States, the neutrality hypothesis characterize the nexus between these variables for the rest of the sample countries.

The article proceeds as follows. Section 2 explains the methodology. Section 3 describes the corresponding data and the empirical results. Policy implications are also included in this section. Section 4 concludes the article.

2. Methodology

As stated earlier, the purpose of this study is to investigate the causal relationship between stock price and political uncertainty within seven OECD countries (i.e., Canada, France, Germany, Italy, Spain, UK, and the US) over the monthly period of 2001.01-2013.04 by focusing on both panel behavior and country-specific analysis. The method we use to detect the potential causal linkages between stock price and political uncertainty is the so-called the bootstrap panel causality test proposed by Kónya (2006). Compared to traditional causality tests that proceed with testing for the unit root first, and then estimate the error correction model in order to examine the Granger causality, the bootstrap panel causality test has several advantages. First, the bootstrap panel causality test can bypass the unit root tests in which the power of the unit root tests is usually weak and the results vary across different testing methods (Kónya, 2006). Second, due to a failure of accounting for both cross-country interrelations and country-specific heterogeneity, the traditional panel error correction model provides a biased estimation in testing the causal relationship between two time series (Pesaran, 2006). Although the bootstrap panel causality test is more sophisticated than traditional causality tests, these are three issues that should be dealt with before proceeding with the bootstrap panel causality test. We present these issues as follows:

i) Cross-sectional dependency

The first issue in our panel causality analysis is to test the existence of cross-sectional dependence across countries. Pesaran (2006) shows that ignoring cross-section dependency leads to substantial bias and size distortions in estimation and inference of the relationship between two variables. Since a high degree of globalization and market integration makes a country to be sensitive to the economic shocks in other countries, there may exist cross-sectional dependence across these seven OECD countries.

Three tests, CD_{BP} , CD_{LM} , and CD tests⁴, were used to test the cross-sectional dependence of the data. The CD_{BP} test was proposed by Breusch and Pagan (1980). Under the null hypothesis of no cross-sectional dependence for panel data, the CD_{BP} statistic is asymptotically distributed as chi-square with $N(N-1)/2$ degrees of freedom, where N represents number of countries.

Note that the CD_{BP} test is only valid for N relatively small and T (time span) sufficiently large (Pesaran, 2004). Hence, Pesaran (2004) proposes a cross-sectional dependency test (the so-called CD test). Under the null hypothesis of no cross-sectional dependence for panel data as $T \rightarrow \infty$ and $N \rightarrow \infty$ in any order, the CD statistic is asymptotically distributed as standard normal. Although CD test corrects the drawback of CD_{BP} test when N is large, there are two shortcomings of the CD test addressed in the literature. First, the CD test is subject to decreasing power in a certain situation that the population average pair-wise correlations are zero, although the underlying individual population pair-wise correlations are non-zero (Pesaran et al., 2008). Second, the CD test would fail to reject the null hypothesis in stationary dynamic panel data models when the factor loadings have zero mean in the cross-sectional dimension (Sarafidis et al., 2009). In order to deal with these problems, Pesaran et al. (2008) proposed a bias-adjusted test which is a modified version of the CD_{BP} test by using the exact mean and variance of the CD_{BP} statistic. Under the null hypothesis of no cross-sectional dependence for panel data with first $T \rightarrow \infty$ and then $N \rightarrow \infty$, CD_{LM} statistic is also asymptotically distributed as standard normal.

ii) Slope homogeneity

The second issue in our panel causality analysis is to test whether or not slope

⁴ CD_{BP} indicates cross-sectional dependence test of Breusch and Pagan (1980), CD_{LM} indicates cross-sectional dependence based on Lagrange Multiple test, and CD indicates cross-sectional dependence test of Pesaran (2004)

coefficients are homogenous in our empirical model. It does not allow us to capture heterogeneity due to country specific characteristics, if the slope homogeneity is assumed without any empirical evidences (Breitung, 2005). In addition, Granger (2003) stated that the causality from one variable to another variable by imposing the joint restriction for whole panel is a strong null hypothesis (Granger, 2003). The standard F test is a common method to test the null hypothesis of slope homogeneity against the alternative hypothesis of slope heterogeneity. Nevertheless, the standard F test is only valid if these conditions, where (i) the cross section dimension (N) is relatively small and the time span (T) of panel is large, (ii) the explanatory variables are strictly exogenous, and (iii) the error variances are homoscedastic, are justified. By relaxing the homoscedasticity assumption (i.e., condition (iii) mentioned above) in the standard F test, Swamy (1970) derives the slope homogeneity test on the dispersion of individual slope estimates from a suitable pooled estimator.

Note that both the F and Swamy's tests require panel data models where N is small relative to T (Pesaran and Yamagata, 2008). In order to validate the Swamy's test without any restrictions on the relative expansion rates of N and T , the \mathcal{X}^c test was proposed by Pesaran and Yamagata (2008) for testing slope homogeneity in large panels. Under the null hypothesis of slope homogeneity with the condition of $(N, T) \rightarrow \infty$, so long as $\sqrt{N}/T \rightarrow \infty$ and the error terms are normally distributed, the \mathcal{X}^c statistic follows an asymptotic standard normal distribution. The small sample properties of \mathcal{X}^c statistic can be improved under the normally distributed errors by using a bias adjusted statistic (\mathcal{X}_{adj}^c) suggested by Pesaran and Yamagata (2008).

iii) Panel Causality Analysis

The third issue in our panel causality analysis is to deal with both cross-section dependence and slope heterogeneity across sample OECD countries simultaneously.

If these two properties of data are found, the bootstrap panel causality test proposed by Kónya (2006) should be used to simultaneously deal with both cross-section dependency and country-specific heterogeneity in testing the causal relationship between political uncertainty and stock prices. The bootstrap panel causality test is based on Seemingly Unrelated Regression (SUR) estimation of the set of equations and the Wald tests with individual country-specific bootstrap critical values. The special feature of the bootstrap panel causality test is that there is no need to pre-test panel unit root and cointegration properties of the data, because country-specific bootstrap critical values are generated in comparison with the Wald statistic. In addition, one can identify which and how many countries exhibit Granger causal relations by imposing country-specific restrictions. The system to be estimated in the bootstrap panel causality approach is displayed as follows:

$$\begin{aligned}
y_{1t} &= \alpha_1 + \sum_{j=1}^{l_{y1}} \beta_{1j} y_{1t-j} + \sum_{j=1}^{l_{x1}} \delta_{1j} x_{1t-j} + \varepsilon_{1t} \\
y_{2t} &= \alpha_2 + \sum_{j=1}^{l_{y1}} \beta_{2j} y_{2t-j} + \sum_{j=1}^{l_{x1}} \delta_{2j} x_{2t-j} + \varepsilon_{2t} \\
&\vdots \\
&\vdots \\
y_{Nt} &= \alpha_N + \sum_{j=1}^{l_{y1}} \beta_{Nj} y_{Nt-j} + \sum_{j=1}^{l_{x1}} \delta_{Nj} x_{Nt-j} + \varepsilon_{Nt}
\end{aligned} \tag{1}$$

and

$$\begin{aligned}
x_{1t} &= \alpha'_1 + \sum_{j=1}^{l_{y2}} \beta'_{1j} y_{1t-j} + \sum_{j=1}^{l_{x2}} \delta'_{1j} x_{1t-j} + \varepsilon'_{1t} \\
x_{2t} &= \alpha'_2 + \sum_{j=1}^{l_{y2}} \beta'_{2j} y_{2t-j} + \sum_{j=1}^{l_{x2}} \delta'_{2j} x_{2t-j} + \varepsilon'_{2t} \\
&\vdots \\
&\vdots \\
x_{Nt} &= \alpha'_N + \sum_{j=1}^{l_{y2}} \beta'_{Nj} y_{Nt-j} + \sum_{j=1}^{l_{x2}} \delta'_{Nj} x_{Nt-j} + \varepsilon'_{Nt}
\end{aligned} \tag{2}$$

where $y = [y_{1t}, y_{2t}, \dots, y_{Nt}]'$ and $x = [x_{1t}, x_{2t}, \dots, x_{Nt}]'$ denote stock price index and political uncertainty index, respectively. Both y and x were transformed into a

natural logarithm scale. $ly(lx)$ is the lag length of $y(x)$. α_i and α'_i are individual intercepts; β_{ij} and δ_{ij} (β'_{ij} and δ'_{ij}) are slope coefficients in Equation [1] (Equation [2]). ε_{it} and ε'_{it} represent residual terms. Equation [1] and Equation [2] are the SUR system because each equation in this system has different predetermined variables while the error terms might be contemporaneously correlated.

We can construct four alternative hypotheses of causal linkages for a country in the system. First, the political uncertainty leading hypothesis means that there is one-way Granger causality from political uncertainty (x) to stock price index (y) if not all δ_{ij} are zero, but all β'_{ij} are zero. Second, the stock price leading hypothesis states that there is one-way Granger causality running from stock price index (y) to political uncertainty (x) if all δ_{ij} are zero, but not all β'_{ij} are zero. Third, the feedback hypothesis indicates that there is two-way Granger causality between political uncertainty index (x) and stock price index (y) if neither δ_{ij} nor β'_{ij} are zero. Fourth, neutrality hypothesis shows there is no Granger causality between political uncertainty (x) and stock price index (y) if all δ_{ij} and β'_{ij} are zero. As indicated by Kónya (2006), the results from the bootstrap panel causality test may be sensitive to the lag structure. The selection of optimal lag structure is determined by minimizing Schwarz Bayesian Criterion from 1 to 4 lags (Kónya, 2006).⁵ Details regarding how to calculate the bootstrap critical values for Equations [1] and [2] interested readers can refer to Kónya (2006).

⁵ It should be noted that we have tried different lag lengths including 5, 8 and 12 lags, but it appeared that the Schwarz information criterion (SIC or also referred to as the Bayesian Information Criterion) becomes bigger. Consequently, we selected lags from 1 to 4 and found out that the model with three lags is best suited for our data given its smallest SIC value.

3. Data and Empirical Results

The monthly data used in this study covered the period from 2001.01 to 2013.04 for seven OECD countries: Canada, France, Germany, Italy, Spain, UK, and the US. The sample is restricted to those OECD countries for which data on political uncertainty index introduced by Baker et al. (2012) and stock price index are available. These data were obtained from Baker et al. (2012) and the International Financial Statistics maintained by the International Monetary Fund, respectively. The start and end dates of our sample are governed by data availability to ensure a balanced panel structure. Figure 1 plots the political uncertainty index and stock price index of sample countries, while the descriptive statistics are presented in Table 1. As we can see, the stock price index varies across these seven OECD countries from 1195.24 (in the United States) to 27402.59 (in Italy) over the period from 2001.01 to 2013.04. The largest price variability is found in Italy, followed by Canada and Spain. The patterns of changes in Figure 1 show that stock price indices generally exhibit wider fluctuations than their corresponding political uncertainty indices. The latter range from 104.17 (Canada) to 132.56 (United Kingdom). We also observe several periods where political uncertainty indices comove with stock prices for some countries: Italy (2009-2010), Spain (2008-2010), and the United Kingdom and the United States (2008-2011). For the other countries, there is no evidence of synchronization between these variables over time. Note that the higher the value of the political uncertainty index, the more important is the amount of uncertainty about economic policies, tax code provisions, and divergence of economic forecasts.

【Insert Figure 1 here】

【Insert Table 1 here】

Table 2 displays the empirical results for testing cross-sectional dependency and slope homogeneity. As indicated in Table 2, the values of the three different test

statistics (CD_{BP} , CD_{LM} , and CD) are 269.103, 38.283, and 15.568, respectively, which provide strong evidence to reject the null hypothesis of no cross-sectional dependence between political uncertainty and stock price, across the countries at the 1% significance level. This finding is consistent with the view that changes in stock prices and policy uncertainty occurred in a particular country is likely to be transmitted to other countries, due to a high degree of market integration, and close economic linkages in the OECD countries. For instance, Buch and Pierdzioch (2005) document that OECD countries have lower capital controls than non-OECD countries in the 1990s, and have made significant advances towards increased financial integration. To a larger extent, other studies such as Rajan and Zingales (2003) and Hölzl (2006) have shown that European continental financial systems have become more similar to Anglo-Saxon ones under the effects of increased globalization, deregulation, economic integration, harmonization of regulations and corporate governance rules. More recently, Bruno et al. (2012) tackle the issue of financial systems' convergence across the OECD countries by examining whether these countries have achieved a certain degree of convergence in the holdings of financial instruments. They find strong evidence of convergence of shares and insurance products, which can be explained by the increasing importance of capital markets in developed countries. The results are however mixed for debt securities and deposits typically because of the differences across countries in the weight of national public debts and in the role of banks.

【Insert Table 2 here】

Table 2 also reports the results from the slope homogeneity tests, developed by Swamy (1970) and Pesaran and Yamagata (2008). The three different test statistics (λ , λ_{adj} , and Swamy) are 1288.143, 8.854, and 4826.793, respectively, and they indicate that the null hypothesis of the slope homogeneity is clearly rejected at the 1% significance level. The rejection of slope homogeneity implies that the panel causality

analysis by imposing homogeneity restriction on the variable of interest will result in misleading statistical inferences and thus misleading conclusions on both the strength and direction of causality. In this scheme of things, the direction of causal linkages between stock price and political uncertainty in the seven OECD countries is rather heterogenous, or in other words, the directional causal linkages between the variables of interest may differ across these countries.

Taken together, the existence of cross-sectional dependency and heterogeneity across countries suggests the suitability of our empirical framework based on the bootstrap panel causality test. The results from the bootstrap panel causality test, reported in Table 3, confirm this finding effectively. Indeed, they show that not all the stock price indices are affected by political uncertainty, and vice versa. The hypothesis that the stock price index does not Granger-cause the political uncertainty index is rejected only in Italy and Spain at the 1% and 5% levels, respectively. For these two countries, we find that the level of political uncertainty is negatively linked to overall stock price movements. It means that the policy uncertainty would be reduced following an increase in stock prices because they witness more confidence on economic growth and more financing means for companies. Inversely, stock price falls may signal investors' loss of confidence in both the stock market and the economy, which reduces consumption, production and investment and therefore leads to higher uncertainty about the policy options. To put it differently, by observing stock market movements, investors who are a priori heterogeneous may have different expectations about the policy options, which raise the uncertainty about the policy to adopt. Stock price movements in other countries do not drive the changes in the political uncertainty because the causality test rejects the stock price leading hypothesis.

On the other hand, the political uncertainty leading hypothesis cannot be rejected in the United Kingdom and the United States, meaning that political uncertainty

shocks appear to be a matter of concern for investors in stock markets. It seems that investor community in the United States and the United Kingdom, which is pre-dominated by sophisticated investors (e.g., fund managers, arbitragists, and speculators), gives a heightened weight to the policy option that will be chosen. These findings are thus consistent with those of recent studies for the US markets including Dzielinski (2012), Antonakakis et al. (2013), and Kang and Ratti (2013) where a significant influence of policy uncertainty on stock prices was found. In particular, we observe that there is a positive causality running from the uncertainty policy index to stock prices in the United Kingdom and the United States, which at first sight might seem to be counter-intuitive. However, this empirical evidence can potentially be explained by the fact that an increase in uncertainty may lead to lower short-term interest rates which in turn cause the rise in stock prices given the well-accepted theoretical (negative) relationship between interest rates and stock returns (see Hashemzadeh and Taylor, 1988 and references therein).⁶ This is more so the case, since the interest rates in the United States and United Kingdom during the periods under consideration was plummeting (and virtually reaching zero) during the time-period considered in this paper. In a related study, Colombo (2013) examines the effect of the US policy uncertainty index in the spirit of Baker et al. (2012)'s measure on some Euro area macroeconomic aggregates within a structural VAR model. The author finds that the Euro area policy rate significantly decreases following an increase in the US uncer-

⁶ As a robustness check, we perform the following 2-step procedure to examine whether policy uncertainty index affects stock prices indirectly via interest rate. In the first step, we use the Toda-Yamamoto approach to test the causal relationship in the levels between the economic policy uncertainty index (EPU) and the short-term interest rate (IR) for each of the two countries (United Kingdom and United States). Then, the residuals that we obtain from the best-suited regression model of EPU on IR (i.e., the model which has the lowest AIC and BIC values) are employed to estimate their causal effects on stock prices. Our results for both countries, which can be made available upon request, indicate that: i) The economic policy uncertainty (EPU) Granger-causes, and affects negatively and significantly the short-term interest rate (IR); and ii) the fitted value of the interest rate Granger-causes, and affects negatively and significantly stock prices. Putting differently, an increase in the economic policy uncertainty leads to lower the short-term interest rate and a resulting reduced interest rate with fuel stock prices because of their negative relationship.

tainty measure.

There are potentially two additional reasons which explain why economic policy uncertainty can have a positive effect on stock prices in the United Kingdom and United States. First, the sign is based on the sum-of-coefficients on all the lags considered. Hence a positive sign does not necessarily imply a positive effect on impact, but the overall effect. Note that, similar observations were also made by Kang and Ratti (2013) who point to an immediate negative impact on stock returns following a rise in uncertainty, with the effect becoming positive at longer lags. Second, if we assume the agents to be forward-looking, then an increase in economic policy uncertainty in the current period could signal an improvement in the economy in the near-future, especially given that we are talking about two of the most sophisticated economies in the world, and agents do not expect the economic policy uncertainty to persist at a high level, they are likely to invest in equities in the current period and to make profits in the near future when the uncertainty is expected to dip.

Taken together, the results in Table 3 also show that the neutrality hypothesis was supported in three countries (i.e., Canada, France, and Germany), while the feedback hypothesis is, however, never found in these seven OECD countries over the period from 2001.01 to 2013.04.⁷

【Insert Table 3 here】

⁷ Based on the suggestion of one of the anonymous referees, we conducted a robustness check of our analysis by including the world oil price, represented by the price of the Brent crude, and the short-term interest rate represented by the 3-month interbank interest rate of each country. The decision to use these control variables emanates from the theoretical expected relationship between stock prices and interest rates (Hashemzadeh and Taylor, 1988) and the recent literature that links stock prices to stock market and uncertainty (Kang and Ratti, 2013). While the obtained results do not change much as compared with those we presented in this paper, the consideration of these control variables in the system would induce estimation biases. There are two potential problems. First, it is technically difficult to accurately estimate the true causal relationships between variables of interest when their causality is affected by the other variables (Lutkepohl, 1993; Eichler, 2007; Doan and Todd, 2010; Dufour and Taamouti, 2010). Second, unless we add a large number of variables, our framework will always suffer from the so-called problem of omitted variable bias since many factors could affect stock returns (Rapach and Zhou, 2013). Note that the details of the robustness results, which are not reported here to conserve spaces, can be made available upon request to the corresponding author.

Previous studies investigating the relationship between stock prices and political uncertainty, in general, tends to find a negative relationship between these variables, with the impact running from policy uncertainty to stock prices. For example, Dzielinski (2012) constructed an indicator of economic uncertainty from the search volume index (SVI) for the word “economy” provided by Google Trends and documents that a high degree of economic uncertainty is followed by a significant drop of stock returns, a result in favor of the uncertainty leading hypothesis. In addition, Sum (2012) develops a VAR analysis using the EPU index of the United States and shows that an increase in EPU Granger-cause the market returns to drop, a result in support of the political uncertainty leading hypothesis. Note that these two studies investigate the causal relationship between stock price and political uncertainty in a single country (i.e., the United States). Our empirical results regarding the causal relationship in a group of countries from the bootstrap panel causality tests thus complement the findings from these two studies. They are also in line with the two above-mentioned studies, in the sense that it supports the unidirectional causality between stock prices and political uncertainty, particularly for the United States. However, our study contrasts the empirical evidence provided by Kang and Ratti (2013), who find that economic policy uncertainty significantly depresses the real stock returns in Canada, and in Europe (at the regional level).

The implications of our findings differ across countries. For Italy and Spain, policymakers and market authorities should give heed to stock market sentiment in order to neutralize the possibly negative impact of policy uncertainty on stock markets before an optimal policy choice is made. Inversely, to the extent that the optimal policy option has not only political but also economic costs as pointed out by Pastor and Veronesi, the governments in the United Kingdom and United States should have to reduce their policy decision uncertainty, particularly during periods of economic

downturns.

4. Conclusion

The past literature has shown that stock returns and volatility are significantly affected by economic policy uncertainty, in addition to firm-specific characteristics, macroeconomic fundamentals and systematic risk factors. Therefore, market participants in financial markets, whatever the location, pay great attention to the current economic conditions and the prospective economic outlook. The more the macroeconomic environment is uncertain, the more it will be difficult to evaluate the asset price generating processes and to make accurate investment decisions.

In this article, we apply bootstrap panel causality, proposed by Kónya (2006), to investigate causal link between political uncertainty and stock price for 7 OECD countries over the 2001.01 - 2013.04 period by looking at both heterogeneity and cross-sectional dependency, while analyzing country-specific causality. Our empirical results are not always consistent with the empirical evidence provided by past studies because political uncertainty affects stock prices in only two out of seven countries under consideration (Italy and Spain). Likewise, the causality from stock prices to political uncertainty is significant in two other countries (United Kingdom and United States). For the remaining countries, the neutrality hypothesis is retained. These different patterns in the linkages between political uncertainty and stock prices cast doubt about the theoretical proposition that policy uncertainty depresses stock returns through its negative impacts on industrial production, economic growth, and firm-level investment decisions. On the other hand, the absence of significant relations between these variables also leads us to think that they may be linked in a non-linear and asymmetric manner. Indeed, policy uncertainty may only have significant impact on stock prices when it exceeds a certain level, while its impact can be differ-

ent depending on whether the stock markets are in bullish or bearish phases. We currently perform this research direction.

Given the difficulty in analyzing causality beyond a bivariate system (Lutkepohl, 1993; Eichler, 2007; Doan and Todd, 2010; Dufour and Taamouti, 2010), future research would be aimed at revisiting the question of relationship between stock returns and economic policy uncertainty using an impulse response analysis in a panel vector autoregressive model, with additional variables that affect both the stock market and policy uncertainty. The impulse response analysis would not only help decipher the magnitude and direction of the effect, but also its persistence.

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Table 1 Descriptive Statistics

Stock Price Index							
Countries	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J.-B.
France	4080.79	6053.90	2692.49	859.94	0.58	2.29	11.53***
Germany	5549.99	7950.70	2491.05	1394.32	-0.20	2.10	5.94**
Italy	27402.59	43823.50	13290.29	8431.69	0.17	1.92	7.83**
UK	2672.85	3414.78	1747.64	430.57	-0.28	2.06	7.36**
Spain	9712.49	15666.30	5794.18	2412.41	0.63	2.64	10.72***
Canada	10559.68	14718.77	6156.49	2414.30	-0.21	1.70	11.46***
US	1195.25	1570.70	757.13	184.88	-0.18	2.41	2.94

Political Uncertainty Index							
Countries	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J.-B.
France	123.07	303.46	51.93	50.18	0.67	2.79	11.47***
Germany	113.41	253.04	51.76	36.19	0.96	4.03	29.08***
Italy	110.08	243.95	40.00	39.17	0.95	4.15	30.79***
UK	132.56	297.42	36.86	69.38	0.66	2.13	15.48***
Spain	104.17	241.81	28.33	40.74	0.70	3.45	13.51***
Canada	104.95	252.92	43.47	43.42	1.08	3.81	32.64***
US	119.75	246.47	57.52	40.81	0.48	2.39	8.04**

Notes: The whole sample period starts from 2001.01 and ends in 2013.04, resulting in a total of 148 monthly observations. ** and *** indicate significance at the 5% and 1% levels, respectively.

Table 2. Cross-sectional Dependence and Slope Homogeneity Tests

Cross-sectional Dependence Test		Slope Homogeneity Test	
CD_{BP}	269.103***	λ_c	1288.143***
CD_{LM}	38.283***	λ_{adj}	8.854***
CD	15.568***	Swamy	4826.793***

Notes: *** indicates significance at the 1% level.

Table 3. Results for Panel Causality

Countries	Coefficient	Wald Statistics	Ho: Stock Index does not Granger Cause Policy Index			Granger Causality Yes/No
			Bootstrap Critical Values			
			10%	5%	1%	
France	0.0416	0.197	3.497	4.891	8.513	No
Germany	0.0081	0.019	3.139	4.436	8.633	No
Italy	-0.2700	12.076***	3.388	4.509	7.841	Yes
UK	0.0681	0.624	4.142	5.335	8.485	No
Spain	-0.281	6.793**	3.189	4.654	7.938	Yes
Canada	0.0557	0.749	3.120	4.695	8.237	No
US	0.0380	0.247	3.315	4.607	8.351	No

Countries	Coefficient	Wald Statistics	Ho: Policy Index does not Granger Cause Stock Index			Granger Causality Yes/No
			Bootstrap Critical Values			
			10%	5%	1%	
France	-0.0003	0.010	2.819	4.185	6.593	No
Germany	0.0092	2.231	2.818	4.059	6.560	No
Italy	0.0125	2.624	3.214	4.767	7.642	No
UK	0.0071	7.516***	2.999	4.068	5.743	Yes
Spain	-0.0020	0.112	3.131	4.378	7.723	No
Canada	-0.0029	0.379	3.091	4.367	6.922	No
US	0.0114	6.396**	2.810	3.831	7.584	Yes

Notes: ** and *** indicate significance at the 5% and 1% levels, respectively. The bootstrap critical values were obtained from 10,000 replications.

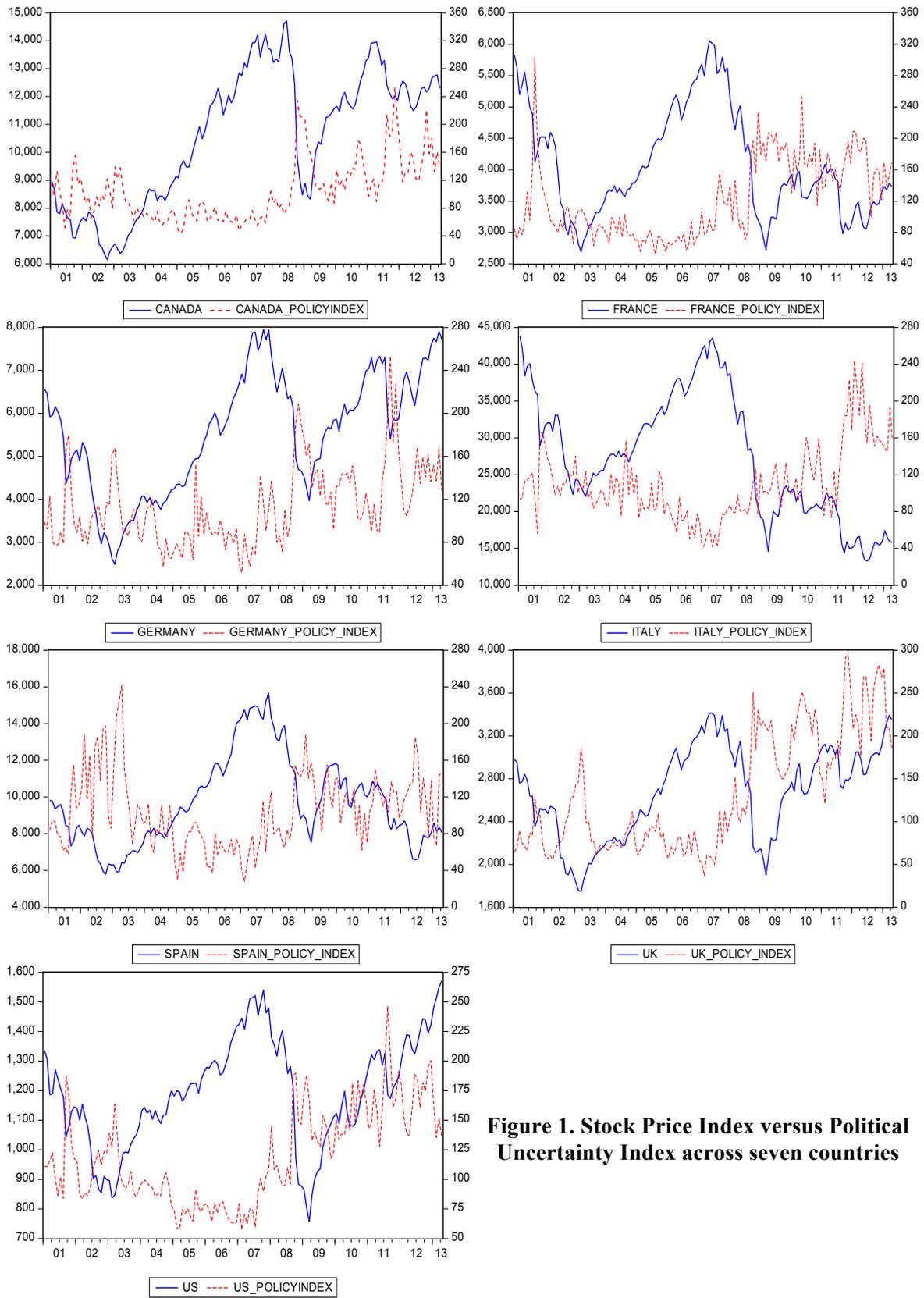


Figure 1. Stock Price Index versus Political Uncertainty Index across seven countries