Can the news tell us anything about uncertainty that the markets don't?

Abstract

This study investigates the dynamic interactions between changes in economic policy uncertainty and movement in price and trade volumes across a sample of 21 countries. Within a vector autoregressive framework, we find that an expectation of uncertainty drives market movement for 18 countries. Our analysis in terms of VAR coefficients, granger causality tests and impulse response functions show a significant market reaction to an expectation of uncertainty, implying that the markets are more sensitive to politically driven economic policy change than media commentators. In light of perceived policy change researchers are cautioned against relying solely on media generated measures of uncertainty when investigating market movements.

JEL Codes: G10, G14, G15, G38

Keywords: Economic policy uncertainty, Equity market, Granger Causality

1. Introduction

The link between political change and market activity is little understood. Policy decision making is an inherently political action. It can end in conflict for the decision maker who must often choose between her own set of ideals and a more pragmatic option. When policy direction is unclear the inevitable level of uncertainty, may result in externalities that affect markets, a possibility which attracts the attention of market participants. Consequently, real economic outcomes are determined in no small part by the degree of uncertainty in an economy, a point echoed in Bernanke (1983).

In the face of contextual uncertainties generated in the political sphere, the machinations of business appear to run less smoothly. Political events, such as the election of Donald Trump as U.S. President in 2016 and that years Brexit referendum result, where the British public endorsed the UK's exit from the EU, can have a significant impact on the behaviour of financial markets. As a consequence, investors, market observers and policy makers are beginning to consider in greater depth the impact that policy related economic uncertainty can have on the markets and the economy. For example, in January 2018, the governor of the Bank of England, Mark Carney, commented on the link between levels of business investment and the degree of political uncertainty in the UK owing to Brexit (The Guardian, 2017).

In this paper our aim is to understand the nature of the interaction between the sentiment created by uncertainty and that of market behavioural characteristics. Through examining a sample which incorporates 21 economies we uncover the dynamic occurring between uncertainty and both market return and volatility. In our analysis, we use the returns on indices compiled by MSCI and realised volatility measures, we model these within a vector autoregressive framework (VAR), and then include a measure of political risk drawn from datasets available on the Economic Policy Uncertainty (EPU) website[1] as detailed in Baker et al (2016). From this, we show that it is the measure of expectation of economic policy uncertainty (EEPU) rather than the EPU index itself which drives changes in the market, implying that uncertainty is sensed in the markets sooner than it is in the media. We find that this EEPU measure Granger-causes first differences in both index returns and realised volatility measures. These results are consistent across the majority of countries featured in our sample and are supported by impulse response analysis. This result is maintained when we include theoretically relevant exogenous variables in our investigation. Our main contribution is to point out that the market senses economic uncertainty ahead of when it first becomes acknowledged in the print media. The implication here is that the market acts as a weather-vane for the degree of economic political uncertainty inherent in an economic system.

Our study joins a large body of literature that traces the links between political uncertainty and economic activity. Previous investigations indicate that the markets react to uncertainty once it enters into the field of public conscience, through the media. Close run elections, where outcomes are difficult to predict, have been shown to correspond with corporate activity such as investment cycles (Bernanke, 1983). In particularly uncertain periods, investment decision-making is often postponed (Bloom et al. 2007). In respect of the markets, most studies tend to show a relationship with uncertainty which is consequential, inferring that it drives market behaviour. Our findings hold a number of implications for investment practitioners, in that it is the expectation of uncertainty rather than uncertainty itself which appears to account for at least some market movement. This sends a clear note of caution to practitioners who are inclined to react to print media regarding uncertainty, our study shows that the market acts efficiently having already priced in this information.

We organise the rest of the paper as follows. In the next section, we review studies which relate to political uncertainty and its impact on the economy and financial markets. In the section after we present

[1] http://www.policyuncertainty.com/

an outline of our research hypothesis and methodological approach. In the fourth section we present the data, a commentary upon our sources for the variables used in our analysis. Section 5 contains a discussion of our findings. The final section incorporates a discussion of robustness, and offers some conclusions and recommendations.

2. Review of the literature

Economic uncertainty is a difficult concept to capture empirically, as it is not observable. Scholars diverge on what they consider an appropriate proxy to represent uncertainty. Jurrado et al (2015) define it as the conditional volatility of the unforecastable component of a variable. Therefore it is reasonable to use both implied and realised volatility in financial markets. In this spirit, Caldara et al (2014) demonstrate that uncertainty shocks are transmitted through the financial channel to impact the real economy. Consequently, some authors use volatility measures to estimate uncertainty, Bloom et al. (2007) use an option index (VXO) to represent uncertainty whilst Bakaert et al (2013) deconstruct the VIX index[2] to draw out an element to represent the same in the equity markets. Scotti (2013) introduces a real-activity uncertainty index which relies upon macroeconomic news forecast errors in order to capture perceived economic uncertainty. Other measures rely on different datasets; Bachman et al (2013), for example, extract data gathered using surveys on disagreement and forecast errors of small businesses analysts whilst Leduc and Liu (2014) create a measure from business and consumer trends surveys both in the US and the UK. Text based uncertainty measures of the type used in this study are a relatively new introduction, Alexopolous and Cohen (2009) create an index based on a count of articles relating to economic survey in the New York times, which they demonstrate is significantly related to a range of macroeconomic variables. The EPU indices used in this study generated by Baker et al (2016) employ a similar logic.

The possibility of a link between media coverage and markets has aroused the interest of a number of scholars. A consensus has yet to be reached on the nature and direction of the flow of information as it runs between the coverage of the markets and asset price changes. Early studies which touched upon this area examined whether the character and magnitude of coverage could impact upon returns, for instance, Niederhoffer (1971) demonstrated how stock prices tended to move when headline fonts were larger. Mitchell and Mulherein (1994) posited that at the firm level, the quantity of news announcements relating to a firm affected its value. In addition to the intensity, the tone of the coverage has been shown to be significantly related to change; Tetlock (2007) relates how pessimism in a popular Wall Street Journal editorial column produced short-lived changes in the Dow Jones Industrial Average. These findings were further strengthened by a follow up firm level study by Tetlock (2008) showing that some publications held greater predictive power than others. Furthermore, individual investors have been shown to produce the short lived reactions associated with intensity spikes in the coverage of certain issues (Barber and Odean, 2008). Media can play a significant role during times of intense economic uncertainty, Shiller (2000) points out that the creation and bursting of asset price bubbles can be associated with increases in media hype. Wisniewski and Lambe (2013) demonstrated how the intensity and tone of media coverage may have accentuated the effects of the credit crunch in the Banking sector. However, where it is estimated, the magnitude of the effect of media coverage is not seen to be particularly large. When examining the effect of online firm IPO's, Bhattacharya et al (2009) note that the flurry of excitement around the IPO of internet stocks accounted for an average 2.5% increase in returns in comparison with conventional firms. The effect of media communications is not to be downplayed. However, the extent to which it is used in the transference of information to the markets is something which we bring into question through this study. Bloom et al. (2007) create a structural framework which analyses the impact

[2] **VIX and VXO measures** (source: http://www.cboe.com).

of uncertainty shocks such as the JFK assassination and the 9/11 terrorist attack on macroeconomic factors, namely aggregate output, employment and productivity. In addition, their analysis of real data shows that when positive shocks are introduced to an economic uncertainty measure, this induces a sequence of short-term recessions and subsequent recoveries. At the firm level, Baum et al (2010) show that even when company specific variables are controlled for, uncertainty remains an important influencing determinant of investment decision-making. Similar results are reported by Bachman et al (2013) for German and US firms, they show that unanticipated movements in uncertainty measures leads to significant and persistent subsequent reductions in production.

The body of knowledge examining the nexus between policy making and financial market movements is growing. The potential for politicians to influence market outcomes has been recognised for some time, for example Santa Clara and Valcanov (2003) conduct a study of asset prices in the U.S. and suggest that the political ideologies of the incumbent party can directly influence returns. Johnson, Chittendon and Jensen (1999) note that in the case of small stocks return differences generated under ideologically opposed administrations can reach up to 20%. This could be accounted for using the Partisan theory posited by Hibbs (1977), where parties with left leaning ideologies pursue policies which result in conditions of higher inflation and lower unemployment, as their powerbase typically favour policies which target unemployment. In contrast, parties which tend to be more right wing, create a situation that appears at the opposite end of the Phillips curve. There are difficulties with the generalizability of this relationship, non US centric studies report no partisan reaction in returns. Bialkowski et al (2007) for instance, examine returns between administrations holding contrasting sets of political ideals and report no significant differences. In emerging markets there is some evidence to suggest that the political risk has a direct negative impact upon stock returns, Bilson et al. (2002) examine 17 emerging stock markets concluding that political risk imposes a greater effect than a corresponding sample of developed markets. Diamonte et al. (1996) who examine quarter on quarter equity returns confirm this with emerging markets and conclude that a decrease in political risk exhibits an 11% rise in returns, a similar sample of developed markets enjoy a more modest return increase (2.5%) in comparison.

A general equilibrium model to explain why policy uncertainty can increase stock return volatility is put forward in Pastor and Veronisi (2012) who suggest that policy changes increase volatility and as a consequence, risk premia. They categorise policy related uncertainty into two forms, the first is the probable impact of policy change while the second relates to the private sectors' estimation of the probability that this will occur. In a neo liberal economic context, they illustrate a set of conflicting conditional effects on equity prices when a forthcoming policy change is announced. Policy changes are viewed as invariably improving the prospects for the firm and are therefore responsible for creating a positive effect on cash flows. However, the uncertain outcome for firm profitability that arises from the letting go of old policy and implementing a new approach increases the discount rates. This has the effect of pushing the prices down. When both effects are netted off, the latter is the stronger of the two so stock prices tend to fall at the announcement of a policy change. Working with the EPU index in the US context, Pastor and Veronisi (2012) show that this is correlated with both realised and implied volatility, although they make no interpretations about causality in the relationship. During times of weaker economic conditions, political risk premiums tend to be higher and associated with increased instances of policy change.

Further work on the EPU index is conducted in Antonakakis et al (2013), they construct a model which correlates equity returns, the EPU index and implied volatility, these are time varying and display a sensitivity to shocks in the demand for oil and for US based recessions. These correlations are consistently negative with the exception of periods of acute financial crisis when recapitalisation interventions on the part of governments create a situation where the returns increase simultaneously with increases in the level of uncertainty.

Implied in much of the literature and the theoretical models constructed to account for the relationship is the direction of the effect. However, the presence of reverse causality, where the markets can be seen to affect political outcomes is yet to be fully established. It is interesting however to turn to the idea that a causal relationship could run in the opposite direction, where the markets forerun changes in administration. Prechter et al. (2012) show that the vote margin by which the re-election occurs among incumbents to the US presidency is significantly correlated with past returns on the stock market. Work by Fair (1978, 1996) establishes that voting decisions are influenced by the electorates retrospective view of economic performance. In response to these perspectives, we remain open to the possibility of differing directional flows of information by conducting our investigation through the lens of a vector auto regressive model.

3. Motivation for study

As the creation and proliferation of economy related news and speculation becomes an ever more accessible commodity, it becomes important that investors understand how events in a political context are transmitted to financial markets. Driving our investigation is the hypothesis that market senses uncertainty ahead of those who report on policy decision making. Literature suggests that stock market movements reflect the expectation inherent in the real economy, which itself is influenced by economic policy. Movements in the market have been demonstrated to have some predictive capacity for changes that happen in the real economy, for instance, in the US, Estrella and Mishkin (1998) show that time series returns of stock prices can be used at a one to three quarter horizon to predict recessions. As stock prices can Granger cause investment (Merton, 1984), we can reasonable suppose that the market can act as a signalling device to managers and therefore a guide to investment choices. Uncertainty around the direction of this policy could be seen as a leading indicator for macroeconomic change including how markets behave. As the EPU index represents public concern over economic policy, we form a different argument from that assumed from the findings of previous studies, instead we argue that markets lead public concern and make sense of the uncertainty existent within the situation before reporters do. The resulting discussions in the newspaper confirm the depth of uncertainty already felt by the markets. To test this hypothesis, we use the EPU index one period hence as a proxy for the market's rational expectation, that being, uncertainty in the future. This we formally express as:

$$E(EPU_{t+1} \mid I_t)_t = EPU_{t+1}$$

Where I_t is the information set available to the market, $E(EPU_{t+1})_t$ is the expectation of uncertainty on the part of the market, rather than the uncertainty itself.

4. Methodology

Choosing an appropriate framework to model the relationship in each country between economic policy uncertainty and market behaviour presents a number of challenges. Economic theory doesn't provide a ready-made dynamic specification which identifies the full nature of the relationship between our variables. As endogenous variables may appear on both sides of the equation, opting for a non-structural approach to modelling the relationship between the variables is the prudent choice. Establishing the causal flow is important as the model employed must bring into account any possibility of the presence of a bi-directional feedback loop. We therefore follow the precedent for this dataset given in Bloom et al. (2007) which explores the relationship by entering the variables into a Vector Autoregressive framework. This is a frequently used method for analysing the dynamic impact of randomised disturbances for a system of variables. The approach offers greater flexibility than the structural models and a more precise means by which to detect possible forecasting mechanisms. The need for a priori structural modelling is avoided as each endogenous variable specified is treated as a p-lagged function of all endogenous

variables identified in the system. For this study, we apply a separate VAR for each country in the study where the following system is applied:

$$y_t = c + \sum_{i=1}^{p} \Phi_i \, y_{t-1} + \Psi x_{t-1} + \varepsilon_t, \;\; t = 1,2, \ldots\ldots, T \qquad [1]$$

Where c is the vector of intercepts, y_t is a vector of two endogenous variables and includes first differences in the economic policy uncertainty index and changes in the each country's equity index. Lags ρ are chosen using the Akaike Information Criterion (Akaike, 1973, 1974) which enables the selection of an optimal lag length. x_{t-1} is a 3 variable vector of controls consisting of stock market index returns, a first differenced risk free rate and an implied volatility index. In some instances in the re-specification of the model we set $\Psi = 0$. Residuals are given in vector ε_t where:

$$E(\varepsilon_t) = 0, E(\varepsilon_t \varepsilon_{t'}) = \sum \text{and} \sum = \{\sigma_{ij,}\, i, j = 1,2\}. \qquad [2]$$

Cholesky decompositioning is used to express the variance-covariance matrix in the form of $\sum = PP'$.

In modelling the aforementioned relationship we use Granger causality analysis (Granger, 1969) which employs the VAR framework to reveal the nature of the relationship between the endogenous variables in the model. This form of analysis will allow a distinction to be made between a supposed cause and effect. This step of the investigation is carried out through restricting $\Psi = 0$ in the estimation of [1]. When deciding whether variable $y_{i,t}$ granger causes series $y_{j,t}$ the researcher must determine whether the hypothesis $\mathrm{H}_0: \Phi_1(j,i) = 0, \ldots \Phi_1(j,i) = 0$ can be rejected. In the event that the *F*-test used to test the hypothesis offers a rejection the variable, $y_{i,t}$ can then be thought of as endogenous.

In addition, the vector autoregressive framework facilitates further investigation using the impulse response functions (IRF's). IRF's impose a one standard deviation shock to a variable within the framework charting its accumulated response over time. Generalised impulse response functions first introduced by Pesaran and Shin in 1998 have the advantage over similarly used configurations in that these are not affected by how variables are ordered within the model. Rewriting equation [1] to represent it as a moving average changes the equation thus:

$$y_t = \boldsymbol{\alpha} + \sum_{i=0}^{\infty} \boldsymbol{A}_i \varepsilon_{t-i} + \sum_{i=0}^{\infty} \boldsymbol{G}_i x_{t-i-1,} \;\; t = 1,2,..T \qquad [3]$$

Here the values $\boldsymbol{\alpha}, \boldsymbol{A}$ and $\boldsymbol{G}$ are retrieved using recursive substitution. On introducing the one standard deviation shock to the VAR equation at time $\boldsymbol{t}$, it is possible to rewrite the generalised impulse response for the system at time $\boldsymbol{t + n}$ to be:

$$\boldsymbol{IR}_j(n) = \frac{1}{\sqrt{\sigma_{jj}}} A_n \sum e_j, n = 0,1,2 \ldots \qquad [4]$$

In this equation e_j is a 2x1 selection with unity as its $\boldsymbol{j - th}$ element and with zero as the other element. The accumulated responses are arrived at through cumulating the impulse responses over an *n*-month period.

5. Data

We compute the dividend adjusted daily returns on MSCI standard country indices for 21 counties over a period beginning in January 1985 and ending in December 2016, obtained from DataStream. All returns

are given in US dollars to eliminate the possible influence of exchange rates[3]. Our Economic Policy Uncertainty (EPU) index is provided in the economic policy uncertainty website[4] and is based on an approach formulated by Baker et al. (2016), this is a news based measure which reflects the frequency of articles in leading newspapers in each of the countries for which the variable is constructed. The measure is created by conducting a count of articles on the basis that these contain keywords which indicate content relating to uncertainty. The authors demonstrate that the article counts are consistent with key political events by mapping their indices against significant political shocks which would have affected the policy making system, for example, spikes in the index for the US correspond with notable events such as presidential elections, the global financial crisis and the 9/11 terrorist attack. A similar mapping exercise is conducted for the other country variables establishing close consistency with movement in the indices and political events of national significance.

For the US version of the economic uncertainty index, Baker et al (2016) construct this using three components, a measure of newspaper coverage of policy related economic uncertainty, the number of tax code provisions coming to maturity in each year and the level of disagreement between economic analyst forecasts. For the other countries in the sample, some are constructed by Baker et al (2016), whilst others are compiled by different authors but hosted on the EPU website (See Table 1 in appendix). The key difference between the US index and those compiled in the other countries is that the latter construct their index using only the news coverage component. To maintain consistency we use the news component of the US indices in our VAR system, when we run the regression again using the three component index there is little difference in significance and direction.

In the US, the news based component is constructed from the search results of ten newspapers, each with a nationwide readership. A month by month count of articles containing terms linked to economic and policy uncertainty is made. To feature in the article count, the piece in question must include keywords specific to all three of a specified search criteria which are uncertainty, the economy and policy. The change in the volume of articles covered by that paper over time is dealt with by dividing the raw count of the articles pertaining to policy uncertainty with the total number of articles published in that newspaper over that month. The series for each newspaper is then normalised to have a unit standard deviation through the entire observation period. These normalised values are then summed across newspapers creating a multi paper index. This series is then normalised to an average value of 100 over the sample period. A similar approach is taken with the other countries. Variation exists across the constructed indices in terms of the number of newspapers covered and the search terms and language used to cover the three aforementioned topics.

In order to control for other possible determinants for market wide index returns and realised volatility as outlined in Merton (1974) we include exogenous variables in the VAR systems. Availability of data for each country across our sample differs; therefore we include control variables as they are available and relevant for each country. We extract the data from the IMF and OECD and the federal reserve of St Louis websites. Definitions of the variables in addition to how they are employed differently across the sample are included in Table 1. Figure 1 depicts the return index for both the US and UK stock markets and shows an apparent upward trend from 1985 to 2016 while the realised volatility and EPU index do not appear to have a trend. During certain periods of intense uncertainty such as during the dot com collapse in 2001 and the financial crisis of 2008 the return index fell and both volatility and EPU rose dramatically, in general during boom periods the return index tends to rise whilst volatility and EPU fall. In order to ensure that all variables used in the study satisfy the condition of stationarity required by the

[3] Returns of local currency are also considered, the results remain the same.
[4] www.policyuncertainty.com

model we use the first order difference logarithm of these variables. We then test for and confirm stationarity by performing Augmented Dickey Fuller tests (Dickey and Fuller, 1979).

[Insert Table 1 about here]

[Insert Table 2 about here]

[Insert Figure 1 about here]

6. Analysis and Findings

In conducting our VAR analysis we estimate two separate systems. The first, the naïve version, includes only the endogenous variables of interest, namely the market expectation of uncertainty (EEPU), the market return index (RI), the realised volatility measure (RV) and each of their lags. Our second estimation includes these alongside other variables which control for other possible determinants of both market returns and volatility; these are discussed in detail in the data section. These control variables are entered into the VAR system using two lags in order to avoid possible endogeneity problems from including them concurrently. The lag length is chosen using the Akaike Information Criterion (Akaike 1973, 1974) allowing us to select the optimal model relative to other possible iterations. Running several versions of the VAR we find that our results are insensitive to the choice of lags indicating the strength of our results. Following the estimation of the VARs of the latter system we display the corresponding coefficients alongside their t-statistics in Table 3. In both VAR systems employed we achieve similar results, for the sake of brevity we report the VAR system which includes the controls in Table 3. The results point to a clear uni-directional relationship between EEPU and both the RI and RV variables, where, for all but three countries in the sample there are strong and significant relationships. For returns (RI) the direction is negative whilst with volatility (RV) this is positive. For returns we reveal four distinct cases, for the first case, where only the first lag is significant, we show that (in the eight countries for RI and thirteen for RV) the market senses the uncertainty at least one month ahead of time. When we consider the differences between the performance as they relate to each of the two variables, this can be accounted for because the RV measure is more sensitive to economic policy uncertainty as investors are still unsure as to how to react to the changing circumstance. When significance is displayed in RI measure it means that investors have reached a consensus on how the situation affects their portfolios. In the second case, we show that eight countries for RI and four for RV display significance over both lags, this suggests that the market senses the uncertainty ahead of when this is publicised but it is still absorbing the news in the second month. In the third case in two countries only lag two is significant, no countries fall into this category for RV, this suggests that the market does not sense uncertainty before reporters. In the final case where no significant coefficients are present, this occurs in three countries and also fails to support our hypothesis. The EPU measure is not collected along uniform lines and we hypothesise that the difference in outcome here may be accounted for by variations in the collection process. Cases one and two support our argument; whilst cases three and four do not, as there are 18 countries falling into the two former cases, our evidence is sufficient to support our general hypothesis.

In order to make some inference about the causal direction within the system we use Granger Causality analysis (Granger, 1969) as part of our VAR framework. This test allows us to determine which of the

variables in our system are useful in the forecasting of the others. We also use the Akaike method to select an optimal lag length of 2. Our results indicate that the direction of the relationship runs from the expectation of uncertainty (EEPU) to both returns (RI) and volatility (RV) in 18 of the 21 countries included in the sample. In only a small number of cases the causal relationship is significant in both directions, indicating a positive bi-directional feedback loop. Taken overall, these results suggest that in general the expectation of uncertainty granger causes change in both returns and volatility, rather than the other way around, in other words, market movement does not contribute to people's expectation of uncertainty over policy.

The literature suggests that market movement influences the real economy (Bloom 2009, Bloom et al 2007), it is reasonable therefore to assume that governments could issue policy as a direct response to real economic change. Carrying on from this we would expect to see the market movement could lead to indirect changes in the economic policy. Our results do not support this reasoning; no influence is identifiable as we do not find the granger causality running from our market movement variables to our EEPU measure. We can also observe that no relationship is detected between the realised volatility measure and that of returns for any country as is consistent with findings from other studies (for example, Baillie and De Gennaro, 1990).

In figures 2 and 3 we illustrate the magnitude of the accumulated impulse responses to positive shocks (IRF's) for five countries of our sample (Australia, Brazil, Japan, Germany, the UK and the US). A representative sample of graphs is presented alongside each of their respective confidence intervals. When the lower bound of the confidence interval is above that of zero we can say that the response to the positive one standard deviation shock in variable under investigation is significant. For the VAR models we investigated with controls we can see that the accumulated responses in the US for example has a peak of 0.058 (t-stat=4.68) and 0.52 (t-stat=7.93) for returns and volatility respectively. For the UK the magnitude of responses in these variables reach 0.037 (t-stat=2.33) for RI and 0.27(t-stat=3.48) for RV. In all the other countries tested in our sample with the exception of Ireland, China and Russia we find responses of a similar size to these. Upon introducing a shock in either RI or RV to EEPU we do not yield significant results in most cases, therefore confirming the general uni-directional flow of information.

As 18 out of the 21 countries employed show consistency we are compelled to ask why this is not the case for the remaining 3. China, Russia and Ireland deliver coefficients which are neither strong nor significant, we reason that this may be because each of these were the only countries to have an EPU measure based on an arbitrary decision to choose 1 news source, it is possible that the full effects of uncertainty may not have been captured as a result of editorial decision making particular to the newspaper, a measure drawn from a wider sample of news sources could yield alternative results.

7. Robustness

Interestingly, previous studies which model the economic policy uncertainty (EPU) index against returns in a vector auto-regression system (Baker et al 2016, Antonakakis et al 2013) fail to show a conclusive causal link between the two variables. Confirming these results with a more up to date sample we model the EPU variable against returns for each country in our sample and again do not show evidence of dynamic interaction. However, our results become strongly significant when we adjust the EPU variable to become an expected measure. This suggests that the expectation of economic policy uncertainty is a greater indicator of what may occur in the market later than the original EPU measure.

When we analyse the data using daily rather than monthly for two of the countries (US and UK), we find that both exhibit similar results to our main sample. We find similar results suggesting that the market moves ahead of the EPU index which suggests that it is the expectation of uncertainty which drives the market, for the US reaction is statistically significant two days ahead whilst for the UK this is one day. A possible reason that may account for the difference may be the reporting styles of the media outlets used in both countries, where the US journalists detect signs of impending uncertainty more slowly than their UK counterparts. Further investigation to seek to understand reporting differences is required but this is beyond the scope of this study. In addition, we find evidence of reverse causality where the stock market is seen to granger cause EPU in the short run, these findings are in a similar spirit to those found by Prechter et al (2012) and Wisiniewski et al (2012) which link political outcomes to market change.

Some studies (Graham and Harvey 2010, Longstaff et al 2010, Pan and Singleton 2008,) suggest that an appropriate proxy for uncertainty is the implied volatility as expressed through the CBOE Volatility Index (VIX). The VIX index is calculated using the S&P 500 stock index options and indicates the intensity of risk aversion and volatility inherent in the market. Baker et al (2016) distinguishes the EPU from the VIX index by arguing that EPU focuses on political uncertainty whilst VIX is sensitive to factors that influence the stock market only Another key difference between the two measures is that VIX reflects implied volatility by looking ahead by 30-days the uncertainty represented by the EPU does not have this explicit horizon. When we examine the VIX alongside EPU either in a naïve VAR or one with exogenous controls we find no evidence of a relationship. However, when we remove the EPU variable from the system and introduce EEPU, which itself is one month ahead of the uncertainty measure (EPU) we find that expectation of uncertainty Granger-causes the VIX but not the other way around. This implies that the expectation of uncertainty foreruns accepted indicators of future volatility.

Exchange rate risk could also influence fluctuations in value in the stock markets and may itself be a consequence in increased policy related economic uncertainty. In this study we simply report the results using variables denominated in US dollar. However, in our analysis we also investigated each country variable using local currencies and this does not change the conclusions we draw from our findings. Following these checks of the robustness of our findings we remain confident in our conclusions.

8. Conclusion

Economic policy uncertainty has hitherto been a difficult concept to quantify; however, with the emergence of new datasets which adopt a media based approach the inclination among researchers and investors is to look to these to attempt forecasting. Although the introduction of the dataset by Baker et al (2016) represents an important step in quantifying uncertainty, we must extend a word of caution to investors planning to use these measures as part of a market timing portfolio adjustment strategy. In this study, we endeavour to understand the nature of the link between uncertainty and market activity. We use a Vector auto regressive framework to model the dynamic interaction between variables across a sample of 21 countries.

From this, our main finding from the study is that we observe that markets absorb the context of uncertainty more quickly than the media, and this is not out of line with generally accepted ideas on the Efficient Market Hypothesis (See Fama, 1970). Although the EPU is well accepted to proxy for uncertainty, researchers must remain cautious in using purely media based datasets to develop forecasting techniques. Our findings present a clear indication that, at least in the case of newspaper based content; the markets are more adept at sensing uncertainty than journalists.

In our study, we have discovered that the expectation of uncertainty has a positive relationship with increased volatility and negative equity index returns. We also demonstrate that volatility is more sensitive than equity returns to changes in the expectation of uncertainty, although a significant relationship is

discernible for both. Our granger causality analysis adds weight to the findings detailed here, showing that the expectation of uncertainty Granger causes market movement. When Granger causal analysis is employed in the opposite direction either using volatility or returns no time dependent relationship is present. Furthermore when we examine these variables at a daily interval we yield the same results, and show that the market moves ahead of the media by at least one day. When we introduce a one standard deviation positive shock using impulse response functions to our EEPU variables we uncover a significant reaction on the part of both volatility and returns, when examined in the opposite direction for most of our countries in the sample the effect is not reversed. The same conclusion cannot be reached for any of the above when we look simply as the uncertainty measure itself, this offers further confirmation that it is the expectation of uncertainty which drives the market rather than when it crystallises in the public conscious through reportage in the press.

The implications are clear; investors need to look further than media generated variables which signify uncertainty in attempting to anticipate the direction of market movement, the markets are sensitive to policy uncertainty and are shown to reflect the expectation of the health of the future economy. Despite the level of interest in media generated economic policy uncertainty measures, these do not offer anything radical, the capacity of the markets to adequately capture information, at least in this respect, remains unchallenged.

Our work suggests that market movements are a more appropiate proxy for uncertainty, and that volatility based uncertainty measures such as VIX are a better indicator for this. However, as discussed in Baker et al (2016), the difficulty is that market movements are not focused on policy uncertainty but also are reflective of other components. A potentially more useful direction for future research might be to decompose and separate out these policy uncertainty components from market movements as they occur.

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Table 1*: In the table below are the definitions of the exogenous variables used as controls in the VAR systems employed in this study. The data is recorded at monthly intervals and the length of time series vary according the sample length employed for each country's VAR system.*

Control variables	Definition
PPI	The Producer Price Index charts the change in selling prices received by producers of goods and services.
CPI	The Consumer Price Index indicates changes in the level of goods and services purchased by households
Unemployment rate	The Unemployment rate is defined as the measure of unemployed people actively seeking work; this is calculated by dividing this number by the total labour force.
CCI	The Consumer Confidence Index is comprised using household level data on planning for large purchases with respect to their current and forecast economic situation. A 'normal' state is estimated and compared against the opinions collected; the level of differentiation creates the index.
BCI	Business Confidence Index, this is comprised of the assessments of enterprises' production orders and stocks, both in current and forecasted states. The differentiation between normal and observed states constitutes the index.
CFNAI	Chicago Fed National Activity Index this index is recorded on a monthly basis and assesses overall economic activity together with associated inflationary pressure.
Recession Dummy	This is a variable adjusted into a time series that interprets the US business cycle. This is a dummy series at a monthly interval which represents periods of contraction and expansion, with values of 1 and 0 respectively. The series is compiled by the National Bureau of Economic Research (NBER) and is available at. http://www.nber.org/cycles/cyclesmain.html.
Shiller PE Ratio	Shiller Price/Earnings ratio, is a cyclically adjusted measure adopted from S&P 500. It is calculated by dividing the price by a moving average of the previous ten years of inflation adjusted earnings.

Table 2: *The table below matches the exogenous variables applied in each VAR system to each for the countries for which these are available. Definitions for each variable are available in Table 2.*

Countries	Variables applied
US	PPI, CPI, Unemployment, CCI, BCI, CFNAI, Recession Dummy, Shiller PE Ratio
Korea, Germany, Italy, UK, France, Spain, Canada, Sweden, Japan, Ireland, Russia, Netherlands	PPI CPI Unemployment CCI BCI
Chile	CPI Unemployment BCI
HongKong, China, Mexico	CPI CCI
Singapore, India	CPI

Figure 1: *Illustrates the time series of the natural logarithm for the main variables for our US and UK samples for 384 monthly observations for a time period beginning in January 1985 and ending in December 2016. For brevity, we do not include similar figures for the other countries which we use in our study. logRI represents the total market return for stocks traded in the US and UK, logEPU is the natural logarithm for the news based economic policy uncertainty indicator created by Baker et al (2016) while logRV represents the natural logarithm of the realised volatility of returns calculated from the daily market returns from the total US and UK markets on a monthly basis. All market related data depicted in these figures is sourced in DataStream.*

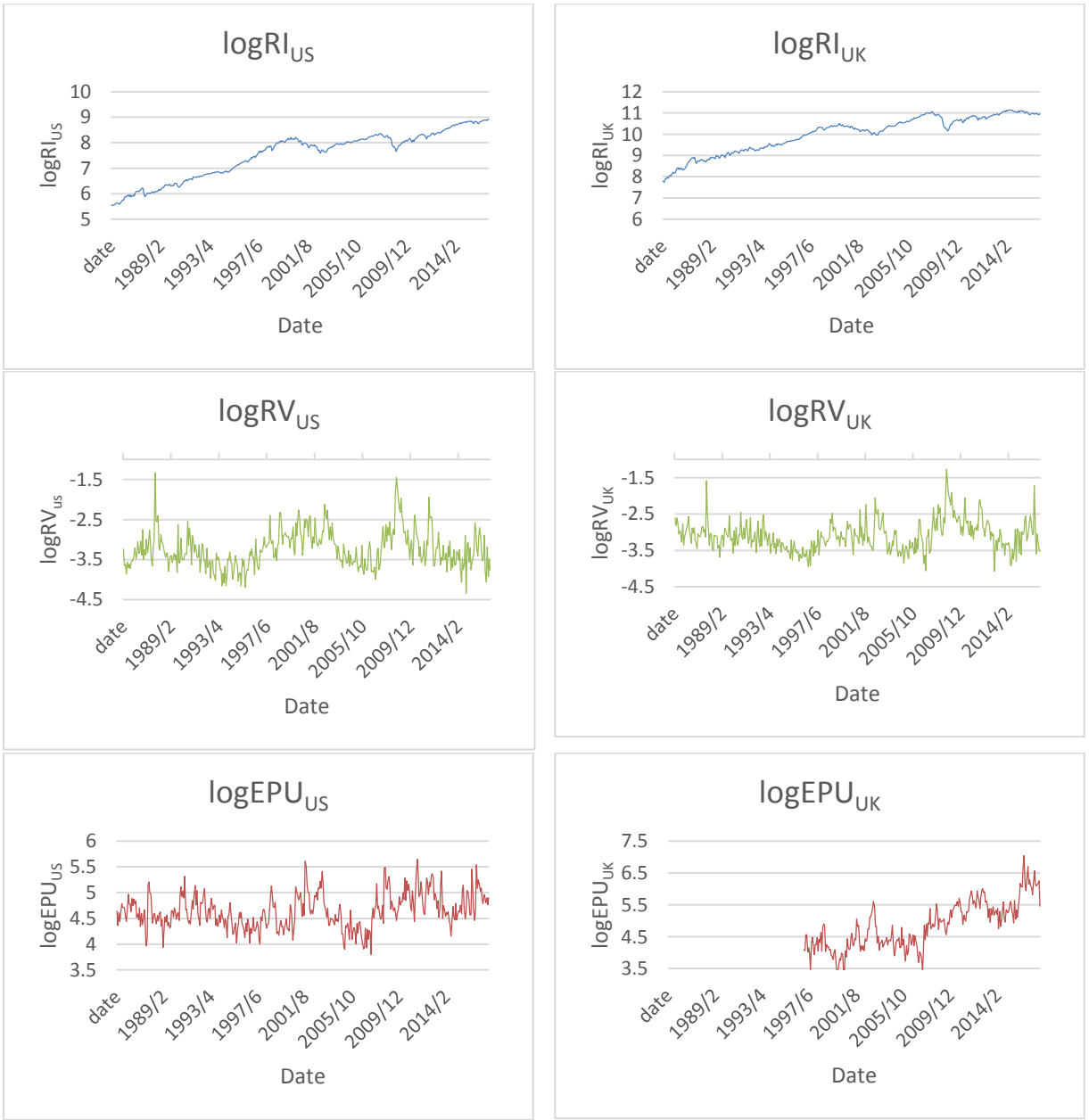


Table 3: The results of the VAR system and Granger causality

*Note: This table presents the Vector Autoregressive coefficients for all parameters in our system for each country in our sample, this is presented alongside Granger causality tests statistics for the same sets and *, ** and *** denote statistical significance at 1%, 5% and 10%, respectively.*

Return Index Equation $\Delta logRI_t$

	VAR Coefficients		Granger Causality		
	$\Delta logEEPU_{t-1}$	$\Delta logEEPU_{t-2}$		chi2	p
Australia	-0.0288*	-0.0135	$\Delta logRV_t$	3.726	0.155
	(-2.52)	(-1.13)	$\Delta logEEPU_t$	6.462	0.040
Brazil	-0.0328*	-0.0178	$\Delta logRV_t$	2.480	0.289
	(-2.23)	(-1.23)	$\Delta logEEPU_t$	5.164	0.076
Canada	-0.0236	-0.0415**	$\Delta logRV_t$	4.196	0.123
	(-1.64)	(-2.91)	$\Delta logEEPU_t$	9.212	0.010
Chile	-0.00910	-0.0713***	$\Delta logRV_t$	0.637	0.727
	(-0.48)	(-3.36)	$\Delta logEEPU_t$	11.662	0.003
China	-0.0117	-0.0117	$\Delta logRV_t$	2.761	0.251
	(-1.14)	(-1.17)	$\Delta logEEPU_t$	1.909	0.385
France	-0.0287*	-0.0359**	$\Delta logRV_t$	0.047	0.977
	(-2.27)	(-2.74)	$\Delta logEEPU_t$	9.040	0.011
Germany	-0.0329***	-0.0154	$\Delta logRV_t$	0.354	0.838
	(-3.66)	(-1.67)	$\Delta logEEPU_t$	13.374	0.001
HongKong	-0.0327***	-0.0195*	$\Delta logRV_t$	0.824	0.662
	(-3.61)	(-2.15)	$\Delta logEEPU_t$	14.016	0.001
India	-0.0692***	-0.0212	$\Delta logRV_t$	2.785	0.248
	(-4.09)	(-1.14)	$\Delta logEEPU_t$	16.736	0.000
Ireland	0.0155	-0.00256	$\Delta logRV_t$	2.056	0.358
	(1.95)	(-0.32)	$\Delta logEEPU_t$	6.256	0.044
Italy	-0.0340*	-0.0495***	$\Delta logRV_t$	0.559	0.756
	(-2.30)	(-3.33)	$\Delta logEEPU_t$	12.074	0.002
Japan	-0.0580***	-0.0474**	$\Delta logRV_t$	8.744	0.013
	(-3.98)	(-3.11)	$\Delta logEEPU_t$	20.762	0.000
Korea	-0.0677***	-0.0549**	$\Delta logRV_t$	2.320	0.314
	(-3.69)	(-2.97)	$\Delta logEEPU_t$	16.369	0.000
Mexico	-0.0335***	-0.00992	$\Delta logRV_t$	2.119	0.347
	(-3.35)	(-0.95)	$\Delta logEEPU_t$	11.240	0.004
Netherlands	-0.0690***	-0.0214	$\Delta logRV_t$	0.828	0.661
	(-3.95)	(-1.16)	$\Delta logEEPU_t$	15.783	0.000
Russia	-0.0172	-0.00844	$\Delta logRV_t$	8.6613	0.013
	(-1.24)	(-0.60)	$\Delta logEEPU_t$	1.550	0.461
Singapore	-0.0579**	-0.0686**	$\Delta logRV_t$	4.474	0.107
	(-2.73)	(-3.19)	$\Delta logEEPU_t$	15.482	0.000
Spain	-0.0524***	-0.0154	$\Delta logRV_t$	2.463	0.292
	(-4.24)	(-1.21)	$\Delta logEEPU_t$	17.969	0.000
Sweden	-0.148***	-0.0635*	$\Delta logRV_t$	1.225	0.542
	(-5.00)	(-2.00)	$\Delta logEEPU_t$	25.138	0.000
UK	-0.0353***	-0.00439	$\Delta logRV_t$	3.362	0.186
	(-3.34)	(-0.41)	$\Delta logEEPU_t$	11.802	0.003
US	-0.0455***	-0.0238*	$\Delta logRV_t$	2.180	0.336
	(-5.02)	(-2.39)	$\Delta logEEPU_t$	26.272	0.000

Table 3 The results of the VAR system and granger causality (continue)

Revealed Volatility Equation $\Delta logRV_t$

	VAR Coefficients		Granger Causality		
	$\Delta logEEPU_{t-1}$	$\Delta logEEPU_{t-2}$		chi2	p
Australia	0.234***	0.0413	$\Delta logRI_t$	2.235	0.327
	(4.32)	(0.73)	$\Delta logEEPU_t$	19.147	0.000
Brazil	0.147**	0.0536	$\Delta logRI_t$	2.677	0.262
	(3.04)	(1.13)	$\Delta logEEPU_t$	9.261	0.010
Canada	0.195*	0.0927	$\Delta logRI_t$	6.263	0.044
	(2.55)	(1.22)	$\Delta logEEPU_t$	6.771	0.034
Chile	0.279**	0.161	$\Delta logRI_t$	8.262	0.016
	(2.85)	(1.45)	$\Delta logEEPU_t$	8.458	0.015
China	0.0142	0.00906	$\Delta logRI_t$	2.919	0.232
	(0.32)	(0.21)	$\Delta logEEPU_t$	0.113	0.945
France	0.306***	0.213**	$\Delta logRI_t$	3.749	0.153
	(4.56)	(3.05)	$\Delta logEEPU_t$	22.342	0.000
Germany	0.180***	0.0605	$\Delta logRI_t$	4.136	0.126
	(3.74)	(1.22)	$\Delta logEEPU_t$	14.228	0.001
HongKong	0.181***	0.118*	$\Delta logRI_t$	5.449	0.066
	(3.74)	(2.43)	$\Delta logEEPU_t$	15.509	0.000
India	0.381***	0.143	$\Delta logRI_t$	2.672	0.263
	(5.55)	(1.90)	$\Delta logEEPU_t$	30.954	0.000
Ireland	0.0229	0.0419	$\Delta logRI_t$	5.298	0.071
	(0.46)	(0.84)	$\Delta logEEPU_t$	0.708	0.702
Italy	0.314***	0.243***	$\Delta logRI_t$	0.633	0.729
	(4.28)	(3.30)	$\Delta logEEPU_t$	21.031	0.000
Japan	0.584***	0.364***	$\Delta logRI_t$	0.830	0.660
	(6.10)	(3.64)	$\Delta logEEPU_t$	42.214	0.000
Korea	0.212**	0.106	$\Delta logRI_t$	0.751	0.687
	(3.24)	(1.61)	$\Delta logEEPU_t$	10.648	0.005
Mexico	0.246***	0.0735	$\Delta logRI_t$	1.995	0.369
	(4.68)	(1.34)	$\Delta logEEPU_t$	22.007	0.000
Netherlands	0.484***	0.123	$\Delta logRI_t$	5.617	0.060
	(5.27)	(1.27)	$\Delta logEEPU_t$	28.647	0.000
Russia	0.121*	0.0139	$\Delta logRI_t$	2.61	0.271
	(2.13)	(0.24)	$\Delta logEEPU_t$	5.0406	0.080
Singapore	0.404**	0.232	$\Delta logRI_t$	7.790	0.020
	(3.19)	(1.80)	$\Delta logEEPU_t$	12.013	0.002
Spain	0.265***	0.0841	$\Delta logRI_t$	1.277	0.528
	(4.81)	(1.48)	$\Delta logEEPU_t$	23.136	0.000
Sweden	0.675***	0.223	$\Delta logRI_t$	1.724	0.422
	(5.18)	(1.60)	$\Delta logEEPU_t$	26.798	0.000
UK	0.273***	0.0922	$\Delta logRI_t$	3.561	0.169
	(3.48)	(1.15)	$\Delta logEEPU_t$	12.142	0.002
US	0.517***	0.0343	$\Delta logRI_t$	7.598	0.022
	(7.93)	(0.48)	$\Delta logEEPU_t$	66.090	0.000

Table 3 The results of the VAR system and granger causality (continue)

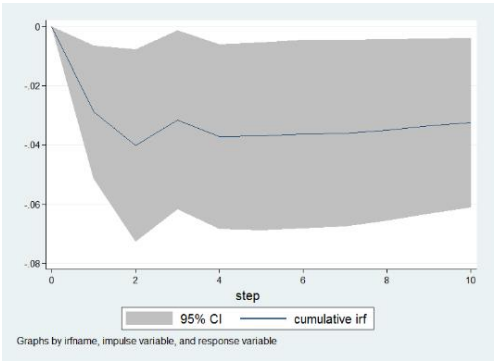
Economic Policy Uncertainty Equation $\Delta logEEPU_t$

	Var Coefficients				Granger Causality		
	$\Delta logRI_{t-1}$	$\Delta logRI_{t-2}$	$\Delta logRV_{t-1}$	$\Delta logRV_{t-2}$		chi2	p
Australia	-0.0622	0.527	-0.0703	0.0314	$\Delta logRI_t$	1.586	0.452
	(-0.14)	(1.24)	(-0.77)	(0.35)	$\Delta logRV_t$	1.129	0.569
Brazil	0.137	0.144	-0.0320	-0.0666	$\Delta logRI_t$	0.275	0.871
	(0.38)	(0.41)	(-0.30)	(-0.62)	$\Delta logRV_t$	0.385	0.825
Canada	-0.136	0.246	-0.0313	-0.0272	$\Delta logRI_t$	0.658	0.719
	(-0.37)	(0.69)	(-0.47)	(-0.42)	$\Delta logRV_t$	0.275	0.872
Chile	-0.520	-0.179	-0.0327	-0.214*	$\Delta logRI_t$	1.027	0.598
	(-0.95)	(-0.34)	(-0.31)	(-2.12)	$\Delta logRV_t$	4.680	0.096
China	-0.131	0.286	0.140	-0.0134	$\Delta logRI_t$	0.833	0.659
	(-0.39)	(0.85)	(1.74)	(-0.17)	$\Delta logRV_t$	3.945	0.139
France	-0.233	0.493	0.0470	0.0115	$\Delta logRI_t$	1.242	0.537
	(-0.45)	(0.96)	(0.50)	(0.13)	$\Delta logRV_t$	0.251	0.882
Germany	-0.409	0.622	0.0218	-0.113	$\Delta logRI_t$	3.457	0.178
	(-0.99)	(1.49)	(0.29)	(-1.49)	$\Delta logRV_t$	2.982	0.225
HongKong	-0.0803	1.396**	-0.0759	0.153	$\Delta logRI_t$	7.380	0.025
	(-0.15)	(2.71)	(-0.77)	(1.56)	$\Delta logRV_t$	3.992	0.136
India	-0.132	0.616	0.000432	0.0483	$\Delta logRI_t$	3.843	0.146
	(-0.41)	(1.95)	(0.01)	(0.66)	$\Delta logRV_t$	0.470	0.791
Ireland	-1.208	-1.495	-0.190	-0.0700	$\Delta logRI_t$	4.480	0.106
	(-1.34)	(-1.62)	(-1.41)	(-0.51)	$\Delta logRV_t$	2.002	0.367
Italy	0.168	0.145	-0.00800	-0.0816	$\Delta logRI_t$	0.602	0.740
	(0.60)	(0.52)	(-0.14)	(-1.43)	$\Delta logRV_t$	2.223	0.329
Japan	0.201	0.334	-0.0281	-0.0990**	$\Delta logRI_t$	2.859	0.239
	(0.84)	(1.43)	(-0.81)	(-2.85)	$\Delta logRV_t$	8.150	0.017
Korea	-0.0665	0.665*	-0.245***	-0.0658	$\Delta logRI_t$	6.150	0.046
	(-0.23)	(2.39)	(-3.31)	(-0.85)	$\Delta logRV_t$	10.950	0.004
Mexico	-1.027	0.0878	-0.0880	0.0159	$\Delta logRI_t$	3.157	0.206
	(-1.78)	(0.16)	(-0.84)	(0.15)	$\Delta logRV_t$	0.927	0.629
Netherlands	-0.109	-0.138	0.0722	0.0525	$\Delta logRI_t$	0.214	0.898
	(-0.29)	(-0.36)	(0.99)	(0.76)	$\Delta logRV_t$	1.164	0.559
Russia	0.291	1.304*	0.339*	0.281	$\Delta logRI_t$	6.33	0.042
	(0.50)	(2.48)	(2.43)	(1.86)	$\Delta logRV_t$	6.96	0.031
Singapore	-0.457	0.389	-0.134**	-0.0398	$\Delta logRI_t$	3.561	0.169
	(-1.58)	(1.39)	(-2.80)	(-0.82)	$\Delta logRV_t$	7.854	0.020
Spain	0.511	-0.0136	0.127	-0.119	$\Delta logRI_t$	1.220	0.543
	(1.10)	(-0.03)	(1.33)	(-1.26)	$\Delta logRV_t$	4.643	0.098
Sweden	0.241	-0.0192	-0.0208	0.00338	$\Delta logRI_t$	2.547	0.280
	(1.59)	(-0.13)	(-0.64)	(0.11)	$\Delta logRV_t$	0.529	0.768
UK	-1.281**	0.108	-0.0302	-0.0693	$\Delta logRI_t$	8.201	0.017
	(-2.85)	(0.24)	(-0.53)	(-1.22)	$\Delta logRV_t$	1.481	0.477
US	0.330	0.741	0.0708	-0.00929	$\Delta logRI_t$	3.669	0.160
	(0.84)	(1.92)	(1.69)	(-0.24)	$\Delta logRV_t$	4.189	0.123

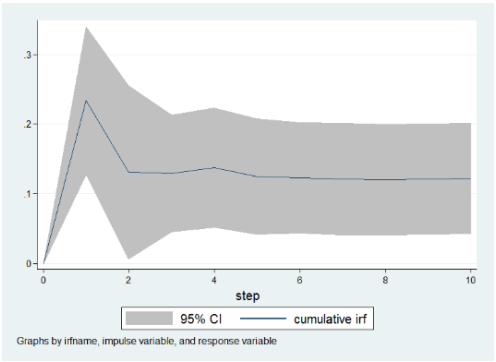
Figure 2 Impulse response functions

Note: The graphs below depict the accumulated impulse-response functions to generalized one standard deviation innovations in EEPU variables to RV and RI each for a representation of our sample in Australia, Brazil, Germany, Japan, the UK and the US. All models for each panel depicted below are based on a VAR with two lags. The shaded area represents the space that occupies ± 2 standard error distances from the impulse functions.

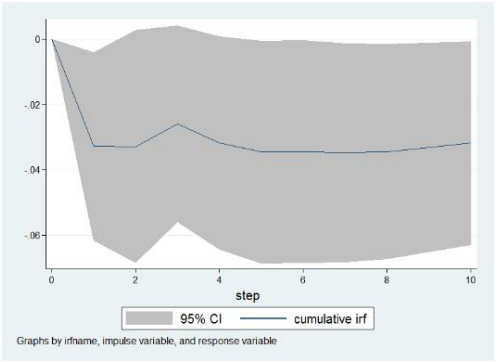
Impulse: EEPU, Response: RI
Australia



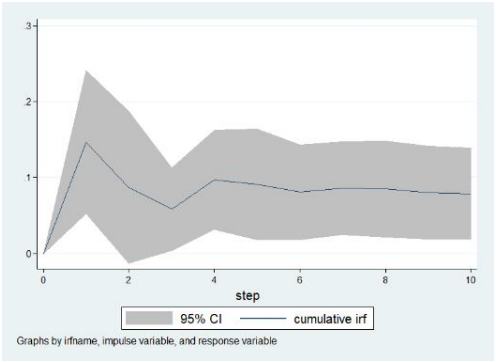
Impulse: EEPU, Response: RV
Australia



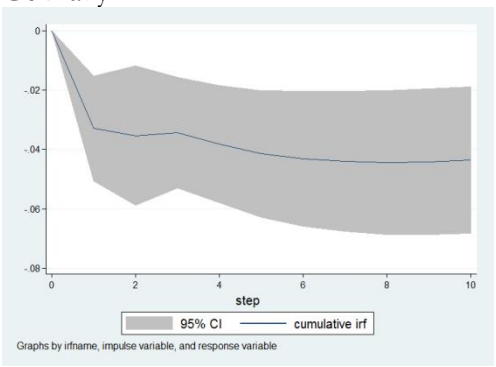
Brazil



Brazil



Germany



Germany

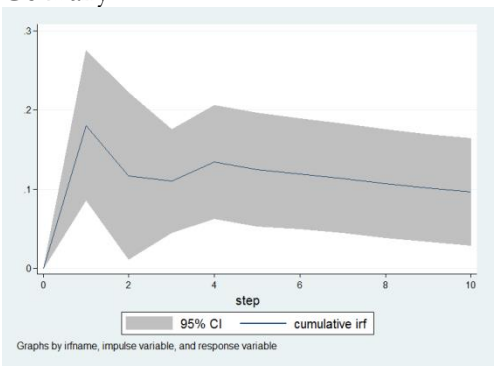
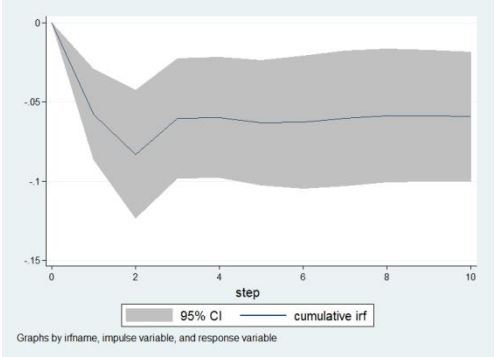


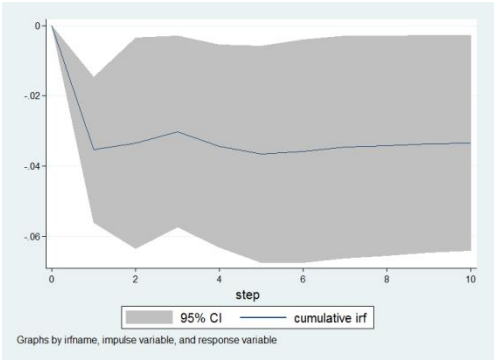
Figure 2 Impulse response functions (continued)

Impulse: EEPU, Response: RI

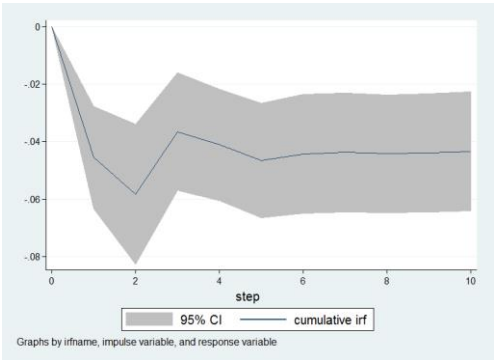
Japan



UK

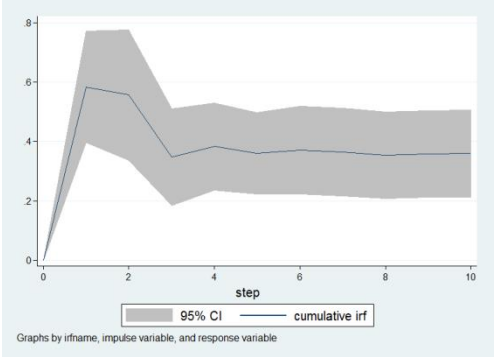


US

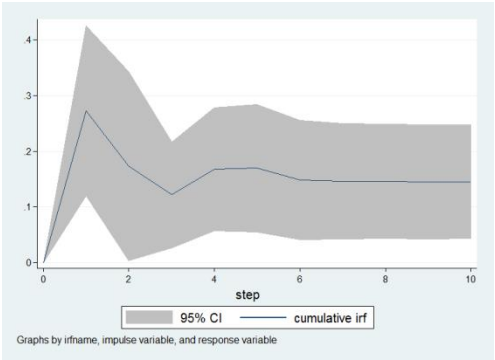


Impulse: EEPU, Response: RV

Japan



UK



US

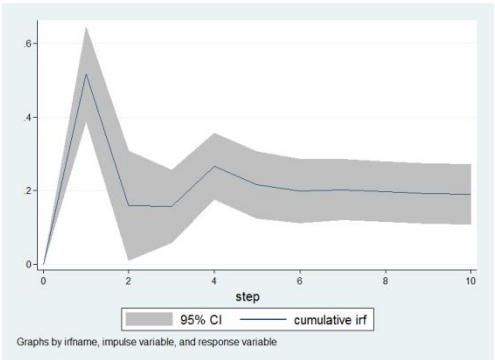
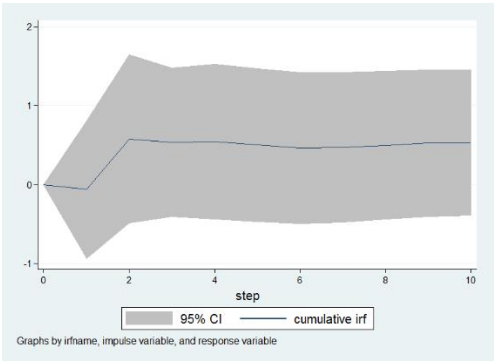


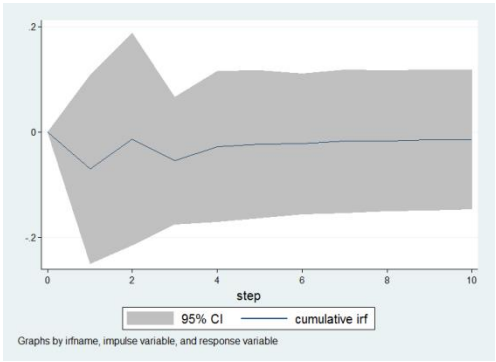
Figure 3 Impulse response functions

Note: The graphs below depict the accumulated impulse-response functions to generalized one standard deviation innovations in market variables RV and RI to the EEPU variables for a representation of our sample in Australia, Brazil, Germany, Japan, the UK and the US. All models for each panel depicted below are based on a VAR with two lags. The shaded area represents the space that occupies ± 2 standard error distances from the impulse functions.

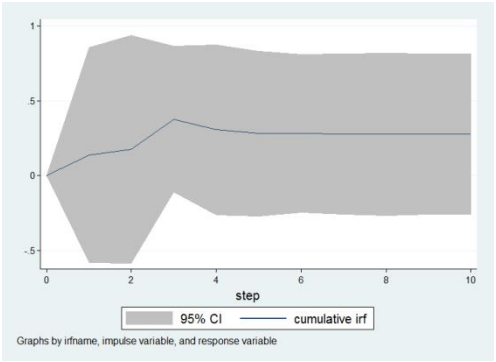
Impulse: RI, Response: EEPU
Australia



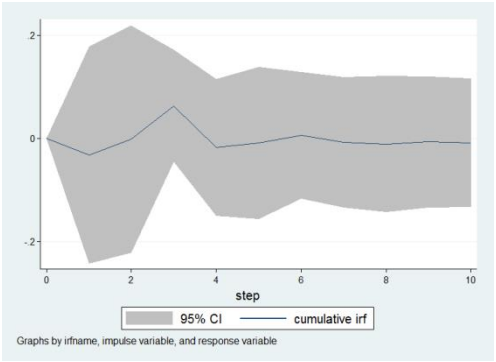
Impulse: RV, Response: EEPU
Australia



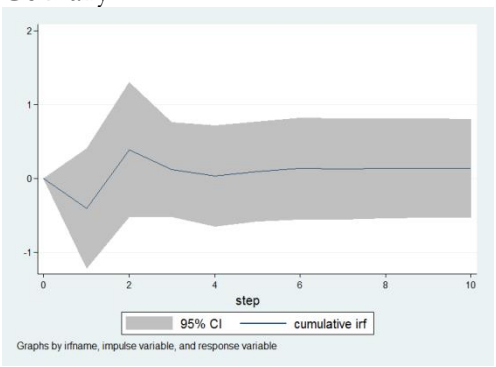
Brazil



Brazil



Germany



Germany

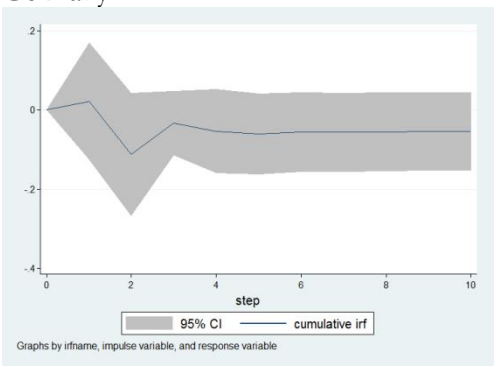
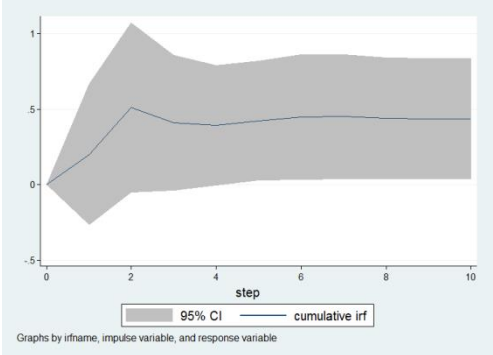
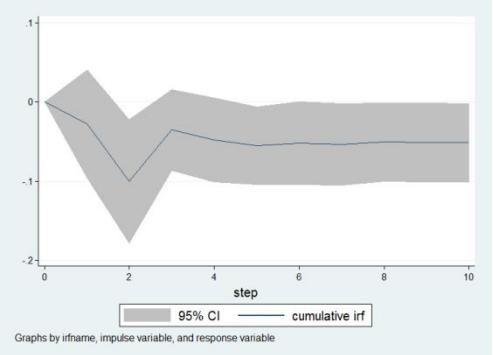


Figure 3 Impulse response functions (continue)

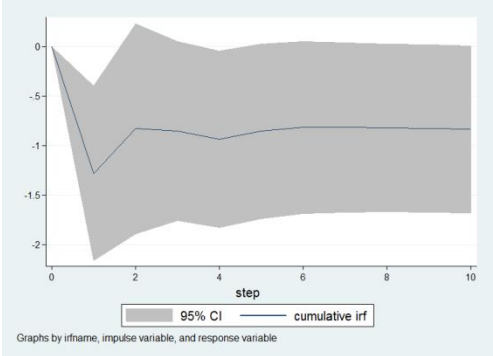
Impulse: RI, Response: EEPU
Japan



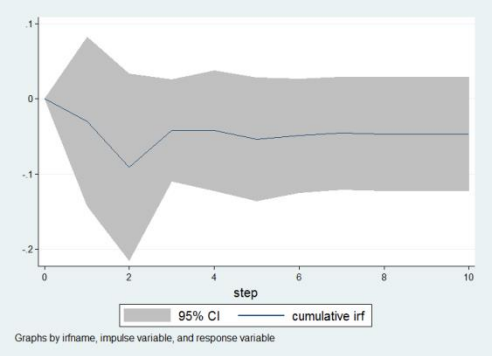
Impulse: RV, Response: EEPU
Japan



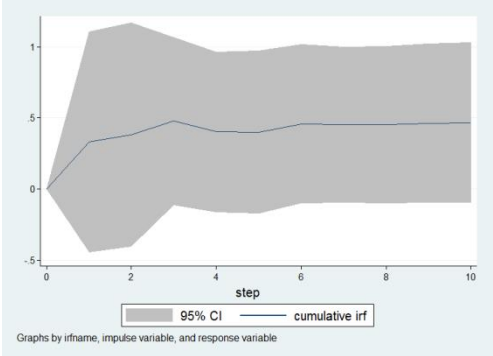
UK



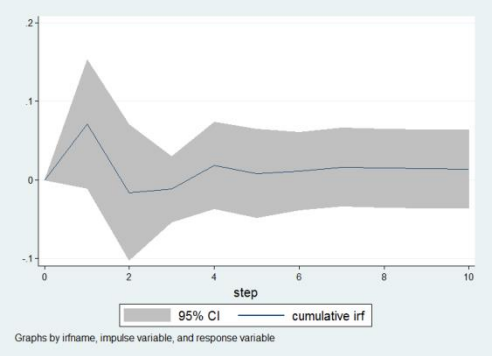
UK



US



US



Appendix Table 4:

In the table below each of the country indices representing economic policy uncertainty in our sample is recorded. The second column indicates the number of newspapers used to create the index. The third column lists the searched keyword terms column four provides details on the compilers for each index. The fifth column specifies the range of dates for which the data has been collected.

Country	# of newspaper sources	Keywords used	Compilers	Start/End date
Australia	8	uncertain(ty), economic(my), regulation, Reserve Bank of Australia, RBA, deficit, tax , taxation, taxes , parliament, senate, cash rate, tariff , war	J Borland, R McKibbon, J Morley, A Pagan	Jan 1998- Jan 2018
Canada	5	uncertain(ty), economic(my), policy, tax, spending, regulation, central bank, budget, deficit.	S Baker, N Bloom, S Davis	Jan 1985 Jan 2018
China	1 (English version South China Morning post)	China(ese), uncertain(ty), economic(my), policy, spending, budget, political, interest rates, reform AND government, Beijing, authorities, tax, regulation, regulatory, central bank, People's Bank of China, ,PBOC, deficit ,WTO	S Baker, N Bloom, S Davis, X Wang.	Jan 1995 Jan 2018
France	2	uncertain(ty), economic(my), AND policy relevant term (native language)	S Baker, N Bloom, S Davis	Jan 1987 Jan 2018
Hong Kong	10	Terms relating to Region, Economy, Uncertainty and Policy	P Luk, M Cheng, P Ng, K Wong	Apr 1998 Dec 2017
Ireland	1	uncertain(ty), economic(my), regulation, legislation, Dáil, deficit, government, "central bank" or Taoiseach	R Zalla	Jan 1985 Jan 2018
Japan	4	uncertain(ty), economic(my), 'tax,' 'government spending', 'regulation,' 'central bank' or certain other policy-related terms;	Elif C. Arbatli, Steven J. Davis, Arata Ito, Naoko Miake and Ikuo Saito	Jan 1987 Jan 2018
Mexico	2	Economy: económica, economía Policy: regulación, regulaciones, deficit, deficits, presupuesto, presupuestos, "Banco de México", BdeM, Banxico, "Los Pinos", "Congreso General", senado, "Cámara de Diputados," legislación, legislaciónes, ley, leyes, arancel, aranceles, impuesto, tributación, impuestos, tributaciones, military, militares, Guerra, guerras, "la Fed", "la Reserva Federal" Uncertainty (incierto, incertidumbre)	S Baker, N Bloom, S Davis	Jan 1986 Jan 2018
Russia	1	uncertain(ty), economic(my), AND policy relevant term (native language equivalents of 'policy', 'tax', 'spending', 'regulation', 'central bank', 'law', terms relating to political institutions like the Duma, 'budget',	S Baker, N Bloom, S Davis	Jan 1994 Jan 2018
Spain	2	uncertain(ty), economic(my), AND policy relevant term (native language)	S Baker, N Bloom, S Davis	Jan 2001 Jan 2018
UK	2	uncertain(ty), economic(my), AND policy relevant term (native language)	S Baker, N Bloom, S Davis	Jan 1997 Jan 2018
USA	10	uncertain(ty), economic(my), AND congress', 'legislation', 'white house', 'regulation', 'federal reserve', or 'deficit'.	S Baker, N Bloom, S Davis	Jan 1985 Jan 2018
Brazil	1	"incerto" or "incerteza", "econômico" or "economia", and one or more of the following policy-relevant terms: regulação, déficit, orçamento, imposto, banco central, alvorada, planalto, congresso, senado, câmara dos deputados, legislação, lei, tarifa.	S Baker, N Bloom, S Davis	Jan 1991 Jan 2018
Chile	2	uncertainty (incierto or incertidumbre), and economics (economía or económico/a or economista/s) and one or more of the following policy-relevant terms: politics	Rodrigo Cerda, Alvaro Silva and Jose Tomas Valente	Jan 1993 Jan 2018

Germany	2	(política) or tax (impuesto/s) or regulation (regulación) or tax collection (recaudación) or reform (reforma) or congress (congreso) or senate (senado) or congressman (diputado/a) or fiscal spending (gasto fiscal) or public spending (gasto público) or public debt (deuda publica) or fiscal budget (presupuesto fiscal) or Central Bank (Banco Central) or Ministry of Finance (Ministerio de Hacienda). uncertain(ty), economic(my), AND policy relevant term (native language)	S Baker, N Bloom, S Davis	Jan 1993 Jan 2018
India	7	uncertain(ty), economic(my), AND policy relevant terms such as 'regulation', 'central bank', 'monetary policy', 'policymakers', 'deficit', 'legislation', and 'fiscal policy	S Baker, N Bloom, S Davis	Jan 2003 Jan 2018
Italy	2	uncertain(ty), economic(my), AND policy relevant term (native language)	S Baker, N Bloom, S Davis	Jan 1997 Jan 2018
Korea	6	uncertain(ty), economic(my), commerce AND government, "Blue House", congress, authorities, legislation, tax, regulation, "Bank of Korea", "central bank", deficit, WTO, law/bill or "ministry of finance"	S Baker, N Bloom, S Davis	Jan 1990 Jan 2018
Netherlands	5	uncertainty 'onzeker' or 'onzekerheid') and economics ('economisch' or 'economie') and one or more policy-related terms such as 'beleid' (policy), 'minister', 'begroting' (budget) or 'belasting' (tax).	Kok, Kroese and Parlevliet	Mar 2003 Jan 2018
Singapore	NA To compute the time-varying trade weights, we use the sum of Singapore's annual import flows plus export flows for these 18 countries	terms pertaining to the economy (E), policy (P) and uncertainty (U).	S Baker, N Bloom, S Davis	Jan 2003 Jan 2018
Sweden	4	ekonomi or ekonomisk (E) and riksbank, centralbank, regering, departement, or reglering (P) and osaker or oro (U).	Hanna Armelius, Isaiah Hull and Hanna Stenbacka Köhler	Jan 1976 Jan 2018