Perceptions of the threat to national security and the stock market

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Abstract

This paper investigates the impact of national security concerns on equity valuations in the U.S. from 1985 to 2018. While existing literature focuses on actual events of a violent nature, our process is different. We examine the effect of continuous indices derived from media coverage of these issues. Our analysis documents that journalistic reportage can provoke significant changes in the first and, to a certain extent, the second moment of U.S. equity return distribution. These changes extend even beyond the impact of events that transpired. Furthermore, business confidence also appears to be undermined by media coverage of threats to the nation and its citizenry.

Keywords: National Security, Equities, Business Confidence, Economic Policy Uncertainty
JEL Codes: G12, G14

1. Introduction

Threats to national security tend to dominate headlines and disrupt the public sense of calm in myriad ways. War, embargos, terrorism, and the saber-rattling of influential political figures can directly impact perceptions of a safe society and, in turn, investor assessment of risk. Earlier studies echo this point suggesting that episodes of war and aggression from hostile actors can affect the price behavior of equities (Rigobon and Sack, 2005; Wolfers and Zitzewitz, 2009; Berkman *et al.*, 2011; Omar *et al.*, 2017). However, it is not entirely clear whether the perception of threats to national security can transmit to the financial market. Despite presenting a danger to the economic status quo, surprisingly little work exists on the potential relationship between societal fears over national security and equity value.

Our study investigates this relationship by employing continuous media-based indices that quantify concern over U.S. national security expressed in the media. We show that such concern is associated with statistically significant declines in returns on the S&P 500 index, in addition to increases in volatility. Our investigation separates the effect of media-induced panic from the reaction created by an actual security-related event. Our findings remain robust even after controlling for changes in the business and political cycle, real corporate earnings, seasonal anomalies, and other confounding sources of economic policy uncertainty.

This inquiry contributes to the literature in several ways. First, using U.S. data, we disentangle the effects of press reportage alluding to concerns over national security from actual events. In doing so, we quantify the impact that media-induced fear exerts on the markets. It is not beyond reason to think that alarmistic media reportage could propagate fear amongst investors and lead them to formulate exceedingly pessimistic visions of the future. Therefore, it is essential to distinguish between a *de facto* threat and the popular perception of one.

Second, we adopt a new angle to gauge this market effect, which has hitherto been measured using event study analysis (Amihud and Wohl, 2004; Wolfers and Zitzewitz, 2009). Specifically, we model the relationship using a continuous index. Since security events are often impossible to predict, a change in viewing threats to security via the lens of a continuous index may be more useful to investors. It could allow them to rebalance their portfolios as they continually monitor changes in the climate of threat perception. Furthermore, unlike in the standard event study technique, we are not compelled to presuppose that each national security event carries equal importance. Crises can differ in terms of the threat posed, the number of fatalities, and the material losses incurred. Quantifying the severity of the danger on a continuous scale goes a long way towards improving measurement accuracy.

Consideration of journalistic opinion in parallel with the actual historical events also has one important, albeit less obvious, advantage. Exclusive preoccupation with the recorded history may lead to a situation where low-probability high-impact events that have not materialized throughout the sample period are entirely ignored. This gives rise to the so-called peso problem, which renders tests of market efficiency invalid (Krasker, 1980). Imagine, for instance, the dire scenario that would be a global nuclear war. Fortunately, an apocalyptic event such as this has thus far failed to transpire, so the frequentist approach based on historical data may suggest that the likelihood of one unfolding is equal to zero. In reality, however, the risk of such a development is ever-present, affecting the market's valuation of assets. Journalists and political pundits may occasionally contemplate such extreme events in their newspaper columns, helping alleviate the peso problem's gravity.

Another issue that we alluded to earlier is examining whether economic uncertainty driven by national security affects stock index returns volatility. Prior literature indicates that this may, to some extent, be the case. Berkman *et al.* (2011) demonstrate that the magnitude of stock market movements increases the outbreak of wars and reduces by with hostilities' cessation.

Amidst an ongoing conflict, however, no abnormal volatility behavior is observed. Essaddam and Karagianis (2014) and Essaddam and Mnasri (2015) show that market variability can be affected by terrorist attacks, albeit the effect is ephemeral and restricted to a few days. In this paper, we re-examine the impact of threats to national security on the second moment of return distribution by utilizing the continuous threat index. We also extend the analysis beyond realized volatility to examine the behavior of volatility implied by options prices. Our study permits us to assess whether the effects are restricted to the market's contemporaneous riskiness or whether the perception of elevated risk is projected into the future.

Aggravation of economic policy concerns by an imperiled state of national security may induce rises in the discount rates and depress stock market valuations. The same outcome will prevail if investors believe that companies' future performance will weaken as a result. We ponder this possibility by analyzing the association between jeopardized national security and business confidence. To the best of our knowledge, prior literature has not considered this issue. In what follows, we provide evidence supporting the existence of such an association. This finding implies that worries over a nation's citizenry and its secrets can influence the prices of equities through more than one channel.

2. Literature Review and Hypothesis Development

The theoretical basis for understanding why concerns over national security could impact market values emerges from the literature which develops the concept of hysteresis (McDonald and Siegel, 1986; Krugman, 1988; Pindyck, 1988; Dixit, 1989). These scholars argue that uncertainty influences behavior and can have a lasting effect even after the original problem becomes resolved. The government shapes the context within which private firms operate, and when uncertainty arises over policy direction, this can have clear economic implications. As a result, when underlying risk is perceived to be higher, the value of the option not to invest can marginally outweigh the benefit of following through with investment and bearing the costs of making that decision. The term 'optimal inertia' best describes this impasse (Dixit, 1992: 110).

Another frame of reference emerged with the creation of Economic Policy Uncertainty (EPU) index (Baker, Bloom and Davis, 2016). EPU has spawned many studies attesting to the negative influence on economies, that elevated levels of uncertainty can produce (Baker Bloom and Davis, 2016; Leduc and Liu, 2016; Kydland and Zarazaga, 2016; Sinha, 2016; Husted *et al.*, 2016; Caggiano *et al.*, 2017). Real economic impacts emanating from economic policy uncertainty also manifest through reduced corporate investment levels (Gulen and Ion, 2016) and unemployment rates (Mian and Sufi, 2014; Caggiano *et al.*, 2017).

We must emphasize that this paper's primary focus is not the economic policy uncertainty measure *per se* but rather its subcomponent. More specifically, we concentrate on national security threats, which can lead to future policy revisions, affecting the level of uncertainty. The events that followed the 9/11 terrorist attack epitomize such a chain of events. In section 5.4, we demonstrate empirically the existence of a close link between economic policy uncertainty and the number of newspaper items published on topics of war and terrorism.

2.1. Impact upon Returns

The literature is replete with studies evidencing the influence a political uncertainty context can hold over market price. Pastor and Veronesi (2012) provide a theoretical model indicating that government policy change may induce a fall in stock prices, with steeper declines evident when the policy uncertainty becomes more pronounced. The link is made more explicit in Pastor and Veronesi (2013). The authors demonstrate how asset risk premiums are determined by the magnitude of political uncertainty, especially when underlying economic conditions are weak. A different voice of support for this point appears in Kelly *et al.* (2016), who build a model in which political uncertainty explains stock options' price.

Kang and Ratti (2013) point to a relationship of cause and effect by observing how increases in the EPU index provoke negative returns for U.S. stocks. Broadly similar conclusions appear in Antonakkis *et al.* (2014) and Arouri *et al.* (2016). Christou *et al.* (2017) observe that positive shocks to the U.S. EPU index induce a spillover effect on other economies, highlighting the possible far-reaching consequences of indecision over economic policies. The result is not limited to the equity markets, with bond defaults growing somewhat in likelihood and credit protection costs rising in the face of increased uncertainty (Wisniewski and Lambe, 2015).

As mentioned before, national security concerns are linked to economic policy uncertainty and, therefore, have the potential to impact equity returns. It is reasonable to suspect that the threat of war and an increased instance of terrorism presents a distinct risk to firms. The literature abounds with studies that investigate and uncover this effect. Political instability culminating in military action is noted by numerous studies to impact financial markets directly. For instance, a drop in equity values corresponding to the ground offensive in Iraq in 2003 is evidenced in Rigobon and Sack (2005). Similarly, Berkman *et al.*'s (2011) study of 447 international political crises reveals that annual global stock returns would have been 3.6% higher had those crises not occurred. Omar *et al.* (2017) examine the market effects of 43 wars and observe that these led to declines of 3.47% and 4.67% in the world stock index and the S&P 500, respectively.

The effect is not confined to military interventions. Terrorist events also destabilize the markets and may lead to significant and negative abnormal returns. Karolyi and Martell (2010) examine 75 U.S.-listed firms domiciled across 11 countries where a terrorist event occurred and observe that negative stock returns tend to appear on the event day. Additionally, Brounen and Derwall (2010) document a typical abnormal return of -0.92% on the day terrorist attacks occurred. Similar reactions appear outside U.S.-centric samples. Chesney *et al.* (2011) analyze terrorist incidents across 11 countries over 25 years and demonstrate that these directly impact equity returns. Nguyen and Enomoto (2009) note similar behavior in Iran and Pakistan for terror-inspired incidents.

These studies point to the possibility that, for our sample of U.S. firms, heightened national security concerns embedded in media reports negatively impact stock market returns. Hence, we formulate our first testable hypothesis:

H1: Stock index returns are negatively related to the intensity of newspaper coverage of national security concerns.

2.2 Impact upon volatility

Tracing the link between economic policy uncertainty, which encompasses national security concerns, and aggregate market volatility remains a relatively unexplored aspect of the uncertainty literature. We ground our motivation for exploring this link in work by Pastor and Veronesi (2012). They construct a general equilibrium model illustrating how policy changes increase the volatility of market behavior. This theoretical claim seems to be validated by the empirical finding of Bialkowski *et al.* (2008), who document abnormally high realized volatility during election periods in an international sample of 28 OECD countries. It also coheres with the observation that prices of options become more expensive during elections and global summits (Kelly *et al.*, 2016).

Other papers that support the idea that political or policy-related uncertainty and volatility are linked include Bittlingmayer (1998), who analyzed a period of intense political and economic uncertainty accompanying the late 19th to early 20th century transitioning of Germany from an imperial state to a republic. This study finds that both output declines and volatility are associated with the tenuous political situation of the time. Boutchkova *et al.* (2012) also examine how national and international political risks may affect the volatility of returns across certain industries. They observe that industry classes with specific international trade relations are more exposed to this risk than others. Liu and Zhang (2015) further elaborate on the theme by showing how volatility forecasting accuracy improves when economic policy uncertainty is added as a predictive variable.

However, a specific link between volatility and a sense of unease over national security is much more difficult to pin down. Schwert's (1989a) longitudinal U.S. study investigating volatility determinants noted particular periods of fluctuation in bond returns during the U.S. civil war (1861-65) and the Great War (1914-18), with the situation being less pronounced for stock returns. When we search for a contemporary example for the supposed link, we find a study of Bevilacqua *et al.* (2020), who observe an effect of terrorist incidents on the VIX index when decomposed into put and call options, with an impact in the former rather than the latter. Other studies empirically trace realized volatility responses to terror events (see, for instance, Arin *et al.* (2008); Nikkinen and Vähämaa (2010); and Essadam and Karagianis (2014)). Furthermore, Berkman *et al.* (2011) show that stock market instability is exacerbated by initiations of international crises and ameliorated by their cessation.

All of these studies focus on events that have already materialized. However, in Pastor and Veronesi's (2013) model, the market responds to the political signaling of change in the future policy direction under scrutiny. Consequently, the factor driving market fluctuation is the speculation that something may happen rather than the event itself. From this precept, we reason that media reportage could create concern over national security that, in turn, would exacerbate perceived policy uncertainty and destabilize market prices. In focusing on this media aspect, our study advances the literature by embracing a more all-encompassing view of the perception of whether society is safe.

We then extend the modeling beyond the historical perspective and examine the forward-looking VIX index. The link between implied volatility and national security concerns has only been examined once in the prior literature (see Bevilacqua *et al.*, 2020). The extant evidence shows that, in the face of terrorism, stock returns exhibit significantly elevated realized volatility, which is relatively short-lived (Essaddam and Mnasri, 2015). In developed capital markets like the U.S., recovery following an attack can be swift (Chen and Seims, 2004). This recovery may be related to the immediate response of monetary authorities and government agencies trying to stabilize the market and provide fiscal stimulus (Johnston and Nedelescu, 2005). Therefore, VIX becomes an essential indicator of the perceived enduring effects on market risk going beyond a transitory spike in realized volatility. Using this reasoning, we propose to investigate the following two hypotheses:

H2: Realized stock index returns volatility is elevated in periods of heightened media speculation about national security.

H3: VIX index is affected by the frequency with which national security concerns are raised in the press.

Since stock index volatility can be viewed as part and parcel of systematic risk, the inability to reject H2 and H3 could imply augmentation of discount rates in times of adverse security events. This, in turn, would lead to a fall in stock market prices, as was postulated by hypothesis H1.

2.3 Business Confidence

A further factor motivating our study is the desire to understand whether national security concerns can imprint themselves on market valuations via undermining confidence in future business and economic performance. We identify some themes in the literature that already make the connection with actual militaristic change.

For instance, increased military spending can signal that society is becoming more preoccupied with potential dangers and threats. Heightened concerns over national security inevitably result in the allocation of resources to deal with the problem. There is scholarly contention over whether a larger military purse heralds positive economic change. Keynes (1940) maintained that it could, arguing that military spending was perhaps the single most important means by which to mobilize the disbursement of public funds on a grand scale. Such a move could, in his view, bolster consumer demand and provide the enhanced economic stimulus that precipitates full employment. The standard debate amongst scholars of U.S. economic history is that Roosevelt's New Deal policies were not enough to pull the economy out of the depths of the depression, which began with the Wall Street crash in 1929. However, the advent of World War II and the boost in military spending built upon these policies pushed the economy into recovery (Krugman, 2011). The argument is not without its detractors; some hold that the U.S. economy had regained most of the ground lost before America entered into the war (DeLong and Summers, 1986), others that the economy had returned to normal owing to monetary expansion (Romer, 1991). It is argued that recovery did not happen until after the war had ended despite GNP doubling between 1942 and 1944 (Higgs, 1992).

However, more generalized empirical evidence supporting the Keynesian ideal that wartime expenditure brings prosperity is harder to square empirically. Over the longer-term and with other conflicts, a contradictory picture emerges. Using an international dataset, Bayoumi *et al.* (1993) noted that a fall in military expenditure leads to increases in consumption and private investment in industrialized and less developed economies. The effect is to strengthen the rise in GDP in the long-term. Knight *et al.* (1996) reiterated this point. They commented on the presence of a 'peace dividend' in the form of more significant economic outputs for countries committed to reducing military budgets. Therefore, it seems that countries with high military spending levels suffer the adverse consequences of reduced capital accumulation and inefficient resource allocation. In a 28 country four-decade study, Yakovlev (2007) produced similar findings and showed that increased military spending could stifle growth, except when the country was a net exporter of arms and defense equipment. As an employment stimulant, military spending does not appear to be the optimum choice either. A study by Garret-Peltier (2017) estimates that each $1 million of federal defense spending generates 6.9 jobs, while investing that same amount in healthcare or education can generate 14.3 and 15.2 jobs, respectively. Similar conclusions about the economic viability of this area of spending are reached in Deger and Smith (1983) and in Cappelen *et al.* (1984), who note that a sizeable military budget impedes economic growth and investment. Possibly, as a consequence of the confounding effects of other factors upon the economic context, it is difficult to reach any firm opinion about this issue.

Sanctioning or blockades can also hurt the economies involved. The evidence points to an effect stretching across both the state administering the measure and its target. Inevitably, net trade flows are dramatically affected following sanctioning (Hufbauer *et al.*, 1997; Caruso, 2003; Yang *et al.*, 2004; Hufbauer *et al.*, 2007), having a potentially adverse effect on both economies. The impact does not end there for the target. The target nation's banking system can also be affected (Hatipoglu and Peksen, 2016), with foreign direct investment dissipating as firms recall funds from the sanctioned country (Biglaiser and Lektzian, 2011). There is also a distinct possibility that sanctions increase the probability that a currency crisis may occur in the target country (Peksen and Son, 2015). Therefore, the bellicose atmosphere that accompanies these policy directives may adversely affect individual and firm fortunes in both economies.

Terrorist incidents can also serve to undermine business confidence. Prior research suggests that terror events can negatively impact market returns. For example, the 9/11 attack wiped 7.13% off the value of the Dow Jones Industrial Average on the day and 12.76% over the following year (Jackson, 2008). High correlations with the UK and German and Japanese markets meant that the effects reverberated internationally (Mun, 2005). Richman *et al.* (2005) also document a spillover effect of the attacks' impact on 28 other industrial and emerging economies. Within the U.S. alone, Rose *et al.* (2009) estimate the economic impact to reach approximately $100 billion. The singular nature of the attacks on the World Trade Center could lead one to suspect that the capacity of terrorism to disrupt the economy is somewhat overstated. However, less spectacular acts also serve to erode business confidence and inflict economic damage. Blomberg *et al.* (2004) argue that terrorism can appear in times of depressed economic conditions but that its presence can diminish the economy further. For instance, Abadie and Gardeazabal (2003) document a 10% reduction in GDP in Spain's Basque region since violent separatist activities began there in the 1960s.

As a consequence of the perceived effect on an economy, terrorist events negatively affect sentiment and create downward pressure on expected firm valuations (Nikkinen and Vähämaa, 2010; Drakos, 2010). Specific industries can be affected more than others; for instance, in the wake of 9/11, the airline industry was particularly severely hit (Drakos, 2004; Ito and Lee, 2005). Insurance firms also became casualties of the attacks (Cummins and Lewis, 2003), even if an accurate figure is difficult to pin down. Still, Liedtke and Courbage (2002) estimate this to be $40 to $50 billion. As disaffected parties resort to terrorism to showcase their grievances, concerns over national security in this respect do not promise to abate soon. Terrorism and its devastating consequences will feature as an enduring transgressor upon the political and economic landscape of many industrialized nations.

The considerations outlined above lead us to the development of the following hypothesis:

H4: National security concerns, particularly those highlighted by journalists, undermine business confidence.

3. Data and Summary Statistics

Our study benefits from the work of Baker, Bloom, and Davis (2016), who construct a monthly U.S. "national security" categorical index as well as 11 other main, categorical, and sub-categorical indices of economic policy uncertainty. These are based on a computer-automated search of the media archive of 10 major U.S. newspapers for the main index of economic policy uncertainty (henceforth, EPU) and over 2000 newspapers from the Access World News database for the categorical and sub-categorical indices.[2]

Baker, Bloom, and Davis (2016) derive the national security index by counting the frequency of articles that contain (i) the trio of terms "uncertainty" or "uncertain"; "economic" or "economy"; and one of the following policy terms "White House," "Congress," "Federal Reserve," "regulations," "legislation," "deficit," or variants of these terms, for example, "Fed," "regulatory," and "uncertainties," and (ii) one or more of 17 national security-specific terms. This latter group of terms includes, for example, "national security," "armed forces," "war," and "defense spending."[3] Simply put, while this index shares the aforementioned trio of terms with other categorical counterparts, it differs in the category-relevant terms. While the general EPU index is developed based only on the trio of terms, each categorical index extends the EPU using policy-specific terms. For example, the monetary policy index is built by counting articles containing the three terms as well as phrases such as "open market operations," "quantitative easing," and "Bernanke."

By its construction, the national security index provides a continuous quantification of economic policy uncertainty associated with perceptions of threats to national security. This feature, in turn, allows us to contribute to the existing literature by examining the effects of security-driven economic uncertainty on valuations of equities. Equally importantly, the fact that the index is based on media coverage permits us to further contribute to the literature by

[2] The series can be downloaded from /www.policyuncertainty.com/index.html. Baker, Bloom and Davis (2016) cite Newsbank database as the source of articles used in constructing categorical indices. This appears to have changed since, as the database Access World News is now the source cited in the webpage from which data was accessed.

[3] The full list of terms for the national security and other categorical indices are available at: www.policyuncertainty.com/categorical_terms.html

exploring the media's potential role in affecting financial markets by propagating and amplifying uncertainty.

Our empirical investigation on the link between security-related economic uncertainty and equity valuations uses monthly data from January 1985 to March 2018. We start the analysis in 1985 because data on the U.S. national security index is only available from that year. This series and data on additional control variables for the business cycle, outlined below, are only available monthly, which further dictates the use of monthly series.

The national security index enters our sample as the logarithmic change in monthly observations (denoted *USNS)*.[4] We use monthly data on the Standard and Poor's 500 (S&P 500) index to derive continuous monthly returns ($R_{S\&P\ 500}$). We also investigate the impact on the first difference of both the realized and implied volatility of returns, using the CBOE VIX index (denoted, respectively, $\Delta STDM\ and\ \Delta VIX$). For the realized volatility, we source daily data on S&P500 and compute within-month return variation. Subsequently, we construct the first difference in the monthly annualized standard deviation of returns. Both the S&P500 and VIX indices are sourced from DataStream.[5]

To further explore the rationale underlying hypothesized adverse effects on equities, we analyze the potential impact of national security–based uncertainty on business sentiment changes using the OECD U.S. business confidence index. The index reflects surveys of opinions in the U.S. industry about future output growth and anticipated turning points in economic activity. Monthly data for the sample period on the U.S. confidence index is sourced from the OECD database and used to construct logarithmic change in the index (denoted *BCI_G*).

[4] While the original series does not exhibit non-stationarity, we transform the index into logarithmic change to use same unit of measurement for our variables.
[5] Data on VIX index is only available since 1990, so our analysis involving VIX will start from that year.

In order to control for the confounding uncertainty arising from other policy-specific areas, we utilize monthly observations over the sample period for fiscal policy, monetary policy, regulation, trade policy, health care, and entitlement. Each is included in the sample as monthly logarithmic change and denoted, respectively, as *Fiscal*, *Monetary, Regulation, Trade_policy, Health,* and *Entitlement*. We do not include the two fiscal policy sub-categories, taxes, and government spending, because the specific terms used in their construction also feature among the terms of fiscal policy. For the same reason, we exclude financial regulations as it is a sub-category of the regulation index.[6]

Although each categorical index is derived using category-relevant terms, they still share the broad trio of terms related to uncertainty, the economy, and policy. This characteristic presents a challenge in disentangling the specific policy area that gives rise to economic uncertainty and points at a potential multicollinearity problem.

In order to tackle this challenge, we proceed by constructing our own media-based national security variable. Using the Nexis database, we manually count the monthly frequency of articles containing only the terms "military, conflict" or "terror," published in U.S. English language newspapers over our sample period. Our variable denoted (*MCandTerror*) is the logarithmic change in the monthly sum of these frequencies. By excluding the trio of terms from our variable, we can focus solely on media coverage of national security developments. This exclusion enables us to measure the link with valuations of equities in the presence of other categorical indices. Consequently, we utilize our self-constructed national security variable while also controlling for other categorical indices and replicate the analysis we perform using the Baker, Bloom and, Davis (2016) national security index.

[6] We exclude the categorical index titled "sovereign debt and currency crises" from our sample due to several zero observations in an early interval of our sample period. However, as Baker, Bloom and Davis (2016) show, this categorical index had minimal contribution to EPU between 1985 and 2014 (most of our sample period). For example, the relative frequency of the index to average EPU over 1985 – 2014 stood at only 1.6%, which compares to 23.8% for the national security index.

To control for systematic influences, we use monthly seasonally-adjusted data on U.S. industrial production growth (IP_G), consumer price inflation ($Inflation$), and the first difference in the civilian unemployment rate ($\Delta Unemp$) in order to capture the possible influence of the business cycle on equity markets. We source all data for macroeconomic controls from the Federal Reserve Bank of St Louis (FRED).[7] To account for corporate performance changes, we use the Standard and Poor's real earnings historical series taken from Shiller's online data repository and construct continuous earnings growth ($Earning\_G$).[8]

Since the national security index is a media-based variable, we also account for national and cross-border security events occurring over the sample period. The rationale underpinning this approach is to verify whether the media hype or factual developments propel market movements. We use actor-level data of version 12 of the International Crisis Behavior Database (ICB) to extract and construct a variable that captures variation in the number of incidents in which the U.S. had either direct or semi-direct military involvement and denote it *Crisis*.[9] Furthermore, we construct a dummy variable (labelled *Terror*) that takes the value 1 for months in which a terrorist event resulting in significant loss of life or injury took place, and zero otherwise. Data on terrorism is sourced from the High Casualty Terrorist Bombings (HCTB) database compiled by the Center for Systemic Peace.[10]

To control for seasonal anomalies, we construct two dummy variables capturing the possible Halloween (Bouman and Jacobsen, 2002) and January effects (Rozeff and Kinney, 1976; Haugen and Jorion, 1996; Haug and Hirschey, 2006), denoted, respectively, *Halloween* and *Jan_effect*. Moreover, we include a dummy variable indicating the incumbent president's party

[7] FRED database is accessible via https://fred.stlouisfed.org/
[8] Data on real earnings are available at www.econ.yale.edu/~shiller/data.htm.
[9] The database contains a variable (coded USINV) characterizing the level and nature of U.S. involvement in a crisis. Levels 7 and 8 refer to semi-direct and direct U.S. military intervention in conflicts, respectively. The ICB database is accessible via https://sites.duke.edu/icbdata. Version 12 covers the period up to December 2015, so our analysis ends in that month and year, whenever this variable appears in modeling.
[10] HCTB data is available at www.systemicpeace.org/inscrdata.html

affiliation to account for the political cycles (Hibbs, 1977; also see Wisniewski (2016) for a survey of relevant literature). This variable, denoted *Democrat*, takes the value of one, if the president was a Democrat, and zero otherwise.

[Insert Tables I and II about here]

Table I contains definitions of all variables included in our empirical investigation, while Table II reports the descriptive statistics for the sample. A noteworthy observation reported in Table II relates to the high volatility of the national security index and other categorical indices. Given that its construction is media-based, the index's variability reflects the sporadic nature of events in national security affairs. The volatility of our self-constructed media-based security variable (*MCandTerror*) confirms this observation. An additional noticeable finding is that the EPU index's volatility, which reflects broad policy uncertainty, is lower than that of any other categorical index.

Table II reports the unit root results for the variables included in our analysis. We utilize the Augmented Dickey-Fuller test (Dickey and Fuller, 1981), allowing for a trend and an intercept and applying the Schwarz Information Criterion (BIC) (Schwarz, 1978) for lag length selection. Table II shows that all our variables are stationary. However, these results are obtained using a test that does not allow for structural breaks. To address this issue, we use modified Augmented Dickey-Fuller Innovational Outlier test (see Perron, 1989; Perron and Vogelsang, 1992a; 1992b; Zivot and Andrews, 1992; Banerjee *et al.*, 1992; Vogelsang and Perron, 1998). Specifically, we follow the Vogelsang and Perron (1998: 1077) approach by considering the Zivot and Andrews (1992) and Banerjee *et al.* (1992) model. The break date is chosen endogenously by selecting the date where the ADF *t*-statistic of unit root is minimal while applying the Schwarz Information Criterion for lag selection. Results from running the test are presented in the final column of Table II and all show that the null can be rejected for all series.[11]

The correlation matrix reported in the Appendix highlights several regularities and noteworthy observations. The table documents a significant and negative association between changes in the U.S. national security index and the first moment of *S&P500* return distribution. On the other hand, developments on the national security front correlate significantly and positively with changes in U.S. equities' volatility. Moreover, a significant and negative decline in business confidence is associated with a rise in national security uncertainty. These findings are further confirmed by correlation results from our self-constructed security variable.

Furthermore, significant correlations with expected signs are documented between occurrences of direct military interventions and mean returns as well as implied volatility of S&P 500 options. Interestingly, while returns and implied volatility appear to show no association with terrorist events, economic policy uncertainty is significantly and positively correlated with these incidents. The table also offers support for our argument that called for the construction of our security variable (*MCandTerror*) to control for other categorical indices. This is because *USNS* shows a significant and positive correlation with other categorical indices, while *MCandTerror* shows similar result only in association with monetary policy with a coefficient's magnitude two times lower than that of its *USNS* counterpart.

4. Methodology

To investigate the association between economic uncertainty arising from U.S. national security and the valuations of equities, we specify and run the following models using data at a monthly frequency:

[11] Innovation Outlier model assumes that a break occurs gradually. We follow this approach as Zivot and Andrews (1992) proposed their method of selecting break date based on data in the context of this model. However, our conclusions remain intact when assuming a sudden break; i.e. using Additive Outlier model. Our findings are also robust to different specifications used under each model.

$$R_{S\&P\,500,t} = \beta_1 + \beta_2 USNS_t + \beta_3 R_{S\&P500,t-1} + \beta_4 IP\_G_{t-1} + \beta_5 Inflation_{t-1} + \beta_6 \Delta Unemp_{t-1} + \beta_7 Earning\_G_t + \beta_8 Jan\_effect_t + \beta_9 Halloween_t + \beta_{10} Democrat_t + \beta_{11} Crisis_t + \beta_{12} Terror_t + \varepsilon_{2,t} \quad (1)$$

where $R_{S\&P\,500,t}, R_{S\&P500,t-1}$ denote continuous returns of the U.S. S&P500 equity index at time *t* and *t-1*, respectively. The dependent variable is included with a lag to account for persistence in returns. $USNS_t$ denotes the first difference in the natural logarithm of Baker, Bloom, and Davis (2016) U.S. national security uncertainty index at period *t*. Precise definitions of all the control variables in the regression were provided in Table I. $\varepsilon_{1,t}$ denote the residuals obtained from model (1). To generate unbiased results, we run the model using Newey and West (1987) method, which allows us to obtain heteroskedasticity and autocorrelation corrected (HAC) errors.

Several variants of the abovementioned model are attempted. In the simplest specification, we dispose of the control variables by restricting $\beta_4 = \beta_5 = \cdots = \beta_{12} = 0$. Subsequently, we proceed with the estimation of the complete version of equation (1). We then implement the general-to-specific approach (see Campos *et al.*, 2005) and arrive at a parsimonious specification. This approach relies on dropping the explanatory variable with the highest *p*-value and re-estimating the regression. Such an operation is repeated iteratively until all remaining regressors are statistically significant at the 10% level or better.

We then model the S&P500 first and second moments of returns by assuming a generalized autoregressive heteroskedasticity GARCH (*p*, *q*) approach proposed by Bollerslev (1986). Specifically, the results we obtain from the general-to-specific approach feed into the mean equation, while the logarithmic change in the national security index at period *t* ($USNS_t$) enters the variance equation. The results from the mean equation allow us to test the robustness of our OLS findings. Simultaneously, the variance equation's findings permit us to explore the association between security-related uncertainty and conditional volatility. Therefore, we specify the following variance equation:

$$h_t = \omega + \sum_{i=1}^{p} \gamma_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \emptyset_j h_{t-j} + \theta USNS_t \quad (2)$$

where ε_{t-i}^2 are squared residuals at time *t-i* obtained from the mean equation, h_t and h_{t-j} denote conditional volatility at period *t* and *t* – *j* respectively, while *p* and *j* denote the lag lengths. We follow the process outlined by Engle and Patton (2001) for determining the lag lengths *p* and q. This approach calls for selecting the best model of GARCH (*p, q*) class for $p \in [1, 5]$ and $q \in [1, 2]$ using the Schwarz Information Criterion (BIC).

To model the association between national security-related uncertainty and both implied and realized volatility, we rerun variants of model (1) using, as the dependent variable, the first difference in CBOE VIX index at period *t* denoted ΔVIX_t, and the first difference in the standard deviation of returns at time *t* denoted $\Delta STDM_t$.

We postulate a negative association between equity returns and changes in economic uncertainty arising from worries over national security. We also hypothesize that variations in the national security index are associated with an increase in conditional, realized, and implied volatilities. We argue that the impact on valuations can arise from the discount rate effect. Specifically, our postulations are based on documented evidence in the literature, which shows that uncertainty about government policy and its economic ramifications are accompanied by falls in returns and elevated volatility (Pastor and Veronesi, 2012; 2013). The changes are due to an increase in the risk premium, which, in turn, elevates discount rates (Pastor and Veronesi, 2012).

While the discount rate effect represents one mechanism that explains the adverse movements in stocks, expectations about future performance may act as a parallel or alternative process. Specifically, heightened economic uncertainty arising from national security can dampen expectations, which, in turn, negatively affects valuations. We argue that a forward-looking measure of business sentiment can echo or reflect expected future performance. Consequently, we source and utilize the growth in the OECD business confidence index for the U.S. (*BCI_G*) as a dependent variable in model (1), its version without control variables and the general-to-specific approach. We hypothesize that national security concerns will be associated with a decline in business confidence, reflecting the perceived toxic ramifications of economic uncertainty arising from national security affairs.

Finally, we replicate the analysis using our self-constructed media-based security index. That is, we rerun the models for returns, first differenced realized and implied volatility as well as changes in business confidence, using $MCandTerror_t$ instead of $USNS_t$ as the primary explanatory variable. We do so while also controlling for the first difference in the natural logarithm of the categorical indices for fiscal policy, monetary policy, regulations, trade policy, healthcare, and entitlement, each denoted, respectively, as $Fiscal_t$, $Monetary_t$, $Regulation_t$, $Trade\_policy_t$, $Health_t$, and $Entitlement_t$.

5. Empirical Results

5.1 National security and stock market returns

We proceed to model the impact of national security concerns on stock market fluctuations in two steps. First, we utilize Baker, Bloom, and Davis (2016) U.S. national security categorical index and construct a unique set of control variables that have been recognized in the literature to determine returns. Second, we replicate our analysis using a self-constructed media-based security variable while including additional categorical uncertainty indices.

Panel A in Table III presents linear regressions linking continuously compounded returns on the S&P 500 ($R_{S\&P500}$) to the percentage changes in the national security index (*USNS*). The first specification in the table controlling for lagged returns reveals that heightened media attention focused on national security threats coincides with decreasing equity valuations. This factor carries a *p*-value of 0.01 and jointly explains 3.1% of the stock index return variance. Such a finding is logically and theoretically coherent for at least three reasons. First, in response to elevated risk levels, investors may adjust their discount rates upwards, which will depress the fundamental value of listed corporations. Second, a fearful population may alter their behavior and propensity to consume, which ultimately will affect companies' cash flows. Third, violent developments may directly affect issuers through the indiscriminate destruction of human and physical capital.

[Insert Table III about here]

The second specification includes a broad spectrum of control variables that fall within several categories. To start with, we incorporate macroeconomic aggregates that are available at a monthly sampling frequency. These include growth in industrial production (*IP_G*), inflation in the Consumer Price Index (*Inflation*), and the first differenced civilian unemployment rate (*ΔUnemp*). To account for the fact that these variables reach the general public with a delay, we lag them by one month. The model also incorporates companies' financial performance, the political orientation of the President, and well-known seasonalities in stock returns. Finally, and perhaps most importantly, we include objective (as opposed to media-based) measures of national security threats. These include a dummy variable for high causality terrorist events (*Terror*) and the change in the number of conflicts with direct or semi-direct U.S. military involvement (*Crisis*).

Column (3) presents a parsimonious specification arrived at using the general-to-specific approach (see Campos *et al.*, 2005). Specification (4) uses general-to-specific results as its input but does not presuppose the error terms' homoskedasticity. Instead, it proceeds by assuming a generalized autoregressive conditional heteroscedasticity (GARCH (p, q)) process. We follow Engle and Patton's (2001) approach to selecting the order of *p* and *q*. We find that

GARCH (2,1) is the best model, as BIC is at a minimum relative to other GARCH specifications. Bollerslev *et al.* (1992) state that GARCH (2,1) is among the typical models adopted in the literature. Furthermore, French, Schwert, and Stambaugh (1987) utilize the same p and q lag lengths in their GARCH specification while studying the association between returns and volatility. Their choice is driven by the finding of prolonged decay in their daily squared dependent variable between lags 1 and 60, which indicates that σ_t^2 is related to many lags of ε_t^2.

The mean equation in our GARCH (2,1) mimics the general-to-specific specification, while the variance equation incorporates the growth in the national security index, recognizing that this index may impact both the first and the second moment of the return distribution. Indeed, from an empirical perspective, this turns out to be the case. *USNS* bears a negative coefficient and is statistically significant at 1%. It also seems to significantly elevate the return volatility, as illustrated by the estimates for the variance equation in the GARCH specification. These results are consistent with the theoretical idea of increased discount rates in response to heightened national security risk.

Several further reflections on the underlying mechanisms are in order. First, the *USNS* retains its statistical significance, even after controlling for the fluctuating profitability of U.S. corporations. While the level of fear arising from terrorist attacks and warmongering may affect companies' financial performance within specific industries, it would be inappropriate to claim that this diminished financial performance is solely responsible for the effect we describe here. Second, in specifications (2), (3), and (4) the actual events are disentangled from the narrative presented in the media. Journalistic reportage can affect stock market investors beyond the events that have transpired. The narratives presented to the general public can propagate and magnify the level of fear, perhaps beyond what would be considered rational.

New deployments of U.S. troops in crises abroad depress stock market valuations by an economically and statistically significant magnitude. This observation corroborates the earlier findings of Rigobon and Sack (2005), Wolfers and Zitzewitz (2009), Berkman *et al.* (2011), and Omar *et al.* (2017). Regarding terrorist attacks, the results lack statistical significance. Several authors noted that stock market responses to acts of violence perpetrated against civilian targets by terrorists are temporary (Chen and Siems, 2004; Kollias *et al.,* 2011a; Kollias *et al.*, 2011b). The markets tend to rebound relatively quickly and can be propped up by central banks' actions in the event's aftermath. This short-lived reversible effect quickly diffuses and becomes unobservable in monthly data.

A brief examination of the influence exerted by the control variables is also warranted. While economic aggregates seem to be less pertinent, some regressions indicate that high percentage rises in corporate earnings stimulate stock price appreciation. This is consistent with the discounted cash flow and dividend discount valuation models. The Halloween effect seems to be still present in the distribution of returns, while the January effect appears to have been arbitraged out over time, which has already been noted by Marquering *et al.* (2006).

Panel B in Table III shows the results from replicating the analysis above using our security variable (*MCandTerror*) instead of the national security categorical index (*USNS*), while also controlling for other policy-specific uncertainty indices. Specification (8) is obtained from the GARCH (1, 1) process with lags p and q selected using Engle and Patton's (2001) approach. Again, this model uses as input the variables arrived at using the general-to-specific approach shown under specification (7). All specifications in Panel B yield results that confirm the negative association between returns and media-coverage of national security-related developments. Importantly, these are robust even after accounting for the potential effects of uncertainty emanating from other categorical indices.

A noticeable finding is documented in the variance equation under specification (8) in Table III. Unlike the finding obtained using *USNS*, our security variable appears to be insignificantly associated with conditional volatility. A plausible explanation lies in the difference between the two variables. The term "uncertainty" and its variants are among the keywords used by Baker, Bloom, and Davis (2016) in deriving their national security index. On the other hand, our security variable is intentionally constructed to capture only national security coverage. We argue that the media's propagation of uncertainty arising from security concerns is what drives the nexus between *USNS* and conditional volatility.

5.2 National security and return volatility

The GARCH specification results provided some preliminary evidence showing that the media portrayal of the nation-state's security can influence the second moment of the return distribution. To probe this issue further, we formally examine the changes in implied and realized volatility of the U.S. stock market index. Expressing our volatility measures in the first difference rather than the level form allows us to circumvent the problems inherent in modeling near-integrated persistent time series. Again, we proceed in two steps, where we first model the volatility as a function of the national security categorical index and, in the second step, we replicate the analysis using the alternative national security variable.

We first focus on the changes in the implied volatility index *ΔVIX* and we treat it as our dependent variable. The first specification in Table IV reports a simple regression of *ΔVIX* on the percentage change in the national security index (*USNS*) and lagged *ΔVIX*, while the second regression is more comprehensive, as it incorporates a full set of controls. We drop many of these controls in the parsimonious specification (3). By reproducing this setup, we model the first difference in the annualized standard deviation of S&P 500 returns (see columns labeled (4)-(6) where we choose *ΔSTDM* as the dependent variable).

[Insert Table IV and V about here]

The first thing that we can glean from Table IV is that an increase in newspaper articles about security-related uncertainty coincides with heightened volatility. The same is true for all of the empirical models considered, and the result is always statistically significant at the 5% level or better. The journalistic narrative seems to inflate market gyrations and appears to be much more influential than the actual events' impact. The number of new crises in which the U.S. is involved militarily is of no consequence to market volatility, and the dummy variable capturing terrorist attacks is consistently insignificant across the board. Such a constellation of results shows that the perceptions of both a national security risk and associated economic uncertainty, as portrayed by the media, are of greater importance to the marketplace than actual events.

Table V reports the results obtained by replicating the analysis above using the alternative media-based security variable (*MCandTerror*). The findings in columns (1) to (3) provide further support for the nexus between implied volatility and national security concerns. The coefficient of *MCandTerror* is significant at 5% or better even in the presence of other sources of uncertainty in the model. Specifications (4) to (6) show results from regressing first differenced realized volatility on our security variable and all set of controls and show results that echo the findings on conditional volatility in Table III. Our alternative security variable appears to be insignificantly associated with the variance of returns. Again, we argue that the differences between the two security variables can explain the discrepancy in construction terms. The positive association between changes in the categorical security index and both conditional and realized volatilities could be caused by the current sentiment of economic uncertainty arising from security concerns, which the media propagates. Our self-constructed security variable lacks this uncertainty component by design.

In summary, the results support our hypothesis that the perception of threats to national security is associated with adverse effects on equity markets. Consequently, our findings are in-line with evidence documented in the literature on the unfavorable effects of political risk and economic policy uncertainty on the cost of financing (Francis, Hasan, and Zhu, 2014); capital flows (Schmidt and Zwick, 2015; Julio and Yook, 2016); investment (Julio and Yook, 2012; Pastor and Veronesi, 2012; Baker, Bloom, and Davis, 2016); systematic volatility (Mei and Guo, 2004; Boutchkova *et al.*, 2012; Pastor and Veronesi, 2012); and returns (Pastor and Veronesi 2012; 2013). We argue that our findings can be explained by the rise in the risk premium, which, in turn, increases discount rates. The positive change in premia is caused by the uncertainty arising from national security concerns and their economic ramifications. This is also caused by an increase in stocks' co-movement (Pastor and Veronesi, 2012), which implies a reduction in investors' ability to diversify domestically.

5.3 National security and business confidence

We contemplate that the discount rate effect can explain the adverse changes in valuations that we documented above. An alternative or parallel mechanism giving rise to the unfavorable effects on stock markets can be found in expected future performance. We argue that a rise in security-driven economic uncertainty can depress expectations and that a forward-looking measure of business sentiment can echo these changes in expectations. Therefore, we source monthly data on the OECD U.S. business confidence index, and incorporate percentage changes in this variable, denoted *BCI_G*, as a dependent variable. Consequently, we replicate the steps we followed previously. However, we exclude from the set of controls both dummies for Halloween and January effects, as these are explanatory variables for equities.

Panel A of Table VI reports results for models in which the categorical national security index acts as an explanatory variable. The results indicate that heightened uncertainty arising from the national security sphere is associated with a pessimistic view of the future on the part of businesses. Panel B in Table VI reports similar results and shows a statistically significant and negative association between the alternative security variable and business sentiment.

Therefore, the findings under Panels A and B point at expected future performance as an additional mechanism that can explain the adverse movements in stocks in response to a rise in security uncertainty.

[Insert Table VI about here]

5.4 Robustness checks and further results

In this section we provide a description of additional tests that have been conducted to verify the validity of our narrative. Detailed results of these tests can be obtained from the authors upon request.

To start with, we assessed the goodness of fit of our GARCH specifications by examining the Q-stats of the standardized and squared standardized residuals.[12] All Q-stats were insignificant, which indicates that mean and variance equations are correctly specified. As an additional diagnostic tool, we run the test for independence proposed by Brock, Dechert, and Scheinkman (1987) and Brock *et al.* (1996) (BDS test) on the standardized residuals obtained from each GARCH model. This test has power against non-linear dependencies and deterministic chaos (Bollerslev *et al.*, 1992) and is shown to exhibit good power in detecting facets of non-IID behavior (Hsieh, 1991). Following Scheinkman and LeBaron (1989), we set the proximity parameter $\epsilon=0.5\sigma$ and specify embedding dimensions 2 to 5. We were unable to reject the null hypothesis that standardized residuals are independently identically distributed, which indicates that our models fit the data well.[13]

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[12] It is worth noting that for OLS specifications obtained under model (1) and general-to-specific approach, and presented under Table III, IV, V and VI, variance inflation factors (VIFs) are below 10. To check stability of these OLS specifications, we run a cumulative sum of recursive residuals (CUSUM) test of Brown, Durbin, and Evans (1975) on these OLS specifications, and arrive at results that indicate the stability of our models at a 5% level of significance.

[13] We also varied the proximity parameter and embedding dimensions following Schwert (1989b) and Vosvrda and Zikes (2004). While we do not report the results in the paper, we still cannot reject the null hypothesis of independence.

An additional line of inquiry we pursued was to explore the extent to which developments in the sphere of national security, as captured by our security variable *MCandTerror,* heighten economic policy uncertainty. To this end, we run a model in which the percentage change in economic policy uncertainty (*EPU*) is taken to be the dependent variable, while *MCandTerror* as well as a set of controls (including other categorical indices) act as explanatory factors. Similar to business confidence, we excluded both dummies for Halloween and January effects. A strong evidence of positive and statistically significant link between media coverage of national security concerns and economic policy uncertainty has been found. This finding requires further reflection in light of the predictions of Pastor and Veronesi (2012). They show that an increase in uncertainty about government policy can bring about a decline in returns and a rise in volatility. Consequently, our finding that national security concerns contribute to increasing economic policy uncertainty provides a rationale for the documented adverse movement in valuations. Simply put, media coverage of developments in national security is associated with heightened economic policy uncertainty, and that, in turn, can increase risk premia and discount rates. Another interesting finding that we observed was the lack of significance of the variables *Crisis* and *Terror* in the EPU regressions, which attests to media hype's role in propagating uncertainty.

A question may arise as to the extent to which media coverage of actual events is what drives the findings we report. In the absence of such occurrences, economic uncertainty arising from other aspects of national security, such as potential wars, may not affect markets. We probe this issue in two steps. First, we run the following model in which logarithmic change in national security index is regressed on a set of explanatory variables:

$$USNS_t = \alpha_1 + \alpha_2 Direct\_MI_t + \alpha_3 Semi_{MI_t} + \alpha_4 Terror_t + \alpha_5 Democrat_t + \varepsilon_t \qquad (3)$$

where $USNS_t$, $Terror_t$ and $Democrat_t$ are defined as in previous models, while $Direct\_MI_t$ and MI_t are the number of crises in a given month *t* in which the U.S. had direct and semi-direct military involvements, respectively. The data used to construct these variables are obtained from the Version 12 actor-level data of the International Crisis Behavior Database. Simply put, we orthogonalized the security media index with respect to the actual events by obtaining the error terms from the regression above. These residuals are the national security uncertainty component that is not driven by actual events and can thus be conceived as media hype or speculation. We denote the orthogonalized series as $Resid_{USNS,t}$, and use it as an explanatory variable with controls for returns, volatility, and business confidence. The sign of coefficient and level of significance of $Resid_{USNS,t}$ remains intact across all specifications. This indicates that the nexus between security-related economic uncertainty and equities is not driven only by media coverage of actual events but also by speculative reporting on other aspects of national security (e.g., potential military involvements and elevated threat levels of terrorist attacks).

A final robustness check to validate our findings is conducted to address stock index choice concerns, i.e., equity index-specific results. We source monthly and daily data on both the Dow Jones Industrial Average and NASDAQ to address this issue, covering the sample period. Monthly series are used to construct returns (R_{DJ} and R_{NASDAQ}) while daily data are utilized to derive first differenced annualized realized volatility for both indices ($\Delta STDM_{DJ}$ and $\Delta STDM_{NASDAQ}$). The return and volatility models were re-estimated using these two alternative equity indices. The results clearly showed that the market portfolio choice does not drive the association between security-related economic uncertainty and equities. Importantly, given that these are market-wide stock indices, the results show that a reliance on domestic diversification may prove ineffective when faced with national security-based risks. This lends further support to our argument for increased risk premia and discount rates.

6. Conclusion

Our inquiry revolves around two important themes, namely national security concerns and the media impact on the markets. Conceptually, we build on the economic policy uncertainty literature, which is justified because acts of war and terror often induce political turmoil. This literature finds that heightened levels of policy uncertainty hurt the economy as expressed through aggregate reductions in firm valuations (e.g., Baker, Bloom and Davis, 2016; Leduc and Liu, 2016; Kydland and Zarazaga, 2016; Sinha, 2016; Caggiano *et al.*, 2017; Husted *et al.*, 2016). We can confirm this general finding by looking specifically at how the printed media covers the topic of danger to the nation and its citizenry. Our results also indicate that intensified coverage of national security topics in the press can increase stock market volatility, mirroring earlier findings for economic policy uncertainty (see, for instance, Liu and Zhang, 2015; Brogaard and Detzel, 2015; Arouri *et al.*, 2016; Christou *et al.*, 2017). The perception of security risk that permeates the marketplace may depress stock prices through the discount rate channel. An alternative rationalization based on our results is that security threats seriously undermine business confidence.

As a facet of uncertainty reported through the media, we show that national security concerns can influence the price beyond the effect created by the actual events. This observation chimes with the findings of studies highlighting the media's all-pervasive influence on market activity (see, for instance, Tetlock, 2007; Tetlock *et al.*, 2008; Bhattacharya *et al*., 2009). The message here is that alarmistic reportage and over-reporting create a disproportionate focus on events, generating a stimulus and a striking price response beyond what is warranted by the actual events. This could be conceived as a cautionary tale, warning us of the possible undue influence of reportage during periods of heightened security concerns and the panic that it can propagate.

The long-term investor could manage her portfolio, remaining mindful that making the media a primary source for information as they analyze the investing environment is fraught with peril. The tendency to overstate the gravity of a security issue could wrongfoot an investor and lead to portfolio rebalancing decisions based on a perception of the situation, quickly dissipating rather than actualizing. Alternatively, investors with shorter investing horizons and who favor a market timing strategy could use the continuous index employed in this paper to generate exit and entry signals to the market, knowing that the index anticipates particular price reactions.

One limitation of our findings is that it is confined to press-generated content. While it is clear that broadsheet media editorials and reportage are generally reflective of overarching themes running through all media, it ignores changing patterns in the consumption of information. As society shifts away from the more traditional means of receiving their news, studies that incorporate the emergence of new consumption phenomena, for example, the appearance of echo chambers, could provide a useful insight into how intensification of concerns over specific issues may occur.

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Table I: Variable Definition

Variable Name	Definition*	Source
$R_{S\&P500}$	Continuously compounded returns on Standard and Poor's 500 index (percentage points)	Datastream
ΔVIX	First difference in CBOE implied volatility index by S&P500 index options	Datastream
ΔSTDM	First difference in annualized standard deviation of S&P 500 returns computed from daily data within a given month	Datastream
BCI_G	First difference in the natural logarithm of the OECD U.S. Business Confidence Index	OECD Database, available online at: https://data.oecd.org/leadind/business-confidence-index-bci.htm
USNS	First difference in the natural logarithm of U.S. national security media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
MCandTerror	First difference in the natural logarithm of our manually constructed national security variable, expressed in percentage points. The series level is derived by counting the monthly frequency of articles containing the terms "military conflict" or "terror" in U.S. English language newspapers, then aggregating frequencies for each month.	Nexis
IP_G	First difference in the natural logarithm of U.S. industrial production multiplied times 100	Federal Reserve Bank of St. Louis
Inflation	First difference in the natural logarithm of U.S. consumer price index multiplied times 100	Federal Reserve Bank of St. Louis
ΔUnemp	First difference in the U.S. rate of unemployment	Federal Reserve Bank of St. Louis
Earning_G	First difference in the natural logarithm of the real U.S. corporate earnings	Robert Shiller's online data, available at www.econ.yale.edu/~shiller/data.htm
Democrat	Dummy variable taking the value of 1 for a democrat president and 0 otherwise	Database of Political Institutions 2017

Halloween	Dummy variable that captures the Halloween effect by taking the value of 1 for the months November to April and zero otherwise	Own construction
Jan_effect	Dummy variable that captures January effect by taking the value of 1 for January and zero otherwise	Own construction
Crisis	A variable the counts month to month change in the number of international conflicts that occurred in a given month in which the U.S. had a direct or semi-direct military intervention	Own construction using the Database of International Crisis Behavior Project (version 12)
Terror	A variable indicating the occurrence of high casualty terrorist event in a given month	High Casualty Terrorist Bombings (HCTB) database of the Center for Systemic Peace
EPU	First difference in the natural logarithm of U.S. Economic Policy Uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Fiscal	First difference in the natural logarithm of U.S. fiscal policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Monetary	First difference in the natural logarithm of U.S. monetary policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Regulations	First difference in the natural logarithm of U.S. regulations policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Trade_policy	First difference in the natural logarithm of U.S. trade policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Health	First difference in the natural logarithm of U.S. healthcare policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html
Entitlement	First difference in the natural logarithm of U.S. entitlement policy media-based uncertainty index multiplied times 100	Webpage of Economics Policy Uncertainty, available online: www.policyuncertainty.com/index.html

Table II: Summary Statistics

	No. obs.	Mean	Standard Deviation	25th Percentile	Median	75th Percentile	Unit Root Test	Structural break modified unit root test
$R_{S\&P500}$	398	0.6754	4.3155	-1.7093	1.1002	3.4570	-18.7016***	-18.7964***
ΔVIX	338	-0.0159	4.1518	-2.1375	-0.1650	1.7775	-15.7995***	-19.4173***
ΔSTDM	398	0.0177	8.2467	-3.2582	-0.2158	2.8605	-13.0295***	-27.9881***
BCI_G	398	0.0048	0.2260	-0.1429	0.0020	0.1508	-8.5186***	-8.5545***
EPU	398	-0.2681	25.3610	-15.6984	-0.0722	14.4106	-15.2694***	-22.4223***
USNS	398	-0.1459	42.4822	-26.8764	-1.6567	24.0337	-25.9629***	-26.0543***
MCandTerror	398	0.5274	33.6015	-17.7185	-1.1457	12.8000	-15.4276***	-23.0100***
IP_G	398	0.1625	0.6161	-0.1487	0.2052	0.5325	-5.4759***	-16.1199***
Inflation	398	0.2158	0.2576	0.1098	0.2152	0.3468	-12.9773***	-13.1221***
ΔUnemp	398	-0.0080	0.1535	-0.1000	0.0000	0.1000	-4.1415***	-18.0466***
Earning_G	395	0.2643	6.5582	-0.8867	0.5036	1.6450	-4.6885***	-7.6106***
Fiscal	398	-0.3248	35.0456	-24.4316	-1.6262	24.7153	-11.5366***	-22.7633***
Monetary	398	-0.5754	51.5596	-34.8050	-0.2069	33.6823	-11.7280***	-25.5158***
Regulation	398	-0.1065	37.1108	-24.5968	-1.5689	21.8214	-15.9923***	-28.2332***
Trade_policy	398	0.3652	68.2566	-47.8028	1.1174	45.0406	-14.9856***	-31.0164***
Health	398	-0.1256	52.1778	-32.8446	0.4276	32.6032	-16.2748***	-28.3621***
Entitlement	398	-0.4533	60.4870	-40.3000	-3.1152	38.7054	-10.8916***	-27.3539***

This table reports the summary statistics for the variables used in analyzing the association between changes in U.S. national security uncertainty, stock market valuations, return volatility and business confidence. The definitions of variables are provided in Table I. The last two columns present, respectively, the results from ADF unit root tests assuming a trend and intercept and using Schwarz Information Criterion, and the results from unit root test that allows for a structural break following Zivot and Andrews (1992) and Vogelsang and Perron (1998) specifications of Innovation Outlier model with intercept and trend, break in trend, endogenously determined break date and Schwarz Information Criterion. ***, **, * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table III: Modelling S&P 500 Returns

Panel A. Returns on EPU-based national security index (USNS)

	(1)	(2)	(3)	(4)
Intercept	0.6406	-0.0726	0.2386	0.4006
	(0.2394)	*(0.4731)*	*(0.2959)*	*(0.2643)*
USNS $_t$	-0.0169**	-0.0167**	-0.0174**	-0.0148***
	(0.0068)	*(0.0078)*	*(0.0071)*	*(0.0047)*
$R_{S\&P500,t}$	0.0489	0.0284		
	(0.0712)	*(0.0722)*		
IP_G $_{t-1}$		0.7558		
		(0.6716)		
Inflation $_{t-1}$		-0.1333		
		(0.7281)		
$\Delta Unemp_{t-1}$		-0.4297		
		(1.3660)		
Earning_G $_t$		0.0594	0.0945*	0.0489***
		(0.0407)	*(0.0522)*	*(0.0178)*
Jan_effect $_t$		-0.1933		
		(0.8701)		
Halloween $_t$		0.7386*	0.7822**	0.7974**
		(0.3924)	*(0.3663)*	*(0.3465)*
Democrat $_t$		0.5122		
		(0.4132)		
Crisis $_t$		-1.0691*	-1.0909*	-0.9811**
		(0.5534)	*(0.5577)*	*(0.4343)*
Terror $_t$		-0.7566		
		(1.3904)		

Panel B. Robustness: Returns on manually constructed media-based security variable

	(5)	(6)	(7)	(8)
Intercept	0.6480	0.0751	-0.0606	0.1927
	(0.2428)	*(0.4561)*	*(0.3950)*	*(03346)*
MCandTerror $_t$	-0.0214***	-0.0222**	-0.0200**	-0.0220***
	(0.0075)	*(0.0091)*	*(0.0079)*	*(0.0065)*
$R_{S\&P500,t}$	0.0551	0.0070		
	(0.0712)	*(0.0674)*		
IP_G $_{t-1}$		0.8673		
		(0.6218)		
Inflation $_{t-1}$		-0.3401		
		(0.7705)		
$\Delta Unemp_{t-1}$		-0.5176		
		(1.3497)		
Earning_G $_t$		0.0564		
		(0.0401)		
Jan_effect $_t$		0.6517		
		(0.9971)		
Halloween $_t$		0.3790	0.6357*	0.4917
		(0.3894)	*(0.3625)*	*(0.4169)*
Democrat $_t$		0.5048	0.8419**	0.6324
		(0.4113)	*(0.3926)*	*(0.4072)*
Crisis $_t$		-1.1831**	-1.4059***	-1.2428***
		(0.5092)	*(0.5174)*	*(0.4115)*
Terror $_t$		1.8416		
		(2.0320)		
Fiscal $_t$		-0.0126		
		(0.0128)		
Monetary $_t$		-0.0141***	-0.0183***	-0.0143***
		(0.0053)	*(0.0054)*	*(0.0039)*
Regulations $_t$		-0.0060		
		(0.0072)		
Trade_policy $_t$		-0.0008		
		(0.0035)		
Health $_t$		-0.0023		
		(0.0053)		
Entitlement $_t$		0.0021		
		(0.0050)		

Panel C. Variance Equation			**GARCH (2, 1)**				**GARCH (1, 1)**	
			Intercept	5.2766** *(2.1227)*			*Intercept*	0.6393 *(0.4333)*
			$Resid^{2}_{t-1}$	0.1736** *(0.0714)*			$Resid^{2}_{t-1}$	0.1292*** *(0.0362)*
			$Resid^{2}_{t-2}$	-0.0276 *(0.0684)*			h_{t-1}	0.8454 *(0.0406)*
			h_{t-1}	0.5411*** *(0.1695)*			$MCandTerror_{t}$	0.0087 *(0.0180)*
			$USNS_{t}$	0.0932*** *(0.0124)*				
No. obs.	397	370	371	371	397	370	371	371
R-squared	3.1%	9.42%	7.8%	7.09%	3.14%	15.88%	11.60%	11.22%
Adj. R-squared	2.61%	6.64%	6.79%	6.08%	2.65%	11.81%	10.40%	10.01%
F-statistic	6.3025	3.3850	7.7361		6.3927	3.9081	9.5800	
Prob(F-statistic)	0.0020	0.0002	0.0000		0.0019	0.0000	0.0000	

This table reports the results from modeling the returns of S&P 500. Panel A reports the OLS estimation results from modeling S&P 500 returns as a function of the first difference in the natural logarithm of the U.S. national security categorical index (*USNS*) and a set of control variables. Specification (4) presents results from the mean equation of the GARCH (2, 1) model. Panel B. reports OLS estimation results from modeling S&P 500 returns as a function of logarithmic change in self-constructed media-based security variable (*MCandTerror*) and other controls. Specification (8) reports the results from the mean equation using GARCH (1, 1). Panel C. reports the variance equation results for GARCH (2, 1) and GARCH (1, 1). All OLS-based standard errors are heteroskedasticity and autocorrelation corrected (HAC) and obtained using Newey and West (1987) method. Parameter standard errors are given in parentheses. The table also reports the R-square, adjusted R-square, and the corresponding F-statistic to test the model's overall significance with the corresponding *p*-value. For full definitions of dependent and explanatory variables, please refer to Table I.

Table IV: Modelling S&P 500 implied and realized volatility on EPU-based national security index

Dependent variable	*ΔVIX*	*ΔVIX*	*ΔVIX*	*ΔSTDM*	*ΔSTDM*	*ΔSTDM*
Model specification	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0055	0.0712	0.0802	0.0385	0.3359	6.4126***
	(0.1710)	*(0.4951)*	*(0.3682)*	*(0.2710)*	*(0.9265)*	*(1.4313)*
$USNS_t$	0.0205***	0.0216**	0.0174**	0.0324**	0.0291**	0.0284**
	(0.0072)	*(0.0086)*	*(0.0075)*	*(0.0142)*	*(0.0133)*	*(0.0123)*
ΔVIX_{t-1}	-0.0906	-0.0964				
	(0.0734)	*(0.0887)*				
$\Delta STDM_{t-1}$				-0.3410***	-0.3371***	-0.4016***
				(0.0970)	*(0.0916)*	*(0.0934)*
IP_G_{t-1}		-0.7745			-1.2324	-2.3317**
		(1.0633)			*(1.4066)*	*(1.1421)*
$Inflation_{t-1}$		1.9550**	1.6995**		2.8712	
		(0.8924)	*(0.8214)*		*(1.7426)*	
$\Delta Unemp_{t-1}$		-0.3084			-3.4107	
		(1.7820)			*(2.5599)*	
$Earning\_G_t$		0.0072			0.0073	
		(0.0344)			*(0.0515)*	
Jan_effect_t		-0.3014			1.6315	
		(0.7123)			*(1.1992)*	
$Halloween_t$		-0.8559*	-0.8722**		-1.7621*	
		(0.4685)	*(0.3989)*		*(0.9393)*	
$Democrat_t$		0.1554			-0.0903	
		(0.3738)			*(0.5785)*	
$Crisis_t$		0.4694			0.8082	
		(0.5118)			*(1.3594)*	
$Terror_t$		0.3820			3.4095	
		(1.3396)			*(2.4429)*	
No. obs.	337	310	338	397	370	397
R-squared	4.83%	10.33%	6.47%	13.82%	17.65%	23.84%
Adj. R-squared	4.26%	7.02%	5.63%	13.38%	15.12%	23.25%
F-statistic	8.4692	3.1219	7.6980	31.5839	6.9746	40.9968
Prob(F-statistic)	0.0003	0.0005	0.0001	0.0000	0.0000	0.0000

This table presents OLS estimation results from modeling the first difference of realized and implied volatility of S&P500 returns as a function of logarithmic changes in U.S. national security and other control variables. For full definitions of dependent and explanatory variables, please refer to Table I. Specifications (1) to (3) pertain to modeling implied volatility, while in (4) to (6), realized volatility is the dependent variable. The table also reports the R-square, adjusted R-square, and the corresponding F-statistic to test the regression's overall significance with the corresponding *p*-value. All standard errors are heteroskedasticity and autocorrelation corrected (HAC) and obtained using Newey and West (1987) method. Parameter standard errors are given in parentheses, while ***, **, * denote statistical significance at a 1%, 5%, and 10% significance level, respectively.

Table V: Modelling S&P 500 implied and realized volatility on manually constructed media-based security variable

Dependent variable	*ΔVIX*	*ΔVIX*	*ΔVIX*	*ΔSTDM*	*ΔSTDM*	*ΔSTDM*
Model specification	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0227	-0.0123	0.0090	0.0256	0.0893	6.2896***
	(0.1774)	*(0.4862)*	*(0.3569)*	*(0.2796)*	*(0.7901)*	*(1.3969)*
MCandterror $_t$	0.0231***	0.0244**	0.0207**	0.0213*	0.0075	
	(0.0088)	*(0.0114)*	*(0.0095)*	*(0.0114)*	*(0.0146)*	
ΔVIX $_{t-1}$	-0.0718	-0.1026				
	(0.0782)	*(0.0926)*				
ΔSTDM $_{t-1}$				-0.3278***	-0.3265***	-0.3906***
				(0.1006)	*(0.0888)*	*(0.0913)*
IP_G $_{t-1}$		-0.8814			-1.5298	-2.5023**
		(1.0197)			*(1.3231)*	*(1.0842)*
Inflation $_{t-1}$		2.0675**	1.8170**		3.3436**	
		(0.8886)	*(0.8368)*		*(1.6289)*	
Δ*Unemp* $_{t-1}$		-0.2813			-3.3862	
		(1.7956)			*(2.6693)*	
Earning_G $_t$		0.0131			0.0160	
		(0.0338)			*(0.0488)*	
Jan_effect $_t$		-0.8369			1.5987	
		(0.8802)			*(1.4900)*	
Halloween $_t$		-0.6449	-0.7979**		-1.3547*	
		(0.4352)	*(0.3705)*		*(0.8168)*	
Democrat $_t$		0.1740			-0.0685	
		(0.3821)			*(0.5425)*	
Crisis $_t$		0.7214			1.1315	
		(0.5299)			*(1.3408)*	
Terror $_t$		-1.9536			2.4660	
		(2.4638)			*(1.8986)*	
Fiscal $_t$		0.0119	0.0132*		0.0406	
		(0.0113)	*(0.0078)*		*(0.0274)*	
Monetary $_t$		0.0072			0.0338***	0.0375***
		(0.0056)			*(0.0095)*	*(0.0109)*
Regulations $_t$		0.0122	0.0130*		0.0264**	0.0266**
		(0.0077)	*(0.0074)*		*(0.0114)*	*(0.0127)*
Trade_policy $_t$		0.0005			0.0051	
		((0.0035)			*(0.0070)*	
Health $_t$		-0.0031			-0.0273	

		(0.0078)			*(0.0181)*	
Entitlement $_t$		0.0033			-0.0022	
		(0.0073)			*(0.0083)*	
No. obs.	337	310	338	397	370	397
R-squared	3.93%	14.63%	9.72%	11.79%	27.38%	30.21%
Adj. R-squared	3.35%	9.66%	8.36%	11.35%	23.87%	29.39%
F-statistic	6.8225	2.9429	7.1518	26.3413	7.8052	42.4142
Prob(F-statistic)	0.0012	0.0001	0.0000	0.0000	0.0000	0.0000

This table presents OLS estimation results from modeling the first difference of realized and implied volatility of S&P500 returns as a function of logarithmic changes in media-based security variable *MCandTerror* and other control variables. For full definitions of dependent and explanatory variables, please refer to Table I. Specifications (1) to (3) pertain to modeling implied volatility, while in (4) to (6), implied volatility is the dependent variable. The table also reports the R-square, adjusted R-square, and the corresponding F-statistic to test the regression's overall significance with the corresponding *p*-value. All standard errors are heteroskedasticity and autocorrelation corrected (HAC) and obtained using Newey and West (1987) method. Parameter standard errors are given in parentheses, while ***, **, * denote statistical significance at a 1%, 5%, and 10% significance level, respectively.

Table VI: U.S. Business confidence index

Panel A. Business confidence on EPU-based national security index (USNS)				**Panel B. Robustness: Business confidence on manually constructed media-based national security variable**			
	(1)	(2)	(3)		(5)	(6)	(7)
Intercept	0.0009	0.0230	0.0182*	*Intercept*	0.0012	0.0243*	0.0195**
	(0.0071)	*(0.0142)*	*(0.0097)*		*(0.0072)*	*(0.0139)*	*(0.0097)*
$USNS_t$	-0.0004***	-0.0004**	-0.0004**	$MCandTerror_t$	-0.0007***	-0.0008***	-0.0007***
	(0.0002)	*(0.0002)*	*(0.0002)*		*(0.0002)*	*(0.0002)*	*(0.0002)*
BCI_G_{t-1}	0.8344***	0.8674***	0.8492***	BCI_G_{t-1}	0.8399***	0.8705***	0.8530***
	(0.0271)	*(0.0314)*	*(0.0306)*		*(0.0269)*	*(0.0313)*	*(0.0304)*
IP_G_{t-1}		-0.0264		IP_G_{t-1}		-0.0245	
		(0.0174)				*(0.0172)*	
$Inflation_{t-1}$		-0.0744**	-0.0801***	$Inflation_{t-1}$		-0.0805***	-0.0852***
		(0.0245)	*(0.0259)*			*(0.0245)*	*(0.0260)*
$\Delta Unemp_{t-1}$		0.0567		$\Delta Unemp_{t-1}$		0.0528	
		(0.0449)				*(0.0439)*	
$Earning\_G_t$		0.0000		$Earning\_G_t$		-0.0002	
		(0.0008)				*(0.0008)*	
$Democrat_t$		-0.0026		$Democrat_t$		-0.0034	
		(0.0155)				*(0.0153)*	
$Crisis_t$		0.0138		$Crisis_t$		0.0123	
		(0.0104)				*(0.0097)*	
$Terror_t$		-0.0855		$Terror_t$		-0.0011	
		(0.0784)				*(0.0422)*	
				$Fiscal_t$		-0.0001	
						(0.0002)	
				$Monetary_t$		-0.0002	-0.0003**
						(0.0001)	*(0.0001)*
				$Regulations_t$		-0.0002	
						(0.0002)	
				$Trade\_policy_t$		0.0000	
						(0.0001)	
				$Health_t$		-0.0001	
						(0.0001)	
				$Entitlement_t$		0.0001	
						(0.0001)	
No. obs.	397	370	397		397	370	397

R-squared	71.06%	73.43%	71.87%		71.59%	74.80%	72.96%
Adj. R-squared	70.92%	72.73%	71.66%		71.44%	73.74%	72.68%
F-statistic	483.8055	110.5596	334.7346		496.3535	70.0627	264.3705
Prob(F-statistic)	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000

This table presents OLS estimation results from modeling the first difference in the natural logarithm of the OECD U.S. business confidence index (*BCI_G*) as a function of national security variables. Panel A., specifications (1), (2), and (3) are OLS-based in which *BCI_G* is modeled as a function of the first difference in a natural logarithm of the U.S. national security index and other controls. Panel B. reports replication of analysis in A. by modeling *BCI_G* as a function of the first difference in a natural logarithm of the media-based security variable *MCandTerror* and other controls. The table also reports the R-square, adjusted R-square, and the corresponding F-statistic to test the regression's overall significance with the corresponding *p*-value. All standard errors are heteroskedasticity and autocorrelation corrected (HAC) and obtained using the Newey and West (1987) method. Parameter standard errors are given in parentheses, while ***, **, * denote statistical significance at a 1%, 5%, and 10% level, respectively. For full definitions of dependent and explanatory variables, please refer to Table I.

Appendix: Correlation Coefficients

`	$R_{S\&P500}$	ΔVIX	$\Delta STDM$	*BCI_G*	*EPU*	*USNS*	*MCandTerror*	*IP_G*	*Inflation*	$\Delta Unemp$	*Earning_G*	*Jan_effect*	*Halloween*	*Democrat*
$R_{S\&P500}$	1.0000													
ΔVIX	-0.7023***	1.0000												
$\Delta STDMt$	-0.3588***	0.5350***	1.0000											
BCI_G	0.2393***	-0.1937***	-0.1786***	1.0000										
EPU	-0.2996***	0.2904***	0.2705***	-0.2176***	1.0000									
USNS	-0.2224***	0.2300***	0.1739***	-0.1692***	0.6526***	1.0000								
MCandTerror	-0.2279***	0.2027***	0.1738***	-0.1199**	0.2244***	0.3514***	1.0000							
IP_G	0.1932***	-0.1066**	-0.0562	0.1001**	0.0177	-0.0055	0.0092	1.0000						
Inflation	-0.0108	0.1213**	0.1339***	0.0683	-0.0100	0.0523	0.0056	0.0655	1.0000					
$\Delta Unemp$	-0.0897*	0.0214	-0.0063	0.0772	0.0117	0.0127	-0.0134	-0.3634***	-0.0660	1.0000				
Earning_G	0.1719***	0.0242	0.0233	0.2300***	0.0003	-0.0018	-0.0441	0.3489***	0.2545***	-0.1975***	1.0000			
Jan_effect	-0.0270	-0.0179	0.0448	0.0212	0.1860***	0.1689***	0.0974*	0.0031	-0.0886*	0.0175	-0.0257	1.0000		
Halloween	0.1047**	-0.1482***	-0.1028**	0.0332	-0.1628***	-0.1505***	-0.0327	0.0114	-0.0969*	0.0082	-0.0811	0.2966***	1.0000	
Democrat	0.1340***	-0.0052	-0.0123	0.0243	-0.0068	0.0011	0.0043	0.1589***	-0.1280**	-0.2103***	0.1759***	0.0127	0.0038	1.0000
Crisis	-0.1401***	0.0978***	0.0327	0.0357	0.0153	0.1680***	0.0969*	-0.0727	-0.0158	0.0200	-0.0367	0.0000	-0.0786	0.0000
Terror	-0.0725	0.0582	0.0976*	-0.0904*	0.1325**	0.2403***	0.4110***	-0.0546	-0.0348	0.0637	-0.0463	-0.0292	0.0332	0.0176
Fiscal	-0.1964***	0.1854***	0.1506***	-0.1983***	0.7587***	0.4773***	0.0543	-0.0183	0.0095	0.0339	-0.0038	0.2788***	-0.1723***	-0.0039
Monetary	-0.1972***	0.1704***	0.2369***	-0.1530***	0.7438***	0.3703***	0.1598***	0.0821	-0.0088	0.0039	-0.0034	0.0924	-0.1132**	0.0138
Regulations	-0.1681***	0.1854***	0.1442***	-0.1067**	0.5310***	0.3366***	0.0725	0.0062	-0.0041	-0.0073	0.0105	0.0786	-0.0969*	-0.0081
Trade_policy	-0.0495	0.0464	0.0012	-0.0503	0.2002***	0.1371***	0.0020	-0.0319	-0.0310	-0.0088	0.0020	0.0077	-0.0914*	-0.0001
Health	-0.1342***	0.1335***	0.0379	-0.1281**	0.5530***	0.3003***	0.0133	-0.0159	0.0224	-0.0249	0.0042	0.3052***	-0.1897***	-0.0041
Entitlement	-0.1346***	0.1366***	0.0479	-0.1126**	0.5566***	0.2810***	0.0141	0.0478	0.0198	0.0223	0.0097	0.2441***	-0.1323***	0.0069

	Crisis	*Terror*	*Fiscal*	*Monetary*	*Regulations*	*Trade_policy*	*Health*	*Entitlement*
Crisis	1.0000							
Terror	0.0805	1.0000						
Fiscal	-0.0088	0.0562	1.0000					
Monetary	-0.0883*	0.0882*	0.4705***	1.0000				
Regulation	0.0973*	0.0568	0.4132***	0.3129***	1.0000			
Trade_policy	0.0376	-0.0122	0.1177***	0.1211**	0.1463***	1.0000		
Health	0.0059	0.0085	0.7217***	0.3154***	0.3445***	0.1390***	1.0000	
Entitlement	-0.0669	0.0449	0.7203***	0.3386***	0.3496***	0.0886*	0.8006***	1.0000

This table reports the Pearson correlation coefficient for variables described in the data section of this paper. Table I provides definitions of these variables. ***, **, * denote statistical significance at 1%, 5% and 10% significance level, respectively.