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Short Selling and Economic Policy Uncertainty

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Short Selling and Economic Policy Uncertainty

Abstract

We study the trading behavior of short sellers in the presence of economic policy uncertainty (EPU). Daily short selling activity at either the aggregate level or the individual stock level is increasing in the EPU index (Baker, Bloom and Davis, 2016). EPU has great explanatory power for short trading. Cross-sectional tests show that the increase in short interest under high political uncertainty is from shorting stocks characterized by higher mispricing, greater policy sensitivity, higher illiquidity, greater volatility or analyst dispersion. Short sellers earn abnormal profits by trading on public information related to EPU.

Keywords: short selling, economic policy uncertainty, political uncertainty, trading, risk, mispricing

JEL: G10, G12, G18, D80

Short Selling and Economic Policy Uncertainty

Every day, financial markets and particularly stock markets react to political news about what government has done or might do to change the rules of the economic game. Governmental decisions regarding different economic policies present an increasingly important source of uncertainty for the financial market. Baker, et al. (2014) show that as a government's actions and policies are featured more and more prominently in the overall economy, the market impact of government economic policy uncertainty becomes more salient. Noticeable examples related to policy uncertainty include the exit of quantitative easing related to monetary policies in the US, Trump's new economic policies, and Britain's exit of the Euro zone. Julio and Yook (2012) show that economic policy uncertainty surrounding political turnovers, such as those during elections, affects corporate investment. While political events offer a worthwhile opportunity to study the impact of political uncertainty on the financial market, the high-frequency nature of financial markets that react to government economic policies necessitates measures to gauge political uncertainty at an equally high frequency.

Baker, Bloom, and Davis (2016) developed the news-based government's Economic Policy Uncertainty (EPU) index to measure the government's economic policy uncertainty in the United States; they show that the EPU index can saliently measure political uncertainty at a high frequency, from daily to monthly frequencies. Various studies employ their EPU index and find that it represents an important source of risk for asset pricing (Pastor and Veronesi,

2012, 2013; Kelly, Pastor, and Veronesi, 2014; Brogaard and Detzel, 2015) and corporate finance (Gulen and Ion, 2016). Conversely, empirical evidence shows that firms respond to political uncertainty in risk-taking decisions (Akey and Lewellen, 2015). The effect of EPU on trading, especially short trading, has not been previously studied in the literature. We are the first to empirically establish a relationship between short selling activities and economic policy uncertainty. If political uncertainty related to government economic policies casts significant impact on stocks and the equity market, one natural question is whether short sellers will respond strategically and precipitate their short trading with the uncertain news announcement of government economic policies.

EPU can present a significant trading opportunity for short sellers. One possible way short sellers might exploit EPU is by possessing superior ability to analyze public news and media reports about government economic policies. For example, Mitchell, Pulvino, and Stafford (2004) show that short sellers exploit merger news, and they significantly increase short selling during announcements of mergers. Karpoff and Lou (2009) and Christophe, Ferri, and Angel (2004) show that at the firm level short sellers often trade before initial public revelation of corporate bad news, as in the case of accounting misrepresentation or a negative earnings announcement. Many literatures demonstrate that short sellers are informed traders (Desai et al., 2002; Boehmer, Jones, and Zhang, 2008; Diether, Lee and Werner, 2009) and they increase the short positions when they discover bad news from public information (Dechow et al., 2001; Desai, Krishnamurthy and Venkataraman, 2006 and Hirshleifer, Teoh, and Yu, 2011). However,

economic-wide policy uncertainty is regarded as one of the most important sources of market risk that moves the equity prices, as Mei and Guo (2002) find that political uncertainty is associated with spiked market volatility and even, to some extent, financial crisis. In sum, EPU presents a significant trading opportunity for short sellers to trade, either for the purpose of hedging or speculation.

We hypothesize that short sellers increase their short interest when economic policy uncertainty is high. We empirically test this hypothesis by regressing short selling activities either at the aggregate market level or at the individual stock level on the EPU index. Engleberg, Reed, and Ringgenberg (2013) show that short sellers face short selling risk and that such risk is due to loan supply, fees, and other frictions. Cross-sectional firm characteristics matter too. We thus hypothesize that short sellers increase their short interest in stocks whose price or trading is sensitive to economic policy uncertainty. Empirically, we test this hypothesis by employing cross-sectional tests and relating short interest on each stock's individual characteristics, such as illiquidity, volatility, mispricing, return-EPU sensitivity, and investor opinion dispersion.

Short selling represents one important type of trading activity in financial markets with great impact. The literature shows that short selling results in efficiency, as arbitrage eliminates mispricing (Miller, 1977; Harrison and Kreps, 1978; Diamond and Verrecchia, 1987; Saffi and Sigurdsson, 2010; Boehmer and Wu, 2013). Diether, Lee, and Werner (2009) and Boehmer, Jones, and Zhang (2013) find that short selling improves market quality and liquidity. Beber

and Pagano (2013) show that short selling restrictions have the undesired consequence of slowing price discovery in stocks worldwide. We do not attempt to address the question on the market effect of short selling, in general. Instead, we are more interested in the impact of economic policy uncertainty on short selling activities. The focus is on whether short sellers act on changes during times of policy-driven political uncertainty and what strategies they employ to exploit spikes in government economic policy uncertainty, both in time series and cross-sectional data.

We use the daily short selling data collected from the NYSE TAQ Regulation SHO Database. SEC required all SRO (Sell-Regulatory Organizations) to make trade-level short selling data available to the public after January 2005. We aggregate the millisecond short selling transaction data at the daily level within the Reg SHO period from January 3rd, 2005 to July 6th, 2007. Combining short selling data and the daily EPU index developed by Baker, Bloom, and Davis (2016)[1], we find that EPU has great explanatory power on short selling. Short interest at either the aggregate level or the individual stock level significantly increase in the EPU index. The EPU's effect on short interest has a duration of three days but with a decreasing impact. The regressions include weekday, year, or industry fixed effects and control for micro-structure correlations.

The cross-sectional tests show that the effect of economic policy uncertainty on short

[1] The daily EPU index data is available at http://www.policyuncertainty.com. The website was developed by Baker, Bloom, and Davis.

interest is more pronounced for stocks with higher institutional ownership, more liquid stocks, more volatile stocks, or stocks with higher analyst forecast dispersion. Furthermore, short sellers choose to short more on stocks characterized with higher alphas from three factor adjusted methods (Fama and French, 1993) or firms whose return is more sensitive to EPU.

Short sellers trading on EPU subsequently earn abnormal profits. We show that short interest's effect on predicting negative return is greater in a higher EPU state than in a lower EPU state. The cross-sectional tests show that short interest's negative predictability is stronger in a higher EPU state than in a lower EPU state for more liquid stocks, more volatile stocks, for stocks with greater dispersion, and for stocks with higher institutional ownership.

This research contributes to both short sale and political uncertainty literature by explicitly showing how short sellers strategically respond to EPU-related news and form strategies to exploit policy-driven political information. This is the first study that links economic policy uncertainty with short selling. We show that short sellers indeed take into account public news of economic policy uncertainty and increase their short interest to speculate or hedge. Our evidence provides empirical support for Pastor and Veronesi (2012, 2013) and Brogaard and Detzel (2015) from the short selling perspectives. Our paper also lends support to Engleberg, Reed, and Ringgenberg (2012) by revealing that short sellers react to economic policy uncertainty news in cross-sectional fashion consistent with maximum expected benefit for short selling. Consistent with the finding from Diether, Lee, and Werner (2011) that a short selling strategy is profitable, we provide new evidence that short sellers earn abnormal returns by

exploiting economic policy uncertainty. The paper also provides concrete evidence that short sellers possess superior ability to analyze public news related to government economic policies, not just firm news shown by Karpoff and Lou (2009) and Christophe, Ferri, and Angel (2004).

The rest of paper is organized as follows: Section 2 describes the data and reports the summary statistics. Section 3 presents the main results, and Section 4 concludes the paper.

II. Data and Summary Statistics

To investigate whether short sellers follow the government policy environment to make their trading decisions, each day we use the daily Economic Policy Uncertainty (EPU) index to capture market-wide political uncertainty related to government policy. This dataset has been widely accepted by researchers. The daily EPU index is obtained from the website http://www.policyuncertainty.com, developed by Baker, Bloom, and Davis (2016). They report the daily EPU index by calculating frequency using the following measures. The EPU index is the number of articles based on newspaper archives from Access World News' Bank service which contain at least one term from each of 3 sets of terms. The first set is *economic* or *economy*. The second is *uncertain* or *uncertainty*. The third set is *legislation* or *deficit* or *regulation* or *congress* or *federal reserve* or *white house*.

For short sellers trading activity, we collect the number of shares shorted at the millisecond level from the NYSE TAQ Regulation SHO pilot database and then aggregate into the daily level. This dataset is only available during the Regulation SHO period, from January 3rd, 2005

to July 6th, 2007, but it covers the US equity market comprehensively. The final sample consist of 1328 common stocks (with a share code equal to 10 or 11) traded on the NYSE after eliminating the stocks with missing returns and price less than 5 dollars to be consistent with the previous literatures[2].

The daily return, closing price and shares outstanding data are obtained directly from Center for Research in Security Prices (CRSP) database. We construct the return momentum, volatility and the Amihud (2002) illiquidity ratio from daily data available from CRSP dataset. We obtain monthly analyst forecasts of stock earnings data from the I/B/E/S, and we calculate the analyst dispersion measure for each stock to proxy for a company's riskiness by following the method of Imhoff and Lobo (1992); Barron, Kim, Lim, and Stuerke (1998); Barron and Stuerke (1998); and Diether, Malloy, and Scherbina (2002). We also obtain institutional ownership data for each stock from 13f institutional holding data, available from the WRDS database. To measure the short selling costs, we compute the institutional ownership (IO) from Thomson Reuters 13f institutional holdings dataset by following the method of Asquith, Pathak, and Ritter (2005) and Nagel (2005). For the stocks with available return data but no reported institutional ownership data, which suggest the stock is held in amount less than 10000 shares, we assume it has zero institutional ownership.[3]

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[2] Brent et al. (1990) suggest that the NYSE requires a minimum maintenance margin for short selling change at $5 per share. Diether, Lee and Werner (2009) perform the analysis through constructing portfolios with price of at least $5.

[3] SEC requires institutional investors holding equity position greater than 10,000 shares to file quarterly 13F reports at the end of each quarter. Hence literatures normally assume the missing institutional holding data reflect no institutional ownership. See Nagel (2005), Boehme, Danielsen, and Sorescu (2006), Boehmer and Kelley (2009), Berkman et al. (2009).

We first calculate the natural logarithm transformation of the daily EPU index and use it as the main variable in the research to avoid skewness. To capture short sellers' trading activities, we use short interest ratio in the paper by dividing the number of shares sold short on NYSE with the number of shares outstanding for each stock. To analyze the short selling transaction in market level, we aggregate daily short interest into market level by summing up all firms' short interest ratio at each trading day.

[INSERT TABLE 1]

Table 1 reports the summary statistics of the key variables in this research including the sample mean, median, standard deviation, and 1% and 99% percentiles. EPU index has a mean value of 57.20 and median value of 48.49. The summary statistics indicate that EPU index shows daily great variation. Short interest ratio has a mean value of 0.17% and median value of 0.10%, respectively. The result in Table 1 on short selling activity suggests that short trading represents a significant form of trading in the market place. Daily return data shows the mean and median value of 0.07% and 0.03%, consistent with the literature of the studies with the same dataset.

Figure 1 presents the time series of daily short interest ratio at aggregate market level and EPU index of previous trading day. In order to make comparing patterns across figures more intuitive, we standardize short interest ratio and EPU index to have zero mean and unit standard deviation. The pattern shows that short interest and the EPU index move together closely. The spikes in EPU are accompanied by subsequent days of increase in short interest. This pattern

is also confirmed by weekly data about the movement of short interest and EPU index of previous trading day. The evidence suggests that short sellers increase or decrease their short interest by following EPU index closely.

III. Method and Main Results

3.1 The Effect of EPU on Short Interest

To capture how short sellers react regarding economic policy uncertainty or any change in EPU on the market level, we implement aggregate regressions of short interest on EPU using the following specifications that are alternatively used in the empirical analysis:

$$\text{short interest}_{\text{t}} = \alpha_{\text{t}} + \sum_{n=0}^{5} \beta_n \log(\text{EPU})_{\text{t-n}} + \gamma CV_t + \epsilon_t$$

In the regression specification, $\text{short interest}_{\text{t}}$ is the daily number of shares sold short divided by the number of shares outstanding. Many studies use short interest ratio as the main measure of short selling. For example, Dechow et al. (2001), Desai et al. (2002), Asquith et al. (2005) and Boehmer et al. (2010) all use short interest to investigate the underperformance of stocks with large short selling. The independent $\log(\text{EPU})_{t-n}$ is the logarithm of the previous trading day's EPU level. The CV_t stands for a set of market level control variables, which include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors for size- and value-weighted portfolios. ϵ_t is the error item. We aggregate every stock's short interest ratio into market level to illustrate the market wide

impact of EPU on short selling. We include logarithm of EPU index from t-5 to t because of the mandatory three-day securities settlement period, regulated by the SEC; short sellers may undergo forced buy-in to cover their position within this period. Table 2 reports the regressions of aggregate logged EPU on aggregate level short interest ratio. In order to make comparing and interpreting coefficients across variables more intuitive, we standardize short interest ratio, logarithm of EPU index and all the control variables to have zero mean and unit standard deviation. We include year and weekday fixed effects to eliminate the concern that the results are driven by time-related or weekday-related shocks. We calculate significance using the standard errors of coefficient estimates with Newey-West (1987) adjustment of five lags.

[INSERT TABLE 2]

Table 2 reports the results for the regression results of aggregate short interest ratio on the logarithm of the EPU index. Columns (1) to (6) regress the short interest on the individual EPU of each lag; Column (7) regresses short interest on EPU from five trading days before to contemporaneous EPU.

The results show that the EPU significantly affects short interest at the market level. Not only is the concurrent EPU (logarithm of EPU index) highly and significantly correlated with short interest but lagged EPU from t-3 to t-1 are all positively related to short interest, as well. Economically, a one standard deviation increase in EPU at time t is associated with 13.4% increase in short interest at time t. One standard deviation increase in EPU at t-2 results in an 15.6% increase in short interest at t. Market return, on the other hand, is negatively associated

with short interest.

The evidence suggests that EPU is an important factor for short selling activities in the market. Since short sellers are required to cover their position within three trading days, this effect, found in Table 2, indicates that EPU's effect on short selling is only significant within 3 trading days. Short sellers, on average, increase short interest facing economic policy uncertainty.

To further test whether short sellers are influenced by EPU at the individual stock level, we implement the pooled OLS regressions with the following model specifications:

$$\text{short interest}_{\text{i,t}} = \alpha_{\text{t}} + \gamma_{\text{m}} + \delta_{\text{n}} + \sum_{n=0}^{5} \beta_n \log(\text{EPU})_{\text{i,t-n}} + \sigma CV_{i,t} + \epsilon_{i,t} \quad (2).$$

In the regressions, CV_t stands for a set of firm level control variables, which include momentum, volatility, the Amihud Illiquidity Measure, and the logarithm of market capitalization. Momentum is calculated with an average return from the preceding 30 trading days. Volatility is the daily return standard deviation of the preceding 30 trading days, and the Amihud Illiquidity Measure follows Amihud (2002) who suggests that illiquidity can be measured as a stock's absolute value of return divided by dollar volume. Market capitalization is calculated by multiplying the total number of shares outstanding with the present share price. We include year, industry, and weekday fixed effects in our panel data regressions to eliminate concern that the results are driven by firm characteristics, time-related or weekday-related shocks. In order to make comparing and interpreting coefficients across variables more intuitive, we standardize short interest ratio, logarithm of EPU index and all the control

variables to have zero mean and unit standard deviation. Table 3 reports the results of panel regression results. The regressions control for weekday fixed effects, year and industry fixed effects. The standard errors are calculated using the Newey-West (1987) approach that controls autocorrelation and heteroscedasticity.

[INSERT TABLE 3]

The results reported in Table 3 show that EPU measures from lagged t-3 to concurrent t are positively associated with short interest at time t. This finding is consistent with the aggregate finding in Table 2. The coefficient estimates of control variables suggest that short sellers lower short interest for stocks with momentum but accelerate short selling for stocks with higher volatility or illiquidity.

As we have discovered that short sellers significantly increase their short interest when economic political uncertainty increases, a natural follow-up question is whether the effect of EPU on short interest depends on short selling costs. We measure short selling costs with institutional ownership as it is correlated with the supply of lendable shares. By using the quarterly 13F filings data, we compute institutional ownership as the sum of holdings of all institutions for each stock in each quarter then divided by the number of shares outstanding. We sort all firms according to their institutional ownership level and divide the whole sample into three subsamples, according to different levels of institutional ownership. We run subsample regressions of short interest on the logarithm of EPU index. All subsample regressions control for weekday, year, and industry fixed effects and use the Newey-West (1987)

approach to control for autocorrelation and heteroscedasticity. All the regression variables have been standardized to have zero mean and unit standard deviation for more intuitive interpreting.

[INSERT TABLE 4]

The results reported in Table 4 show that short interest is positively and significantly associated with EPU from t-3 to t for two subsamples with medium or high institutional ownership. In contrast, the effect of EPU on short interest is very weak for the subsample with low institutional ownership. This is consistent with the cost explanation of short selling. Short sellers accelerate short selling in a state of higher EPU by choosing stocks that are easily borrowed from institutions.

In the following section, we study whether the effect of EPU on short selling activities exhibits cross-sectional variations related to a stock's different characteristics. We include three measures of firm characteristics: the Amihud (2002) illiquidity measure, return volatility, and analyst forecast dispersion. We divide the whole sample into two subsamples by sorting all firms according to each of the characteristics and run regressions with the subsample, respectively. The regressions control for year, industry, and weekday fixed effects and calculate robust standard errors using the Newey-West (1987) approach to control for autocorrelation and heteroscedasticity. All the regression variables have been standardized to have zero mean and unit standard deviation for more intuitive interpreting.

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[INSERT TABLE 5]

The regression results reported in Table 5 shows that the effect of EPU on short interest is relatively higher in the subsample of stocks with higher illiquidity (more liquid), higher volatility, or greater dispersion. The evidence suggests that short sellers increase their short interest by choosing stocks in a cross-sectional fashion for better impact.

If EPU represents a significant market-wide factor influencing short selling, one natural question is whether short sellers will short stocks with higher mispricing or whose return more sensitive to the EPU index. We measure the overpricing of stocks using the Fama-French model's alpha estimates and calculate stock return sensitivity to EPU with return-EPU beta from an augmented Fama-French factor model. All the estimates are generated through preceding 30 trading days rolling window regression.

$$R_{\mathrm{i,t}} = \alpha + \beta_{\mathrm{i}}\log(\mathrm{EPU})_{\mathrm{i,t}} + \sigma_i Rm_t + \gamma_i SMB_t + \theta_i HML_t + \epsilon_{i,t} \qquad (3).$$

In the regressions, $R_{\mathrm{i,t}}$ is the individual firm's return over the risk-free rate. Rm_t is the CRSP value-weighted market return over the risk-free rate. β_{i} is the firm's return sensitivity to the political uncertainty illustrated by the EPU index. SMB_t and HML_t are the Fama-French factors for size- and value-weighted portfolios. $\epsilon_{i,t}$ is the error item.

The stocks characterized by higher alphas are overpriced, while stocks with higher return-EPU betas are more sensitive to government economic policies. We divide the whole sample into two subsamples—firms with higher alpha vs. lower alpha and stocks with higher return-EPU beta vs. those with lower return-EPU beta—and run regressions with the subsample, respectively. The regressions control for year, industry, and weekday fixed effects and calculate

robust standard errors using the Newey-West (1987) approach to control for autocorrelation and heteroscedasticity. All the regression variables have been standardized to have zero mean and unit standard deviation for more intuitive interpreting. Table 6 reports the subsample results of short interest on EPU.

[INSERT TABLE 6]

As shown in Table 6, the effect of EPU on short interest is more salient in the subsample of stocks with higher alpha or higher return-EPU beta. The evidence suggests that short sellers increase short selling of overpriced stocks or stocks that are more sensitive to EPU news, especially in the state with higher EPU.

3.2 Profitability of Short Selling Related to EPU

The overall findings from the previous section confirm that short sellers act on EPU news, and they increase short interest when EPU is high. In this section, we investigate whether short sellers earn abnormal profitability by building short selling trading strategies on EPU. In doing so, we run baseline regressions using the following specification:

$$r_{\mathrm{i,t}} = \alpha + \beta \mathrm{short\ interest}_{\mathrm{i,t-1}} + \sigma CV_{i,t} + \epsilon_{i,t} \qquad (4).$$

In the regressions, $r_{\mathrm{i,t}}$ represents the daily stock returns. The CV_t includes all control variables, such as the risk-free rate, the daily CRSP value weighted market return (over the risk-free rate) and the daily Fama-French factors for size- and value-weighted portfolios. Table 7 illustrates the results of the effect of short selling on subsequent return, conditional on the EPU level. The regressions control for year, industry, and weekday fixed effects and all the

regression variables have been standardized to have zero mean and unit standard deviation for more intuitive interpreting.

The results show that the negative predictability of short selling on a subsequent day's return is greater when EPU is higher, with a magnitude of more than double the effect when the EPU is lower. This evidence suggests that short sellers can earn higher abnormal return when they increase short interest during a higher state of EPU.

[INSERT TABLE 7]

Table 8 reports the effect of short selling on a subsequent return by double sorting on the EPU index and institutional ownership. The results show that the return predictability monotonically increases in institutional ownership in Columns 4 and 8. Further, In the subsamples of firms with low institutional ownership, the return predictability monotonically increases in EPU index. Similarly, the return predictability monotonically increases in EPU index in the subsample of firms with high institutional ownership. This evidence suggests that short sellers will earn a higher abnormal return when they trade on EPU and when borrowing shares is relatively easy.

[INSERT TABLE 8]

The following three tables report the regression results of short selling and return predictability by double sorting on stock characteristics. Three characteristics we rely on include the Amihud illiquidity Measure, volatility, and analyst forecast dispersion. We use daily return and price data to calculate the Amihud illiquidity ratio, return from the previous 30

trading days for volatility measurement and previous month's analyst forecast for calculating analyst forecast dispersion. Table 9, Table 10, and Table 11 report the subsample regression results of stock return at t on short position of each firm by first sorting stocks on high and low EPU state and secondly sorting stocks on Amihud illiquidity ratio, return volatility and forecast dispersion, respectively.

[INSERT TABLE 9]

As the Columns 4 and 8 of Tables 9 shows, short interest at t-1 is negatively predictive of stock return at t in the subsamples of firms with low or high Amihud illiquidity ratio. Further, In the subsamples of firms with low Amihud illiquidity ratio, the return predictability monotonically increases in EPU index.

[INSERT TABLE 10]

Table 10 reports the regression results of short position's return predictability in subsamples of firms with low and high volatility. The return predictability monotonically increases in EPU in the subsample of firms with high volatility. In contrast, there is no pronounced increase in predictive relation between short position and future return according to EPU level in the subsample of firms with low volatility.

[INSERT TABLE 11]

Table 11 reports the regression results of short position's return predictability in

subsamples of firms by dividing the whole sample into two subsamples according to analyst dispersion. The return predictability increases for stocks with high analyst dispersion as shown in Columns 4 and 8. Further, when the subsamples are divided into three quintiles according to EPU level, the short position's return predictability monotonically increases in EPU only when firms have high analyst dispersion. In contrast, there is no pronounced increase in predictive relation between short position and future return according to EPU level in the subsample of firms with low analyst dispersion.

Overall, the evidence presented in Tables 9, 10 and 11 suggests that short sellers earn abnormal profits by shorting stocks during high EPU conditions on low illiquid, more volatile, and high dispersed firms.

IV. Conclusion:

Short sellers are important investors in the market, and short selling is associated with effective price discovery and information efficiency. For the first time in the literature, we link short selling with economic policy uncertainty (EPU) and show that EPU has great explanatory power on short trading activity. Since Baker, Bloom, and Davis (2016) construct a news-based daily index to measure governments' economic policy uncertainty, the literature shows that economic policy uncertainty increasingly features prominently in the financial markets and thus represents an important source of risk that influences the stock prices.

We find that short selling activities increase significantly during states of high economic

policy uncertainty. Daily short selling activity of either the market aggregate level or the individual stock level is positively associated with the EPU level. The evidence suggests that short sellers take a government's economic policy uncertainty into account in forming their short selling trading strategy.

The short selling activity exhibits cross-sectional patterns. For example, the increase in short selling activity during a higher state of EPU takes place mainly in stocks with high valuation risk and those characterized by higher illiquidity, greater volatility, and higher analyst dispersion. Further, short sellers increase short position in stocks either with greater overvaluation (greater Fama-French alphas) or higher loadings of EPU beta (greater return-EPU correlation). The evidence suggests that short sellers build shorting strategies to exploit policy uncertainty risk of stocks.

Consequently, short sellers seem to earn abnormal returns by shorting portfolios of stocks during higher economic policy uncertainty. We empirically document a significant and negative relationship between short interest and future stock return in the highest percentile of the EPU index, especially stocks with high institution ownership, low illiquidity or greater analyst dispersion.

The research contributes to the literature of both the market effect of political uncertainty and the research about short selling. We are the first to document that short sellers are trading on economic policy uncertainty. The evidence suggests that short sellers may have superior ability to analyze public information related to government economic policies; they form

trading strategies to exploit EPU information; and they earn abnormal profitability.

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Appendix: Variable Definition and Construction

Variables	Definition	Source
EPU	Daily Economic Political Uncertainty Index	Baker et al. (2016)
Log(EPU)	Log transform of EPU	Baker et al. (2016)
Short Interest	The ratio of the daily number of shares sold short to the number of share outstanding	TAQ
Return	Holding period return	CRSP
Momentum	Stock return of preceding 30 trading days	CRSP
Volatility	Moving standard deviation of stock return within 30 trading days prior	CRSP
Amihud	The Amihud Illiquidity ratio by dividing the absolute value of return by dollar volume	CRSP
Market Cap (Million $)	The market capitalization by multiplying the total number of shares by the present share price	CRSP
Dispersion	The analyst forecast dispersion by dividing the standard deviation of earnings forecasts over the absolute value of the mean of earnings forecasts among analysts for the current fiscal year-end	I/B/E/S
IO	the sum of holdings of all institutions for each stock in each quarter divided by the number of shares outstanding.	Thomson 13F

Figure 1: The Relationship of Aggregated Short Interest and EPU

This figure plots the relationship between the previous Economic Political Uncertainty index (EPU) at day t-1 as well as the aggregated short interests at day t for the whole market from 2005 to mid-2007. All the variables are standardized to have zero mean and unit standard deviation for comparison.

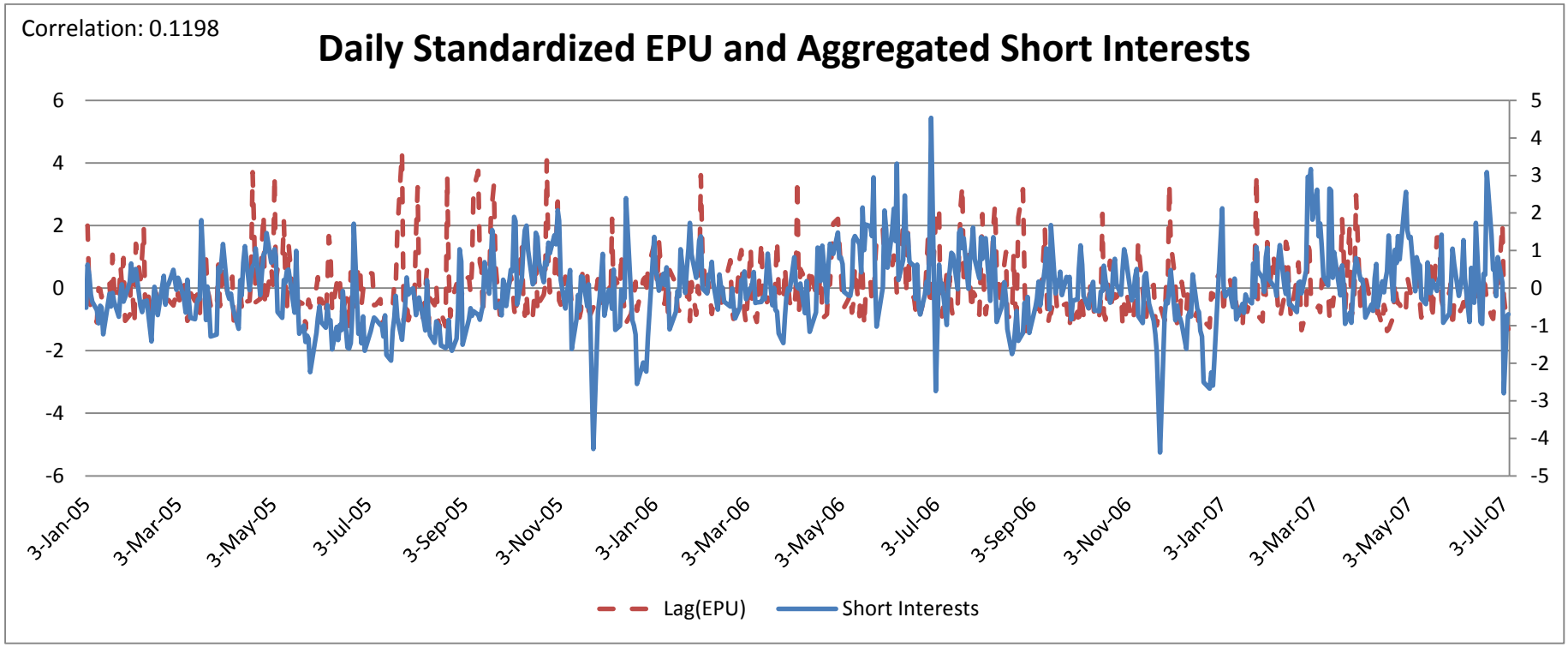

Figure 2: The Relationship of Aggregated Short Interests and EPU

This figure plots the relationship between the previous Economic Political Uncertainty index (EPU) at day t-1 as well as the aggregated short interest at day t for the whole market from 2005 to mid-2007. All the variables are standardized to have zero mean and unit standard deviation for comparison. We take the average of lag (EPU) and Short Interest into a weekly pattern.

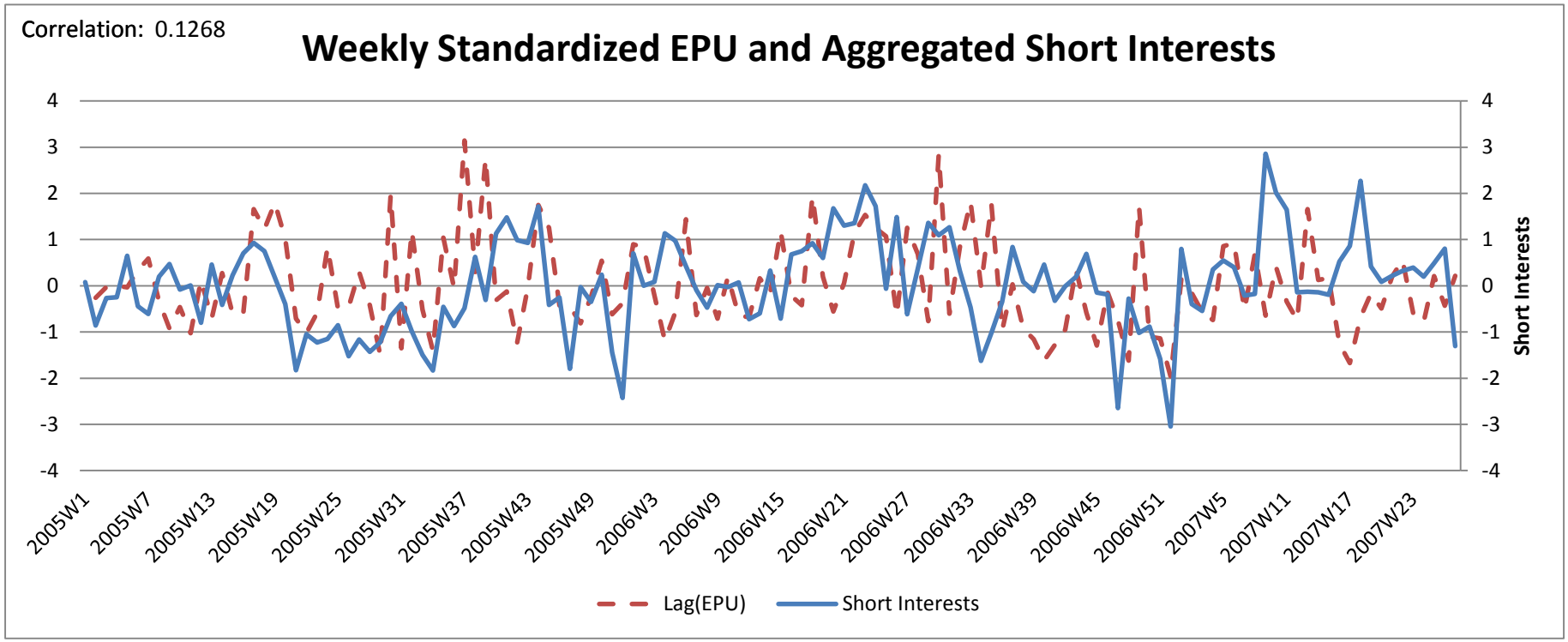

Table 1：Summary Statistics

This table reports summary statistics for the sample consisting of 1328 common stocks listed on the NYSE from January 3rd, 2005 to July 6th, 2007. We exclude securities such as warrants, preferred shares, close-end funds, American Depositary Receipts, and REITs. The variables reported include the Economic Political Uncertainty (EPU) index, the log transform of EPU (log(EPU)), short interest (the ratio of the daily number of shares sold short to the number of share outstanding), institutional ownership, stock return, Amihud Illiquidity and market capitalization. Momentum and volatility are constructed using data from the preceding 30 trading days.

	Obs.	Mean	Median	S.D.	P1	P99
EPU	738,789	57.20	48.49	36.21	9.79	187.79
Log(EPU)	738,789	3.87	3.88	0.61	2.28	5.24
Short Interest	738,782	0.17%	0.10%	0.29%	0.00%	1.09%
Return	699,397	0.07%	0.03%	1.89%	-4.67%	5.29%
Momentum	699,397	2.31%	1.83%	10.26%	-22.21%	32.69%
Volatility	738,782	1.70%	1.53%	0.83%	0.50%	4.51%
Amihud	738,789	1.22%	0.05%	19.71%	0.00%	15.93%
Market Cap (Million $)	738,789	9140	2214	26268	102	128512
Institutional Ownership	663,572	71.19%	75.48%	19.94%	8.85%	98.92%
Dispersion	652,427	8.89%	2.54%	79.76%	0.00%	93.33%

Table 2：The Impact of EPU on Aggregate Short Interest

We report the aggregated results of time-series regression for all the stocks. The dependent variable is the aggregated short interest (the ratio of the daily number of shares sold short to the number of share outstanding) at time t for the whole market. The independent variables of interest are the logarithm of the previous day's EPU index. Control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include day of week and year fixed effects. The standard errors are adjusted by a Newey-West estimation of five lags. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: Aggregated Short Interest$_t$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(EPU_t)	0.134***						0.099***
	(3.05)						(2.60)
Log(EPU_{t-1})		0.141***					0.075**
		(3.12)					(2.16)
Log(EPU_{t-2})			0.156***				0.106***
			(3.11)				(2.89)
Log(EPU_{t-3})				0.130**			0.079**
				(2.47)			(2.09)
Log(EPU_{t-4})					0.090*		0.044
					(1.70)		(1.11)
Log(EPU_{t-5})						0.059	0.022
						(1.26)	(0.59)
RF_t	-0.083	-0.080	-0.074	-0.069	-0.075	-0.081	-0.052
	(-0.62)	(-0.60)	(-0.56)	(-0.52)	(-0.56)	(-0.59)	(-0.39)
$MKTRF_t$	-0.099*	-0.094*	-0.084	-0.092*	-0.096*	-0.094*	-0.097*
	(-1.95)	(-1.89)	(-1.60)	(-1.75)	(-1.91)	(-1.84)	(-1.92)
SMB_t	-0.034	-0.031	-0.038	-0.030	-0.025	-0.025	-0.035
	(-0.58)	(-0.53)	(-0.67)	(-0.52)	(-0.43)	(-0.42)	(-0.62)
HML_t	-0.066	-0.048	-0.052	-0.045	-0.046	-0.043	-0.056
	(-1.48)	(-1.13)	(-1.19)	(-0.99)	(-1.02)	(-0.95)	(-1.33)
Constant	-0.706***	-0.687***	-0.655***	-0.658***	-0.702***	-0.695***	-0.671***
	(-3.54)	(-3.47)	(-3.30)	(-3.35)	(-3.53)	(-3.46)	(-3.46)
Weekday FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
N	630	629	628	627	626	625	625
Adj R-square	0.116	0.118	0.122	0.115	0.106	0.101	0.146
F-test	7.654	8.432	8.421	7.588	7.020	7.013	6.434

Table 3: The Impact of EPU on a Firm's Short Interest

We report the firm-specific time-series regression of daily short interest on the Economic Policy Uncertainty (EPU) index for each stock. The dependent variable is the firm-level short interest (the ratio of the daily number of shares sold short to the number of share outstanding) at time t. The independent variables of interest are the logarithm of the previous day's EPU index. The control variables include momentum, return volatility, Amihud illiquidity ratio and market capitalization. All specifications include the day of week, industry and year fixed effects. The standard errors are adjusted by a Newey-West estimation of five lags. The numbers in parentheses are t-statistic. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: Individual Short Interest $_t$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(EPU_t)	0.007***						0.005***
	(4.56)						(4.01)
Log(EPU_{t-1})		0.008***					0.004***
		(5.29)					(3.75)
Log(EPU_{t-2})			0.010***				0.008***
			(7.20)				(7.20)
Log(EPU_{t-3})				0.007***			0.004***
				(4.75)			(3.66)
Log(EPU_{t-4})					0.002		0.001
					(1.45)		(0.58)
Log(EPU_{t-5})						-0.001	-0.003**
						(-0.89)	(-2.32)
$Momentum_t$	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.009***
	(-2.92)	(-2.92)	(-2.89)	(-2.97)	(-3.06)	(-3.12)	(-2.66)
$Volatility_t$	0.178***	0.178***	0.178***	0.178***	0.178***	0.178***	0.177***
	(33.64)	(33.64)	(33.61)	(33.62)	(33.65)	(33.67)	(33.49)
$Amihud_t$	0.120***	0.120***	0.120***	0.120***	0.120***	0.120***	0.120***
	(6.06)	(6.06)	(6.06)	(6.05)	(6.06)	(6.06)	(6.06)
Market Cap_t	-0.047***	-0.047***	-0.047***	-0.047***	-0.047***	-0.047***	-0.047***
	(-39.60)	(-39.60)	(-39.60)	(-39.60)	(-39.59)	(-39.59)	(-39.59)
Constant	-0.225***	-0.225***	-0.223***	-0.224***	-0.225***	-0.224***	-0.224***
	(-8.23)	(-8.21)	(-8.14)	(-8.17)	(-8.21)	(-8.17)	(-8.18)
Industry FE	X	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
N	699397	699397	699397	699397	699397	699397	699397
Adj R-square	0.078	0.078	0.078	0.078	0.078	0.078	0.078
F-test	733.793	733.816	734.578	734.532	733.907	733.609	587.601

Table 4: The Impact of EPU on a Firm's Short Interest across Institutional Ownership

We report the firm-specific time-series regression of daily short interest on Economic Policy Uncertainty (EPU) index across institutional ownership. We separate our all stocks into three quintiles based on the levels of intuitional ownership at last quarter. Dependent variable is the firm-level short interest (the ratio of the daily number of shares sold short to the number of share outstanding) at time t. The independent variables of interest are the logarithm of previous day's EPU index. The control variables include momentum, return volatility, Amihud illiquidity ratio and market capitalization. All specifications include day of week, industry and year fixed effect. The standard errors are adjusted by a Newey-West estimation of five lags. The numbers in parentheses are t-statistic. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variables: Individual Short Interest $_t$			
	(1) Low IO	(2) Middle IO	(3) High IO
Log(EPU_t)	0.004	0.005***	0.010***
	(1.07)	(3.15)	(5.92)
Log(EPU_{t-1})	0.003	0.005***	0.009***
	(1.07)	(3.46)	(5.39)
Log(EPU_{t-2})	0.005*	0.007***	0.011***
	(1.89)	(5.26)	(7.03)
Log(EPU_{t-3})	0.004	0.004***	0.006***
	(1.34)	(2.87)	(3.71)
Log(EPU_{t-4})	0.001	0.003**	-0.001
	(0.34)	(2.38)	(-0.33)
Log(EPU_{t-5})	-0.003	-0.002	-0.001
	(-1.15)	(-1.05)	(-0.50)
$Momentum_t$	-0.004	0.007*	0.005
	(-0.53)	(1.79)	(1.22)
$Volatility_t$	0.163***	0.142***	0.173***
	(12.58)	(38.16)	(36.83)
$Amihud_t$	0.131***	-0.288***	-1.710***
	(6.40)	(-8.15)	(-16.26)
Market Cap_t	-0.009***	-0.096***	-0.148***
	(-5.81)	(-33.87)	(-22.20)
Constant	-0.443***	-0.139***	-0.203***
	(-14.75)	(-3.43)	(-4.68)
Industry FE	X	X	X
Weekday FE	X	X	X
Year FE	X	X	X
N	208012	209331	209204
Adj R-square	0.06	0.105	0.103
F-test	131.939	248.172	241.314

Table 5: The Impact of EPU on Short Interest, According to Firm Characteristics

We report the firm-specific time-series regression of daily short interest on the Economic Policy Uncertainty (EPU) index, according to a firm's characteristics. We separate all stocks into three types by sorting on the Amihud Illiquidity ratio, Volatility, and the analyst dispersion at time t-1. The dependent variable is the firm-level short interest (the ratio of the daily number of shares sold short to the number of share outstanding) at time t. The independent variables of interest are the logarithm of the previous day's EPU index. The control variables include momentum, return volatility, Amihud illiquidity ratio and market capitalization. All specifications include the day of week, industry and year fixed effects. The standard errors are adjusted by a Newey-West estimation of five lags. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: Individual Short Interest $_t$						
	(1) Low Illiq	(2) High Illiq	(3) Low Vol	(4) High Vol	(5) Low Disp	(6) High Disp
Log(EPU_t)	0.003**	0.007***	0.004***	0.007***	0.006***	0.005***
	(2.15)	(2.91)	(3.49)	(2.85)	(4.70)	(3.29)
Log(EPU_{t-1})	0.003**	0.005***	0.003***	0.005**	0.005***	0.005***
	(2.21)	(2.59)	(2.84)	(2.47)	(4.53)	(3.17)
Log(EPU_{t-2})	0.005***	0.010***	0.005***	0.011***	0.007***	0.009***
	(4.33)	(4.88)	(4.29)	(5.75)	(6.77)	(6.59)
Log(EPU_{t-3})	-0.000	0.007***	0.002	0.006***	0.004***	0.003**
	(-0.21)	(3.58)	(1.58)	(3.04)	(4.19)	(2.20)
Log(EPU_{t-4})	-0.003**	0.004*	-0.002**	0.003	-0.001	0.001
	(-2.48)	(1.79)	(-1.97)	(1.42)	(-0.79)	(1.04)
Log(EPU_{t-5})	-0.003**	-0.004*	-0.004***	-0.002	-0.003***	-0.001
	(-2.43)	(-1.85)	(-3.26)	(-0.89)	(-2.65)	(-0.90)
$Momentum_t$	-0.013***	-0.010**	-0.004	-0.011***	-0.001	-0.002
	(-3.14)	(-2.32)	(-0.97)	(-2.58)	(-0.39)	(-0.63)
$Volatility_t$	0.240***	0.156***	0.244***	0.146***	0.172***	0.168***
	-44.89	-20.3	-40.11	-16.03	-44.69	-36.07
$Amihud_t$	0.095***	0.128***	0.041***	0.148***	-0.924***	-0.026***
	-8.69	-5.41	-2.96	-5.37	(-8.78)	(-4.16)
Market Cap_t	-0.063***	-0.004	-0.042***	-0.069***	-0.056***	-0.058***
	(-47.76)	(-0.10)	(-48.31)	(-14.34)	(-48.71)	(-25.57)
Constant	0.009	-0.302***	-0.002	-0.395***	0.059	-0.073**
	-0.22	(-10.07)	(-0.05)	(-12.46)	-0.41	(-2.04)
Industry FE	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
N	350514	348883	345946	345637	309690	308267
Adj R-square	0.167	0.05	0.06	0.053	0.111	0.104
F-test	561.817	137.422	262.089	156.732	360.72	342.072

Table 6: The Impact of EPU on Short Interest, According to Firm's Policy Sensitivity and Mispricing

We report the firm-specific time-series regression of daily short interest on the Economic Policy Uncertainty (EPU) index according to the firm's return sensitivity to EPU (beta) and the firms' mispricing (Fama-French's alpha) on daily short interest. We employ the preceding 30 days to calculate individual alpha and beta from daily stock returns on the logged EPU index using a Fama-French three factor model. We separate all stocks into two quintiles based on the levels of alpha and beta. The dependent variable is the firm-level short interest (the ratio of the daily number of shares sold short to the number of share outstanding) at time t. The independent variables of interest are the logarithm of the previous day's EPU index. The control variables include momentum, return volatility, Amihud illiquidity ratio and market capitalization. All specifications include the day of week, industry and year fixed effects. The standard errors are adjusted by a Newey-West estimation of five lags. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: Individual Short Interest $_t$				
	(1) Low Alpha	(2) High Alpha	(3) Low Beta	(4) High Beta
Log(EPU_t)	0.004*	0.007***	0.005***	0.005***
	(1.94)	(3.96)	(2.66)	(3.24)
Log(EPU_{t-1})	0.005***	0.004*	0.000	0.008***
	(2.91)	(1.96)	(0.14)	(5.34)
Log(EPU_{t-2})	0.006***	0.009***	0.005***	0.010***
	(3.38)	(5.59)	(3.22)	(6.88)
Log(EPU_{t-3})	0.004**	0.005***	0.003	0.006***
	(2.32)	(3.18)	(1.63)	(4.45)
Log(EPU_{t-4})	0.001	0.001	0.001	0.001
	(0.78)	(0.34)	(0.41)	(0.90)
Log(EPU_{t-5})	-0.003*	-0.001	-0.005***	0.001
	(-1.82)	(-0.42)	(-2.75)	(0.40)
$Momentum_t$	-0.025***	0.001	-0.007	-0.016***
	(-5.58)	(0.30)	(-1.50)	(-2.93)
$Volatility_t$	0.145***	0.154***	0.134***	0.164***
	(17.77)	(19.78)	(16.56)	(16.12)
$Amihud_t$	0.097***	0.077***	0.108***	0.069***
	(3.35)	(4.09)	(3.48)	(3.53)
Market Cap_t	-0.049***	-0.052***	-0.054***	-0.047***
	(-31.72)	(-33.59)	(-29.47)	(-25.94)
Constant	-0.301***	-0.146***	-0.224***	-0.223***
	(-11.18)	(-4.29)	(-6.39)	(-5.71)
Industry FE	X	X	X	X
Weekday FE	X	X	X	X
Year FE	X	X	X	X
N	349918	349409	349663	349664
Adj R-square	0.079	0.080	0.073	0.087
F-test	462.570	478.306	321.588	340.501

Table 7: The Impact of Short Selling on Stock Returns across EPU Quintile

This table illustrates the impact of firm-level short selling on subsequent stock returns across quintiles of the Economic Policy Uncertainty level. We separate all firms into three quintiles by sorting the previous day's EPU index at time t-2. The dependent variable is the daily stock return at day t ($return_t$). The independent variable of interest is the short interest at day t-1, which is the ratio of the daily number of shares sold short to the number of share outstanding. The control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include the day of week, industry and year fixed effects. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Dependent Variable: $Return_t$			
	(1) Low EPU	(2) Middle EPU	(3) High EPU	(4) Full Sample
$Short\ Interest_{t-1}$	-0.006***	-0.009***	-0.016***	-0.010***
	(-2.84)	(-4.39)	(-8.03)	(-8.81)
RF_t	-0.010**	-0.001	0.009**	-0.001
	(-2.25)	(-0.25)	(1.96)	(-0.32)
$MKTRF_t$	0.348***	0.356***	0.350***	0.352***
	(152.39)	(166.07)	(155.73)	(277.67)
SMB_t	0.123***	0.116***	0.119***	0.120***
	(56.11)	(48.55)	(52.02)	(92.71)
HML_t	0.039***	0.045***	0.035***	0.040***
	(20.14)	(22.65)	(16.59)	(35.59)
Constant	-0.013**	-0.006	0.013*	-0.002
	(-1.97)	(-0.91)	(1.85)	(-0.57)
Industry FE	X	X	X	X
Weekday FE	X	X	X	X
Year FE	X	X	X	X
N	246087	245106	244944	737461
Adj Rsquare	0.165	0.185	0.175	0.176
F-test	4413.549	5013.742	4674.738	14229.995

Table 8: The Impact of Short Selling on Stock Returns across EPU Quintile and Institutional Ownership

This table illustrates the impact of firm-level short selling on subsequent stock returns across quintiles of the Economic Policy Uncertainty level. We separate all firms into two dimensions by sorting the previous day's EPU index at day t-2 and the last quarter's intuitional ownership. The dependent variable is the daily stock return at day t. The independent variable of interest is the short interest at day t-1, which is the ratio of the daily number of shares sold short to the number of share outstanding. The control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include the day of week, industry and year fixed effects. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: $Return_t$

	Low Institution Ownership				High Institution Ownership			
	(1) Low EPU	(2) Middle EPU	(3) High EPU	(4) Full Sample	(5) Low EPU	(6) Middle EPU	(7) High EPU	(8) Full Sample
$Short\ Interest_{t-1}$	-0.001	-0.007***	-0.018***	-0.009***	-0.013***	-0.017***	-0.020***	-0.016***
	(-0.51)	(-2.59)	(-6.83)	(-5.95)	(-3.08)	(-4.00)	(-4.36)	(-6.55)
RF_t	-0.012*	0.008	0.001	-0.002	-0.010	-0.007	0.013*	-0.001
	(-1.93)	(1.29)	(0.17)	(-0.62)	(-1.58)	(-1.12)	(1.89)	(-0.24)
$MKTRF_t$	0.331***	0.339***	0.329***	0.333***	0.361***	0.370***	0.367***	0.367***
	(100.67)	(109.92)	(102.35)	(183.04)	(101.86)	(112.84)	(106.72)	(188.51)
SMB_t	0.107***	0.090***	0.095***	0.099***	0.133***	0.132***	0.131***	0.133***
	(34.08)	(26.41)	(29.22)	(53.41)	(39.51)	(36.25)	(37.55)	(67.03)
HML_t	0.041***	0.044***	0.029***	0.039***	0.037***	0.045***	0.037***	0.041***
	(14.87)	(15.62)	(9.54)	(24.04)	(12.59)	(15.10)	(11.57)	(23.63)
Constant	-0.012	0.016*	0.000	-0.000	-0.015	-0.014	0.020**	-0.001
	(-1.30)	(1.72)	(0.00)	(-0.00)	(-1.50)	(-1.36)	(1.96)	(-0.25)
Industry FE	X	X	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
N	110137	110217	110250	331254	110335	110050	110031	331007
Adj R-square	0.158	0.174	0.163	0.165	0.169	0.195	0.185	0.184
F-test	110137	110217	110250	331254	110335	110050	110031	331007

Table 9: The Impact of Short Selling on Stock Returns across EPU Quintile and Illiquidity

This table illustrates the impact of firm-level short selling on subsequent stock returns across quintiles of the Economic Policy Uncertainty level. We separate all firms into two dimensions by sorting the previous day's EPU index at day t-2 and each firm's Amihud Illiquidity Measure at day t-1. The dependent variable is the daily stock return at day t. The independent variable of interest here is the short interest at day t-1, which is the ratio of the daily number of shares sold short to the number of share outstanding. The control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include the day of week, industry and year fixed effects. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: $Return_t$

	Low Illiquidity				High Illiquidity			
	(1) Low EPU	(2) Middle EPU	(3) High EPU	(4) Full Sample	(5) Low EPU	(6) Middle EPU	(7) High EPU	(8) Full Sample
$Short\ Interest_{t-1}$	0.000	-0.017***	-0.020***	-0.012***	-0.008***	-0.005*	-0.015***	-0.009***
	(0.04)	(-4.89)	(-6.06)	(-6.45)	(-2.84)	(-1.91)	(-5.45)	(-5.93)
RF_t	-0.005	-0.007	0.010*	0.002	-0.014**	0.009	0.005	-0.002
	(-0.99)	(-1.25)	(1.80)	(0.52)	(-2.09)	(1.33)	(0.71)	(-0.62)
$MKTRF_t$	0.349***	0.359***	0.357***	0.356***	0.348***	0.352***	0.342***	0.347***
	(122.23)	(133.63)	(126.96)	(224.18)	(97.54)	(105.33)	(97.95)	(175.65)
SMB_t	0.057***	0.065***	0.058***	0.060***	0.188***	0.167***	0.178***	0.179***
	(20.57)	(21.66)	(19.92)	(36.74)	(54.42)	(44.88)	(49.20)	(88.05)
HML_t	0.030***	0.045***	0.034***	0.037***	0.047***	0.044***	0.035***	0.043***
	(12.62)	(18.29)	(12.67)	(26.23)	(15.61)	(14.38)	(10.65)	(24.24)
Constant	-0.003	-0.030***	0.032***	0.001	-0.026**	0.023**	-0.008	-0.005
	(-0.40)	(-3.66)	(3.71)	(0.14)	(-2.55)	(2.25)	(-0.73)	(-0.88)
Industry FE	X	X	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
N	121879	121828	121874	365581	121615	121907	121739	365261
Adj R-square	0.17	0.203	0.187	0.186	0.171	0.179	0.172	0.174
F-test	2245.669	2783.175	2506.347	7562.752	2260.393	2387.807	2268.285	6936.790

Table 10: The Impact of Short Selling on Stock Returns across EPU Quintile and Amihud Illiquidity

This table illustrates the impact of firm-level short selling on subsequent stock returns across quintiles of the Economic Policy Uncertainty level. We separate all firms into two dimensions by sorting the previous day's EPU index at day t-2 and each firm's volatility measure at day t-1. The dependent variable is the daily stock return at day t. The independent variable of interest here is the short interest at day t-1, which is the ratio of the daily number of shares sold short to the number of share outstanding. The control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include the day of week, industry and year fixed effects. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: Return $_t$								
	Low Volatility				High Volatility			
	(1) Low EPU	(2) Middle EPU	(3) High EPU	(4) Full Sample	(5) Low EPU	(6) Middle EPU	(7) High EPU	(8) Full Sample
Short Interest$_{t-1}$	-0.016***	-0.017***	-0.018***	-0.012***	-0.003	-0.010***	-0.016***	-0.009***
	(-4.81)	(-4.74)	(-4.95)	(-6.45)	(-1.10)	(-3.43)	(-5.70)	(-5.93)
RF$_t$	-0.000	0.008	0.006	0.002	0.001	-0.007	0.027***	-0.002
	(-0.07)	(1.55)	(1.03)	(0.52)	(0.14)	(-0.90)	(3.23)	(-0.62)
MKTRF$_t$	0.298***	0.306***	0.296***	0.356***	0.400***	0.410***	0.404***	0.347***
	(116.06)	(128.66)	(117.89)	(224.18)	(103.05)	(110.31)	(105.98)	(175.65)
SMB$_t$	0.059***	0.034***	0.048***	0.060***	0.187***	0.194***	0.190***	0.179***
	(23.94)	(13.04)	(18.60)	(36.74)	(49.94)	(47.29)	(47.96)	(88.05)
HML$_t$	0.032***	0.017***	0.003	0.037***	0.046***	0.072***	0.062***	0.043***
	(14.72)	(7.40)	(1.24)	(26.23)	(13.93)	(20.29)	(17.02)	(24.24)
Constant	-0.009	0.012	-0.016**	0.001	-0.012	-0.018	0.048***	-0.005
	(-1.25)	(1.60)	(-2.08)	(0.14)	(-1.05)	(-1.60)	(4.14)	(-0.88)
Industry FE	X	X	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
N	117683	113368	114895	365581	117553	113249	114835	365261
Adj R-square	0.166	0.194	0.182	0.186	0.179	0.203	0.19	0.174
F-test	2103.076	2439.732	2282.344	7562.752	2311.973	2612.587	2444.787	6936.790

Table 11: The Impact of Short Selling on Stock Return across EPU Quintile and Analyst Dispersion

This table illustrates the impact of firm-level short selling on subsequent stock returns across quintiles of the Economic Policy Uncertainty level. We separate all firms into two dimensions by sorting the previous day's EPU index at day t-2 and the last month's analyst dispersion. The dependent variable is the daily stock return at day t. The independent variable of interest here is the short interest at day t-1, which is the ratio of the daily number of shares sold short to the number of share outstanding. The control variables include the risk-free rate, the daily CRSP value-weighted market return (over the risk-free rate), and the daily Fama-French factors SMB and HML for size- and value-weighted portfolios. All specifications include the day of week, industry and year fixed effects. The numbers in parentheses are t-statistic. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable: $Return_t$								
	Low Dispersion				High Dispersion			
	(1) Low EPU	(2) Middle EPU	(3) High EPU	(4) Full Sample	(5) Low EPU	(6) Middle EPU	(7) High EPU	(8) Full Sample
$Short\ Interest_{t-1}$	-0.014***	-0.012***	-0.010**	-0.012***	-0.009**	-0.017***	-0.027***	-0.017***
	(-3.76)	(-3.03)	(-2.37)	(-5.17)	(-2.27)	(-4.05)	(-6.43)	(-7.19)
RF_t	-0.006	0.001	0.000	-0.002	0.000	-0.001	0.021***	0.008*
	(-0.99)	(0.12)	(0.03)	(-0.59)	(0.02)	(-0.12)	(2.69)	(1.82)
$MKTRF_t$	0.335***	0.339***	0.329***	0.334***	0.373***	0.387***	0.386***	0.383***
	(112.52)	(120.21)	(109.66)	(200.34)	(99.66)	(108.83)	(106.13)	(184.65)
SMB_t	0.079***	0.070***	0.086***	0.080***	0.148***	0.147***	0.135***	0.143***
	(27.60)	(22.22)	(27.56)	(46.67)	(40.98)	(37.11)	(35.74)	(66.79)
HML_t	0.016***	0.009***	-0.002	0.008***	0.058***	0.080***	0.069***	0.069***
	(6.27)	(3.27)	(-0.87)	(5.51)	(18.34)	(24.00)	(20.16)	(37.06)
Constant	-0.018**	-0.002	0.004	-0.006	-0.003	-0.017	0.029***	0.004
	(-2.12)	(-0.26)	(0.43)	(-1.28)	(-0.25)	(-1.53)	(2.63)	(0.66)
Industry FE	X	X	X	X	X	X	X	X
Weekday FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
N	105916	104724	104424	315067	105692	104261	104181	314153
Adj R-square	0.181	0.200	0.194	0.191	0.167	0.196	0.184	0.183
F-test	2112.777	2369.670	2246.364	6751.459	1928.530	2298.264	2114.272	6370.619