Policy Uncertainty and Market Liquidity

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This version: November 14, 2017

Abstract

We examine the effect of policy uncertainty on firm level stock market liquidity. We posit three channels through which policy uncertainty may affect firm level liquidity. First, policy uncertainty could affect firm level liquidity through the information asymmetry channel. During periods of heightened policy uncertainty, managers have incentives to delay their communication of these decisions to the public due to adverse effects on their stock prices. We expect higher levels of information asymmetry leading to lower levels of market liquidity. Second, we suggest that a firm's liquidity would be more adversely affected if it faces higher levels of cash flow risk during periods of high policy uncertainty. Finally, we postulate that policy uncertainty affects a firm's market liquidity by affecting a firm's funding liquidity – defined as the ease with which a trader can obtain financing. Our empirical results suggest that policy uncertainty indeed affects firm level market liquidity through the three channels posited. Our results are robust to controls for macroeconomic variables and potential endogeneity.

Acknowledgments: We gratefully acknowledge helpful comments from seminar participants at University of South Australia.

1. Introduction

Firms operate in an environment where their businesses are subject to significant levels of uncertainty concerning the timing, content, and potential effect of policy decisions. Recent events such as the political conflicts and fiscal crises in the United States have spurred research the impact of economic policy uncertainty on corporate decision-making and activities. Academic studies have extensively examined the impact of policy uncertainty on corporate decisions such as the firm investment decisions (Bernanke, 1983; Bloom, 2009; Gulen & Ion, 2016; Julio & Yook, 2012; Leahy & Whited, 1996; Rodrik, 1991), mergers and acquisitions (Nguyen & Phan, 2017; Bonaime et al., 2017), and cash holdings (Duong et al., 2017). There are no studies that have examined the impact of policy uncertainty on a firm's stock market liquidity. Our study attempts to fill this gap by investigating the impact of policy uncertainty on a firm's stock liquidity and the underlying economic channels of this impact.

We use a measure the overall level of policy uncertainty in the economy developed by Baker, Bloom, and Davis (2013) (henceforth BBD). They construct an index of aggregate policy uncertainty as a weighted average of three individual components. The first component is formed from a count of newspaper articles containing key terms related to policy uncertainty. The second component assesses the level of uncertainty regarding future changes in the tax code using the dollar impact of tax provisions that are to expire in the near future. The third component utilizes the dispersion in economic forecasts of the CPI and government spending to measure the uncertainty about fiscal and monetary policy.

Based on a review of the relevant literature, we posit three channels through which policy uncertainty may affect firm level liquidity. First, we postulate that the information asymmetry channel is expected to affect firm level liquidity. Managers of firms are expected to take decisions that will help them to tide over periods of heightened policy uncertainty. For instance, as Gulen and Ion (2015) show, they may postpone irreversible investments. Further, they may also make other significant decisions such as cutting dividends to conserve cash.

We argue that the policy uncertainty-induced reduction in information quality adversely impacts stock liquidity. Classical models of the price formation process (Copeland and Galai, 1983; Glosten and Milgrom, 1985) posit that when the dealers face an increased level of information asymmetry, they will widen the bid–ask spread to offset the higher expected losses stemming from trading with informed traders. Managers have incentives to delay their communication of key corporate decisions to the public during periods of heightened policy uncertainty due to adverse effects on their stock prices. Thus during periods of heightened policy uncertainty, firms may disclose less information or engage in distorted information disclosure. As a result, the wedge between the level of information possessed by informed and uninformed investors increases, which potentially leads market makers to widen the bid–ask spread. Prior empirical work on the relation between voluntary and mandated disclosures in various settings document a positive association between the level of information disclosure and stock liquidity (Balakrishnan et al., 2014; Diamond and Verrecchia, 1991; Healy et al., 1999; Heflin et al., 2005; Leuz and Verrecchia, 2000; Schoenfeld, 2017; Shroff et al., 2013; Welker, 1995). We therefore expect that firms will be less informationally transparent during periods of increased policy uncertainty and will therefore experience greater deteriorations in stock liquidity.

In addition to information asymmetry, risk matters for liquidity. Investors would prefer to trade large quantities when stocks are less risky than when risk is higher. This is because most traders are likely to be risk-averse and capital constrained (Peress, 2010). Consistent with this view, Peress (201) and Kale and Loon (2011) posit that a firm with market power has more stable cash flows due its ability to set prices in the product market and therefore its stock price is less sensitive to order flows, leading to better stock market liquidity. Policy uncertainty affects a firm's profitability, cash flows and therefore stock returns inducing more volatility in these variables. Risk averse, capital-constrained traders are likely to hold back on their trades of equity during periods of high policy uncertainty. Since trading activity directly influences a firm's stock market liquidity, we expect lower levels of liquidity during periods of high policy uncertainty. Thus risk is the second channel through which policy uncertainty affects stock liquidity.

Finally, market level macro factors would also affect firm level liquidity. Brunnermeier and Pedersen (2009) posit that a firm's market liquidity is affected by funding liquidity – defined as the ease with which a trader can obtain financing. Brunnermeier and Pedersen (2009) show that funding liquidity is affected by volatility, funding shock, and losses in asset holdings. Funding liquidity explains commonality in liquidity documented in prior work (Chordia, Roll, and Subrahmanyam, 2000; Hasbrouck and Seppi, 2001; Huberman and Halka, 2001). Events that trigger policy uncertainty such as the recent subprime crisis can be characterized as a period with high asset price volatility, funding shocks and widespread decline in asset prices are expected to be followed by periods of declining funding liquidity.

We conduct our empirical tests using a sample of 66,822 firm year observations during the 1993-2013 period. Our sample covers all firms from the New York Stock Exchange, American Stock Exchange and Nasdaq for which the relevant data was available. Our empirical results suggest that policy uncertainty indeed affects firm level market liquidity. The baseline results show that policy uncertainty is positively related to effective spread. Our models control for a number of key variables shown to influence effective spreads as shown in prior literature (Chung et al., 2010). Larger and older firms have lower effective spreads. Firms with higher turnover have lower effective spreads. Firms with lower price, higher leverage have higher effective spreads. Amex and Nasdaq firms have higher effective spreads as compared to firms listed on the NYSE. Interestingly, the effect of policy uncertainty spills over into the next period as well. Our results are robust to use of alternate proxies for liquidity. We find similar results when we use Amihud's illiquidity measure, and Hasbrouck's half spread measure estimated using Gibb's sampling.

We ensure that our results are not tainted by omitted variables bias due to the BBD measure capturing the effect of general economic uncertainty. We use several macroeconomic measures of uncertainty following Bloom (2009) and Gulen and Ion (2015) such as the coefficient of variation of the biannual GDP forecasts from the Livingstone survey of the Philadelphia Federal Reserve Bank, the cross-sectional standard deviation in firm-level profit growth, the monthly VXO implied volatility index from the CBOE, the cross-sectional standard deviation in firm-level monthly stock returns, and the comprehensive measure of macroeconomic uncertainty of Jurado, Ludvigson, and Ng (2015). Our policy uncertainty measure continues to have a positive significant impact on effective spread suggesting that our measure is not subsumed by economic uncertainty measures.

Finally, to allay concerns of endogeneity, we use a two-stage least squares procedure using political polarization in US and Canadian policy uncertainty as instrument variables in the first stage model. Political polarization serves as a suitable instrument on account of the relevance and exclusion criteria. Partisan polarization is estimated using the DW-Nominate scores of McCarty et al. (1997). The second stage regressions which use fitted policy uncertainty using the first stage model show that policy uncertainty continues to positively influence effective spread and Amihud's illiquidity measure.

We conduct additional analyses to confirm the validity of our baseline results. We confirm that the effect of policy uncertainty is more pronounced during the GFC period. Further, we check to see if the deterioration in liquidity is more severe for stocks whose returns are more sensitive to the policy uncertainty variable. Overall, our results suggest that policy uncertainty significantly influences market liquidity of stocks and the results are robust to the use of alternate proxies for liquidity.

We next examine the empirical evidence regarding the channels through which policy uncertainty affects stock market liquidity. We test the proposition that the information asymmetry channel affects liquidity using different proxies that capture information asymmetry such as size of the firm, analyst coverage, analyst forecast dispersion and higher opacity of financial information. Overall, we find support for the view that information asymmetry channel is indeed the conduit through which policy uncertainty affects a firm's liquidity.

We examine the validity of the second channel – cash flow risk by using several proxies such as stock return volatility, earnings volatility and sales volatility. We find that these cash flow risk variables interact with policy uncertainty exacerbating stock market illiquidity. Overall, these results suggest that stocks with higher cash flow volatility suffer further declines in liquidity during periods of high policy uncertainty.

Finally, we study the impact of funding channel through which policy uncertainty could affect stock market liquidity. We use a two-step approach. In the first step, we use TEDSPREAD as the proxy for funding constraint and examine how policy uncertainty affects it. We confirm that policy uncertainty significantly worsens a firm's funding position. In the second step, we interact TEDSPREAD with policy uncertainty and examine its impact on stock liquidity. Our results suggest that the impact of policy uncertainty is heightened when dealers face severe funding constraints. Overall, we find evidence supporting the validity of all three channels – information asymmetry, cash flow risk and funding liquidity.

We contribute to the growing literature on the impact of policy uncertainty. While prior work has focused on the impact of policy uncertainty on corporate activities, our emphasis is on market effects – particularly stock market liquidity. Prior work has not examined this important aspect of the impact of policy uncertainty. Our work complements earlier work which suggests that firms curtail their investment activity in the wake of heightened policy uncertainty. Our work suggests that policy uncertainty through its impact on stock market liquidity could affect a firm's financing activities. Thus the deterioration in liquidity may be a potential conduit through which policy uncertainty affects a firm's investment program.

The rest of the paper is organized as follows. In the next section we describe the data, and variables used. The empirical results are discussed in Section 3. The final section contains our concluding comments.

2. Data and variable descriptions

2.1. Data and sample selection

The data for our study are retrieved from various data sources. We collect measures of economic policy uncertainty developed by Baker et al. (2016) from the following website http://www.policyuncertainty.com/. To calculate our liquidity measure, we use the following six data sources: (1) the daily and monthly stock return data from the Center for Research in Security Prices (CRSP), (2) intraday trades and quotes from the Trade and Quote databases (TAQ), (3) shareholder rights data from the Investor Responsibility Research Center (IRRC), firm financial data from the Compustat Industrial Annual File, (4) analyst coverage data from Institutional Brokers Estimates System (I/B/E/S), (5) institutional holdings data from the CDA/Spectrum Institutional Holdings database and (6) managerial compensation data from the Compustat Executive Compensation file. For other firm-specific characteristics, we use Compustat annual industry file. Our sample period is between 1993 and 2013 due to the data availability to calculate our stock market liquidity measures.

Following the literature on liquidity (i.e. Amihud (2002), Kale and Loon (2011)), we only include stocks that are listed as ordinary common share (CRSP share code 10 or 11) and are listed in NYSE, AMEX or NASDAQ. We also delete firms that have less than 100 days of data available to calculate our liquidity measures. Firms' stocks that have closing price of less than $5 are also excluded from our sample. We also require our firms to have data on price and shares outstanding available whenever return and volume data are available. Finally, we exclude firms without an identifiable 4-digit SIC code in the CRSP Daily Stock File at the end of the year.

2.2 Variable definitions

2.2.1 Measure of economic policy uncertainty

The economic policy uncertainty index is developed by Baker et al. (2016) (hence forth BDD index). This is a weighted average of the three components. The first component quantifies the volume of news- based policy uncertainty every month starting in January 1985. This is done by searching on the 10 leading newspapers: USA Today, Miami Herald, Chicago Tribune, Washington Post, Los Angeles Times, Boston Globe, San Francisco Chronicle, Dallas Morning News, New York Times and Wall Street Journal that contain the following key words: "uncertainty" or "uncertain"; "economic" or "economy"; and one of the following policy terms: "congress", "deficit", "Federal Reserve", "legislation", "regulation" or "White House". To control for changing in the volume of articles across newspapers and time, total numbers of word counts are scaled by the total numbers of articles in the same newspaper and month, which yields a monthly policy uncertainty series for each newspaper. These monthly newspaper-level uncertainty series are then standardized by unit standard deviation from 1985 to 2010 and then average across the ten papers per month. Finally, the series are then normalized to a mean of 100 from 1985 to 2009.

The second component of the BBD index measures the level of uncertainty related to future changes in the tax code. It is a transitory measure constructed by the number of temporary federal tax code provisions set to expire in the contemporaneous calendar year and future ten years and reported by the Joint Committee on Taxation. The third and final component is the CPI disagreement and expenditure dispersion. It is measured by the forecasters' disagreement (the interquartile range of forecast) over future outcomes about inflation rates and federal government purchases, respectively.

The overall measure of policy uncertainty is calculated by normalising each of the three components above and then weighted average of the resulting series, using a weight of one-half for the news-based component, one-sixth of the tax component and one-third for the forecaster disagreement component.

2.2.2 Stock market liquidity measures

We use five measures of stock market liquidity. The first and the most common measure of stock market liquidity is the log of effective spread (ESPREAD) which is the log of the twice of the absolute value of the difference between the actual trade price and the mid-point of the market quote.

The second measure is developed by Corwin and Schultz (2012) (CSSPREAD) which reflects both the variance of the stock price and and the bid-ask spread which is a function of the high-low ratios on two consecutive single days. The CSSPREAD is estimated based on the following assumptions. The true or actual value of the stock price follows a diffusion process and there is a spread of S%, which is constant over the 2-day estimation period. The daily high price is a buyer-initiated trade and is therefore grossed up by half of the spread and the daily low price is a seller-initiated trade and is discounted by half of the spread. The observed high-low price range contains both the range of the actual prices and the bid-ask spread.

The observed high (low) stock price for day t is calculated from the following equation :

$$CSSPREAD = [\ln\left(\frac{H_t^0}{L_t^0}\right)]^2 = [\ln\left(\frac{H_t^A\left(1+\frac{S}{2}\right)}{L_t^A\left(1+\frac{S}{2}\right)}\right)\}^2$$

Where H_t^A (L_t^A) is actual high (low) stock price on day t and H_t^0 (L_t^0) is the observed high (low) stock price for day t.

The third measure is Amihud (2002)'s illiquidity index (AMIHUD) which can be interpreted as the daily price response associated with one dollar of trading volume, thus serving as a rough measure of price impact. It is defined as the average ratio of the daily absolute return to the (dollar) trading volume on that day. The cross-sectional study employs for each stock in the annual average:

$$AMIHUD_{i,y=}1/D_{iy}\sum_{t=1}^{Diy}\left|R_{iyd}\right|/VOLD_{ivyd}$$

Where: D_{iy} is the number of days for which data are available for stock i in year y. R_{iyd} is the return on stock i on day d of year y and $VOLD_{ivyd}$is the respective daily volume or the daily price impact of the order flow.

Our fourth measure of stock market liquidity is Hasbrouck (2009)'s log of Gibbs index (GIBBS). Hasbrouck (2009) estimates the effective half-spread by using a Bayesian Gibbs sampler on the following model:

$$\Delta p_t = c.\Delta q_t + \beta^m.r_t^m + \epsilon_t$$

Where Δp_t is change in stock price at time t, r_t^m is the market return on day t and it is assumed that the market return is independent of Δq_t where q is a trade direction indicator and β^m is market beta.

Table 1 presents the summary statistics for the variables used in this study. For each variable, we provide information about the total number of observations, the mean and median values, the standard deviation, and the values at the 25th and 75th percentiles. For our baseline analysis, there are 68,434 observations, although the number of observations decreases for further analysis due to data unavailability. Our main explanatory variable, policy uncertainty, has a mean value of … and a median value of ... These statistics are comparable to those of Nguyen and Phan (2017). Similarly, the average value of our measure of illiquidity, natural logarithm of ESPREAD, is -5.95, and Amihud of -6.258, which are comparable to the values reported in Atawanah et al. (2017). The average firm in our sample has total assets of about $574 million (with a natural logarithm value of 6.353), an age of about 10 years (with a natural logarithm value of 2.337), a leverage ratio of 0.198, a ratio of R&D to sales of 3.2%, and institutional ownership of about 47%.

[Insert Table 2 here]

3. Empirical Results

We regress stock market illiquidity on policy uncertainty and report the baseline regressions in Table 2. We use two proxies for illiquidity – ESPREAD and AMIHUD. ESPREAD is the natural logarithm of the effective spread and AMIHUD is the natural logarithm of Amihud's illiquidity index. These measures are computed at the firm level and have been widely used in market microstructure literature. The results indicate that policy uncertainty exerts a significant positive impact on illiquidity. When economy-wide policy uncertainty is high, it appears to impart a substantial and significant negative effect on stock market liquidity. The impact of economic policy uncertainty is reflected in contemporaneous liquidity (t) and the effect persists until the next year (t+1). The impact of policy uncertainty reverses in year t+2 suggesting that policy uncertainty is resolved. Following prior literature, we use a number of control variables. Large firms are more liquid (less illiquid) than small firms. Firms with positive stock return performance (CUMRET) tend to be more liquid. Stocks with higher idiosyncratic risk, better analyst coverage, higher turnover, higher age, higher institutional ownership, and higher R&D expenditure are more liquid. Stocks with lower price level, higher leverage, and listed on American exchange and NASDAQ are more illiquid.

[Insert Table 2 here]

In Table 3, we check the robustness of our baseline results by using alternate proxies for illiquidity. Policy Uncertainty continues to have a positive and significant on the two alternate measures of illiquidity used – CSSPREAD and GIBBS. As outlined in section 2.2.2, CSSPREAD is derived from high and low prices observed over two consecutive days. GIBBS is the stock liquidity measure proposed by Hasbrouck (2009 in which he uses a Bayesian Gibbs sampler to estimate effective spread. Our results suggest that policy uncertainty imparts a negative effect on liquidity even when these two alternate measures of liquidity are used. There are some differences in the significance of control variables, but our main conclusion remains valid.

[Insert Table 3 here]

A major concern regarding our baseline result is that the BBD index may inadvertently capture other sources of economic uncertainty. It is likely that this contamination effect may arise from two sources. The first source of contamination is due to potential high correlation between the BBD index and variables that signify macroeconomic uncertainty but are unrelated to policy uncertainty. It is possible that events that lead to policy uncertainty such as wars, recessions, and financial crises may also drive increases in general macro-economic uncertainty. The second source of contamination of the BBD index is by construction. Although Baker et al. (2016) have taken great efforts to mitigate this source of potential measurement error, we think that this concern is still worth considering. We control for these potential contaminations by undertaking two types of robustness checks. First, we control for all plausible macroeconomic variables that may potentially affect our results by including them explicitly in the following equation:

$$Illiq_{i,t} = PU_{i,t} + Firm\_Controls_{i,t-1} + Macro\_Controls_{i,t} + + \epsilon_{i,t} \qquad ....(1)$$

First, we use ELECYEAR, which is a dummy variable that takes the value of 1 in presidential election years. This is to ensure that the policy uncertainty variable is not capturing the effect of elections (Marshall et al., 2016). Second, we use GDPDIS which is the natural logarithm of GDP dispersion provided by the Livingstone survey of professional forecasters. This measure is a proxy for uncertainty about future economic growth. Third, we control for uncertainty about future profitability by using SDPROFIT, which is the log of yearly cross-sectional standard deviation of firm-level profit growth. Fourth, we capture information about perceived uncertainty in equity markets by using VXO, the monthly cross-sectional standard deviation of stock returns from the Chicago Board of Options Exchange. Fifth, we use JLN, which is a comprehensive measure of uncertainty developed by Jurado, Lugvigson, and Ng (2015). Finally, we use SDRETURN, the cross-sectional standard deviation in monthly stock returns. We use these controls in addition to the previously used firm-level controls. The empirical results which are reported in Table 4 (models 1 and 3) suggest that policy uncertainty remains its positive and statistically significant impact on measures of illiquidity. Even after controlling for macroeconomic uncertainty, a 100% increase in policy uncertainty leads to a 45.3% increase in effective spread.

In the second approach, we remove potential confounding effects by extracting macroeconomic uncertainty components from the original policy uncertainty measure by separately running time-series regressions of policy uncertainty on a set of macroeconomic uncertainty variables and extracting the residuals. We then replace PU in equation (1) by the residuals and rerun equation (1). The empirical results which are reported in Table 4 (models 2 and 4) suggest that policy uncertainty remains its positive and statistically significant impact on measures of illiquidity. Our results suggest that a doubling in the residual policy uncertainty increases effective spread by 12.8% - a substantial increase. Overall, it appears that the effect of policy uncertainty is not confounded by other macroeconomic factors suggested by prior work.

[Insert Table 4 here]

Although, we have taken meticulous steps to mitigate the effects of confounding factors, we would like to address potential endogeneity concerns. Following Gulen and Ion (2015), we use an instrument variable approach. Here we employ two IV variables (i) political polarization (POLAR) at either House of Representative or Senate level; and (ii) Canadian policy uncertainty. Then we calculate the arithmetic average of monthly fitted PU to derive yearly PU (or FPU). We use a proxy for political polarization following the approach of Mccarty et al. (1997). They derive DW-NOMINATE scores the first dimension of which can be interpreted as legislators' position on government intervention in the economy. Two scores are derived from these measures. The first score Senate DW is calculated as the average of the scores for Republican party members minus the average for Democratic party members. This represents the level of partisan polarization in the senate. Similarly, another measure DW House is calculated to denote the partisan polarization in the house of representatives. In the first stage, we regress policy uncertainty on Senate DW (House DW) and include macro variables used earlier and year dummies. In the second stage, the fitted policy uncertainty (FPU) variable based on either House/Senate polarization is used an independent variable to see its effect on liquidity. Our instrument (DW Senate / DW House) satisfies the relevance condition since we expect higher levels of partisan polarization to affect policy uncertainty. Further, our approach also fulfils the exclusion criterion as well, since partisan polarization is not expected to have any direct impact on market liquidity.

Our two-stage regression approach uses the following equations:

$$PU_t = \alpha_0 + \beta_1 POLAR_t(Senate/House) + \beta_2 CANPU_t + \beta_k EU_{k,t} + \epsilon_t \quad (2)$$

$$Illiq_{i,t} = \alpha_0 + \beta_1 FPU_{i,t} + \beta_j CONTROL_{j,i,t} + \gamma_i Firm_i + \epsilon_{i,t} \quad (3)$$

The results are reported in Table 5. The fitted policy uncertainty variables are positive and highly significant. These results assure us that the relation between policy uncertainty and liquidity are not tainted by potential endogeneity.

[Insert Table 5 here]

We conduct additional analyses to further show the robustness of our baseline results. In the first analysis, we examine if the effect is more pronounced during the period of extremely high policy uncertainty period of the recent Global Financial Crisis (2008-09). We estimate the following model:

$$Illiq_{i,t} = PU_{i,t} + GFC_{i,t} + PU_{i,t} * GFC_{i,t} + Firm\_Controls_{i,t-1} \quad (4)$$

In the second analysis, we estimate the following model to see if the effect is more pronounced for stocks whose returns are more sensitive to PU. The PU-stock return sensitivity (BETA) is computed by regressing each Fama-French 48 industry's value weighted monthly excess stock returns on the BBD policy uncertainty index over the 60 months prior to the beginning of the firm's fiscal year (Bonamie et al., 2017).

$$Illiq_{i,t} = PU_{i,t} * BETA_{i,t} + Firm\_Controls_{i,t-1}. \quad (5)$$

The results which are reported in Table 6 suggest that the effect of policy uncertainty on liquidity is more pronounced during the GFC period. Further, stocks whose returns are more sensitive to PU face greater declines in liquidity as indicated by the significant positive coefficient of the interaction term PU*BETA.

[Insert Table 6 here]

We next examine the channels through which policy uncertainty affects liquidity. We posit that economic policy uncertainty will affect stock market liquidity through three channels. The first channel by which economic policy uncertainty is expected to affect stock market liquidity is due to information asymmetry. We postulate that firms which have lower information asymmetry suffer lesser levels of liquidity deterioration due to policy uncertainty than firms which have more severe levels of information asymmetry. The second channel by which economic policy uncertainty affects stock market liquidity is through cash flow risk. Firms which face higher volatility in their operations will be subject to more uncertainty in their decisions due to macro-policy uncertainty. Finally, the last channel which is expected to affect stock market liquidity is through funding constraints.

We propose that the first channel – information asymmetry effects of policy uncertainty - will be larger for smaller firms, firms with lower analyst coverage, firms with higher analyst forecast dispersion and higher opacity of financial information. SIZE is measured as logarithm of total assets, ANACOV as natural logarithm of the number of analysts following the firm, and OPAQUE is the prior three-year moving sum of the absolute value of discretionary accruals. The PU*SIZE variable has a negative and statistically significant impact on ESPREAD and AMIHUD suggesting that large firms suffer less from policy uncertainty driven liquidity declines. Further the negative coefficient on PU*ANACOV suggests that firms with larger analyst following are less affected by policy uncertainty. In a similar vein, we find that PU*OPAQUE is positive implying that more opaque firms face greater reductions in liquidity due to higher policy uncertainty. Overall, we find support for the view that policy uncertainty affects the stock market liquidity via the information asymmetry channel.

[Insert Table 7 here]

The second channel by which policy uncertainty is expected to affect liquidity is through cash-flow risk. We posit that firms which are subject to higher cash flow risk will face further deterioration in liquidity in periods of high policy uncertainty. We use several measures that capture the vulnerability of a firm to cash flow risk. The first measure is RETVOL, the annualized stock return volatility computed as the standard deviation of monthly returns over the fiscal year (Brogaard et al., 2017). The second measure is EPSVOL, the earnings per share volatility computed as the natural logarithm of unexpected shocks to quarterly earnings per share (Irvine and Pontiff, 2008; Kale and Yoon, 2011). The third measure is CFSVOL, the cash flow per share volatility computed as the natural logarithm of unexpected shocks to quarterly cash flow per share (Irvine and Pontiff, 2008; Kale and Yoon, 2011). The fourth measure is SPSVOL, the sales per share volatility computed as the natural logarithm of unexpected shocks to quarterly sales per share (Irvine and Pontiff, 2008; Kale and Yoon, 2011). We report the results using these variables and their interactions with the policy uncertainty measure in Table 8. We find all the cash flow risk variables when interacted with policy uncertainty have a strong positive and statistically significant impact on measures of illiquidity. The strongest effect is seen when we use the return volatility measure. These results suggest that effect of policy uncertainty is more pronounced for stocks with higher levels of cash-flow volatility.

[Insert Table 8 here]

The third channel through which policy uncertainty could affect liquidity is through the funding channel. Funding liquidity represents the ability of dealers to finance their inventory and is therefore likely to positively affect market liquidity Brunnermeier et al., 2008; Brrunnermeier and Pedersen, 2008). Funding liquidity is measured by TED spread, which is the difference between the 3-month LIBOR and the 3-month T-Bill rate.

We study the impact of policy uncertainty on funding liquidity by using a two-step approach. In the first stage, we examine the impact of PU on TEDSPREAD by estimating the following model:

$$TEDSPREAD_t = PU_t + Macro\_Controls_t \qquad (6)$$

We use the six macroeconomic variables used before. We find that the policy uncertainty measure has a reliably positive and significant impact on TED spread suggesting that policy uncertainty worsens the liquidity position of stocks. Table 9 contains our results.

[Insert Table 9 here]

In the second step, we examine the effect of PU on liquidity when TED spread is high. We find that the interaction term PU*TEDSPREAD_HIGH has a positive and highly significant impact on effective spread and Amihud’s measure of illiquidity. This result, reported in Table 10, suggests that the impact of policy uncertainty on liquidity is exacerbated during periods when dealers face severe funding constraints.

[Insert Table 10 here]

Overall, from our results so far, we can conclude that policy uncertainty affects the liquidity of a firm's stock through three channels - information asymmetry, cash flow risk and funding liquidity.

Finally, we study the economic consequences of the deterioration of liquidity when policy uncertainty is high. We postulate that when policy induced uncertainty adversely affects liquidity, stocks achieve lower returns and face higher costs of equity. We report results suggesting that our conjectures are valid in Table 11. As dependent variables, we use EXRET1 and EXRET2. EXRET1 is the annual excess return computed by compounding monthly stock returns in excess of market return. EXRET2 is the annual excess return computed by compounding monthly stock returns in excess of monthly risk-free return. We find that the interaction terms PU *ESPREAD and PU*AMIHUD display significant negative coefficients suggesting that liquidity drops heightened periods of policy uncertainty leads to lower stock returns.

[Insert Table 11 here]

Overall, our empirical results suggest that policy uncertainty is associated with reductions in stock market liquidity and that this liquidity deterioration has economic consequences.

4. Conclusion

In this paper, we study the impact of policy uncertainty on stock market liquidity. Overall, our empirical work suggests that policy uncertainty has a deleterious effect on stock market liquidity. This result survives rigorous controls for other macroeconomic effects that are expected to affect liquidity. Further, our results are robust to tests that mitigate endogeneity concerns. It appears that the impact of policy uncertainty on stock market liquidity occurs through three channels - information asymmetry, cash flow risk and funding liquidity.

Our work highlights the impact of policy uncertainty on stock market liquidity. Our results suggest that investors hold back on trading when they trade risk-sensitive securities (equity) during periods of high policy uncertainty. Additional empirical work on how policy uncertainty impacts liquidity of securities which are less sensitive to risk such as fixed income instruments is likely to be useful to market participants and policy makers. Further work on how liquidity effects of policy uncertainty impact financing decisions is another avenue for future research.

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Appendix A1: Variable Definition and Construction

Variable	Definition		Sources
Policy Uncertainty			
PU	Log of policy uncertaity index	Log of BBD Index (Overall).	Baker, Bloom & Davis (2016)
Stock Liquidity			
ESPREAD	Log of effective spread	Log of the twice of the absolute value of the difference between the actual trade price and the midpoint of the market quote.	
CSSPREAD	Log of Corwin – Schultz spread	Log of the variance of the stock price and the bid-ask spread which is a function of the high-low ratios on two consecutive single days.	Corwin and Schultz (2012)
AMIHUD	Log of Amihud illiquidity index	Log of the stock price changes per $ millions of trading volume.	Amihud (2002)
GIBBS	Log of Gibbs index	Log of the square root of the negative daily autocorrelation of individual stock returns.	Hasbrouck (2009)
Control variables			
SIZE	Log of total assets	Log of the total assets.	Chung et al. (2010), Fang et al. (2009)
TANG	Asset tangibility	A measure of asset tangibility detailed in Almeida and Campello (2007).	Almeida and Campello (2007)
CUMRET	Cumulative returns	Compounded market-adjusted monthly returns for six months prior to fiscal year end for firm *i*'s stock.	Fang et al. (2009)
ANACOV	Analyst coverage	Log of number of analysts.	Chung et al. (2010) , Fang et al. (2009)
TURNOVER	Turnover	Log of the number of analysts from I/B/E/S following firm i during fiscal year t.	Kale & Loon (2011)
PRICEINV	Price inverse	One over mean stock price.	Chung et al. (2010), Kale & Loon (2011)
AGE	Company age	Log of the firm age.	Chung et al. (2010) , Fang et al. (2009)
IO	Institutional ownership	The percentage of shares held by institutional investors	Chung et al. (2010), Kale & Loon (2011)
RD	R&D expenditure	The ratio of annual R&D expenditure to sales	Chung et al. (2010)
RDDUM	R&D dummy	Dummy if R&D expenditure equals to 0	Edward et al. (2016)
LEV	Leverage	Total book value of debt divided by total assets	
AD	Advertising expenditure	Advertising expense divided by total assets	Kale and Loon (2011)

ADDUM	Advertising dummy	Dummy if advertising is equal to 0	
AMEX	Dummy for AMEX	Dummy if the stock is listed on AMEX	Kale and Loon (2011)
NASDAQ	Dummy for NASDAQ	Dummy if the stock is listed on NASDAQ	Kale and Loon (2011)
Macro-level variables			
ELECYEAR	Election year dummy	Dummy variable indicating the presidential election years	Gulen and Ion (2016)
GDPDIS	GDP dispersion	Log of GDP forecast dispersion	Gulen and Ion (2016)
SDPROFIT	Profit volatility	Log of average profit growth in a fiscal year	Gulen and Ion (2016)
VXO	Implied volatility	Log of VXO index	Gulen and Ion (2016)
SDRETURN	Return volatility	Log of standard deviation of real return in a fiscal year	Gulen and Ion (2016)
JLN	Jurado, Ludvigson & Ng (2015)'s Index	Log of JLN aggregate uncertainty index	Gulen and Ion (2016)
POLAR	Political Polarization	Difference in the first dimension of the DW-NOMINATE scores between the Republican (code: 200) and Democratic (code: 100) parties for either Senate and House of Representatives members.	McCarty *et al.* (1997)
GFC	Global Financial Crisis	Dummy variable indicating the Global Financial Crisis time 2008-2009	
TEDSPREAD	Log of TED spread		
TEDSPREAD_HIGH	Top tercile of TD spread		
Information asymmetry variables			
OPAQUE	Opacity of financial report	The prior three years' moving sum of the absolute value of discretionary accruals	Hutton et al. (2009)
ANADIS	Analyst forecast dispersion		
Cash flow volatility			
RETVOL	Annualised stock return volatility	Computed as the standard deviation on monthly stock return over a fiscal year	Brogaard et al. (2017)
EPSVOL	Earning per share volatility	Log of the standard deviation of unexpected shocks to quarterly earnings per share.	Irvine and Pontiff (2008), Kale and Loon (2011)
CFSVOL	Cashflow per share volatility	Log of the standard deviation of unexpected shocks to quarterly cash flow per share.	Irvine and Pontiff (2008), Kale and Loon (2011)
SPSVOL	Sales per share volatility	Log of the standard deviation of unexpected shocks to quarterly sales per share.	Irvine and Pontiff (2008), Kale and Loon (2011)
Other			

RPU	Residual policy uncertainty	Residuals obtained by running monthly time-series regressions of PU on macroeconomic variables.	Gulen and Ion (2016)
FPU	Fitted policy uncertainty	Estimated value obtained by running monthly time-series regressions of U.S. PU on a measure of political polarization (at either Senate or House of Reprentative levels), Canadian PU and U.S. macro variables.	Gulen and Ion (2016)
BETA	PU-stock return sensitivity	Regress each Fama-French 48 industry's value weighted monthly excess stock returns on the BBD policy uncertainty index over the 60 months prior to the beginning of the firm's fiscal year.	Bonamie et al. (2017)
EXRET1	Annual excess return 1	Compounded monthly stock return in excess of monthly market return	
EXRET2	Annual excess return 1	Compounded monthly stock return in excess of monthly risk-free return	

Table 1
Summary Statistics

	N	Mean	S.D.	P25	Median	P75
ESPREAD	68,434	-5.948	1.293	-7.000	-5.899	-4.862
AMIHUD	68,434	-6.258	3.054	-8.562	-6.430	-3.987
CSSPREAD	68,434	-4.609	0.600	-5.037	-4.633	-4.208
GIBBS	58,328	-5.293	0.777	-5.858	-5.355	-4.766
SIZE	68,434	6.353	1.934	4.995	6.252	7.562
TANG	68,434	0.235	0.237	0.038	0.154	0.356
CUMRET	68,434	0.117	0.584	-0.214	0.010	0.288
ANACOV	68,434	1.237	0.897	0.511	1.213	1.934
TURNOVER	68,434	-5.469	1.054	-6.181	-5.413	-4.711
PRICEINV	68,434	0.066	0.047	0.032	0.052	0.085
AGE	68,434	2.337	1.061	1.609	2.485	3.219
IO	68,434	0.470	0.286	0.220	0.466	0.709
RD	68,434	0.032	0.069	0.000	0.000	0.027
RDDUM	68,434	0.530	0.499	0.000	1.000	1.000
LEV	68,434	0.198	0.188	0.030	0.158	0.313
AD	68,434	0.009	0.027	0.000	0.000	0.002
ADDUM	68,434	0.611	0.488	0.000	1.000	1.000
AMEX	68,434	0.055	0.229	0.000	0.000	0.000
NASDAQ	68,434	0.565	0.496	0.000	1.000	1.000

Table 2
Policy Uncertainty and Stock Liquidity

VARIABLES	(1) ESPREAD (t)	(2) ESPREAD (t+1)	(3) ESPREAD (t+2)	(4) AMIHUD (t)	(5) AMIHUD (t+1)	(6) AMIHUD (t+2)
PU	**0.356*****	**0.145*****	**-0.154*****	**0.873*****	**0.410*****	**-0.248*****
	[34.17]	[12.68]	[-12.71]	[45.81]	[16.86]	[-8.97]
SIZE	-0.407***	-0.415***	-0.405***	-0.811***	-0.693***	-0.587***
	[-40.83]	[-34.90]	[-29.96]	[-54.39]	[-34.32]	[-24.39]
TANG	0.658***	0.571***	0.445***	0.441***	0.366***	0.179
	[11.90]	[8.55]	[5.76]	[4.75]	[2.79]	[1.12]
CUMRET	-0.177***	-0.153***	-0.111***	-0.540***	-0.369***	-0.242***
	[-47.25]	[-33.74]	[-22.79]	[-73.89]	[-36.87]	[-21.99]
ANACOV	-0.063***	-0.007	0.056***	-0.263***	-0.141***	-0.021
	[-8.34]	[-0.85]	[5.72]	[-21.83]	[-9.07]	[-1.19]
TURNOVER	-0.219***	-0.184***	-0.143***	-0.630***	-0.444***	-0.329***
	[-36.92]	[-26.00]	[-17.74]	[-59.36]	[-31.59]	[-19.97]
PRICEINV	0.249**	-1.463***	-1.859***	5.313***	0.597**	-1.246***
	[2.45]	[-11.67]	[-12.50]	[28.50]	[2.34]	[-4.03]
AGE	-0.367***	-0.342***	-0.317***	-0.438***	-0.426***	-0.388***
	[-38.21]	[-27.62]	[-20.95]	[-24.79]	[-16.55]	[-12.07]
IO	-0.855***	-0.686***	-0.536***	-0.783***	-0.724***	-0.594***
	[-28.06]	[-18.50]	[-12.34]	[-15.19]	[-10.52]	[-7.22]
RD	-0.900***	-1.119***	-1.087***	-2.270***	-3.105***	-2.814***
	[-8.76]	[-8.24]	[-6.72]	[-11.76]	[-10.62]	[-7.95]
RDDUM	-0.011	-0.022	-0.009	-0.019	-0.063	-0.045
	[-0.43]	[-0.74]	[-0.28]	[-0.48]	[-1.14]	[-0.66]
LEV	0.554***	0.393***	0.188***	1.161***	0.916***	0.666***
	[15.19]	[9.34]	[4.04]	[19.27]	[11.94]	[7.47]
AD	0.820***	0.754**	0.677*	0.576	0.949	0.984
	[2.60]	[2.06]	[1.69]	[1.27]	[1.50]	[1.34]
ADDUM	0.184***	0.159***	0.119***	0.079***	0.107***	0.114***
	[12.71]	[9.28]	[6.02]	[3.48]	[3.53]	[3.11]
AMEX	0.122***	0.129***	0.152***	0.050	0.149*	0.208**
	[3.83]	[3.38]	[3.39]	[0.86]	[1.91]	[2.18]
NASDAQ	0.514***	0.398***	0.340***	0.402***	0.347***	0.366***
	[19.55]	[13.29]	[10.51]	[9.63]	[6.45]	[5.81]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66,822	56,156	47,752	66,822	56,156	47,752
Adjusted R-squared	0.886	0.860	0.850	0.930	0.900	0.894

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 3
Alternative Measures of Stock Liquidity

VARIABLES	(1) CSSPREAD (t)	(2) GIBBS (t)
PU	**0.296*** **	**0.557*** **
	[40.08]	[48.58]
SIZE	-0.058***	-0.129***
	[-8.74]	[-15.00]
TANG	0.113***	0.362***
	[2.70]	[6.91]
CUMRET	-0.060***	-0.105***
	[-20.75]	[-23.91]
ANACOV	-0.042***	-0.022***
	[-7.92]	[-3.15]
TURNOVER	0.112***	0.003
	[24.55]	[0.44]
PRICEINV	1.768***	1.582***
	[23.77]	[15.03]
AGE	-0.199***	-0.275***
	[-26.04]	[-27.78]
IO	-0.001	-0.258***
	[-0.03]	[-8.62]
RD	0.180**	-0.276***
	[2.38]	[-2.84]
RDDUM	-0.026	-0.030
	[-1.45]	[-1.30]
LEV	0.233***	0.239***
	[9.36]	[7.67]
AD	0.500***	0.264
	[2.61]	[1.10]
ADDUM	0.031***	0.090***
	[3.03]	[6.94]
AMEX	-0.133***	-0.124***
	[-4.91]	[-3.30]
NASDAQ	0.313***	0.302***
	[16.36]	[12.40]
Firm FE	Yes	Yes
Year FE	No	No
Firm Cluster	Yes	Yes
Observations	66,822	56,829
Adjusted R-squared	0.647	0.629

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 4
Control for Macroeconomic Uncertainty

VARIABLES	(1) ESPREAD (t)	(2) ESPREAD (t)	(3) AMIHUD (t)	(4) AMIHUD (t)
PU	**0.453*** **		**1.173*** **	
	[41.51]		[51.88]	
RPU		**0.128*** **		**0.677*** **
		[10.66]		[30.05]
ELECYEAR	-0.101***		-0.133***	
	[-24.84]		[-16.23]	
GDPDIS	-0.333***		-0.151***	
	[-31.53]		[-7.11]	
SDPROFIT	0.015***		-0.074***	
	[9.11]		[-19.47]	
VXO	-1.361***		-1.199***	
	[-39.54]		[-17.25]	
SDRETURN	0.851***		1.050***	
	[45.43]		[27.57]	
JLN	1.335***		1.075***	
	[44.43]		[17.52]	
Firm controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes
Observations	61,846	61,846	61,846	61,846
Adjusted R-squared	0.905	0.877	0.932	0.926

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 5 2SLS Regression:
Political Polarization

VARIABLES	(1) ESPREAD (t)	(2) ESPREAD (t)	(3) AMIHUD (t)	(4) AMIHUD (t)
FPU (Senate)	**0.784***** [58.13]		**1.416***** [55.26]	
FPU (House)		**0.795***** [58.98]		**1.406***** [54.93]
Firm controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes
Observations	47,203	47,203	47,203	47,203
Adjusted R-squared	0.887	0.888	0.934	0.934

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 6
Cross-sectional and Time-series Analyses

VARIABLES	(1) ESPREAD (t)	(2) ESPREAD (t)	(3) AMIHUD (t)	(4) AMIHUD (t)	(5) ESPREAD (t)	(6) AMIHUD (t)
PU	0.263***	0.314***	0.686***	0.901***		
	[25.74]	[26.87]	[37.07]	[36.57]		
PU*GFC	**0.141****	**0.899*****	**1.927*****	**2.576*****		
	[2.34]	[9.94]	[12.16]	[11.50]		
GFC	-0.368	-4.177***	-8.830***	-12.228***		
	[-1.24]	[-9.32]	[-11.35]	[-11.03]		
PU*BETA					**1.191*****	**2.631*****
					[3.36]	[3.79]
BETA					-5.126***	-11.338***
					[-3.17]	[-3.57]
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66,822	61,846	66,822	61,846	56,156	56,156
Adjusted R-squared	0.890	0.906	0.933	0.933	0.935	0.945

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 7 Channel 1: Information Asymmetry

VARIABLES	(1) ESPREAD (t)	(2) AMIHUD (t)	(3) ESPREAD (t)	(4) AMIHUD (t)	(5) ESPREAD (t)	(6) AMIHUD (t)	(7) ESPREAD (t)	(8) AMIHUD (t)
PU*SIZE	**-0.021***** [-3.51]	**-0.044***** [-4.11]						
PU*ANACOV			**-0.145***** [-13.63]	**-0.097***** [-4.25]				
PU*ANADIS					**0.028***** [2.99]	**0.041**** [2.20]		
ANADIS					-0.106** [-2.48]	-0.128 [-1.54]		
PU*OPAQUE							**0.032***** [2.97]	**0.090***** [4.10]
OPAQUE							-0.135*** [-2.68]	-0.423*** [-4.18]
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	66,822	66,822	66,822	66,822	40,838	40,838	42,075	42,075
Adjusted R-squared	0.932	0.939	0.933	0.939	0.935	0.938	0.935	0.946

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 8
Channel 2: Cash-flow Risk

VARIABLES	(1) ESPREAD (t)	(2) AMIHUD (t)	(3) ESPREAD (t)	(4) AMIHUD (t)	(5) ESPREAD (t)	(6) AMIHUD (t)	(7) ESPREAD (t)	(8) AMIHUD (t)
PU*RETVOL	**0.320*****	**1.715*****						
	[7.57]	[18.86]						
RETVOL	-1.061***	-7.715***						
	[-5.39]	[-18.29]						
PU*EPSVOL			**0.082*****	**0.166*****				
			[7.84]	[8.65]				
EPSVOL			-0.319***	-0.608***				
			[-6.72]	[-6.95]				
PU*CFSVOL					**0.070*****	**0.134*****		
					[7.43]	[7.59]		
CFSVOL					-0.280***	-0.516***		
					[-6.51]	[-6.40]		
PU*SPSVOL							**0.059*****	**0.058*****
							[7.18]	[3.63]
SPSVOL							-0.225***	-0.182**
							[-5.96]	[-2.49]
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56,137	56,137	37,680	37,680	37,665	37,665	37,607	37,607
Adjusted R-squared	0.937	0.946	0.935	0.944	0.935	0.944	0.935	0.943

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 9
Policy Uncertainty and Funding Liquidity

VARIABLES	(1) TEDSPREAD (t)	(2) TEDSPREAD (t)	(3) TEDSPREAD (t)	(4) TEDSPREAD (t)	(5) TEDSPREAD (t)	(6) TEDSPREAD (t)	(7) TEDSPREAD (t)
PU	**0.562*****	**0.562*****	**0.562*****	**0.562*****	**0.562*****	**0.562*****	**0.641*****
	[3.85]	[3.85]	[3.85]	[3.85]	[3.85]	[3.85]	[4.03]
ELECYEAR		-0.159	0.862***	0.009	0.528	-0.474	-3.578***
		[-1.28]	[5.31]	[0.07]	[1.50]	[-0.30]	[-3.71]
GDPDIS			-0.799***	0.216	-4.211	-1.103	-4.992***
			[-5.58]	[1.63]	[-1.37]	[-0.35]	[-7.44]
SDPROFIT				-0.173***	0.425	-0.170	0.837***
				[-4.45]	[1.01]	[-0.23]	[8.83]
VXO					7.494	2.889	-5.523*
					[1.42]	[0.71]	[-1.96]
SDRETURN						1.714	1.386
						[0.53]	[0.74]
JLN							9.812***
							[3.52]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	252	252	252	252	228
Adjusted R-squared	0.753	0.753	0.753	0.753	0.753	0.753	0.746

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 10
Channel 3: Funding Constraint

VARIABLES	(1) ESPREAD (t)	(2) ESPREAD (t)	(3) AMIHUD (t)	(4) AMIHUD (t)
PU	0.432***	0.083***	0.837***	0.513***
	[40.56]	[6.28]	[42.02]	[19.91]
TEDSPREAD_HIGH	-0.794***	-1.208***	-2.889***	-1.347***
	[-11.52]	[-13.47]	[-18.47]	[-6.09]
PU*TEDSPREAD_HIGH	**0.223*** **	**0.200*** **	**0.667*** **	**0.169*** **
	[14.62]	[9.83]	[19.12]	[3.39]
Firm controls	Yes	Yes	Yes	Yes
Macro controls	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Firm Cluster	Yes	Yes	Yes	Yes
Observations	66,822	61,846	66,822	61,846
Adjusted R-squared	0.891	0.909	0.931	0.935

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 11
Economic Consequences

VARIABLES	(1) EXRET1	(2) EXRET2	(3) EXRET1	(4) EXRET2
PU*ESPREAD	**-0.022*** **	**-0.026*** **		
	[-2.93]	[-3.41]		
ESPREAD	0.229***	0.246***		
	[6.30]	[6.78]		
PU*AMIHUD			**-0.008** **	**-0.009*** **
			[-2.56]	[-2.90]
AMIHUD			0.108***	0.113***
			[7.59]	[7.93]
SIZE	-0.199***	-0.200***	-0.161***	-0.163***
	[-22.94]	[-23.10]	[-17.28]	[-17.41]
BTM	0.165***	0.164***	0.135***	0.134***
	[21.36]	[21.14]	[16.92]	[16.72]
CUMRET	-0.050***	-0.051***	-0.067***	-0.067***
	[-8.61]	[-8.58]	[-10.99]	[-10.92]
RETVOL	0.181***	0.182***	0.213***	0.215***
	[9.62]	[9.63]	[11.38]	[11.38]
ROA	0.063	0.053	0.125***	0.114***
	[1.53]	[1.26]	[3.02]	[2.72]
Observations	48,064	48,064	48,064	48,064
Adjusted R-squared	0.163	0.415	0.169	0.419
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm Cluster	Yes	Yes	Yes	Yes

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1