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Policy uncertainty and the maturity structure of corporate debt☆

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ABSTRACT

This study examines the effect of policy uncertainty on corporate debt maturity structure. We find that elevated levels of policy uncertainty lead firms to shorten debt maturity, indicating that firms become more cautious to committing to long-term debt obligations and is suggestive of increased risk aversion during high policy uncertainty periods. However, not all firms react similarly. In contrast to Myers' (1977) prediction, high growth firms lengthen debt maturity during high policy uncertainty periods. The evidence regarding the relationship between debt maturity and credit quality is not non-monotonic as firms with highest and lowest credit quality diverge in terms of debt maturity when policy uncertainty is elevated. Further, larger firms increase their debt maturity, while financially-constrained firms and firms with greater exposure to domicile political environment obtain short-term debt. The results are robust to a battery of tests including the use of instrument variable and placebo analysis.

1. Introduction

Corporate financing decisions involve not only capital structure choice but also the debt maturity structure of the firm. To the extent that firms select debt maturity by trading off the costs of underinvestment and mispricing of long-term debt (e.g. Myers, 1977; Flannery, 1986; Datta et al., 2005) against the liquidity/refinancing risk and monitoring effect of short-term debt (e.g. Diamond, 1991, 1993), a change in those costs under policy uncertainty is expected to influence corporate debt maturity structure choice. Notably, while the extant literature has examined the relation between firm-level characteristics and debt maturity structure, we know very little about how policy uncertainty affects debt maturity choice.

Policy uncertainty revolves around uncertainty associated with decision makers (such as elected officials and institutions) who will make policy decisions, the actual decisions that will be made, and the timing of new policy implementation. The implications of policy uncertainty on corporate financial decisions have recently emerged as a topic of considerable research interest. For instance, during periods of elevated policy uncertainty, empirical studies find that firms reduce investments (Gulen and Ion, 2016) and conduct fewer acquisitions (Nguyen and Phan, 2017). Studies also show that the volume of debt issuances and seasoned equity offerings wanes during periods of higher political uncertainty as firms become reluctant to raise capital (Cao et al., 2013; Gungoraydinoglu et al., 2017) and are less likely to undertake initial public offerings (Çolak et al., 2017). Moreover, firms incur higher cost of debt (Gao and Qi, 2013; Francis et al., 2014; Waisman et al., 2015) and cost of equity (Brogaard and Detzel, 2015; Çolak et al., 2017) due to higher risk premium aggravated by greater political uncertainty.

Given that a firm's financing and investment activities are affected by policy uncertainty, our study aims to address the following questions: Does policy uncertainty have any effect on a firm's debt maturity choice? How do firm characteristics, such as growth opportunities, firm size, credit quality, financial constraints, and exposure to political uncertainty, influence the relation between policy uncertainty and debt maturity structure choice?

Debt structure choice theories postulate that firms attempt to balance various risks such as, market-based risks arising from refinancing risk and mispricing risk, as well as agency costs-based risks that give rise to the underinvestment and overinvestment problems. Some of these risks may be exacerbated by policy uncertainty. When a firm issues short-term debt, it raises the potential

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costs stemming from refinancing risk (Diamond, 1991; Harford et al., 2014). This concern may be aggravated in high policy uncertainty periods due to greater information risk (information is less informative as per Durnev (2012)) and changes in the economic environment, which prompts firms to favor lengthening their debt maturity to mitigate the adverse effects of liquidity/refinancing risk.

In addition to the fact that high policy uncertainty increases credit risk and default risk (Manzo, 2013; Jiang and Tong, 2016), it may also exacerbate investors' loss aversion, causing them to demand a higher yield.[1] There is empirical evidence that high uncertainty raises the cost of financing (e.g., Çolak et al., 2017). Based on these concerns, a high policy uncertainty environment would be more conducive to longer-term debt. However, on the other side of the ledger, long-term debt can potentially be more mispriced than short-term debt because its price is more sensitive to changes in firm value than that of short-term debt (Flannery, 1986; Kale and Noe, 1990). Therefore, if high uncertainty about government policy increases the risk of mispricing, firm's propensity to avoid being mispriced would be stronger, which is expected to lead to shorter debt maturity.

The agency-cost based risk arising from conflict of interest between bondholders and stockholders gives rise to suboptimal investment decisions where the "underinvestment problem" largely affects high growth firms. Based on Myers' model (1977), extending debt maturity raises the costs of the underinvestment problem for high growth firms, creating a situation where firms have incentives to reject positive net present value (NPV) projects due to the conflict of interests between shareholders and bondholders. Additionally, given the higher asymmetric information of high growth firms, short-term debt has the advantage of periodic monitoring triggered through more frequent refinancing or repaying the principal sooner.

On the other hand, the opposite agency issue relates to the "overinvestment problem" arising from managers' opportunistic diversion of firm cash flow and resources that can lead to an increase in the firm's size but not its value, such as adopting overly risky projects or undertaking value destroying acquisitions (Jensen and Meckling, 1976). This opportunistic behavior can be attenuated with long-term debt (Jensen, 1986; Harvey et al., 2004) as it commits the firm to disburse cash flows to creditors instead of utilizing earnings for negative NPV investments.

Elevated levels of policy uncertainty are found to limit the firm's willingness to spend on capital investment. Given the depressed level of investment expenditures during policy uncertainty periods (see e.g. Gulen and Ion, 2016), the agency costs associated with investment decisions (underinvestment and overinvestment costs) are expected to be dampened.

Using a sample of 38,093 firm-year observations during the period January 1, 1985 to December 31, 2014, we empirically examine the link between policy uncertainty and corporate debt maturity. We measure the degree of policy uncertainty using the Economic Policy Uncertainty Index (EPU Index) developed by Baker et al. (2016).[2] To address the causal relationship between the choice of leverage and debt maturity, we adopt the two-stage least squares regression method (Barclay et al., 2003; Johnson, 2003). Our investigation provides robust evidence of a negative relationship between policy uncertainty and debt maturity. Our findings complement prior studies, which show that during periods of elevated policy uncertainty firms are also cautious about committing to investments (Gulen and Ion, 2016; Julio and Yook, 2012), reluctant to issue debt (Cao et al., 2013), and more conservative in their reporting (Khan and Watts, 2009).

In addition to the aggregate EPU Index, we utilize the different components of the EPU Index, which confirm that the average firm chooses shorter-term debt maturity during periods of high policy uncertainty. The results are not sensitive to the measurement of EPU (the logarithm of EPU, end of year EPU, and yearly median EPU). The association between uncertainty and debt maturity is maintained when we use quarterly measures of long-term debt and quarterly EPU. A battery of tests confirm that our inferences are not due to other factors. For instance, we evaluate whether our policy uncertainty measure is distinct from general macroeconomic uncertainty and the financial crisis, which injected a degree of economic uncertainty in the form of a credit supply shock. The analyses reveal that the policy uncertainty effect is distinct from the influence of macro-economic factors or the uncertainty and supply shock caused by the financial crisis. We also conduct a test utilizing an instrumental variable for EPU (McCarty et al., 1997; Gulen and Ion, 2016), which confirms our main results validating that our findings are robust to endogeneity concerns. Placebo analysis also strongly reaffirms our primary findings. Our findings suggest that corporate debt maturity is negatively associated with greater risk aversion encountered during periods of high uncertainty.

We then extend the analysis to examine the influence of policy uncertainty on debt maturity by firm type since not all firms are similarly affected by policy uncertainty. During high policy uncertainty periods, we document a positive association between debt maturity and credit quality in which firms with higher credit quality tend to lengthen their debt maturity. Thus, when policy uncertainty is high, the costs of the liquidity/refinancing risk outweigh the costs of underinvestment and mispricing of long-term debt. This finding is in contrast to the traditional predictions of the credit risk view (Diamond, 1991). Further, our results suggest that high growth firms prefer to finance through long-term debt under high uncertainty environments even though such firms are more prone to the underinvestment problem. This finding is in stark contrast to the predictions by Myers (1977) but corroborate Diamond and He's (2014) prediction that short-term debt overhang in bad times (e.g., high policy uncertainty) renders short-term financing less desirable for high growth firms.

Next, we document that large firms build up long-term debt when policy uncertainty rises, suggesting that liquidity/refinancing costs outweigh mispricing costs. In contrast, financially constrained firms shorten their debt maturity in periods of high policy uncertainty, thereby avoiding mispricing costs. Further, firms with greater exposure to the political environment exhibit a preference for short-term debt, most likely from private lenders who offer the advantages of ameliorating information asymmetry, as well as better monitoring and enforcement of contracts (Diamond, 1984).

Our findings contribute to the current literature on corporate decisions and policy uncertainty. Specifically, we add another dimension to the capital structure literature by recognizing the impact of policy uncertainty on debt maturity choice. We extend the evolving literature on policy uncertainty by showing that firms are not only cautious in making investment commitments as shown in prior research, but also are generally reluctant to commit to long-term debt obligations. Our study also complements the current literature on debt maturity by documenting that different types of firms respond differently in terms of debt maturity choice to changes in policy uncertainty.

[1] Loss aversion refers to investor's tendency to be more sensitive to losses than to gains (Kahneman and Tversky, 1979).

[2] Some prior studies employ the U.S. presidential election years as a proxy for policy uncertainty (e.g., Mei and Guo, 2004; Julio and Yook, 2012).

2. Background literature and hypotheses development

2.1. Policy uncertainty and debt structure choice

Policy uncertainty is expected to affect corporate decisions and performance through three channels. First, a change in the economic environment due to a policy change will influence firms' outcomes, such as increasing the volatility of expected cash flows and profitability, which can lead to changes in firms' stock price (Pástor and Veronesi, 2012) and default risk (Francis et al., 2014). Second, policy uncertainty environments could have a negative effect on firm market values since the risk arising from policy uncertainty is not fully diversifiable. Accordingly, shareholders and bondholders would require extra compensation, in the form of higher risk premium, for bearing the additional non-diversifiable risk (Pástor and Veronesi, 2013; Waisman et al., 2015; Çolak et al., 2017). Finally, the financial frictions imposed by policy uncertainty are expected to constrain firms' borrowing ability (Cao et al., 2013; Gungoraydinoglu et al., 2017).[3] All these effects would arguably affect market-based risks, such as debt refinancing and mispricing risks, which cause firms to modify their debt maturity structure to adjust to the change in the business environment.

2.2. Linking policy uncertainty and debt maturity structure: theories and hypotheses

The theories on debt maturity choice propose trade-offs between a number of factors such as the liquidity/refinancing risk, mispricing risk, the underinvestment and overinvestment problems, as well as signaling and monitoring effects associated with debt maturity.[4] More specifically with regards to market-based risks, debt maturity reflects the balance between the costs of refinancing short-term debt on the one hand (Diamond, 1991, 1993; Barclay and Smith, 1995) and the cost of mispricing of long-term debt on the other (Myers, 1977; Flannery, 1986; Datta et al., 2005).

With regards to refinancing, firms face the risk that changes in market conditions or capital market imperfections (Froot et al., 1993) or changes in the firm's prospects, such as release of bad news, could result in refinancing at a significantly higher interest rate (Diamond, 1991). Further, there is also the risk that lenders could underestimate the continuing value of the firm and not allow refinancing to take place, leading to an inefficient liquidation of the firm (e.g., Sharpe, 1991; Diamond, 1991, 1993) or the sale of important assets at fire-sale prices (Brunnermeier and Yogo, 2009; Choi et al., 2017). By exposing the firm to rollover risk, short-term debt also increases the firm's overall credit risk (Gopalan et al., 2014) and the potential for the underinvestment problem to manifest (Almeida et al., 2012). These costs are associated with short-term debt that is subject to more frequent refinancing and monitoring.

High uncertainty about government policy is a political risk that is not fully diversifiable and thus entails a political risk premium (Pástor and Veronesi, 2013). This is caused by the fact that policy uncertainty injects greater variability in firms' expected cash flows (Manzo, 2013), which in turn causes firms to be more cautious about raising capital (Cao et al., 2013; Brogaard and Detzel, 2015). In a similar vein, to mitigate the adverse effects arising from refinancing, firms may lengthen their maturity structure during periods of high policy uncertainty.

Extending debt maturity also has adverse effects. In an asymmetric information framework, where firm insiders are better informed than outside investors, Flannery (1986) and Kale and Noe (1990) show that long-term debt can potentially be more mispriced than short-term debt. Thus, firms with favorable private information issue short-term debt to reduce borrowing costs when favorable information materializes. Given the uncertainty about the impact of potential changes in government policies on firm profitability, the firm's inclination to avoid being mispriced therefore would be stronger during high policy uncertainty periods. Also, since investors are exposed to non-diversifiable liquidity shocks, long-term debt is viewed as having lower liquidity than short-term debt and is thus more expensive to issue (Chen et al., 2013).

In the presence of information asymmetry between the firm and investors, short-term debt can serve as a *signaling mechanism* where high quality firms issue short maturity debt to signal their high quality whereas low quality borrowers prefer to issue relatively overpriced long-term debt to minimize issuance costs from rolling over short-term debt (Flannery, 1986; Kale and Noe, 19,990). While short-term debt increases the risk of liquidation for low quality firms, this risk is negligible for high quality firms.

Further, private lenders, especially banks, which typically lend short term (Barclay and Smith, 1995; Krishnaswami et al., 1999), are perceived to have information and monitoring advantages over public debtholders. These advantages should prevail in periods of low and high policy uncertainty. Due to these benefits, the yield requirements to compensate for the risk arising from policy uncertainty of private lenders are more likely to be lower than that of less-informed arm's-length debtholder, *ceteris paribus*. Consequently, firms may shorten their debt maturity to lower their debt cost during periods of policy uncertainty.

Equally important is the impact of policy uncertainty on risk attitudes. The research findings of delayed/reduced investments (Gulen and Ion, 2016; Nguyen and Phan, 2017) as well as higher risk premiums in the debt (Gao and Qi, 2013; Francis et al., 2014; Waisman et al., 2015) and equity markets (Brogaard and Detzel, 2015; Çolak et al., 2017) during periods of elevated policy uncertainty point to an increase in risk perception. To the extent that policy uncertainty increases risk aversion, corporate debt maturity is expected to decline (Chen et al., 2018). Given the tension from the opposing effects described above, we propose two mutually exclusive hypotheses. However, to the extent that policy uncertainty impacts risk attitudes, the greater likelihood is for firms to reduce debt maturity, as per hypothesis **H1B**.

H1A. If liquidity/refinancing costs outweigh mispricing costs, the firm's debt maturity will increase when policy uncertainty rises.

H1B. If the costs of mispricing outweigh liquidity/refinancing costs, the firm's debt maturity will not increase, or even decrease, when policy uncertainty rises.

Next, given that debt maturity differs across different firm attributes, we discuss how firm characteristics can influence (or moderate) the relation between policy uncertainty and debt maturity choice. Firms with high growth opportunities are associated with stronger informational asymmetries, which renders the lenders' task of measuring the firm's riskiness more difficult. Additionally, such firms are subject to underinvestment incentives. The twin concerns of opaqueness and the underinvestment problem are mitigated through the use of more short-term debt which is renegotiated more frequently than long-term debt.

The agency-theoretic costly contracting approach stipulates that investors and managers can settle the various agency issues via financial debt contracts (Jensen, 1986). As argued by Myers (1977),

[3] It is important to note that empirical evidence does not support the notion that periods of political uncertainty increase information asymmetry. While Durnev (2012) shows that information available in stock prices is less useful for managerial decisions during such periods of uncertainty, this is not caused by greater information asymmetry.

[4] The literature on debt maturity offers other drivers of debt maturity choice such as taxes and gap filling. The evidence regarding the relevance of tax to debt maturity is mixed with Lewis (1990) arguing that taxes may be completely irrelevant to debt maturity decisions.

firms with high informational asymmetry, such as high growth firms, are exposed to moral hazard leading to severe underinvestment problems. With the assumption of a manager–shareholder interest alignment, Myers (1977) recommends the use of shorter maturity debt to mitigate the underinvestment problem among firms with high growth options. An additional benefit of short debt maturity is its ability to impose discipline on managers, by virtue of forcing frequent access to the capital markets (Barclay and Smith, 1995; Johnson, 2003).

There are a number of reasons why the underinvestment problem may be dampened in times of higher political uncertainty. First, while Barclay and Smith (1995); Guedes and Opler (1996), and Barclay et al. (2003) document a negative relation between growth opportunities and firms' debt maturity, there is empirical evidence that contests the severity of the underinvestment problem at high growth firms (Morris, 1992; Stohs and Maur, 1995; Graham and Harvey, 2001; Scherr and Hulburt, 2001; Deesomsak et al., 2009). For example, Graham and Harvey's (2001) study, which surveys CFOs, find little support for the argument that corporate executives are concerned about the underinvestment problem when they make investment and financing decisions. Further, Scherr and Hulburt (2001) and Deesomsak et al. (2009) find little evidence that growth opportunities influence debt maturity. Moreover, Diamond and He (2014) present a more nuanced view than Myers' (1977) regarding the impact of debt maturity on firm's investments. They show that maturing risky short-term debt in bad times (e.g., high uncertainty) can impose a stronger debt overhang effect than long-term debt in good times simply because there is less uncertainty resolved over the shorter period of time that spans its maturity. They propose a trade-off between long-term overhang in good times and (stronger) short-term overhang in bad times.

Second, the underinvestment hypothesis implicitly assumes that firms can easily refinance their short-term debt; in other words, there is no significant difference in the level of refinancing costs between short-term and long-term debt and that refinancing costs do not vary based on economic conditions. However, this assumption is unrealistic under high policy uncertainty conditions which exacerbate the refinancing risk. Further, the cost of running into a financial constraint is relatively higher for firms with high growth options. Therefore, such firms have more incentives to avoid situations where they cannot refinance short-term debt.

Third, we argue that the agency costs arising from the underinvestment problem are ameliorated in high uncertainty environments, precisely because firms delay/reduce investment expenditure (due to their irreversibility) until the uncertainty regarding future policy changes is resolved (Julio and Yook, 2012). Gulen and Ion (2016) document a strong negative relationship between firm-level capital investment and the aggregate level of uncertainty. Examining how investment changes around national elections, Julio and Yook (2012) show for a panel of countries that political uncertainty creates uncertainty about future payoffs, leading to decline in corporate investments at the firm level. They even postulate that uncertainty that is expected to lead to positive policy changes can induce an incentive to delay capital investments. In addition, Gungoraydinoglu et al. (2017) find that economic uncertainty arising from the recent financial crisis leads to disappearance of debt and equity issuances in the majority of their sample countries. This empirical evidence leads us to propose that the underinvestment problem will be dampened (or become less of an issue) during periods of uncertainty, thereby having lesser influence on debt maturity.

With the above backdrop, we expect that the underinvestment problem will be less important during periods of high uncertainty, hence, reducing the need for shorter maturity debt. While financing costs may be higher, increased financial distress risk and refinancing risk during high uncertainty periods will lead high growth firms to extend their debt maturity. The above discussion leads us to propose the following hypothesis:

H2. Firms with high growth opportunities will lengthen their debt maturity structure compared to those with low growth opportunities when policy uncertainty is high.

Previous studies argue that the conflict between bondholders and shareholders is more acute for smaller firms, which can be attenuated by shortening debt maturity (Smith and Warner, 1979; Barnea et al., 1980). An additional benefit for small firms from issuing short-term debt is reducing flotation costs. Given that small firms have less access to capital markets, they tend to favor privately placed debt with lower fixed costs and lower overall costs (Blackwell and Kidwell, 1998). Flotation costs of long-term debt have a large fixed component where large firms can reap scale economies (Barclay and Smith, 1995). Prior studies have shown that larger and less risky firms with longer-term asset maturities use longer-term debt (Stohs and Mauer, 1996).

Additionally, large firms tend to be mature, with a high stock of tangible assets, and are relatively more informationally transparent, making mispricing a lesser concern for them compared to small firms (Brennan and Hughes, 1991). Hence, to the extent that risk of refinancing increases with policy uncertainty, we predict that large firms will also lengthen their debt maturity to maintain a stable liquidity position.

H3. Larger firms will lengthen their debt maturity structure compared to small firms when policy uncertainty is high.

Diamond (1991, 1993) postulates a non-monotonic relationship between credit risk and debt maturity. In particular, firms with very high credit quality prefer short maturity debt for two reasons. First, their refinancing risk is low; and second, short-term debt allows them to signal their private information when they receive good news and the debt is refinanced. On the other hand, firms with less creditworthiness are expected to lock-in long-term debt to reduce the risk of liquidation by reducing the frequency of returning to the market to raise debt capital. Finally, firms with the poorest credit quality have no choice but to take on short-term debt due to the extreme adverse-selection costs, and the higher likelihood of experiencing low profits. Thus, firms with the highest and lowest credit quality tend to inhabit the shorter end of the debt maturity scale, while firms in the middle of the credit quality spectrum utilize longer-term debt maturity. Empirical evidence supports the credit risk hypothesis described above (see, Barclay and Smith, 1995; Guedes and Opler, 1996; Stohs and Mauer, 1996).

We posit that greater policy uncertainty, which can lead to higher costs of debt (Francis et al., 2014; Waisman et al., 2015), will render long-term debt more expensive. Because poor credit quality firms have a higher risk of default, lenders prefer to renegotiate financing more frequently. Given the limited ability of low credit quality firms (not rated firms) to access long- term debt, they will have no choice but to remain at the short end of the debt maturity spectrum. However, the increase in the cost of debt for firms with high credit quality (investment grade rated firms) will be less onerous, allowing them to lengthen their debt maturity. In addition, high credit quality firms are less subject to mispricing risks of long-term debt. The above two rationales will cause higher quality firms to migrate to the longer end of the maturity continuum. Given that high credit quality firms have incentives to change their maturity structure whereas low credit quality firms cannot do the same, we do not expect Diamond's (1991) predictions regarding the link between credit risk and debt maturity to hold under high policy uncertainty. Based on the above discussion, we propose the following hypotheses.

H4. Highest credit quality firms will lengthen their debt maturity structure compared to their counterparts at the lower end of the credit quality spectrum when policy uncertainty is elevated.

The corporate finance literature postulates that financially flexible firms enjoy better access to capital markets. These firms also experience lower liquidity/refinancing risk and lower mispricing costs during high policy uncertainty. Therefore, financially unconstrained firms have more flexibility in choosing their debt maturity. In contrast, due to high liquidity risk and lenders requiring more frequent monitoring, financially constrained firms may not be able to access the long-end of the debt market during periods of high policy uncertainty. Further, financially constrained firms may be more adversely affected during periods of high policy uncertainty. In combination, these factors imply that financially constrained firms will experience shortening of their debt maturity during periods of elevated uncertainty. Hence, we propose the following hypothesis:

H5. Financially constrained firms will shorten their debt maturity structure compared to firms with low financial constraints when policy uncertainty is high.

Francis et al. (2014) document that firms with higher exposure to political uncertainty are subject to higher loan costs, where a one standard deviation increase of the political exposure is related to an 11.90 basis points larger loan spread. They attribute the results to information asymmetry between the lenders and borrowers as well as a lender's prospect of firm exposure to the political conditions. Similarly, Waisman et al. (2015) document a 34-basis point increase in corporate bond spreads during elevated uncertainty associated with U.S. presidential elections. We expect the information asymmetry of firms with greater idiosyncratic exposure to the political environment would be relatively higher during periods of high policy uncertainty, thereby increasing the costs of debt. To obtain less expensive debt financing, firms with high political exposure are more likely to utilize lenders, who are able to assess their future exposure to the political uncertainty and price their debt more accurately, such as private lenders who tend to provide short-term debt. Accordingly, we posit that when policy uncertainty is elevated, firms with greater exposure to political uncertainty will shorten their debt maturity more.

H6. Firms with low idiosyncratic exposure to the political environment will lengthen their debt maturity structure compared to those with high idiosyncratic exposure to the political environment when policy uncertainty is high.

3. Sample formation and methodology

3.1. The sample

Our initial sample includes all firms with available data on COMPUSTAT and Center for Research in Security Prices (CRSP) databases. Following Barclay and Smith (1995), we restrict our sample to firms with Standard Industrial Classification (SIC) codes from 2000 to 5999, (industrial firms). COMPUSTAT reports the amount of long-term debt at fiscal year-end, which is payable in more than one year through more than five years. To examine the maturity structure of a firm's debt, we measure the percentage of total debt maturing in more than three years. We discard firm-year observations where the total debt maturity is less than 0 or more than 100 percent.

To investigate the link between policy uncertainty and debt maturity, we employ the policy uncertainty index developed by Baker et al. (2016), which is a weighted average of four underlying components (described in a later section). Since the EPU index starts from January 1985, our sample spans the years 1985 through 2014 and consists of 38,093 firm-year observations, representing 5082 unique firms.

3.2. Methodology

Prior theoretical and empirical research document a causal relationship between capital structure and debt maturity (Barclay and Smith, 1995; Johnson, 2003). Given that leverage and debt maturity may be simultaneously determined, we adopt the two-stage least squares regression analysis following Johnson (2003) and Datta et al. (2005). Accordingly, the endogenous leverage variable is the dependent variable in the first-stage, while debt maturity is the dependent variable in the second stage.

In the first-stage, we include variables that have been previously shown by the literature to determine the choice of leverage, estimating Eq. (1). The dependent variable *Leverage* is long-term debt to market value of total assets * 100.

$$Leverage_{it} = f(EPU_t, \mathrm{MTB}_{it}, \mathrm{Size}_{it}, \mathrm{CAPEX}_{it}, \mathrm{Fixed\_Assets}_{it}, \mathrm{Profitability}_{it}, \mathrm{ABN\_Earnings}_{it}, \mathrm{REG}_{it}, \mathrm{RET\_STD}_{it}, \mathrm{TLCF}_{it}, \mathrm{ITC}_{it}, \mathrm{SAIndex}_{it}) \quad (1)$$

Independent Variables. Given the negative association between leverage and policy uncertainty documented in the literature (Cao et al., 2013), we also include the variable *EPU* in the model. When other measures of policy uncertainty are used – the components of the EPU index – to proxy for uncertainty in the second-stage regression, that change is accompanied by a change in the uncertainty measure in the first stage regression model.

Growth opportunities are proxied by the market-to-book ratio, *MTB*, which is defined as the market value of total assets [(share price × outstanding shares + book value of total assets) – book value of equity] divided by book value of total assets. Firm size, *Size*, is measured as the market value of total assets. *CAPEX* is defined as capital expenditure divided by book value of total assets * 100. We include *Fixed_Assets*, which reduce asset substitution problems, thereby raising the firm's optimal capital structure. *Profitability* is measured as the ratio of operating income before depreciation to total assets. We control for firm quality using abnormal earnings, *ABN_Earnings*, computed as earnings in year *t*+1 less earnings in year *t* divided by market value of equity. The variable *REG* takes a value of one when the firm belongs to a regulated industry, and zero otherwise. Regulated industries include railroads (SIC code 4011) through 1980, trucking (4210 and 4213) through 1980, airlines (4512) through 1978, telecommunications (4812 and 4813) through 1982, and gas and electric utilities (4900–4939) (Barclay and Smith, 1995). *RET_STD* is the standard deviation of the natural logarithm of stock return during the fiscal year multiplied by the market value of equity divided by the market value of assets. Net operating loss carryforwards, *TLCF,* is a dummy variable equal to one for firms with operating loss carryforwards, and zero otherwise. Investment tax credits, *ITC*, is a dummy variable that equals one for firms with investment tax credits, and zero otherwise. Finally, the variable *SA Index*, which proxies for the degree of financial constraints the firm faces, is described below.

The model specification of the second stage regression which explains debt maturity draws on the debt maturity literature and is estimated using the model specification in Equation (2) where the dependent variable is represented by the percentage of total debt maturing in more than three years as a percent of total debt, *DEBT3*, measured as in Datta et al. (2005).

$$DEBT3_{it} = f(EPU_t, MTB_{it}, Size_{it}, Size_{it}^2, Rated_{it}, INVG_{it}, SAIndex_{it}, Pol\_Exp_{it}, \widehat{Leverage}_{it}, Asset\_Maturity_{it}, CAPEX_{it}, Term\_Structure_t, ABN\_Earnings_{it}, REG_{it}, RET\_STD_{it}) \quad (2)$$

Independent Test Variables. In our main tests, we employ the overall index, *EPU* as our test variable.[5] Because the EPU index is reported monthly, we convert it into annual data using arithmetic average to match our debt maturity data. In separate models, we also utilize each of the index's components including *NEWS*, *TAX*, *FED*, and *CPI*. The first component, *NEWS*, quantifies the volume of news coverage of policy-related economic uncertainty from ten large newspapers and receives the largest weight. The second component, *TAX*, measures the level of uncertainty related to the number of temporary federal tax code provisions that will be expiring, collected from reports by the Congressional Budget Office. Temporary tax code provisions bring uncertainty to corporations as well as households since they can be extended at the last minute. The last two components capture the disagreement among forecasters about future monetary and fiscal policies reflected in *CPI* and *FED*.

Variable construction for firm type. Market-to-book ratio and firm size are described earlier. The variable *Rated* is a dummy variable that equals one for rated firms, and 0 otherwise.[6] We also create a dummy variable, *INVG*, which equals one if a firm's credit rating is BBB- or higher by Standard & Poor's, and zero otherwise.

To measure a firm's financial constraints for hypothesis **H5**, we adopt Hadlock and Pierce's (2010) *SA Index* measured based on the following equation, where firms with higher SA scores are considered as having greater financial difficulties.

$$\text{SAIndex}_{it} = -0.737 * \log(Size_{it}) + 0.043 * \log(Size_{it}^{2}) \\ -0.040 * FirmAge_{it} \quad (3)$$

To test hypothesis **H6**, we create a measure for each firm's domicile political exposure, in line with Francis et al.'s (2014) procedure utilizing the model below.

$$R_{it} = \alpha + E_{Pi} R_{Pt} + \gamma_{Mi}.R_{Mt} + \gamma_{si}.SMB_t + \gamma_{vi}.HML_t + \varepsilon_{it} \quad (4)$$

where R_{it} represents firm's monthly stock return (over the risk-free rate), R_{Pt} reflects the monthly percent change in the political index (EPU), R_{Mt} is the monthly CRSP value-weighted market return (over the risk-free rate), and SMB_t and HML_t are the Fama-French factors for size and value. Thus, E_{Pi} captures the sensitivity of firm's stock returns to the changes in political uncertainty and is the coefficient of interest. The variable proxying for political exposure, *Pol_Exp,* equals the absolute value of E_{Pi}.

Control Variables. For the endogenous leverage variable, we utilize its predicted value obtained from the first-stage regression instead of its actual value, $\hat{Leverage}$. Diamond (1991) predicts a positive association between leverage and debt maturity since firms with high levels of debt want to avoid suboptimal liquidation. Given that firms tend to match the maturities of their assets and liabilities to minimize the underinvestment problem, we include *Asset_Maturity* in the regression (Stohs and Mauer, 1996).[7] This variable is defined as gross property, plant, and equipment divided by total assets multiplied by gross property, plant, and equipment divided by depreciation plus current assets divided by total assets times (current assets divided by cost of goods sold. *CAPEX* is included to control for firm's investments. Based on the prediction that firms adjust their debt maturity choice in response to the change in term structure to take advantage of interest tax shield (Brick and Ravid, 1985), we also control for the term structure of interest rates (*Term_Structure*). Additionally, a smaller spread differential between long and short-term debt yields, which may reflect accommodative monetary conditions, makes it relatively less expensive to borrow long term, thereby leading to longer debt maturity (Perez, 2017). The variable *ABN_Earnings* is used to proxy for firm quality. Where high quality firms are expected to issue debt with shorter maturity.

We also control for whether the firm belongs to a regulated or unregulated industry. Regulated firms are expected to have longer debt maturity than unregulated firms (Barclay and Smith, 1995; Smith, 1986) because they have less discretion over future investment decisions than managers of unregulated firms, thereby lowering the adverse incentive effects of long-term debt. Finally, we employ *STD_RET* to control for return volatility since riskier borrowers will opt for shorter maturity. Both Eq.s (1) and (2) include separate industry and year fixed effects in all models to account for any potential omitted industry-specific effects and economy-wide effects.

4. Empirical results

4.1. Sample description

Panel A of Table 1 provides descriptive statistics on debt maturity structure for the full sample. We report the distribution of total debt by identifying the percentage of debt that matures in more than one year through more than five years. The table shows that approximately 75.29% of total debt is due in more than one year, 53.73% is due in more than three years, and 35.65% is due in more than five years. The average debt maturity structure of our sample firms is similar to those reported in prior studies.

Panel B of Table 1 presents sample firm characteristics. The mean firm size for our sample firms is $5,923 million with mean leverage of 17.35 percent. The proportion of firms with operating loss carryforwards in our sample is 0.34 while the mean *Asset_Maturity* is 11.63 years.

Panel A of Table 2 reports the Pearson correlations between debt maturity, policy uncertainty, and firm characteristics. The correlations are consistent with previous literature (e.g., Datta et al., 2005). Panel B displays the correlations between EPU and each of its four components. Of all the components, the news factor has the highest association with the aggregate index, whereas the economic forecaster disagreement measures (*FED* and *CPI*) have the lowest link to *EPU*, indicating that policy-related economic uncertainty is mostly due to newspaper coverage.

4.2. Univariate analysis

Table 3 reports univariate analysis of the link between policy uncertainty and percentage of long-term debt maturing in more than three years (*DEBT3*) for the whole sample and for sample firms partitioned by MTB, firm size, credit rating, financial constraints, and political exposure. The results for the whole sample unconditioned by firm characteristics generally reveal a lengthening of the debt maturity. Results in Table 3 also show that high growth firms, large firms, high credit quality firms (investment grade firms), and financially constrained firms lengthen their debt maturity when policy uncertainty is high, whereas low growth firms, non-rated firms, and firms that are not financially constrained experience no change in their debt maturity structure. Also, firms with low political exposure lengthen their debt maturity to a greater extent than

[5] The source of data for this variable is Baker, Bloom, and Davis's Web site (http://www.policyuncertainty.com/index.html)

[6] In addition to reflecting credit quality, bond rating agencies also consider the restrictive covenants included in the corporate financial contracting process which are intended to control for various agency costs (see Iskandar and Emery, 1994). Thus, the ratings may proxy for amelioration of agency costs.

[7] Agency costs between shareholders and bondholders can be mitigated by matching debt maturity with that of assets. When debt is short-term, assets may not generate sufficient cash flow to service the debt by maturity. Thus, by matching maturity of assets with debt, the possibility of a liquidity crisis is reduced.

Table 1
Distribution and descriptive statistics of corporate maturity.1985–2014.

Panel A: Distribution of total debt maturing from the fiscal year end

% of debt maturing in more than	Mean	SD	25th percentile	Median	75th percentile
1 year	75.29	29.98	66.69	87.87	96.80
2 years	63.96	33.10	43.08	75.42	90.91
3 years	53.73	34.06	22.51	61.53	82.84
4 years	44.65	33.57	8.53	47.50	73.26
5 years	35.65	31.83	1.34	32.39	61.78

Panel B: Statistics for main variables at the fiscal year end

Firm characteristics	Mean	SD	25th percentile	Median	75th percentile
Firm size ($millions)	5922.79	23,167.33	125.95	617.24	2,967.58
MTB	1.69	1.44	1.07	1.33	1.84
SA Index	−3.62	0.95	−4.12	−3.48	−3.02
Pol_Exp	0.06	0.99	0.02	0.03	0.06
Leverage (%)	17.35	15.18	4.76	14.22	26.12
Asset_Maturity (years)	11.63	35.74	4.01	7.69	14.28
CAPEX (%)	5.82	5.19	2.42	4.45	7.54
Term_Structure (%)	1.52	1.25	0.44	1.35	2.80
ABN_Earnings	0.27	19.33	−0.03	0.01	0.04
RET_STD	0.07	0.06	0.03	0.05	0.09
Fixed_Assets (%)	33.31	22.34	15.63	28.19	47.34
Profitability (%)	9.47	21.90	7.52	12.05	16.68
% of firms with operating loss carryforwards (TLCF)	33.48				
% of firms with investment tax credits (ITC)	14.32				
% of regulated firms	11.85				
% of non-rated firms	62.19				
% investment grade firms	22.22				
% non-investment grade	15.59				

This table reports the distribution of total debt maturing from the fiscal year end and descriptive statistics of firm characteristics for 38,093 firm-year observations. See Appendix for variable definitions.

Table 2
Pearson correlations between debt maturity, policy uncertinity, and firm characteristic.

Panel A

	−1	−2	−3	−4	−5	−6	−7	−8	−9	−10	−11	−12	−13	−14	−15	−16	−17	−18
1. DEBT3	1																	
2. EPU	**0.03**	1																
3. MTB	**−0.08**	**−0.05**	1															
4. Size	**0.42**	**0.12**	**0.11**	1														
5. Rated	**0.41**	**0.08**	**−0.05**	**0.66**	1													
6. INVG	**0.24**	**0.04**	0.00	**0.60**	**0.69**	1												
7. SA Index	**−0.32**	**−0.11**	**0.02**	**−0.73**	**−0.50**	**−0.52**												
8. Pol_Exp	**−0.01**	−0.01	0.01	**−0.02**	**−0.01**	−0.01	**0.03**	1										
9. Leverage	**0.44**	**0.02**	**−0.29**	**0.10**	**0.28**	−0.01	**−0.06**	0.00	1									
10. Asset_Maturity	**0.05**	**0.01**	**−0.03**	**0.04**	**0.04**	**0.07**	**−0.07**	0.00	**0.06**	1								
11. CAPEX	**0.09**	**−0.07**	**0.03**	**0.04**	0.01	**0.04**	**0.01**	0.00	**0.04**	**0.09**	1							
12. Term_Structure	0.00	**0.64**	**−0.03**	**0.06**	**0.05**	**0.03**	**−0.07**	−0.01	0.01	0.01	**−0.07**	1						
13. ABN_Earnings	**−0.01**	0.01	**0.02**	0.00	0.00	−0.01	0.00	0.00	0.00	0.00	−0.01	0.01	1					
14. REG	**0.19**	0.00	**−0.10**	**0.24**	**0.20**	**0.25**	**−0.22**	0.00	**0.23**	**0.14**	**0.18**	0.01	0.00	1				
15. RET_STD	**−0.29**	**−0.03**	**0.35**	**−0.31**	**−0.31**	**−0.25**	**0.36**	**0.07**	**−0.42**	**−0.07**	**−0.02**	0.00	**−0.02**	**−0.24**	**1**			
16. Profitability	**0.16**	0.00	**−0.33**	**0.25**	**0.14**	**0.13**	**−0.22**	**−0.02**	**0.04**	0.00	**0.11**	−0.01	**−0.05**	**0.04**	**−0.26**	**1**		
17. Fixed Asset	**0.27**	**−0.01**	**−0.14**	**0.18**	**0.18**	**0.22**	**−0.18**	**−0.01**	**0.31**	**0.25**	**0.52**	0.01	−0.01	**0.50**	**−0.29**	**0.13**	**1**	
18. TLCF	**0.08**	**0.08**	**0.02**	**0.12**	**0.05**	**0.09**	**−0.11**	−0.01	**−0.04**	**0.04**	**0.03**	**0.04**	0.00	**0.11**	**−0.02**	**0.04**	**0.09**	**1**
19. ITC	**−0.03**	**0.13**	**0.04**	**−0.01**	**0.01**	**−0.09**	**0.05**	**0.01**	0.00	**−0.05**	**−0.14**	**0.06**	0.01	**−0.16**	**0.10**	**−0.12**	**−0.21**	0.00

Panel B

	EPU	NEWS	TAX	FED	CPI
EPU	1.00				
NEWS	**0.91**	1.00			
TAX	**0.77**	**0.59**	1.00		
FED	**0.55**	**0.32**	**0.18**	1.00	
CPI	**0.63**	**0.37**	**0.36**	**0.63**	1.00

This table reports Pearson correlations of salient focus-relevant characteristics of our sample. See the appendix for variable definitions. Bolded values are significant at 0.05 level or better.

Table 3
Univariate analysis of the link between policy uncertainty and debt maturity structure.

	Percentage of debt maturing in more than three years				
	Lowest policy uncertainty		Highest policy uncertainty		Diff. (Highest-Lowest)
	N	Mean	N	Mean	
All firms	10,790	63.44	9,378	66.21	2.77***
Low MTB	4,590	64.81	4,926	64.71	−0.10
High MTB	6,200	62.42	4,452	67.87	5.45***
Small firms	5,445	51.70	3,583	48.30	−3.40***
Large firms	5,345	75.39	5,795	77.29	1.90***
Not rated	7,044	54.75	5,192	54.07	−0.68
Junk grade firms	1,562	86.56	1,845	84.07	−2.49***
Investment grade firms	2,184	74.92	2,241	79.08	4.16***
Low SA Index	5,441	61.76	4,759	62.29	0.53
High SA Index	5,349	44.99	4,619	48.29	3.30***
Low Pol_Exp	5,178	66.69	5,141	69.34	2.65***
High Pol_Exp	5,612	60.43	4,237	62.41	1.98***

This table presents the mean percentage of total debt that matures in more than three years, *DEBT3*, categorized by firm types and the level of policy uncertainty. The lowest policy uncertainty subgroup represents the lowest quartile firms while the highest policy uncertainty subgroup reflects the highest quartile firms. Definitions of variables that are utilized to construct the firm types (MTB, firm rating status, etc.) are in the Appendix. Low and high are based on median values for each of the variables (as per Table 1, Panel B). ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

high political exposure. Given that these findings are based on univariate analysis, we rely on the multivariate analysis to draw our conclusions.[8]

5. Multivariate analysis

5.1. Policy uncertainty and debt maturity

Table 4 presents the second-stage regression analysis to test the impact of the aggregate level of policy uncertainty (*EPU*) on the percentage of debt maturing in more than three years (*DEBT3*). Overall, Table 4 provides evidence supporting hypothesis **H1B**, indicating that firms, on average, tend to shorten their debt maturity when policy uncertainty is high (coefficient of -0.040 and p-value of 0.02). Similarly, the coefficients on this variable in the remaining models are consistently negative and highly significant in Models 2-5. In Fig. 1, we plot the policy uncertainty variable, EPU, and debt maturity over time. The graphical representation, in general, indicates a negative relationship between these two variables of interest.

To gauge the economic relevance of policy uncertainty, we measure the impact of moving from the median EPU (96) to the 95th percentile (168) in the level of policy uncertainty is associated with 2.88-point drop in the proportion of long-term debt (based on Model 1). Thus, policy uncertainty is associated with an economically large change in debt maturity, suggesting a decline of about 17 percent of the average proportion of long-term debt to total debt. This evidence is similar to that reported by Gulen and Ion (2016) who document a decrease equivalent to 24 percent of the average investment spending level in their sample. This evidence supports **H1B** implying that the costs of mispricing and underinvestment outweigh liquidity/refinancing costs for the whole sample when policy uncertainty is high. The majority of control variables, *Leverage*, *MTB*, *Size*, *CAPEX*, and *ABN_Earnings* have the expected signs and are significant.

5.2. Debt maturity choice and firm type

In Table 4, Model 2 shows that when high growth firms face high uncertainty about government policies, they tend to increase their utilization of long maturity debt financing compared to low growth firms with positive and significant coefficient on MTB (p-value of 0.00). This finding is consistent with the univariate results and supports **H2.** Since liquidity/refinancing risk during periods of high policy uncertainty is high, this result suggests that firms with more valuable growth options lengthen their debt maturity so that they will not have to forgo investment opportunities due to potential lack of access to debt capital. This result for high growth firms contrasts with Myers' (1977) prediction but supports Diamond and He's (2014) assertion that short-term debt overhang can be more severe in uncertain times.

Model 3 also presents evidence that larger firms raise their reliance on long-term debt when high policy uncertainty conditions prevail. The response of large firms is consistent with previous empirical evidence, which document that large firms issue public debt to take advantage of the significant scale economies resulting from a large fixed component of issuance costs and that public debt issues tend to have long maturities (Barclay and Smith, 1995; Stohs and Mauer, 1996). This result is consistent with **H3**.

Model 4 of Table 4 examines the association between debt maturity and credit quality. The significantly positive coefficient on *EPU*INVG*, 0.116 (p-value < 0.0001), implies that firms with the highest credit quality (investment grade firms) lengthen their debt maturity during high policy uncertainty periods, which is more than 8 percentage points increase in debt maturing in more than three years when EPU moves from the median to the 95th percentile. The insignificant coefficient on *EPU*Rated* suggests that rated and unrated firms' debt maturity does not differ based on the level of policy uncertainty. The combination of results on these two coefficients imply that unrated firms (unlike investment-grade firms) are unable to increase their debt maturity when high uncertainty conditions prevail. These findings suggest that the influence of credit quality ratings on maturity when high uncertainty surrounds policy outcomes is not non-monotonic as proposed by the traditional view in Diamond (1993), where both the highest and lowest credit quality firms follow the same debt maturity structure. The results are thus consistent with **H4** as investment grade firms migrate to long-term debt maturity to reduce refinancing risk, while firms with very poor credit quality, due to extreme

[8] To assess whether the link between debt matury and policy uncertainty is linear, we also examine debt maturity over four different quartiles of policy uncertainty. We find that the first three quartiles, starting with the lowest, are more or less similar in terms of debt maturity. The lengthening of maturity happens at the highest quartile level of uncertainty. These results do not appear to imply that the relationship between policy uncertainty and debt maturity is non-linear.

Table 4
Second-stage regression explaining percentage of debt maturing in more than three years.

		Independent variable: *DEBT3*					
Independent variables	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
EPU	-,+	−0.040**	−0.059***	−0.168***	−0.063***	−0.154***	−0.026
		(0.02)	(0.00)	(<.0001)	(0.00)	(<.0001)	(0.15)
EPU*MTB	+		0.011***				
			(0.00)				
EPU*Size	+			0.016***			
				(<.0001)			
EPU*Rated	-,+				−0.018		
					(0.22)		
EPU*INVG	+				0.116***		
					(<.0001)		
EPU*SA Index	–					−0.028***	
						(<.0001)	
EPU*Pol_Exp	–						−0.378***
							(<.0001)
Controls							
MTB	–	−0.627***	−1.76***	−0.608***	−0.613***	−0.623***	−0.602***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Size	+	15.198***	15.200***	13.746***	15.324***	15.384***	15.134***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$Size^2$	–	−0.811***	−0.810***	−0.831***	−0.823***	−0.823***	−0.809***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Rated	+	20.162***	20.175***	20.112***	22.129***	20.097***	20.273***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
INVG	–	−11.022***	−11.051***	−10.946***	−23.292***	−10.944***	−11.140***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SA Index	+	1.120***	1.142***	1.064***	1.047***	4.133***	1.193***
		(<.0001)	(<.0001)	(0.00)	(0.00)	(<.0001)	(<.0001)
Pol_Exp	-,+	0.156	0.155	0.151	0.153	0.153	29.001***
		(0.26)	(0.27)	(0.28)	(0.28)	(0.27)	(<.0001)
Ĺeverage	+	0.454***	0.443***	0.459***	0.463***	0.458***	0.466***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Asset_Maturity	+	−0.003	−0.003	−0.003	−0.003	−0.003	−0.003
		(0.51)	(0.53)	(0.51)	(0.52)	(0.53)	(0.52)
CAPEX	+	0.189***	0.189***	0.189***	0.185***	0.188***	0.189***
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Term_Structure	+	0.014	−0.081	−0.148	−0.028	−0.054	−0.002
		(0.99)	(0.95)	(0.90)	(0.98)	(0.96)	(1.00)
ABN_Earnings	–	−0.021***	−0.021**	−0.021***	−0.021***	−0.021***	−0.021***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
REG	+	−3.422	−3.416	−3.505	−3.770	−3.469	−3.318
		(0.34)	(0.34)	(0.33)	(0.29)	(0.34)	(0.36)
RET_STD	–	−5.041	−5.083	−4.894	−4.164	−5.311	−3.672
		(0.45)	(0.45)	(0.47)	(0.54)	(0.43)	(0.59)
Intercept		−7.147	−4.686	5.939	−4.944	4.684	−7.815
		(0.20)	(0.41)	(0.32)	(0.38)	(0.44)	(0.16)
Industry and year FEs		Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square		0.327	0.327	0.328	0.328	0.327	0.328
N		38,093	38,093	38,093	38,093	38,093	38,093

The table shows the second-stage regressions from a 2SLS regression model where the dependent variable is *DEBT3*. Predicted leverage, Ĺeverage, is from 1st-stage regression where dependent variable is Leverage. Independent variables in 1st-stage regression are *EPU, MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD, TLCF, ITC,* and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

adverse selection costs, have no other choice but to finance with short-term debt to undergo more frequent monitoring through refinancing.

The evidence in Model 5 indicates that financially constrained firms tend to shorten their debt maturity when policy uncertainty is high (coefficient of -0.028 and p-value < 0.0001) and supports **H5**. This finding implies that companies that are financially constrained, in spite of greater pricing risk, are unable to access long-term debt.

Examining political exposure, Model 6 shows that, on average, firms with greater idiosyncratic exposure to the political environment (higher absolute value of E_{Pi}) shorten their debt maturity when policy uncertainty is high (coefficient of -0.378 and p-value < 0.0001). This response is induced by the fact that firms with high political exposure face considerably higher cost of debt due to relatively larger information asymmetry between lenders and borrowers. This result is in support of **H6**.[9]

One potential concern may be that our findings are not a result of market conditions of uncertainty but perhaps due to a different type of firm issuing debt under high uncertainty than under more normal conditions. In other words, the results could be due to smaller, riskier firms and firms with higher growth opportunities being more likely to issue in periods of elevated uncertainty. To examine this possibility, we calculate the mean difference in salient firm characteristics for low and high uncertainty periods. Our (unreported) results rule out the possibility that smaller, riskier firms are issuing debt during high uncertainty periods. In fact, they

[9] In another set of regressions, we utilize lagged explanatory variables. The results are largely maintained.

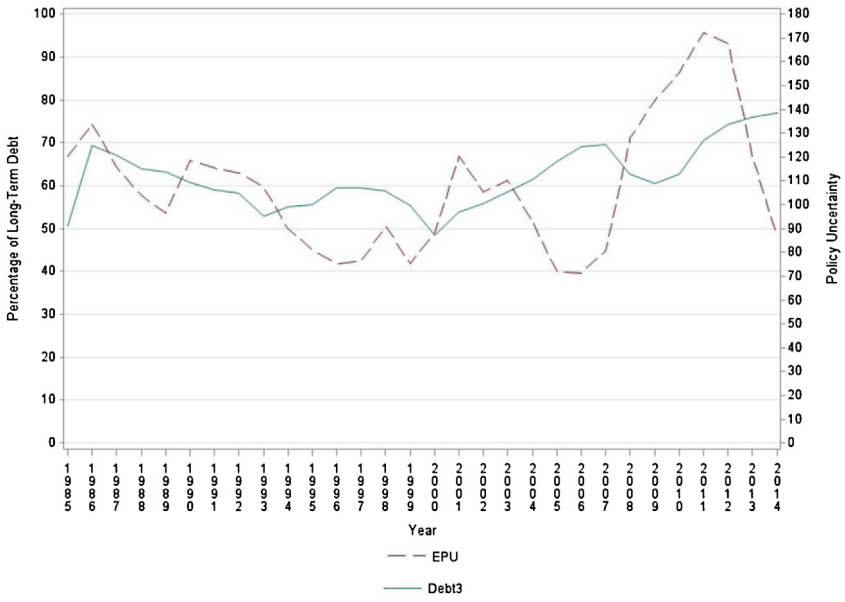

Fig. 1. The relationship between policy uncertainty and debt maturity over time.

are significantly larger in size, less risky, with lower growth opportunities, and are of higher quality (based on abnormal earnings). In sum, our results do not appear to be driven by a group of firms that under normal circumstances tend to issue short-term debt. Instead, the evidence suggests that more stable and less risky firms are more likely to choose to access longer debt capital during periods of elevated policy uncertainty. While we provide evidence on the effect of policy uncertainty on corporate debt maturity structure choice, future research can extend our work by focusing more on the effects of changes in supply and demand of debt due to enhanced policy uncertainty on the resultant debt maturity structure.

5.3. Supplementary analysis

To examine whether the results are sensitive to the measurement of EPU, we re-estimated all the models in Table 4 using i) the logarithm of EPU, ii) end of year EPU, and iii) yearly median EPU. In these three different sets of regressions, the results (unreported) are maintained in terms of magnitude of the coefficients and significance for all models confirming the proposed hypotheses. For example, the coefficient on median EPU in the base model is -0.041 with a p-value of 0.02. Additionally, we use different proxies for some of the test variables. For example, in some models we include firm age as a proxy for financial constraints where older firms are less constrained than younger firms. As an additional measure for political exposure, we employ the proportion of firm revenues from foreign markets since the higher this ratio, the lower the exposure to domestic policy uncertainty in the United States. The results utilizing these alternative measures are largely consistent with the main results.

In another supplementary analysis, we also investigate long-term debt issuance (three or more year of maturity) as a percent of total debt for various firm types during low and high policy uncertainty periods. The univariate analysis (unreported) provides additional evidence to the findings reported in Table 4. The results show that high growth firms increase long-term debt issuance from 3.58% in low uncertainty periods to 4.33% in high uncertainty periods, while low growth firms reduce it. Also, while large firms keep maturity of debt issuance at the same level, small firms reduce long-term debt financing. Similarly, high credit quality firms increase long-term financing from 3.54% in low uncertainty period to 5.15% in elevated uncertainty conditions, while non-rated firms and junk grade firms reduce their reliance on long-term debt. The usage of long-term debt by firms with high and low political exposure is as predicted in hypothesis **H6**. Only the results for firms that are financially constrained do not support predictions of **H5**.[10]

5.4. Results with alternative debt maturity measure

To address the possible concern that annual level of long-term debt may not be a timely measure for the impact of changes in policy uncertainty on debt maturity choice, we also use quarterly level of long-term debt as an alternative dependent variable, where firm control variables are also measured quarterly. However, since COMPUSTAT provides quarterly data only on debt maturing in more than one year, we measure quarterly long-term debt using two approaches. First, following Chance (1982), the first- and second-quarter levels of debt in year *t* are approximated by the year-end debt level of year *t-1*, while the third- and fourth-quarter levels of debt in year *t* are represented by the year-end debt level of year *t*. Second, we measure quarterly long-term debt as the percentage of debt maturing in more than one year (*DEBT1*).[11] The results are similar when estimating these two methods. For parsimony, we report estimations that utilize *DEBT1*, which are presented in Table 5. Because the quarterly *EPU* metric depicts uncertainty on a more granular and timelier basis, the results are stronger and reflect more accurately the impact on debt maturity.[12]

[10] In one additional test, we examine the sensitivity of our results to the elimination of firms that utilize low levels of leverage. This allows us to reduce the impact of firms which normally do not raise long-term capital. To do this, we restrict the sample to firms with a level of leverage at or below the 5th percentile for the sample. In an alternative examination, we eliminate firms that had no debt under low uncertainty conditions. The results are robust to these subsamples.

[11] For additional robustness, we re-estimate this method, utilizing annual firm control variables. The results are robust to this variable measurement. Consistent with Lewis (1990), including tax related variables had no effect on our results.

[12] We analyze whether firms focus on changing their maturity beyond five years or whether the change is mostly for debt with three to five years of maturity by using the percentage of debt maturing in more than five years as the dependent variable. The results show that while *EPU* still negatively and significantly affects firms' debt maturity choice, its effect is slightly weaker, suggesting that even though firms shorten debt maturity when policy uncertainty is high, that adjustment mostly involves a part of their long-term debt, i.e., debt that matures in three years to five

Table 5
Impact of quarterly EPU on percentage of debt maturing in more than one year.

	Independent variable: *DEBT1*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU	−0.023***	−0.035***	−0.139***	−0.053***	−0.138***	−0.011
	(0.00)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.17)
EPU*MTB		0.008***				
		(<.0001)				
EPU*Size			0.016***			
			(<.0001)			
EPU*Rated				0.008		
				(0.30)		
EPU*INVG				0.081***		
				(<.0001)		
EPU*SA Index					−0.029***	
					(<.0001)	
EPU*Pol_Exp						−0.280***
						(<.0001)
Controls						
MTB	−1.053***	−1.942***	−1.033***	−1.042***	−1.050***	−1.045***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Size	12.382***	12.382***	10.969***	12.550***	12.594***	12.395***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$Size^2$	−0.721***	−0.720***	−0.742***	−0.734***	−0.733***	−0.722***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Rated	10.809***	10.834***	10.782***	9.961***	10.762***	10.815***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
INVG	−8.100***	−8.139***	−8.043***	−16.791***	−8.035***	−8.117***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SA Index	1.586***	1.628***	1.510***	1.525***	4.761***	1.590***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Pol_Exp	−12.361***	−12.399***	−12.468***	−12.708***	−12.729***	−12.708***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Ŀeverage	0.271***	0.252***	0.277***	0.280***	0.280***	0.275***
	(<.0001)	(<.0001)	(<.0001)	<.0001)	(<.0001)	(<.0001)
Asset_Maturity	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
CAPEX	0.097***	0.094***	0.096***	0.094***	0.095***	0.097***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Term_Structure	1.070	1.089	1.488**	1.178*	1.293*	1.116
	(0.12)	(0.12)	(0.03)	(0.09)	(0.06)	(0.11)
ABN_Earnings	−0.588**	−0.591***	−0.585***	−0.578***	−0.586***	−0.584***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
REG	−9.833***	−9.927***	−9.935***	−10.379***	−9.998***	−9.898***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
RET_STD	−12.890***	−13.463***	−12.201***	−12.157***	−12.516***	−12.763***
	(<.0001)	(<.0001)	(0.00)	(<.0001)	(<.0001)	(<.0001)
Intercept	31.092***	32.822***	40.684***	33.060***	41.672***	29.636***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.254	0.253	0.255	0.256	0.255	0.254
N	52,019	52,019	52,019	52,019	52,019	52,019

The table shows second-stage regressions from a 2-SLS regression model where the dependent variable is quarterly *DEBT1*. Predicted leverage, Ŀeverage, is from 1st-stage regression where the dependent variable is Leverage. 1st-stage regression is described in Table 4. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, 0.00, and 0.10, respectively.

5.5. Results with alternative uncertainty measures: components of EPU

To tease out the impact of the different components of the EPU on debt maturity choice and identify the broader mechanisms that are driving the results, we perform the same multivariate analyses as in Table 4, utilizing each subcomponent of the EPU separately as measures of policy uncertainty. The influence of fiscal and monetary uncertainty components may have different impact because these may affect the cost and supply of capital.

In Table 6 we report the baseline model for each of the four sub-indices. The findings show that the various uncertainty proxies have significantly negative impact on debt maturity. However, the coefficients vary in magnitude reflecting a difference of the impact of each type of uncertainty. We also estimate the additional models to test the impact of these sub-indices by firm type. The results for all cross-product terms (unreported) reveal that the effect on corporate debt maturity is primarily due to the news and tax related subcomponents as the results associated with these two sub-indices are very similar to those reported in Table 4. Previous studies examining the impact of these components of the EPU index on investment activity (Gulen and Ion, 2016) and acquisitive activity (Nguyen and Phan, 2017) also find that only some of the subcomponent indices are significant determinants.

5.6. Results using an instrumental variable

Given that policy uncertainty tends to be countercyclical, our results may inadvertently capture economic uncertainty. Due to

years. Similar to prior results, all the interaction terms results hold, except for the interaction term between EPU and MTB, which is insignificant implying that high growth firms are less prone to increase debt that matures in more than five years.

Table 6
Effect of policy uncertainty on debt maturity based on EPU sub-indices.

Dependent variable: *DEBT3*				
Independent variables	(1)	(2)	(3)	(4)
NEWS	−0.043**			
	(0.02)			
TAX		−0.003***		
		(0.00)		
CPI			−0.266**	
			(0.02)	
FED				−0.112**
				(0.02)
Controls				
MTB	−0.627***	−0.628***	−0.006***	−0.628***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Size	15.198***	15.211***	15.198***	15.199***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$Size^2$	−0.811***	−0.811***	−0.811***	−0.811***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Rated	20.162***	20.172***	20.160***	20.161***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
INVG	−11.022***	−11.047***	−11.021***	−11.022***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SA Index	1.122***	1.148***	1.120***	1.118***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Pol_Exp	0.156	0.016	0.156	0.014
	(0.26)	(0.92)	(0.26)	(0.92)
Leverage	0.454***	0.442***	0.452***	0.455***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Asset_Maturity	−0.003	−0.003	−0.003	−0.003
	(0.51)	(0.53)	(0.52)	(0.51)
CAPEX	0.189***	0.189***	0.189***	0.189***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Term_Structure	0.893	0.861	−3.378	−1.156
	(0.39)	(0.45)	(0.19)	(0.44)
ABN_Earnings	−0.021***	−0.021***	−0.021***	−0.021***
	(0.00)	(0.00)	(0.00)	(0.00)
REG	−3.422	−3.387	−3.422	−3.412
	(0.34)	(0.35)	(0.34)	(0.34)
RET_STD	−5.041	−4.948	−5.041	−4.653
	(0.45)	(0.47)	(0.45)	(0.49)
Intercept	−8.505*	−8.142	17.361	1.872
	(0.10)	(0.11)	(0.25)	(0.83)
Industry and year FEs	Yes	Yes	Yes	Yes
Adjusted R-square	0.327	0.327	0.328	0.327
N	38,093	38,093	38,093	38,093

The table shows second-stage regressions from a 2SLS regression model where the dependent variable is *DEBT3*. Baker et al.' (2016) EPU sub-indices are the test variables, NEWS, TAX, CPI, and FED. The 1st-stage regresses leverage on *EPU* sub-indices (separately), *MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD, TLCF, ITC*, and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

this potential endogeneity concern where policy uncertainty and debt maturity structure may be unrelated, but both are jointly correlated with unobservable factors, we conduct a test utilizing an instrumental variable. We employ a variable that is associated with policy uncertainty but is unrelated to corporate debt maturity structure. Following McCarty et al. (1997), Gulen and Ion (2016), and Nguyen and Phan (2017), we choose the partisan polarization measure (*Polarization*) as an instrument for *EPU*. *Polarization* is calculated based on the first dimension of the DW-Nominate scores, developed by McCarty et al. (1997), which track the legislators' position on government intervention in the economy. This variable represents the average distance between Democratic and Republican legislators by subtracting the average of these scores for Democratic party members in the Senate from the average for the Republican party members in the Senate.

Following the methodology in Gulen and Ion (2016) in applying this instrument variable, we estimate a regression that explains EPU employing *Polarization* as an independent variable in addition to: *MTB*, *Size*, $Size^2$, *Rated*, *INVG*, *Pol_Exp*, *SA Index*, *Leverage*, *Asset_Maturity*, *CAPEX*, *Term_Structure*, *ABN_Earnings*, *REG*, and *RET_STD*. We then use the predicted value of EPU obtained from this regression, $\widehat{EPU}$, into the second-stage regression – Equation (2). The results presented in Table 7 are consistent with our main findings from Table 4. This evidence validates that our findings are robust to endogeneity concerns.

5.7. Placebo test

To assess the validity of our uncertainty measure, we conduct a placebo analysis by randomly assigning EPU to different years. If the effect on debt maturity is caused by policy uncertainty, we should not observe a negative and significant relation between debt maturity and the randomly assigned EPU (Acharya and Xu, 2017). These results are presented in Table 8. The placebo analysis which uses artificial, randomly assigned EPU exhibits no shortening of debt maturity during artificially assigned high uncertainty periods in all six regressions. In addition, most of the coefficients on the cross-product terms are insignificant; the one exception where the coefficient in Model 6 is significant and with the opposite sign. In general, the placebo analysis reaffirms our primary findings.

Table 7
Polarization as an instrument for policy uncertainty.

Dependent variable: *DEBT3*						
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{E}PU$	−0.054**	−0.073***	−0.140***	−0.074***	−0.148***	−0.027
	(0.02)	(0.00)	(<.0001)	(0.00)	(<.0001)	(0.21)
$\hat{E}PU$*MTB		0.008***				
		(0.01)				
$\hat{E}PU$*Size			0.010***			
			(<.0001)			
$\hat{E}PU$*Rated				−0.022		
				(0.12)		
$\hat{E}PU$*INVG				0.093***		
				(<.0001)		
$\hat{E}PU$*SA Index					−0.019***	
					(0.00)	
$\hat{E}PU$*Pol_Exp						−0.573***
						(<.0001)
Controls						
MTB	−0.326***	−1.198***	−0.320***	−0.328***	−0.328***	−0.308***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Size	12.749***	12.756***	11.851***	12.840***	12.884***	12.634***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$Size^2$	−0.601***	−0.600***	−0.614***	−0.609***	−0.609***	−0.596***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Rated	9.732***	9.744***	9.728***	12.199***	9.703***	9.863***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
INVG	−1.453***	−1.481***	−1.431***	−11.276***	−1.410***	−1.591***
	(0.01)	(0.01)	(0.01)	(<.0001)	(0.01)	(0.00)
SA Index	0.429*	0.431*	0.400	0.394	2.499***	0.567**
	(0.09)	(0.09)	(0.11)	(0.12)	(<.0001)	(0.03)
Pol_Exp	−0.081	−0.082	−0.083	−0.083	−0.083	43.620***
	(0.56)	(0.55)	(0.55)	(0.55)	(0.55)	(<.0001)
$\hat{L}everage$	0.800***	0.799***	0.798***	0.797***	0.799***	0.803***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Asset_Maturity	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.80)	(0.82)	(0.82)	(0.82)	(0.82)	(0.84)
CAPEX	0.205***	0.206***	0.205***	0.202***	0.204***	0.204***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Term_Structure	0.240	0.140	1.591	−0.545	0.709	0.134
	(0.83)	(0.90)	(0.15)	(0.66)	(0.53)	(0.90)
ABN_Earnings	−0.016**	−0.016**	−0.016**	−0.016**	−0.016**	−0.016**
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)
REG	−1.739	−1.736	−1.737	−1.986	−1.684	−1.568
	(0.63)	(0.63)	(0.63)	(0.58)	(0.64)	(0.66)
RET_STD	24.159***	24.887***	23.706***	23.988***	23.597***	24.808***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Intercept	−6.601	−4.397	−0.752	−2.754	2.432	−7.620
	(0.23)	(0.44)	(0.89)	(0.64)	(0.69)	(0.15)
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.381	0.381	0.381	0.381	0.380	0.382
N	38,093	38,093	38,093	38,093	38,093	38,093

The table shows 2nd stage regressions from a 2-SLS regression model where dependent variable is *DEBT3*. 1st stage regression explains EPU using *Polarization* as instrument variable in addition to *Asset_Maturity*, *MTB*, *Size*, $Size^2$, *Term_Structure*, *ABN_Earnings*, *REG*, *Rated*, *INVG*, *SA Index*, *Pol_Exp*. Predicted EPU, $\hat{E}PU$, obtained from this regression is employed in 2nd stage regression. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

5.8. Results controlling for macroeconomic uncertainty measures

Another alternative explanation for our observed results is that debt maturity structure is reacting to changing macroeconomic conditions. To isolate the influence of policy uncertainty from economic uncertainty, we augment our baseline regressions with three variables to control for economic conditions. These variables are the growth in gross domestic product (*GDP Growth*), the yield spread (*Yield Spread*),[13] and the level of macroeconomic uncertainty (*Macro_Uncertainty*). The yield spread is computed as the difference between the five-year Treasury rate and the one-year Treasury rate. Following Jurado et al. (2015), *Macro_Uncertainty* is the three-month ahead macroeconomic uncertainty obtained from Jurado's website. In Table 9, we present the results from re-estimating the models in Table 4 while controlling for these three economic variables. The coefficients on the *EPU* remain robust to this new model specification; similarly, all the interaction terms have a positive sign and are statistically significant. These results reveal that policy uncertainty is distinct from the macro-economic channel and remains a significant determinant of debt maturity.

5.9. Results considering the financial crisis

Since the economic shock of the financial crisis of 2008–2009 constitutes a source of policy uncertainty (Gungoraydinoglu et al., 2017), in Table 10 we incorporate a dummy variable, *CRISIS*, which takes a value of 1 if the year is 2007 through 2009, and zero otherwise. The financial crisis also represents a dramatic credit supply

[13] Both GDP growth and yield spread data are obtained from Federal Reserve Bank of St. Louis link: https://fred.stlouisfed.org.

Table 8
Placebo test of the link between policy uncertainty and debt maturity.

	Dependent variable: *DEBT3*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU	0.003	−0.004	−0.011	0.002	−0.006	−0.005
	(0.53)	(0.67)	(0.51)	(0.74)	(0.77)	(0.37)
EPU*MTB		0.004				
		(0.28)				
EPU*Size			0.002			
			(0.36)			
EPU*Rated				−0.003		
				(0.85)		
EPU*INVG				0.010		
				(0.57)		
EPU*SA Index					−0.003	
					(0.64)	
EPU*Pol_Exp						0.168***
						(0.00)
Controls						
MTB	−0.623***	−1.065***	−0.623***	−0.623***	−0.623***	−0.608***
	(<.0001)	(0.01)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Size	15.180***	15.180***	14.941***	15.179***	15.177***	15.106***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
$Size^2$	−0.809***	−0.809***	−0.809***	−0.809***	−0.809***	−0.806***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Rated	20.156***	20.155***	20.157***	20.449***	20.156***	20.251***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
INVG	−11.040***	−11.042***	−11.045***	−12.075***	−11.044***	−11.133***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
SA Index	1.118***	1.123***	1.116***	1.118***	1.392**	1.171***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.03)	(<.0001)
Pol_Exp	0.156	0.155	0.157	0.156	0.156	−24.033***
	(0.27)	(0.27)	(0.26)	(0.27)	(0.26)	(0.00)
Ŀeverage	0.453***	0.451***	0.453***	0.453***	0.453***	0.463***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Asset_Maturity	−0.003	−0.003	−0.003	−0.003	−0.003	−0.003
	(0.50)	(0.51)	(0.50)	(0.50)	(0.50)	(0.48)
CAPEX	0.189***	0.189***	0.189***	0.189***	0.189***	0.188***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Term_Structure	1.212	1.202	1.203	1.211	1.209	1.211
	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)	(0.23)
ABN_Earnings	−0.021***	−0.021***	−0.021***	−0.021***	−0.021***	−0.021***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
REG	−3.449	−3.445	−3.424	−3.437	−3.440	−3.304
	(0.34)	(0.34)	(0.34)	(0.34)	(0.34)	(0.36)
RET_STD	−5.112	−5.304	−5.150	−5.122	−5.122	−3.526
	(0.45)	(0.43)	(0.44)	(0.45)	(0.45)	(0.60)
Intercept	−15.137***	−14.304***	−13.598***	−15.012***	−14.132***	−13.677***
	(0.00)	(0.00	(0.00)	(0.00)	(0.00)	(0.00)
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.327	0.327	0.327	0.327	0.327	0.327
N	38,093	38,093	38,093	38,093	38,093	38,093

The table uses a placebo analysis with randomly assigned policy uncertainty, showing the second-stage regressions where dependent variable is *DEBT3*. Predicted leverage, Ŀeverage, is from 1st-stage regression. The 1st-stage regression is described in Table 4. See Appendix for variable definitions. Numbers in parentheses are p-values from White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

shock. It is a unique event where the credit supply squeeze is not caused by softness in business activity, and hence is exogenous. Additionally, in the wake of the financial crisis, all firms were affected in varying degrees and not merely those on the lower end of the credit quality spectrum. Thus, credit constraints were binding. As such, the inclusion of *CRISIS* as a variable can provide insight on whether our results regarding policy uncertainty are subsumed by conditions where credit is in short supply. Table 10 shows that firms are more likely to increase short maturity debt when they face high credit supply uncertainty, corroborating Massa et al.'s (2013) findings. More importantly, the evidence from these estimations further confirms the robustness of our results on the relevance of policy uncertainty on maturity.

5.10. Persistence of policy uncertainty on debt maturity

Finally, we examine whether policy uncertainty's impact on debt maturity persists over time. To do so, we estimate the debt maturity structure on the same control variables in Equation (2) except that we lag the uncertainty proxy relevant to the dependent variable. We utilize one-year and two-year lags in separate regressions in Tables 11 and 12, respectively. The results show that conditions of high political uncertainty continue to have a significant downward impact on debt maturity for an additional year, as seen in Table 11. The effect as revealed by the coefficients on the lagged EPU Index variable is similar in magnitude and significance to those observed in earlier results.

Table 9
Impact of policy uncertainty on debt maturity: controlling for macroeconomic uncertainty.

	Dependent variable: *DEBT3*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU	−0.038**	−0.0574***	−0.166***	−0.072***	−0.152***	−0.024
	(0.05)	(0.00)	(<.0001)	(0.00)	(<.0001)	(0.1)
EPU*MTB		0.011***				
		(0.00)				
EPU*Size			0.016***			
			(<.0001)			
EPU*Rated				−0.018		
				(0.22)		
EPU*INVG				0.117***		
				(<.0001)		
EPU*SA Index					−0.028***	
					(<.0001)	
EPU*Pol_Exp						−0.379***
						(<.0001)
GDP Growth	−0.006	−0.007	0.002	0.000	−0.009	−0.004
	(0.98)	(0.97)	(0.99)	(1.00)	(0.97)	(0.99)
Yield Spread	0.166	0.156	0.174	0.177	0.182	0.172
	(0.80)	(0.81)	(0.79)	(0.79)	(0.78)	(0.79)
Macro_Uncertainty	−7.909	−7.974	−8.818	−9.272	−7.929	−8.436
	(0.29)	(0.29)	(0.24)	(0.22)	(0.29)	(0.26)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.327	0.326	0.328	0.328	0.326	0.328
N	38,093	38,093	38,093	38,093	38,093	38,093

The table shows second-stage regressions from a 2SLS regression model where the dependent variable is *DEBT3*. Regressions control for three macroeconomic variables, *GDP Growth*, *Yield Spread*, and *Macro_Uncertainty*. All control variables in Table 4 are included in each model in this table. In 1st stage regression *Leverage* is regressed on *EPU, MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD*, *TLCF*, *ITC*, and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

Table 10
Effect of policy uncertainty on debt maturity: controlling for financial crisis.

	Dependent Variable: *DEBT3*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU	−0.006	−0.021**	−0.096***	−0.025***	−0.094***	−0.008
	(0.42)	(0.02)	(<.0001)	(0.00)	(<.0001)	(0.28)
EPU*MTB		0.004**				
		(0.01)				
EPU*Size			0.012***			
			(0.00)			
EPU*Rated				−0.022		
				(0.12)		
EPU*INVG				0.118***		
				(<.0001)		
EPU*SA Index					−0.023***	
					(<.0001)	
EPU*Pol_Exp						−0.349***
						(<.0001)
CRISIS	−2.641***	−2.611***	−2.539***	−2.630***	−2.575***	−2.658***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.319	0.319	0.319	0.320	0.319	0.320
N	38,093	38,093	38,093	38,093	38,093	38,093

The table shows 2nd model from 2SLS regression where dependent variable is *DEBT3*. Regressions control for the financial crisis with the variable, *CRISIS*, which takes a value of 1 if the year is 2007 through 2009. All control variables in Table 4 are included in each model in this table. In the 1st stage regression leverage is regressed on *EPU, MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD*, *TLCF*, *ITC*, and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

In contrast, Table 12, which reports estimations that utilize the two-year lagged EPU Index, indicates that firms strongly and significantly increase debt maturity, consistent with the view that once uncertainty is resolved, corporations revert back to previous debt maturity structure. Our results complement Gulen and Ion (2016) who find that the dampening of investment expenditures during high policy uncertainty takes up to two years to recover.

6. Conclusions

This is the first study to examine the effect of policy uncertainty on corporate debt maturity choice. Prior literature on debt maturity choice primarily focuses on the impact of firm-level characteristics, leaving a gap in our knowledge regarding the impact of policy uncertainty on this important financing decision. We show that,

Table 11
Effect of policy uncertainty on debt maturity structure: one year ahead.

	Dependent variable: *DEBT3*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU_Lag1	−0.049**	−0.065***	−0.129***	−0.066***	−0.126***	−0.041*
	(0.02)	(0.00)	(<.0001)	(0.00)	(<.0001)	(0.06)
EPU_Lag1*MTB		0.009***				
		(0.00)				
EPU_Lag1*Size			0.010***			
			(<.0001)			
EPU_Lag1*Rated				−0.011		
				(0.45)		
EPU_Lag1*INVG				0.084***		
				(<.0001)		
EPU_Lag1*SA Index					−0.019***	
					(0.00)	
EPU_Lag1*Pol_Exp						−0.209***
						(0.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.327	0.327	0.327	0.328	0.327	0.327
N	37,705	37,705	37,705	37,705	37,705	37,705

The table shows second-stage regressions from a 2SLS regression model where the dependent variable is DEBT3. Regressions include EPU for one year earlier, *EPU_Lag1*. All control variables in Table 4 are included in each model. Predicted leverage is from 1st-stage regression where the dependent variable is Leverage. Independent variables in 1st-stage regression are *EPU, MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD, TLCF, ITC*, and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

Table 12
Effect of policy uncertainty on debt maturity structure: two years ahead.

	Dependent variable: *DEBT3*					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
EPU_Lag2	0.439**	0.406**	0.416**	0.433**	0.423**	0.451**
	(0.02)	(0.04)	(0.03)	(0.03)	(0.03)	(0.02)
EPU_Lag2*MTB		0.009**				
		(0.02)				
EPU_Lag2*Size			0.002			
			(0.43)			
EPU_Lag2*Rated				−0.018		
				(0.21)		
EPU_Lag2*INVG				0.039**		
				(0.02)		
EPU_Lag2*SA Index					−0.003	
					(0.60)	
EPU_Lag2*Pol_Exp						0.125*
						(0.06)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.327	0.327	0.328	0.327	0.326	0.323
N	37,701	37,701	37,701	37,701	37,701	37,701

The table shows second-stage regressions from a 2SLS regression model where the dependent variable is *DEBT3*. Regressions include EPU two years earlier, *EPU_Lag2*. All control variables in Table 4 are included in each model. Predicted leverage is from 1st-stage regression where the dependent variable is Leverage. Independent variables in 1st-stage regression are *EPU, MTB, CAPEX, Size, REG, Fixed_Assets, Profitability, ABN_Earnings, RET_STD, TLCF, ITC*, and *SA Index*. See Appendix for variable definitions. Numbers in parentheses are p-values, calculated using White's heteroskedasticity-corrected standard errors. ***, ** and * denote significance at 0.01, .05, and .10, respectively.

on average, firms facing a substantial amount of policy uncertainty regarding the timing and content of uncertainty resolutions tend to shorten their debt maturity structure. Given the trade-offs involved in the choice of debt maturity, the results imply that the risk of mispricing exceeds refinancing risk. While the uncertainty literature finds strong evidence that firms hold back on investment spending due to its irreversibility during periods of policy uncertainty, in a parallel vein, our findings suggest that policy uncertainty deters firms from committing to long-term debt financing. The change in the debt maturity choice is suggestive of increased risk aversion during high policy uncertainty (see also Chen et al., 2018).

Additionally, we document that different types of firms react differently when policy uncertainty rises. Specifically, we find evidence of a strong positive relationship between policy uncertainty and debt maturity for larger firms and firms with high growth opportunities, while financially constrained firms shorten their debt maturity. We also find that the highest and lowest credit quality firms do not follow Diamond's (1993) prescriptions of financing through shorter debt maturity since the highest credit quality firms shift to longer debt while lowest credit firms (unrated firms) remain in the short debt maturity spectrum. Firms with greater idiosyncratic exposure to domicile political environment tend to obtain short-term debt. The result for firms with growth opportunities and firms with highest credit quality, which are counter to traditional expectations, underscore that firm financing behavior under high policy uncertainty environment differs from that under normal conditions.

We also find that the impact of policy uncertainty on debt maturity persists for two years. However, firms revert to longer debt maturity in the third year, once uncertainty is resolved, which is similar to findings by Gulen and Ion (2016) regarding recovery of investment expenditures after a period of high policy uncertainty.

By examining the influence of policy uncertainty on debt maturity choice, we add to the literature on the determinants of debt maturity structure (Barclay and Smith, 1995; Guedes and Opler, 1996; Datta et al., 2005; Billett et al., 2007). Our results also complement the literature that studies the impact of uncertainty on corporate behavior, such as investment spending (Julio and Yook, 2012; Gulen and Ion, 2016) and financing (Cao et al., 2013; Gungoraydinoglu et al., 2017). Our results are robust to a battery of tests, such as the utilization of uncertainty sub-indices, a quarterly measure of EPU, instrument variable analysis, a placebo test, and the inclusion of controls for macro-economic conditions and for credit supply shock.

Appendix A

Variable definitions

Variables	Definition
Dependent variables	
DEBT1	Debt maturing in more than one year / Total debt * 100
DEBT3	Debt maturing in more than three years / Total debt * 100
Test variables	
EPU	The overall index of policy-related economy uncertainty based on Baker, Bloom, and Davis (2016)
CPI	Draws on Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters, representing the forecast for the consumer price index). *Source*: Baker, Bloom, and Davis's website. http://www.policyuncertainty.com/index.html)
FED	Draws on the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters, representing the forecast for the purchase of goods and services by state, local governments, and by the federal government. *Source*: Baker, Bloom, and Davis's website.
NEWS	An index of search results from ten large newspapers measuring economic and policy uncertainty. *Source*: Baker, Bloom, and Davis's website
TAX	Draws on reports by the Congressional Budget Office (CBO) that compile lists of temporary federal tax code provisions. *Source*: Baker, Bloom, and Davis' website.
Polarization	Political polarization of the U.S. Senate used as the instrument for policy uncertainty.
MTB	Market-to-book ratio is Size/book value of total assets (data item 6)
Pol_Exp	Political exposure equals E_{Pi} from the model: $R_{it} = \alpha + E_{Pi}.R_{Pt} + \gamma_{Mi}.R_{Mt} + \gamma_{si}.SMB_t + \gamma_{vi}.HML_t + \varepsilon_{it}$ where R_{it} is firm's monthly stock return (over the risk-free rate), R_{Pt} is the monthly percentage change in EPU, R_{Mt} is the monthly CRSP value weighted market return (over the risk-free rate), and SMB_t and HML_t are the Fama-French factors for size and value.
Rated	Equals one for rated firms, and 0 for non-rated firms.
SA Index	Calculated using Hadlock and Pierce's method (2010) where SA Index$_{it}$ = -0.737 * log(Size$_{it}$) + 0.043 * log(Size$_{it}^2$) - 0.040 * Firm age$_{it}$
Size	The share price (data item 199) × outstanding shares (data item 54) + book value of total assets (data item 6) − book value of equity (data item 60)
Control Variables	
ABN_Earnings (Abnormal earnings)	(Earnings in year *t*+1 (data item 20) − earnings in year *t*)/(share price (data item 199) × outstanding shares (data item 54)) in year *t*
Asset_Maturity	(Gross property, plant, and equipment (data item 7)/total assets (data item 6)) × (gross property, plant, and equipment (data item 7)/depreciation expense (data item 14)) + (current assets (data item 4)/total assets (data item 6)) × (current assets (data item 4)/cost of goods sold (data item 41))
CAPEX	Capital expenditure (data item 128) / book value of total assets (data item 6) * 100
CRISIS	Equals one if the year is 2007 through 2009, and zero otherwise.
Fixed_Assets	The ratio of net property, plant, and equipment (data item 8) to total assets (data item 6) * 100
ITC: Investment tax credits	Equals one for firms with investment tax credits, and 0 otherwise.
Leverage	Long-term debt (data item 9)/market value of total assets * 100
Profitability	The ratio of operating income before depreciation (data item 13) to total assets (data item 6)
REG	Equals one for firms in regulated industries, and 0 otherwise. Regulated industries include railroads (SIC code 4011) through 1980, trucking (4210 and 4213) through 1980, airlines (4512) through 1978, telecommunications (4812 and 4813) through 1982, and gas and electric utilities (4900 to 4939)
RET_STD	The standard deviation of the natural logarithm of stock return during the fiscal year [standard deviation of (ln(return)) × (market value of equity/market value of assets)]
Term_Structure	The difference between the month-end yield on 10-year government bonds and the month-end yield on 6-month treasury constant maturity date.
TLCF (loss carryforwards)	Equal to 1 for firms with operating loss carryforwards, and 0 otherwise.

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