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THE IMPACT OF POLITICAL RISK AND LOBBYING ON THE COST OF EQUITY CAPITAL

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Abstract

We research how political risk impact the cost of equity capital for individual firms. Using a new measure for political risk we are able to investigate this on a firm level. We hypothesize and find that there is a positive relationship between political risk and the cost of equity capital. We also investigate which tools there are to mitigate this risk. We examine how lobbying expenditures impact the cost of equity capital, as well as if lobbying could mitigate the impact of political risk. We find a negative relationship between lobbying expenditures and the cost of equity capital. We do not find that that lobbying expenditures mitigate the impact of political risk on the cost of equity capital. However, after performing a sub-sample analysis, we do find a mitigating effect of lobbying on political risk.

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Contents

1 Introduction

Understanding how politics impact the economy is necessary for stakeholders to make informed decisions. The government shapes the business environment by imposing taxes and enforcing laws. This impacts the economy and generates what could be described as political risk perceived by firms. Recent events such as the Covid-19 pandemic have increased this kind of risk, and highly volatile financial markets have followed. This has led to research on the relationship between these events, the political system they originate from, and their effect on the financial markets.

The research has led to several attempts of quantifying this kind of uncertainty. Two widely used measures are the firm-level political risk by Hassan et al. (2019) and the Economic Policy Uncertainty (EPU) by Baker et al. (2016). They have both used similar methods to quantify political risk through natural language processing but their area of interest differs. While Baker et al. (2016) measure the uncertainty on an aggregate level and focus on economic policies, Hassan et al. (2019) measure it at firm-level and focus on political risk in general. Figure 1 shows how these two measures have developed over the past 20 years.

From Figure 1, it is evident that both these measures have recently recorded values at earlier unprecedented levels. This undoubtedly is due to the Covid-19 pandemic. Other identifiable peaks are for instance the U.S. invasion of Iraq in 2003 and the 2008 financial crisis. Regardless, Figure 1 suggests the uncertainty that stems from the political system has increased in recent years. Going forward, with the war in Ukraine and political polarization in the U.S., political risk will likely remain at a high level.

This paper will research how this increased political risk impacts firms' cost of equity capital. The cost of equity capital is at the foundation of financial economics. It measures at what cost companies can acquire capital from investors, and conversely, what return investors can expect for committing their capital. It is thus a firm-level measure

Figure 1: Firm-level Political Risk and Economic Policy Uncertainty

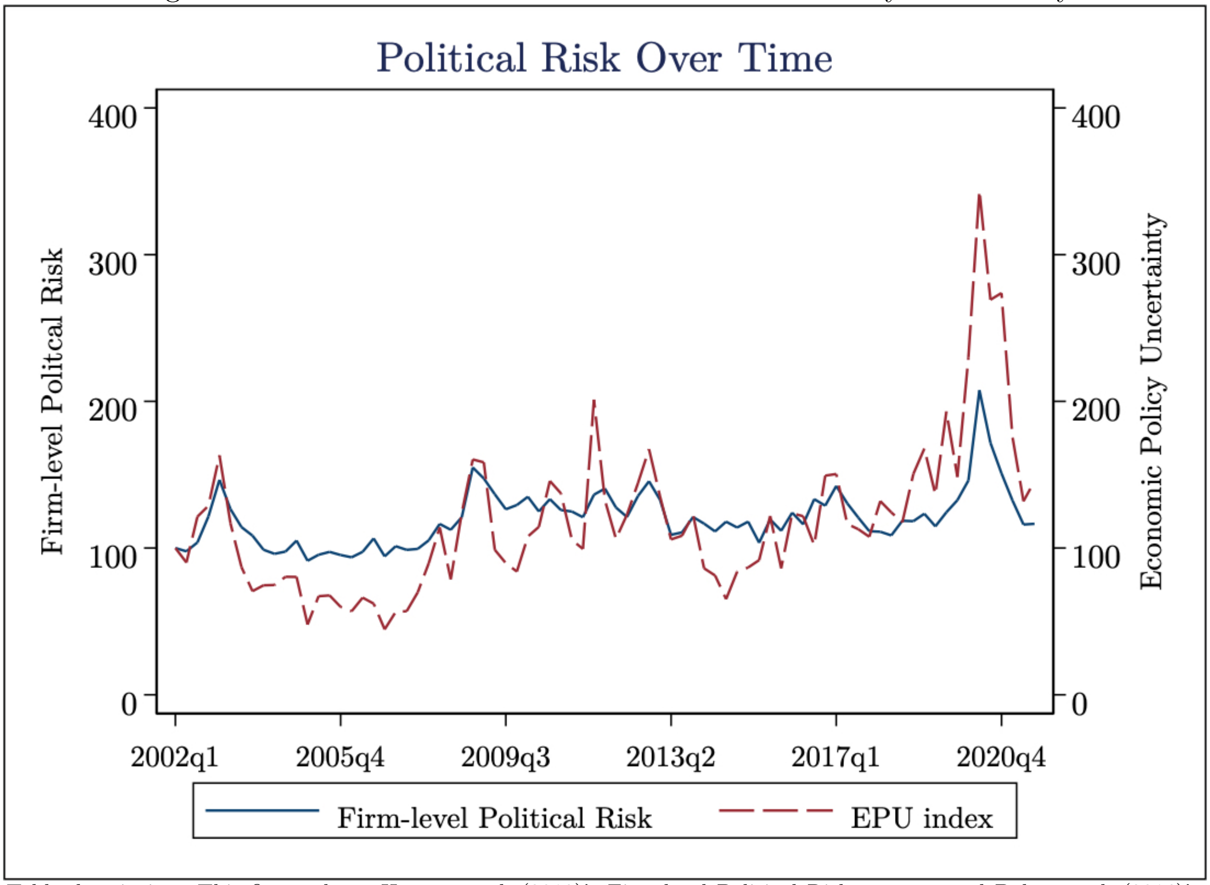

Table description: This figure shows Hassan et al. (2019)'s Firm-level Political Risk measure and Baker et al. (2016)'s Economic Policy Uncertainty index from first quarter of 2002 to third quarter of 2021. Both measures are indexed at 100 in the first quarter of 2002. The data for the EPU index is aggregated global and focuses on economic policies in particular. The data for Firm-level Political Risk is the mean risk of U.S. listed firms and focus on political risk in general.

of risk. Given its importance as a discount rate for both investors and managers and the fact that it captures the risk level of individual firms, it is interesting to learn to what extent political risk impact the cost of equity capital.

We further investigate the tools firms have to try and hedge towards risks stemming from the political system. We choose to look at lobbying expenditures to measure the level of political connectivity of individual firms. Total lobbying expenditures in the U.S. amounted to 3.78 billion dollars in 2021 (OpenSecrets 2022), which is higher than ever before. Given this, it is interesting to investigate what impact these lobbying expenditures have on the cost of equity capital, and its relationship with political risk.

We use a sample of U.S. listed firms and panel data of firm-level political risk, cost of equity, and lobbying expenditures. We find that firm-level political risk successfully manages to explain changes in the cost of equity capital for individual firms. Further, firms who engage in lobbying have on average a lower cost of equity capital than firms that do not. We also find a negative relationship between the cost of equity capital and lobbying expenditures. Finally, in a sub-sample analysis, we find that firms that engage in lobbying on average are less exposed to political risk than firms that do not. Also in the sub-sample analysis, we find that engaging in lobbying will have a mitigating effect on the cost of equity capital in times of rising political risk.

Our results are in line with previous literature. We use Hassan et al. (2019)'s measure of political risk which is to our knowledge the first measure that captures variations on a firm level rather than on an aggregate level. Gorbatikov et al. (2019) also use this measure, and find that it partly explains abnormal stock returns as well as showing that political campaign contributions have a mediating effect of political risk on the cost of equity capital. Compared to Gorbatikov et al. (2019), we estimate the cost of equity capital differently, use it in a different model, and look at lobbying expenditures rather than campaign contributions.

Further, Pham (2019) uses Baker et al. (2016)'s EPU-index to research the effect of political risk on the cost of equity capital. He finds that it explains variations in firms' cost of equity capital. He also finds that being politically connected has the same mediating effect on the rising political risk as we find. We use Pham (2019)'s method of estimating the cost of equity capital as well as a model similar to his. By combining it with a firm-level measure of political risk rather than a measure on an aggregate level we further deepen the understanding of its effect on the cost of equity capital.

Finally, Boubakri et al. (2012) research how being politically connected can impact the cost of equity capital. Using a different indicator than lobbying expenditures for being politically connected, they find that being politically connected has a negative relationship with the cost of equity capital. We develop this research by looking specifically at how individual firms can use a business practice such as lobbying to hedge against political risks.

Overall, our paper contributes to the understanding of how risk stemming from the political sector impacts the cost of equity capital for firms. Also, it contributes to the understanding of how engaging in lobbying could impact both the perceived risk of investors, as well as mitigating the effect of rising political risk and its effect on the cost of equity capital.

2 Literature Review

To evaluate the effect of political risk we begin by looking at the impact of general risk on firms. Bernanke (1983) discusses how managers' decision-making processes regarding irreversible business projects could be affected by uncertainty. Irreversible business projects are said to be investment decisions that cannot be reversed, e.g., deciding to build a new factory for production. He argues that managers operating in uncertain business environments will delay their decisions to get more information. One such uncertainty could be a proposal discussed in the American Congress that could lead to new legislation affecting the business of the manager. By delaying the decision, the manager can wait for the outcome of the proposal and then make a more informed decision. The main observation here is the trade-off between delaying the decision and obtaining more information, which implies an inverse relationship between investments and uncertainty.

Further, Bernanke (1983) observes that under uncertain conditions the possibility to avoid making irreversible decisions represents an option value. The idea is that if the irreversible decision is postponed, the option to be able to decide at a later time has value. Only business projects whose return is greater than the value of still having the option should be undertaken. Pindyck (1988) builds upon this and suggests that firms will continue to invest capital as long as the marginal benefit of additional investment is larger than the marginal cost. The value of the capital committed includes the option value. He then shows that the option value of capital is higher in states of much uncertainty. Bloom et al. (2007) further investigates the relationship between uncertainty and investments empirically, and finds that during periods of high uncertainty firms show a higher degree of caution when it comes to investments.

Bernanke (1983), Pindyck (1988) and Bloom et al. (2007) provide a foundation by showing that uncertainty in general matters for firm-level investment. However, to investigate the effect of political risk on firms, it needs to be defined and quantified. Different papers use different definitions of political risk. Hassan et al. (2019) define it as the risk that originates from the political system and that has an effect on the behavior of individual firms when it comes to decision-making. Baker et al. (2016) instead uses the phrase economic policy uncertainty where uncertainty is defined as by Bernanke (1983). The definition is though set in a politically applied context referring to the economic effects of monetary, fiscal, and regulatory policies set by governments. Pham (2019) partly agrees with the definition set by Baker et al. (2016), but also adds risks stemming from the disagreement between policymakers in government, so-called partisan conflict. We will use the definition by Hassan et al. (2019) throughout this paper.

Baker et al. (2016)'s definition of political risk is measured using their EPU-index. They use textual analysis of newspaper articles to create an aggregate index of economic policy uncertainty. However recent research has been able to measure this on a firm level. In the past, firm-level measures have proven difficult to create due to the lack of firm-level data on exposure to political risk and the type of political risk that individual firms are specifically concerned about. Hassan et al. (2019) create a firm-level risk measure using machine learning by textual analysis of firms' earnings conference calls. The majority of listed firms in the U.S. hold these conference calls in conjunction with the release of their quarterly earnings reports where the management give their view on the firm's performance and respond to questions from analysts.

Hassan et al. (2019) provide evidence that their method indeed captures and quantifies political risk exposure at firm-level. For instance, the measure varies intuitively over time related to political events such as elections and is highly correlated to more aggregate indices and proxies of political risk proposed in previous literature such as Baker et al. (2016). Also, their measure correlates with outcomes such as increased volatility of stock returns which is indicative of political risk found in previous research. Further, they successfully perform a set of falsification exercises and conclude that their measure indeed captures firm-level political risk. Although the measure shows promising results, a caveat to it is that it measures political risk as perceived by firm managers and investors attending conference calls. This could differ from actual political risk.

Having confirmed the validity of this measure, the main finding from Hassan et al. (2019) is that the vast majority of the variation in their measure appears to play out at firm-level. This suggests that conventional methods might not capture large parts of the variation in political risk faced by individual firms. Also, it can be interpreted as that firms are more concerned about the relative position in the cross-section rather than time-variant shocks such as large-scale reforms. This further emphasizes the importance of a firm-level measure relative to the sector or economy-wide proxies used in the past. However, the authors point out that the more aggregate measures of political risk are still useful but the large variation at firm-level suggests a highly heterogeneous effect of political risk on firms, opposite to prior beliefs.

Hassan et al. (2019) include a limited empirical section where they find that when political risk increases, lobbying increases, hiring decreases, and investment decreases. However, their firm-level measure facilitates further research. Until recently, the effect of political risk focused on multinational firms and foreign direct investments such as in Butler & Joaquin (1998). In contrast, political risk is not only present when firms cross borders according to Baker et al. (2016) and Hassan et al. (2019). It is ever-present as the uncertainty regarding potential policy responses to global events and thus not specific to the stability of institutions of a given country. Nonetheless, Baker et al. (2016) argue that stable institutions reduce the uncertainty surrounding their potential actions.

With political risk always present, Pastor & Veronesi (2012) create a theoretical model to analyze how changes in policy and its corresponding uncertainty impact stock prices. They find that policy changes increase the discount rate used by investors due to uncertainty regarding future profitability. Pástor & Veronesi (2013) extend on this research and finds that political risk should demand a risk premium and that this premium will be larger when the economy is weak.

Basic financial theory such as Sharpe (1964) suggests that firm-specific risk can be diversified away by investors, and thus should not be priced. Pástor & Veronesi (2013) suggest that political risk should incur a premium, but use an aggregate measure to quantify political risk. According to Hassan et al. (2019) a lot of the variation in political risk plays out at firm-level and thus a firm-level measure could be more accurate when investigating firm-specific characteristics such as the cost of equity capital.

Gorbatikov et al. (2019) does this by using the measure of Hassan et al. (2019) and exploring whether political risk is priced in the cross-section of returns. They find that firm-specific political risk is priced and stock prices will be affected by political risk both by changes in the discount rate and expected future cash flows. However, the majority of the effect comes from changes in expected cash flows. Either way, this suggests that firm-level political risk is not diversified away by investors. Gorbatikov et al. (2019)'s findings are in line with previous research. Based on this we hypothesize that:

Hypothesis 1: *There is a positive relationship between political risk and the cost of equity capital.*

The second part of this study is related to firms' ability to counteract potential political exposure. Early research by Stigler (1971) predicts that firms have incentives to donate to politicians and lobby to obtain beneficial regulation. A later study by Fisman (2001) find that political connections can be associated with a higher valuation due to economic rents. Similarly, Faccio (2006) concludes that political connections are in general associated with a higher valuation for the same reasons. Also, Faccio et al. (2006) find that politically connected firms are more likely to be bailed out in times of financial distress. Wellman (2017) further investigates how political connections can mitigate political uncertainty as defined by Baker et al. (2016). She finds that politically connected firms tend to invest in projects surrounded by a higher degree of political uncertainty.

This suggests that these firms manage to successfully reduce the information asymmetry towards legislators by being politically connected.

Wellman (2017) also discusses the difference between using lobbying expenditures and campaign contributions as a measurement of political connectivity. She argues that political contributions work as a proxy for access to legislators, while lobbying is a proxy for attempts to influence legislators. Using total lobbying expenditure rather than campaign contributions will likely capture firms' direct interest in certain political topics and in managing political risk. Further, as pointed out by Kim (2017), campaign contributions include complex preferences while lobbying is intended to influence governmental actions and is not necessarily tied to electing a certain individual. Also, Hassan et al. (2019) uses lobbying as an indicator of whether firms manage political risk or not.

Further, Boubakri et al. (2012) investigate how political connectivity impacts the cost of equity capital. Using Faccio (2006)'s sample of politically connected firms and a propensity score matching model, they find that investors require a lower return for politically connected firms compared to non-connected firms. They argue that this is due to the perception that politically connected firms are less risky. Together these results suggest that political connections should lower the discount rates used by investors, i.e. lead to lower levels of cost of equity. More specifically, it leads us to the following hypothesis:

Hypothesis 2: *There is a negative relationship between lobbying expenditures and the cost of equity capital.*

The last part of this study relates to whether lobbying can mitigate the proposed impact of political risk on the cost of equity capital. Pham (2019) investigates how political risk in terms of partisan conflicts and Baker et al. (2016)'s EPU-index impacts the cost of equity capital of firms. He uses a measure based on campaign contributions data. The results suggest that political connections successfully mitigate political risk's effect on the cost of equity capital. Even if the proxy for political connections and the aggregate measure of political risk are different from this study, the results are relevant for comparison. Pham (2019) is the first study to our knowledge that shows that political connections can help mitigate political risk's effect on the cost of equity capital.

Gorbatikov et al. (2019) also include political connections in their analysis. Their measure of political connections is as Pham (2019), based on campaign contributions. They find that political connections matter since the political risk is only priced in the stock returns of firms that do not manage political risk. This is similar to the findings of Pham (2019). Together their results lead us to the following hypothesis:

Hypothesis 3: *Increased lobbying expenditures will partly offset the impact of political risk on the cost of equity capital.*

This paper is different from previous research in several aspects. First and foremost, we use a firm-level measure unlike Boubakri et al. (2012) and Pham (2019). This is possibly an improvement since Hassan et al. (2019) find that the majority of variation plays out at firm-level. Further, we estimate the cost of equity capital in a different way than Gorbatikov et al. (2019). Their way is possibly flawed due to the reliance on realized returns, which will be further discussed in the methodology section. Finally, we use lobbying expenditures rather than campaign contributions based on the discussion above by Wellman (2017) and Kim (2017).

3 Methodology

3.1 Data sources

The main data for computing the cost of equity capital and control variables are gathered from the Compustat fundamentals annual file. Pricing data has been gathered from CRSP monthly stock file. The political risk data set is the same data used in Hassan et al. (2019) but extended to include the years between 2016 and 2021. The data is downloaded from their website. Finally, following the Lobbying Disclosure Act of 1995, firms are obligated to report details regarding lobbying contacts with government officials. This raw data is publicly available. The data set used in this paper is based on the raw data but prepared for Kim (2017) in a convenient format and it is downloaded from the author's website.

3.2 Sample Description

The sample is based on the companies included in Hassan et al. (2019). It consists of 7357 U.S. listed firms and covers the years 2002 to 2021. We first merge the data set with fundamentals from Compustat, the pricing data from CRSP, and lastly, with lobbying data from Kim (2017). Due to the data availability of the different sources, the final sample consists of 6324 firms listed on the NYSE, AMEX, and NASDAQ stock exchanges. The total number of annual observations amounts to 52070.

3.3 Variable definitions

3.3.1 Cost of equity capital

Estimating the cost of equity capital is not as straightforward as it may seem. In earlier research, the capital asset pricing model (CAPM) introduced by Sharpe (1964) is usually relied upon. This method depends on realized returns to estimate the cost of equity capital. According to subsequent research such as Black et al. (1972), Blume & Friend (1973), Fama & French (1997) and Elton (1999), the use of realized returns to estimate the cost of equity capital is flawed. Several alternative methods have been proposed to produce the cost of equity capital estimates that is not based on realized returns.

One of these methods is to compute the implied cost of capital (ICC) based on earnings forecasts. There are several versions of ICC such as Gebhardt et al. (2001), Claus & Thomas (2001) and Ohlson & Juettner-Nauroth (2005). However, they all use firms' book values and analyst forecasts of future earnings to calculate the cost of equity capital. For example, the residual income model used by Gebhardt et al. (2001) and Claus & Thomas (2001) is based on calculating the internal rate of return implied by the current stock price, assuming it is valued using future expected cash flows. Thus, it is the rate used by the market to discount future earnings (Hou et al. 2012). The main advantage of these methods is that they use ex-ante inputs to forecast future earnings rather than looking at realized returns ex-post. Pástor et al. (2008) show that the ICC method outperforms realized returns when it comes to capturing time-varying expected returns. However, they point out that at a firm level the ICC could be biased due to inaccurate analyst forecasts.

Although the papers above provide alternative ways to compute the cost of equity capital, they are all based on analyst forecasts of future earnings. In addition to Pástor et al. (2008)'s concern about inaccurate forecasts, Hou et al. (2012) point out that all firms do not have analyst coverage. Instead, they use a cross-sectional model to predict future earnings. Also, they show that their model captures more of the variation in future earnings than analyst forecasts. Li & Mohanram (2014) build on Hou et al. (2012)'s model, but suggests an alternative model based on a residual income-approach that produces more accurate earnings forecasts according to them. We use Li & Mohanram (2014)'s model for forecasting earnings. The results from our estimations are consistent with those of Li & Mohanram (2014) and are presented in table 6 in the appendix.

While the methods for computing ICC used by Gebhardt et al. (2001) and Claus & Thomas (2001) could be used separately, Hou et al. (2012) propose to take the average of several methods to create what they call the composite ICC. The rationale for using several methods and averaging them is that they all handle different kinds of earnings scenarios differently. For example, the Ohlson & Juettner-Nauroth (2005) method is not defined for firms with negative short-term growth. Li & Mohanram (2014) propose to use the methods of Gebhardt et al. (2001), Claus & Thomas (2001) and Ohlson & Juettner-Nauroth (2005) to create the composite ICC. They mean that this method produces less spurious estimates. In addition, they propose some smaller adjustments to the methods. This paper will use Li & Mohanram (2014)'s approach for calculating the composite ICC. The results are consistent with those of Li & Mohanram (2014) and are presented in table 7 in the appendix.

3.3.2 Political risk

The main independent variable of interest, political risk is quantified by the relative share of words devoted to politics in conjunction with words for risk during firms' quarterly earnings conference calls. This paper will use the measure created by Hassan et al. (2019). Equation (1) illustrates the calculation of the scores.

$$PRisk_{it} = \frac{\sum_{b}^{B_{it}} (I[b \in P/N] \times I[|b - r| < 10] \times \frac{f_{b,P}}{B_P})}{B_{it}} \quad (1)$$

Where $I[]$ is an indicator function and P and N are training libraries of political topics and non-political topics respectively, where both training libraries are a set of bigrams (two-word combinations). Each conference call is divided into a list of bigrams $b = 1, ..., B_{it}$ in a similar manner and r indicates the position of the closest synonym for risk or uncertainty in the transcripts of the conference calls. Thus, the first two terms in the numerator count the number of bigrams associated with political topics that occur within ten words of a synonym for risk or uncertainty. The last term of the numerator is used as a weight to indicate the extent of the bigram's association with political topics where $f_{b,P}$ is the frequency of bigram b in the training library and B_P is the total number of bigrams in the training library. Finally, the expression is divided by B_{it}, which is the total number of bigrams in a certain conference call to make the scores comparable.

Consequently, each conference call is given a score that describes the political risk perceived by the firm at that time. However, this score ranges from 0 to 5748 in our sample and is inconvenient to interpret. Thus we standardize the measure by dividing it by its standard deviation. This will express the coefficient as standard deviations and thus simplify the interpretation of the results. This approach has been used both in Hassan et al. (2019) and Gorbatikov et al. (2019). Also, we observe all of our variables annually. Since Hassan et al. (2019)'s measure for political risk is computed on a quarterly basis, we average them to get a yearly value.

3.3.3 Lobbying

The lobbying variable is observed at firm-level and is measured as the natural logarithm of the aggregate amount of USD spent on lobbying in year t.

3.3.4 Control Variables

Following previous literature, we include a series of control variables that are known to impact the cost of equity capital. Specifically, we include *Size* measured as the natural logarithm of total assets, *Leverage* measured as long term debt divided by total assets, *Market to Book* measured as the book value of equity divided by market capitalization, *Return on Assets* measured as net income divided by total assets and *Volatility* measured as the variance of weekly returns over one year. The control variables originate from the literature that uses realized returns for asset pricing such as Fama & French (1992). They are included since they were found to have a significant effect when using the ICC method by Hou et al. (2012) as well. Finally, the controls have been used in recent literature similar to this paper such as Pham (2019), Boubakri et al. (2012), and Gorbatikov et al. (2019).

Besides the controls for the cost of equity capital, we include a control variable for political risk as well. The main concern regarding the political risk measure is failing to control for the sentiment associated with political risk according to Hassan et al. (2019). For instance, if the increased political risk is due to the firm being investigated by the tax authority, we want to make sure that it is the risk associated with the investigation and not the possible negative outcome (such as a fine) that is affecting the cost of equity. The measure for political sentiment is included in the data set by Hassan et al. (2019) and is calculated similarly to the political risk but takes into account whether the surrounding words in the transcript are of positive sentiment (e.g, "good" and "strong") or negative sentiment (e.g., "loss" and "decline"). This results in a score that we standardize to a unit standard deviation like political risk.

3.4 Summary Statistics

Table 1: Descriptive Statistics

Descriptive Statistics					
	Mean	Std Dev	P25	P50	P75
Cost of Equity	0.0582	0.0564	0.0306	0.0445	0.0663
Political Risk	0.9777	0.9145	0.3367	0.6870	1.2941
Political Sentiment	1.0847	0.9456	0.5427	1.0350	1.5796
Size	6.9872	2.0138	5.5800	6.8989	8.2995
Leverage	0.2114	0.2113	0.0086	0.1721	0.3332
Market to Book	0.5425	0.5905	0.2314	0.4262	0.7096
Return on Assets	-0.0377	0.4387	-0.0264	0.0317	0.0722
Volatility	68.2	159.3	16.3	32.7	68.5
Log Lobbying	3.1404	5.5721	0	0	0
Count	52070				

Table description: This table shows descriptive statistics of the variables. Cost of equity is the mean of the ICC estimates presented in table 7 (in the appendix) for the observations to be included in the regression analysis. Political risk and political sentiment are shown as standard deviations. Size, leverage, market to book, return on assets and volatility is presented as defined in previous section. Lobbying amount is presented as the natural logarithm of USD per year. The sample consists of 52070 annual observations of 6324 firms over 2002 to 2021. Note that all firms do not have observations for all years.

Table 1 provides the descriptive statistics for our main variables. The final sample consists of 6324 unique firm observations between 2002 to 2021. *Cost of Equity* is winsorized at (5, 95), *Leverage* and *Return on Assets* are winsorized at (0, 99) and *Market to Book* is winsorized at (1, 99). This is due to outliers in the data and the thresholds are common in previous literature.

Looking at the statistics for our key variables certain values are noteworthy. First, we note that the firms in our sample on average have had negative earnings during our period of observation due to the mean negative value of -3.77% in return on assets. The median value is a positive value of 3.17% though, which indicates that there is a minority of firms that have had large losses during our sample period. Also, we note that the majority of the firms included in our sample do not have any lobby expenditures. Consistent with Hassan et al. (2019) we log 1 + the dollar amount of lobbying expenditures. The resulting variable is zero up to and beyond the 75th percentile. We note that 1751 of the 6315 firms included in our sample have had at least one registered lobbying expenditure over our period of observation.

Table 2: Correlation matrix

Pairwise correlations									
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Cost of Equity	1.000								
(2) Political Risk	0.025***	1.000							
(3) Political Sentiment	-0.027***	-0.091***	1.000						
(4) Log Lobbying	-0.105***	0.086***	0.021***	1.000					
(5) Leverage	0.019***	-0.009**	-0.032***	0.094***	1.000				
(6) Size	-0.257***	0.027***	0.010**	0.417***	0.304***	1.000			
(7) Market to Book	0.189***	0.036***	-0.127***	-0.088***	-0.127***	0.013***	1.000		
(8) Return on Assets	-0.244***	-0.042***	-0.019***	0.059***	-0.008*	0.266***	0.039***	1.000	
(9) Volatility	0.219***	0.037***	-0.020***	-0.079***	0.015***	-0.213***	0.082***	-0.293***	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table description: This table shows correlations between the variables to be included in the regression analysis. .*, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Looking at our correlation matrix in table 2 we want to review our expectations of each relationship and how it behaves in our sample. Our expectation are based on Fama & French (1992), Boubakri et al. (2012) and Pham (2019). Our expectation is that *Political Risk*, *Leverage*, *Market-to-book* and *Volatility* will have a positive relationship with cost of equity. This indicates that higher levels of these variables will correlate with the increasing cost of equity capital. Conversely, we expect *Political Sentiment*, *Lobbying*, *Size* and *Return on assets* to have a negative relationship with cost of equity. This indicates that higher levels of these variables will have a decreasing impact on the cost of equity capital. All of these relationships are according to the matrix as expected and significant. Regarding the potential issue of multicollinearity, we note that none of the included variables correlate on a level that would raise any concerns.

3.5 Econometric model

To test our first hypothesis that political risk and cost of equity capital will have a positive relationship, we set up the following model specification:

$$CoE_{i,t} = \alpha_i + \lambda_t + \beta_1 PRisk_{i,t} + \beta_2 Controls_{i,t} + \epsilon_{i,t} \tag{2}$$

In this specification, we will regress Hassan et al. (2019)'s measure of political risk, *PRisk*, on our cost of equity capital estimate, *CoE*. A firm fixed effect α and a time fixed effect λ are included to mitigate potential omitted variable bias. We can implement a time fixed effect because all of our variables are at a firm level. This is an advantage compared to previous research that has used an aggregate measure of political risk and thus could not have included a time fixed effect. *Controls* refers to our vector of control variables which in line with both Pham (2019) and Gorbatikov et al. (2019) are leverage, firm size, market-to-book ratio, return on assets and volatility of stock returns. We also include political sentiment to control for the mean of the political shock.

To test our second hypothesis that political risk and lobbying expenditure will have a negative relationship we set up the following model specification:

$$CoE_{i,t} = \alpha_i + \lambda_t + \beta_1 PRisk_{i,t} + \beta_2 Lobbying_{i,t} + \beta_3 Controls_{i,t} + \epsilon_{i,t} \tag{3}$$

CoE, α, λ, *PRisk* and *Controls* are defined as in the specification (2) above but now we add a variable for lobbying. In this specification, the lobbying variable is first a simple dummy indicating whether the firm has lobbying expenditures or not in year t. We also test a different specification, where we instead of having a dummy variable indicating whether a firm has lobbying expenditures or not, have the log of the firms' lobbying expenditures in year t.

To test our third hypothesis that higher levels of lobbying expenditures will reduce the effect of higher political risk on the cost of equity capital, we set up the following specification:

$$\text{CoE}_{i,t} = \alpha_i + \lambda_t + \beta_1 PRisk_{i,t} + \beta_2 Lobbying_{i,t} + \beta_3 Prisk_{i,t} \times Lobbying_{i,t} + \beta_4 Controls_{i,t} + \epsilon_{i,t} \quad (4)$$

CoE, α, λ, *PRisk*, *Controls* and *Lobbying* are defined as in specifications (2) and (3) above. Again we perform two regressions, one where the lobbying variable is a dummy indicating whether the firm has lobbying expenditures or not, and one where the lobbying variable is logged lobbying expenditures. However, we add an interaction term between political risk and lobbying. This is to test our hypothesis that spending money on lobbying should mediate political risk's effect on the cost of equity capital.

4 Results

4.1 Empirical analysis

Table 3 presents the regression results for the specification presented in equation (2) above. Specification (1) does not include any controls while specification (2) does. When comparing them it is evident that the included controls are significant in explaining the cost of equity capital. Further, since the coefficient for political risk and the constant changes, it indicates potential omitted variable bias in specification (1). Looking at specification (2), the coefficient for political risk is significant at the 1% level and is interpreted as that a one standard deviation increase in political risk leads to a 13.2 basis points increase in the cost of equity capital. Thus, the results are consistent with our first hypothesis, that firms are subject to a higher cost of equity in times of increased political risk. Further, the controls except political sentiment are significant at the 1% level. The insignificant coefficient of political sentiment indicates that it is the variance and not the mean of the political risk that is affecting the cost of equity capital (Hassan et al. 2019).

Judging by the results of specification (2), our findings are consistent with previous literature. First, the negative relationship between uncertainty and investments proposed by Bernanke (1983), Pindyck (1988) and Bloom et al. (2007) is supported by our results. Further, Pham (2019) finds that economic policy uncertainty as measured by Baker et al. (2016) has a positive relationship with the cost of equity capital. Similarly, Pástor & Veronesi (2013) and Pastor & Veronesi (2012) find that higher political risk should incur a higher cost of equity capital. Also, all of the control variables have the expected sign according to earlier literature such as Pham (2019) and Boubakri et al. (2012).

The findings in table 3 are relevant for several reasons. First, it supports the results from previous studies even if this study adopted a firm-level measure instead of an aggregate measure of political risk. Thus, the previous studies' results are robust even if the vast majority of variation in political risk plays out at firm-level. Second, the result is an extension of Hassan et al. (2019) showing that investors are concerned about firm-level political risk, not only managers. Hassan et al. (2019) find that hiring and investment decrease in times of high political risk. This can be interpreted as managers' actions in times of an increased risk level. However, recall that the cost of equity capital in all our models is the implied discount rate used by investors. Thus, the result suggests that investors are compensating for political risk by increasing the discount rate.

Table 3: Regression Outputs

Regression Outputs		
Dependent Variable: Cost of Equity		
VARIABLES	(1)	(2)
Political Risk	0.00159***	0.00132***
	(0.000342)	(0.000332)
Political Sentiment		0.000219
		(0.000368)
Leverage		0.0389***
		(0.00370)
Size		-0.0142***
		(0.000782)
Market-to-Book		0.0169***
		(0.00125)
Return on Assets		-0.0144***
		(0.00376)
Volatility		1.60e-05***
		(3.68e-06)
Constant	0.0642***	0.133***
	(0.000970)	(0.00490)
Controls	No	Yes
Observations	52305	52070
R-squared	0.104	0.163
Number of Firms	6324	6315
Firm Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table description: This table presents the regression outputs for specification 1 and specification 2, based on regression equation (2). *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Further, the results build on Gorbatikov et al. (2019) that use the same political risk measure but in a different model. They find that political risk is priced since it is associated with abnormal returns in the months preceding a conference call. While they observe short-term stock returns, we use the annual cost of equity capital based on ex-ante data rather than realized returns and still find a similar result. In conclusion, the results suggest that firm-level political risk has an impact on firms' cost of equity capital.

Table 4 includes lobbying and presents the regression results for equation (3) above as specifications (3) and (4). In specification (3) we again get the result that increasing levels of political risk results in higher levels of cost of equity. The coefficient is statistically significant at the 1% level and has approximately the same magnitude as in specifications (1) and (2). This indicates that none of the variation in the cost of equity capital that the political risk catches is impacted by adding a variable for lobbying. The dummy has as expected by the literature a negative sign, and suggests that if a firm has lobbying expenditures their cost of equity capital will be 0.19 basis points lower all else equal. The coefficient is significant at the 10% level. This indicates that firms that lobby on average have a lower cost of equity than firms that do not.

In specification (4) we replace the dummy variable with a logged, continuous variable containing the annual amount of lobbying expenditure. The variable for political risk is again of the expected sign, statistically significant, and has approximately the same value as in earlier specifications. We find a statistically significant relationship between the cost of equity capital and lobbying expenditure at the 5% level. The coefficient indicates that a 1% increase in lobbying expenditure will lead to a 0.0173 basis point decrease in the cost of equity capital.

The results from both specifications support our second hypothesis that increasing levels of lobbying expenditure will reduce the cost of equity capital for individual firms. The results are also broadly in line with Boubakri et al. (2012). They find that the cost of equity

Table 4: Regression Outputs

Regression Outputs				
Dependent Variable: Cost of Equity				
VARIABLES	(3)	(4)	(5)	(6)
Political Risk	0.00133***	0.00133***	0.00112***	0.00116***
	(0.000332)	(0.000332)	(0.000409)	(0.000408)
Lobby Dummy	-0.00190*		-0.00264**	
	(0.00103)		(0.00112)	
Log Lobbying		-0.000173**		-0.000219**
		(8.67e-05)		(9.35e-05)
Interaction			0.000736	
			(0.000586)	
Interaction				4.55e-05
				(4.37e-05)
Constant	0.133***	0.132***	0.133***	0.133***
	(0.00490)	(0.00491)	(0.00491)	(0.00491)
Controls	Yes	Yes	Yes	Yes
Observations	52070	52070	52070	52070
Adjusted R-squared	0.163	0.163	0.163	0.163
Number of Firms	6315	6315	6315	6315
Firm Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table description: This table presents the regression outputs for specification 3 and 4 based on regression equation (3) as well as specification 5 and 6 based on regression equation (4). The interaction term in specification 5 is $PolticalRisk \times LobbyDummy$. The interaction term in specification 6 is $PolticalRisk \times LogLobbying$. *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

capital is lower for firms that are politically connected as defined by Faccio et al. (2006). Further, Wellman (2017) suggests that lobbying expenditures works as a way to influence legislators. She also suggests that firms that engage in political activity reduce the information asymmetry towards legislators and thus can make investments surrounded by political uncertainty. According to Fisman (2001) and Faccio et al. (2006) this lead to higher company valuations. Given that the cost of equity capital is a discount rate used for valuations, our results support this notion. One possible explanation is suggested by Stigler (1971), who states that political donations are used to get beneficial regulation.

Overall, the results are relevant since managers have an incentive to hold the cost of equity capital down to be able to undertake projects at a cheaper cost. Our results suggest that by engaging in lobbying they do so. It supports the idea that managers of firms who lobby manage to reduce information asymmetry towards legislators. Also, by reducing the cost of equity capital, the discount rate used by investors will be lower. This in turn will lead to higher company valuations. Obviously, this is also desired by the managers to satisfy shareholders. Finally, it is firms with lower leverage that will benefit the most from this since the cost of equity capital constitutes a larger share of their discount rate.

Table 4 also presents the regression results for equation (4) above as specifications (5) and (6). In the first regression, specification (5), we interact the dummy indicating whether firms have lobby expenditures or not with the measure of political risk. First, we note that both the political risk variable and the lobby dummy are of the expected sign and significant at the 1% and 5% level, respectively. The coefficients are different from earlier specifications, where the coefficient for political risk has decreased and the coefficient for the dummy has increased. Turning to the interaction term, which is the variable of interest in this specification, the result is not of the expected sign and have no statistical significance. The result suggests that lobbying expenditure increase the effect of an additional standard deviation increase in political risk. This result contradicts our third hypothesis.

In the second regression, specification (6) we interact political risk with logged lobbying expenditures. The results are similar to specification (5), where both political risk and lobbying keep their statistical significance, but the coefficient for political risk decreases while the coefficient for lobbying expenditures increases. The interaction term is also similar to that of specification (5), namely that it is not of the expected sign and not statistically significant. Again, the coefficient suggests that lobbying expenditures will increase the impact of political risk on the cost of equity capital. This also contradicts our third hypothesis.

The results suggest that the proposed information channel that mitigates the impact of political risks does not exist. This is relevant since it implies that money spent on lobbying with the purpose to manage political risk could have been spent elsewhere. It could also be that lobbying expenditure is not a suitable proxy for political connectedness. Note that the results do show a negative effect of lobbying in terms of cost of equity, but it does not mitigate the effect of political risk.

However, one problem in the specifications above is the significant difference in characteristics between lobbying and non-lobbying firms. For instance, lobbying firms are larger, have a higher mean of political risk, and are more leveraged which we show in table 9 in the appendix. These differences suggest that lobbying is an endogenous choice and based on the firms' characteristics, they will be less or more likely to lobby. Thus, specifications (3)-(6) may suffer from inconsistent estimators. To account for this, we perform a sub-sample analysis of lobbying and non-lobbying firms respectively.

Yet, simply splitting the sample will introduce selection bias. To control for this we follow Gorbatikov et al. (2019) by implementing Heckman (1979)'s two-stage approach for selection bias. The first step is to estimate a cross-sectional probit model for the full sample with the lobby dummy as the dependent variable. We show the results for this regression in table 10 in the appendix. The probit result can be interpreted as the likelihood of whether a firm has lobbying expenditures or not based on the characteristics that were significantly different between the two groups. Using these results we calculate the inverse mills ratio (IMR) according to Heckman (1979) and include it as a control variable in the sub-sample regressions. The results from the regressions on the sub-samples are presented in table 5.

There are several observations to be made from these results. First, there is a difference in the coefficient for political risk between specifications (7) and (8). This suggests that

Table 5: Distinction between Lobbying and Non-Lobbying

Regression outputs

Dependent Variable: Cost of Equity

	Non Lobbying	Lobbying		
	(7)	(8)	(9)	(10)
VARIABLES				
Political risk	0.0163***	0.0124***	0.0124***	0.0309***
	(0.00502)	(0.00293)	(0.00293)	(0.00673)
Log Lobbying			-0.000301	0.00103*
			(0.000509)	(0.000564)
Interaction				-0.00120***
				(0.000310)
Constant	-0.344**	-0.263***	-0.261**	-0.377***
	(0.161)	(0.102)	(0.101)	(0.117)
Controls	Yes	Yes	Yes	Yes
Observations	39292	12778	12778	12778
R-squared	0.181	0.117	0.117	0.119
Number of Firms	5871	1749	1749	1749
Firms Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table description: This table presents the regression outputs when performing sub-sample analysis on non lobbying and lobbying firms respectively. The IMR is included as control variable. *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

political risk has a larger impact on the cost of equity capital of firms that do not engage in lobbying. This result contradicts previous results from Gorbatikov et al. (2019). They find that firms that contribute to political campaigns are more sensitive to political risk. Our result suggests that firms that engage in lobbying are less sensitive to political risk than firms that do not. One explanation for this difference is that the mitigating effect of lobbying actually exists as hypothesized, meaning that firms that engage in lobbying successfully mitigate the effect of political risk on the cost of equity capital. Another is that there is a significant difference in observing lobbying expenditures or campaign contributions as proxies for political connectedness.

Further, compared to the full sample (specification (4) in table 4), the log lobbying coefficient in specification (9) is not significant for firms that lobby. This suggests that our results from specification (4) could suffer bias from the mentioned differences in characteristics between lobbying and non-lobbying firms. Finally, the interaction term between log lobbying and political risk in specification (10) is now significant at a 1% level. The coefficient suggests that a 1% increase in lobbying expenditure will have a mitigating effect of -0.12 basis points on the cost of equity capital of a one unit standard deviation increase of political risk. This is the first significant result that supports our third hypothesis, that lobbying should decrease the impact of increasing political risk on the cost of equity capital. The coefficient for the political risk is of expected sign and significant at the 1% level. The coefficient for the logged lobbying variable in this model is however not of the expected sign but significant at the 10% level. These differences could be interpreted as that the full sample analysis suffers from inconsistent estimators due to the different characteristics of the groups.

Looking at our results from specification (10) they are broadly in line with previous literature. Hassan et al. (2019) find that firms engage in lobbying to mitigate exposure to political risk. Gorbatikov et al. (2019) build upon Hassan et al. (2019)'s results and find that the returns of firms that donate to political campaigns are less sensitive to changes in political risk than firms that do not donate. Further, Pham (2019) shows that the cost of equity capital of politically connected firms is less sensitive to higher economic policy uncertainty as defined by Baker et al. (2016).

Overall, our results find a similar mitigating effect of lobbying expenditures on the cost of equity capital in periods of rising political risk as proposed by our third hypothesis when splitting the sample. However, our results also suggest that there is a trade-off to engaging in lobbying between mitigating political risk's effect and increasing the cost of equity capital. This is due to the different signs of the interaction term and the lobbying term. One explanation for this could be that firms from certain industries spend a lot of money on lobbying but still are perceived as risky to investors. An example could be firms operating in the oil industry.

With the combined results, it is necessary to discuss the implications of political risk and lobbying as a tool to mitigate its effect. Political risk as defined by the literature stems from the political system and this raises the question of to what extent it can be reduced. Our results suggest that it increases financing costs but that firms can mitigate this effect by spending money on lobbying. However, it would be advantageous if the political system the risk stems from could minimize it in the first place. Then the lobbying money could be spent in a better way and the capital cost be lower. Naturally, political risk will always be present but perhaps through increased transparency, it could be lowered. With an increased awareness of the effect of political risk, government officials would potentially be willing to mitigate it.

4.2 Robustness and further analysis

The results in the previous section are subject to several considerations when it comes to robustness. One concern that we address above is that of different firm characteristics relying on whether they have lobbying expenditures or not. This concern is also raised by Gorbatikov et al. (2019) but in the context of different characteristics regarding whether firms contribute to political campaigns or not. Since their proposed fix of using Heckman (1979)'s two-stage approach is also used by us, we want to address some of the implications of using this method. First, the approach relies heavily on the model specification of the probit model in the first step. This means that if the specification is not appropriate, the potential reduction in sample bias will fail. Second, as acknowledged by Heckman (1979), the standard errors presented in the regression are likely to be too small since the IMR is estimated in the first step.

Another concern is whether our sample of unbalanced panel data creates selection bias or not. The sample is based on listed firms on the NYSE, AMEX, and NASDAQ stock exchanges where there are transcripts of earnings conference calls available on Thomson

Reuters StreetEvents. This is due to data availability of pricing and fundamentals data and the transcripts used by Hassan et al. (2019) for the political risk score. Typically, some firms will only appear for a few years in our sample since they might get listed or delisted during the sample period. One could expect that for instance companies with consistently negative earnings will be delisted and that newly listed firms will be smaller in size. However, in terms of the variables cost of equity and political risk, there are few apparent risks related to being recently listed or getting delisted.

Another potential issue is the variation in the political risk measure we lose by averaging quarterly observations into yearly observations. To address this, we look at how the measure of political risk varies between years and within years. This is to make sure we capture the variation in political risk despite observing it annually. The results are presented in table 11 in the appendix. We find that the mean of the standard deviation is similar between and within years, while the median is higher between years than within. This suggests that we do capture variations in the measure, but with more detailed data the analysis could be further deepened.

Further, we perform a Breusch-Pagan test which indicates the presence of heteroskedastic error terms (Breusch & Pagan 1979). Therefore we have used clustered standard errors at a firm-level in each regression presented above. Also, to ensure a fixed effects model is preferable to a random effects model, we adopt a Hausman test. The result shows that the fixed effects model is a better fit.

We also want to address the concern of potential endogeneity in our models. Throughout the paper, we have taken measures to prevent omitted variable bias. First, the literature regarding the determinants the of cost of equity capital is extensive. Following this, it should provide us with the necessary control variables. Second, similar specifications have been used in recent research (Pham 2019 and Boubakri et al. 2012). Finally, unlike previous research, we adopt both firm fixed effects and time fixed effects to control for possible omitted variables.

The last consideration in terms of robustness is that the estimation of the cost of equity capital can be subject to measurement error. Any valuation equation will depend on assumptions. The methods used in this paper are all published and deemed accurate before our sample period and the assumptions accordingly. This led to some problems. For example, the very low interest rates of the 2010s caused issues in some of the calculations. Thus, even if we choose to take the average of four different costs of equity measures to prevent spurious estimates, we still want to acknowledge this potential problem that some estimates might be under or over-estimated. Nonetheless, it should be stressed that all firms are treated identically in performing the estimation.

5 Conclusion

Recent literature shows how aggregate political risk impacts the cost of equity capital and how political connections might mitigate this effect. This paper seeks to provide a better understanding by using a firm-level measure of political risk. This is relevant since the majority of political risk plays out at firm-level (Hassan et al. 2019). The results are in line with prior literature. Political risk has a positive effect on firms' cost of equity capital, political connections proxied by lobby expenditures have a negative effect on the cost of equity capital and political connections help mitigate political risk's effect on the cost of equity capital. These findings are relevant, especially given current global events such as the war in Ukraine.

Applying our results would lead to firms' engaging in lobby activities to mitigate the effect of political risk on the cost of equity capital. However, this is not necessarily desirable. One could argue that money spent on lobbying could have been used elsewhere with a different purpose and thus, it would be advantageous to minimize political risk in the first place. The results of this study could increase the awareness regarding political risk's effect on the economy and increased transparency by government officials could help to reduce it.

There are several interesting further applications of our paper. One would be to research the European market. It possesses many of the characteristics of a developed market as in the U.S., but is based on a different political system. Further, we believe the relationships we have found in this paper could be found in less developed markets. Fisman (2001) suggests that political rents are more prevalent in corrupt countries. This suggests that the negative relationship between lobbying and the cost of equity capital we find, as well as the mitigating effect of lobbying on political risk, could be even stronger in countries that are less developed than the U.S. Also, increasing the frequency of observation would allow for further investigation of the timing and causality in the relationship between political risk, lobbying and cost of equity capital.

The main conclusion is that political risk will be present even in developed democracies and in turn impact the business of individual firms. Our results are found using a sample of U.S.-listed firms. However, there is reason to believe these results apply to other markets as well. Political risk will reasonably be present everywhere.

6 References

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7 Appendix

7.1 Earnings forecast

Li & Mohanram (2014)'s RI model to forecast earnings:

$$E_{t+\tau} = \chi_0 + \chi_1 \times NegE_t + \chi_2 \times E_t + \chi_3 \times NegE_t \times E_t + \chi_4 \times B_t + \chi_5 \times TACC_t + \epsilon \quad (5)$$

Where $E_{t+\tau}$ is the forecasted EPS in time $t + \tau$, E_t is EPS, $NegE_t$ is a dummy for negative EPS, $NegE_t \times E_t$ is an interaction term, B_t is book value of equity per share and $TACC_t$ is change in total accruals. This model is estimated using pooled OLS and all available data over the past 10 years. Thus, if 2005 is year t, we use data from 1995 to 2004 to estimate the earnings of 2006, which is year t+1 (Li & Mohanram 2014). A summary of the results from these regressions are presented in table 6.

Table 6: Summary Statistics of Earnings Forecasts using the RI-model

Average Coefficients and t-statistics						
	Intercept	$NegE_t$	E_t	$NegE_t \times E_t$	B_t	$TACC_t$
E_{t+1}	0.1620	-0.4333	0.6917	-0.3871	0.0071	-0.0058
	7.88	*-15.40*	*41.10*	*-13.81*	*3.91*	*-3.36*
E_{t+2}	0.2423	-0.4992	0.5400	-0.4203	0.0130	-0.0069
	9.82	*-16.49*	*28.61*	*-15.23*	*6.55*	*-3.55*
E_{t+3}	0.3224	-0.5278	0.4204	-0.3664	0.0184	-0.0082
	11.90	*-16.36*	*20.61*	*-13.02*	*8.78*	*-3.24*
E_{t+4}	0.3724	-0.5313	0.3608	-0.3513	0.0188	-0.0035
	13.51	*-15.54*	*17.57*	*-12.45*	*8.73*	*-2.23*
E_{t+5}	0.4234	-0.5499	0.3260	-0.3623	0.0168	0.0001
	15.57	*-15.90*	*15.21*	*-12.34*	*7.07*	*-1.06*

Table description: This table shows the average coefficients and t-statistics (in italic) from the pooled regressions used to obtain earnings forecasts. See equation (5).

7.2 Cost of equity estimates

Using the earnings forecasts from the previous section, the next step is to calculate the ICC. Following Li & Mohanram (2014) we take the average of four different measures of ICC (equation 6-9) and use the same assumptions as them for the inputs.

Based on Ohlson & Juettner-Nauroth (2005):

$$COC_{GM} = A + \sqrt{A^2 + \frac{eps_1}{P_0}(g_2 - (\delta - 1))} \quad (6)$$

$$COC_{PEG} = \sqrt{\frac{g_2}{P_0/eps_1}} \quad (7)$$

Where P_0 is current stock price, dps is dividend per share, eps is earnings per share, $A = \frac{1}{2}((\delta - 1) + \frac{dps_1}{P_0})$, $g_2 = \frac{eps_2 - eps_1}{eps_1}$ and $(\delta - 1)$ is set to risk-free rate-2%. We diverge from Li & Mohanram (2014) here in that we set the $(\delta - 1)$ to risk-free rate-2%

rather than risk-free rate−3%. This is done since the years we observe are during a period of lower risk-free rates than Li & Mohanram (2014) observed period.

Based on Gebhardt et al. (2001):

$$P_0 = B_0 + \sum_{\tau=1}^{12} \frac{(eps_\tau - r \times B_{\tau-1})}{(1+r)^\tau} + \frac{(eps_{12} - r \times B_{11})}{r(1+r)^{12}} \tag{8}$$

Where B_0 is book value per share, B_1 through B_{11} are future book values per share obtained by taking the surplus of earnings forecasts net dividend based on the current payout rate. For firms with negative earnings we take dividends divided by 6% of total assets. r is the implied discount rate that equals ICC_{GLS}. Explicit forecast are used for E_{t+1} to E_{t+5}. Beyond this point, the earnings forecasts are estimated by interpolation to the implied eps of the industry median ROE at time t. The ROE is calculated using Fama & French (1997) 48 industry definition and the past five years of data.

Based on Claus & Thomas (2001):

$$P_0 = B_0 + \sum_{\tau=1}^{5} \frac{(eps_\tau - r \times B_{\tau-1})}{(1+r)^\tau} + \frac{(eps_5 - r \times B_4) \times (1+g)}{(r-g)(1+r)^5} \tag{9}$$

Where g is set to risk-free rate−2%. All other variables are defined as in ICC_{GLS}. r is the implied discount rate that equals ICC_{CT}.

The results from the ICC calculations are presented in table 7.

Table 7: ICC Estimates

Summary Statistics Cost of Equity Measures

	Count	Mean	Std Dev	P25	Median	P75
GLS	25843	.0545903	.0336146	.0288997	.0508834	.0760209
CT	54627	.0419994	.0299429	.022363	.039514	.054955
PEG	29781	.0945496	.0819683	.0427998	.0669596	.1146247
GM	29267	.1080303	.0855275	.0529533	.0802648	.132268
Average	62915	.0626469	.0608063	.0314458	.0463207	.0724963

Table description: This table shows the summary statistics of the different cost of equity estimates used to calculate the average cost of equity used as dependent variable in all regressions.

As evident from table 7, the mean cost of equity for the firms in our sample is 6.26%. This might seem low but as pointed out by Claus & Thomas (2001), the high equity premiums of the 1900s are not realistic nowadays and in recent years an equity premium of 3% is reasonable. Gebhardt et al. (2001) find similar results and hence the results in table 7 are deemed reasonable. Also, when controlling the cost of equity results over time (presented in table 8), it is in line with the estimates of Hou et al. (2012).

Table 8: ICC Estimates by Year

Summary Statistics Cost of Equity Measures by Year						
Year	Count	Mean	Std Dev	P25	P50	P75
2002	2595	.0754107	.0456678	.0434501	.0586939	.0939895
2003	3052	.0569307	.0304414	.0378549	.0477177	.0670835
2004	3209	.0518435	.0256192	.035826	.0453093	.0620058
2005	3208	.0517136	.0261023	.0359418	.0462405	.0614976
2006	3179	.0489113	.0228128	.0369623	.0454507	.0572827
2007	3255	.0602937	.0472099	.0364084	.0453757	.0655421
2008	3170	.0989816	.106519	.0395629	.0611167	.1100209
2009	3181	.0913505	.0825636	.0432984	.0605106	.1048968
2010	3037	.063661	.0451181	.0372158	.0501681	.0760173
2011	3198	.0433101	.0305378	.0244268	.039232	.0587874
2012	3182	.0439585	.0355119	.0220118	.0376452	.0576081
2013	3262	.0639384	.0527715	.0319531	.0432678	.0766749
2014	3474	.0720938	.0566656	.0343858	.0527096	.0906776
2015	3460	.0887576	.0829745	.0383112	.0580548	.1082703
2016	3348	.0890693	.0945107	.0333228	.0514525	.1003131
2017	3159	.0679088	.0823483	.0259471	.0405539	.0699235
2018	3054	.0577618	.0548234	.0272168	.0428005	.0685463
2019	3394	.0374556	.0345186	.0121675	.0297067	.0528239
2020	3421	.030715	.0382746	.001858	.0219318	.0474304
2021	959	.0329626	.0273993	.0137042	.0298536	.0477894
Total	62915					

Table description: This table shows the summary statistics of cost of equity by year in our sample.

7.3 Sub-sample firm characteristics

Table 9: Difference in characteristics lobbying and non-lobbying

Firm characteristics: Non-lobbying vs Lobbying

	Non-lobbying firms		Lobbying firms		Difference
	Mean	SD	Mean	SD	Mean
Cost of equity	0.0615	0.0602	0.0482	0.0411	0.0132***
Political risk	0.9355	0.8996	1.1077	0.9472	-0.1722***
Political sentiment	1.0766	0.9381	1.1095	0.9684	-0.0329***
Size	6.5537	1.8456	8.3205	1.9226	-1.7611***
Leverage	0.2004	0.2156	0.2451	0.1936	-0.0448***
Market to Book	0.5707	0.6217	0.4556	0.4719	0.1158***
Return on Assets	-0.0511	0.4758	0.0033	0.2930	-0.0547***
Volatility	74.9	169.4	47.9	120.7	26.8754***
Count	39292		12778		

Table description: This table shows the difference in characteristics between lobbying and non-lobbying firms. Note that this is based on yearly observations, i.e. if a firm lobbies 5 out of 10 years, only the years with lobbying expenditures will be included in this comparison under lobbying firms and vice versa. The differences are confirmed using t-tests. *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

7.4 Probit regression

We estimate the following probit model in order to calculate the Inverse Mills ratio:

$$Dummy_{i,t} = \beta_0 + \beta_1 PRisk_{i,t} + \beta_2 Controls_{i,t} + \epsilon_{i,t} \tag{10}$$

Dummy is a variable indicating whether a firm has lobbying expenditures or not in year *t*. *Controls* are the same vector of control variables as used in the paper. The results are presented in table 10.

From this we calculate the Inverted Mills ratio according to Heckman (1979):

$$IMR_i = \frac{\phi(Z_i)}{\Phi(-Z_i)} \tag{11}$$

Where Z is the linear prediction estimated from the model, ϕ is the standard normal density function and Φ is the standard normal distribution function.

Table 10: Probit results - determinants of lobbying

Regression Outputs

VARIABLES	(1) Lobby Dummy
Political risk	0.119***
	(0.00693)
Political sentiment	-1.35e-06
	(6.02e-06)
Size	0.294***
	(0.00366)
Leverage	-0.231***
	(0.0326)
Market-to-book	-0.298***
	(0.0130)
Return on Assets	-0.123***
	(0.0142)
Volatility	-8.28e-06
	(4.93e-05)
Constant	-2.762***
	(0.0299)
Observations	52,070

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table description: This table shows the results from the probit regression.*, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

7.5 Within and between variation in Political Risk

Table 11: Variation in Political Risk

Variation in Political Risk		
	Mean	Median
Variation Within Years	98.6639	56.1286
Variation Between Years	95.8144	73.0127
Count	49454	

Table description: This table shows the standard deviation in the political risk measure between years and within years. I.e., it shows where the variation in the measure lies.