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This dissertation is dedicated to my family, whose unconditional love and encouragement have allowed me to reach where I am today. I dedicate it to my husband, Wenbin; without his love, support, and understanding, this work would not have been possible. I dedicate it to my parents, Zhongping Duan and Rui Cheng, and my sister, Xiaowan Duan, who have always been there for me. Finally, I dedicate it to my daughter, Julia Ruoshui Cao, who has made me stronger, better, and more fulfilled than I ever could have imagined.

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Abstract

This dissertation is a collection of three essays on the theme of international finance. Chapter 1 compares the takeover premia paid by government-owned and private sector bidders in the oil and gas industry. Using the Schwert (1996) measure for acquisition premium, I find that public shareholders on average receive a 46% lower premium when the bidder is a government-owned firm than when it is a private sector company. However, the premium difference disappears once I control for deal and target characteristics, and this finding is robust to the concern that government bidders do not invest randomly. I further compare changes in target characteristics after the acquisitions and find no significant differences between the targets acquired by government-owned and private sector firms. These findings suggest that both government and private sector bidders are motivated by commercial objectives when they are investing in the oil and gas industry.

Chapter 2 examines the role of economic policy uncertainty in capital structure adjustments. After accounting for macroeconomic conditions, firm and industry characteristics, I find that firms wait longer to issue debt and reduce leverage during periods of high economic policy uncertainty. Furthermore, debt maturity shortens and borrowing costs increase when uncertainty elevates. The effect of economic policy uncertainty is moderated by supply-side factors such as having access to public debt markets and having an investment grade bond rating. The results are robust to endogeneity concerns, alternative model specifications, testing strategies, and subsample analyses, as well as alternative measures of economic policy uncertainty. Collectively, the evidence suggests that the supply of capital plays an important role in corporate capital structure choices in times of high economic policy uncertainty.

Chapter 3 studies the degree and determinants of capital allocation efficiency across firms using comprehensive firm-level survey data that covers a wide spectrum of developing countries. I document that capital misallocation, as measured by the dispersion in firms' marginal revenue product of capital, is pervasive in firms within the same industry in a country. I find that limited access to finance, bureaucracy, information asymmetry, and gender inequality play important roles in impeding the most efficient allocation of capital across firms in developing countries. By employing the quantile regression technique, I show that these factors exert greater effects on firms that are already highly distorted (i.e., have too little capital). The results have direct policy implications; in particular, governments could achieve a more efficient allocation of capital by eliminating these distortions to enhance economic performance.

Chapter 1:
State Capitalism and Takeover Premia: Evidence from the Oil and Gas Industry

I. Introduction

The recent global wave of state capitalism marks one of the greatest transfers of ownership from private sectors to states, and these transfers occur disproportionally more in the oil and gas sector.[1] In the past 30 years, the value of government purchases worldwide in the oil and gas sector has exceeded US$462 billion, representing 14% of the total value of government-involved purchases across all industries around the world.[2]

Amid the growing presence of government investments, a central question is whether state enterprises behave differently from private firms. However, one major challenge faced by researchers is that government objectives are often unobservable and difficult to identify. I study a unique industry setting in which some state-owned companies have politically motivated objectives when making investments, such as pursuing national energy security. Such non-commercial objectives are often argued to be the driving force behind the rapid global expansion of state-owned oil companies from resource-hungry emerging economies (e.g., China and India) and thereby generate substantial concern from host countries (Dinc and Erel, 2013). One prominent concern is that state-owned companies, with the goal of securing oil reserves in mind, tend to over-bid for assets and thus oppress healthy competition from private oil companies (the

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[1] For example, as shown by Kretzschmar et al. (2010), a growing trend of nationalization can be observed in the oil and gas sector. Moreover, Karolyi and Liao (2016) demonstrate that government acquirers are more likely to pursue targets in the oil and gas industry.

[2] These figures are the based on the author's calculations, using data from the Thomson Reuters Securities Data Company's Platinum Mergers and Acquisitions database.

political motive hypothesis). Under this hypothesis, state owned oil companies are eager to offer higher premia beyond the value of the targets to the acquiring firm to factor any additional future benefits to the society or the nation. Moreover, given their “soft budget constraint” and often privileged access to financial support from governments (e.g., Megginson, Nash and Randenborgh, 1994; Megginson and Netter, 2001; Megginson, Ullah and Wei, 2014), state owned oil companies are not only willing, but also able to pay higher acquisition premia as compared to private sector oil companies.

Alternatively, state-owned companies may act in a commercial way, like their private counterparts; indeed, both types of entities might select optimal targets based on maximizing potential synergy gains. In this case, we should expect to see at least no systematic difference in the premia paid by national and private oil companies (the commercial motive hypothesis).

Distinguishing between the political and commercial motive hypotheses has important policy implications and economic consequences. Based on the view that state-owned oil companies serve as an arm of state policy and pay a higher premium to outcompete private oil companies and secure oil reserves, many host countries have reacted by implementing an invisible barrier to defer or even block deals initiated by foreign state-owned oil companies. In recent years, an increasing number of deals by state-owned bidders have been blocked by regulators due to political opposition in the host countries, which has led to losses of billions of dollars for target shareholders. A well-known case is the China National Offshore Oil Corporation (CNOOC)’s failed bid to purchase the U.S. oil company Unocal. Although the CNOOC put an all-cash bid on the table that was more than 10% higher than the eventually successful bid by Chevron, its takeover attempt drew intense opposition from members of the U.S. Congress and was subsequently blocked. Aside from national security concerns, one important argument made by the host government was that the deal would have created a competitive disadvantage for competing private sector bidders. Despite this accusation, the CNOOC stressed that its objectives were purely commercial.[3]

In this study, I test the two aforementioned contrasting hypotheses by examining whether the premia paid by state-owned oil companies are systematically different from those paid by their private sector counterparts. I construct the largest possible oil and gas investment dataset involving public targets. My sample of deals spans from 1985 to 2015 and consists of 133 government bidders and 928 private bidders. I measure the premia from pre-announcement run-up to completion (as in the work of Schwert, 1996) and document a sizable premium difference between the two types of acquisitions. Contrary to the conventional overpayment view, the premia paid by state-owned companies are lower compared with those paid by private companies. In my overall sample, the average premium for target shareholders is 13% when the bidder is a government-owned firm and 24% when it is a private sector company. The difference is largest in the case of cross-border acquisitions: the average premium for target shareholders is 10% when the bidder is a government-owned firm and 29% when it is a private company. Similar results are also found in relation to other measures of deal premia.

The difference in acquisition premia may originate from the systematic differences in deal and target characteristics. In the overall sample, I find that compared

[3] See Bloomberg's coverage of the CNOOC's failed bid and the company's arguments: https://www.bloomberg.com/news/articles/2017-04-19/etfs-seen-creating-market-that-s-both-mindless-and-too-expensive.

with private bidders, government bidders acquire smaller stakes, use more cash payments and fewer tender offers, and do not include termination fees in as many of their deals. They also acquire targets that are larger and more profitable, have lower growth opportunities, and are undervalued the year before. According to the literature (e.g., Eckbo, 2009), these differences in deal and target characteristics can result in premium variations.

After controlling for these deal and target characteristics, I find that the difference in the premia paid by government and private bidders disappears. One concern is that governments do not select targets randomly, which introduces selection biases. To address this issue, I estimate a Heckman selection regression to control for potential observed and unobserved factors that determine the target selection by governments *ex ante*—and the result remains intact. These findings are consistent with the commercial motive hypothesis, which asserts that state-owned oil companies are guided by commercial objectives when they invest in the oil and gas sector.

I continue to evaluate the commercial motive hypothesis by examining the effect of government acquisition on target operating performance. If the political motive hypothesis is true, government targets (relative to private sector targets) should exhibit a declining operating performance post-acquisition because governments can divert company resources for political projects. In a difference-in-difference analysis, I find no significant differences between government and private sector targets in relation to several aspects of operating performance. Collectively, these results are consistent with the idea that government acquisitions are motivated by commercial objectives.

I further establish the robustness of my findings by showing that they are not sensitive to different types of government investments. I begin by demonstrating that neither government domestic investments nor government cross border investments are associated with higher premia than private sector investments. I then show that for a variety of government investments, the relationship between government investment and acquisition premium remains intact; here I consider government investment from oil poor countries, from common law countries, and from democratic countries. In the same vein, I also demonstrate that the relationship between target operating performance and government investments is independent from the cross-section of government investments.

The present study offers new insights into government investment behaviors. Karolyi and Liao (2016) is a closely related study. They also document that, unconditionally, targets acquired by governments exhibit lower cumulative abnormal returns than those acquired by private sector companies, although the difference is no longer significant once they control for deal and target characteristics. Nonetheless, they only focus on government cross-border investments and do not undertake further analysis to explain the vanished premium difference. Bortolotti, Fotak, and Megginson (2015) examine the acquisition outcome of a special kind of state-owned financial vehicle: sovereign wealth funds. Based on short-term target shareholder gains and post-acquisition performance, they conclude that state ownership negatively affects firm value and performance. Holland (2016) documents that target firm stock prices on average react positively when target shareholders perceive that government investments follow economic motives; however, the study only focuses on government investments, which it does not compare with private investments. Compared with the previously mentioned studies, the present work highlights that government investments are not always guided by political objectives and can be commercially motivated as well. This implies that the concern that government investments in the oil and gas sector are usually politically guided and thus should be approached with caution may be unwarranted.

This study also contributes to the literature on how bidder characteristics affect takeover premia. Eckbo and Thorburn (2000) examine acquisitions of Canadian targets by U.S. and Canadian bidders and find that the bidder's relative size is a key determinant of the announcement-month abnormal stock return. Bargeron, Schlingeman, Stulz, and Zutter (2008) compare the takeover premia paid by private and publicly traded bidders and show that the former pay significantly lower premia than the latter (when other determinants of deal premia are controlled for). They conclude that the premium difference results from the agency cost of public companies. Levi, Li, and Zhang (2008) demonstrate that bid premia are lower when the bidder CEO is female. Relevant studies are also undertaken by Bris and Cabolis (2008), who examine the payment differential for domestic and foreign deals, and Starks and Wei (2013), who relate payment to corporate governance in the bidder's country.

Lastly, this study also adds to literature on both resource nationalism in general and government roles in the oil and gas sector in particular. Focusing on the period 2000–2006, Kretzschmar, Kirchner, and Sharifzyanova (2010) document a trend of governments consolidating ownership over strategically important domestic oil and gas resources. They show that political risk is positively related to state ownership retention. Moreover, Mahdavi (2014) documents that resource nationalism is more likely to occur in countries that are less democratic. Consistent with the implications of these studies, I find that government bidders from less democratic countries pay higher premia for domestic acquisitions. Most studies on government investments in the oil and gas sector are descriptive and subject to a limited set of countries. Jeong and Weiner (2015) consider a sample of Asian countries that they classify as being resource poor. While they focus on state ownership, they do not find that bidders from these resource-poor countries pay significantly higher acquisition premia. Herberg (2011) studies Asian national oil companies and their role in overseas investment from resource-poor countries. He provides anecdotal examples to demonstrate that many national oil companies appear to have paid very high premia in acquisition deals to obtain access to high-quality assets. In contrast, in my study—which is the first to systematically study the premium differences between investments made by national oil companies and their private counterparts in a large sample setting—I find no evidence of the existence of systematic overpayment.

II. Data and descriptive analysis

I obtain all announcements of acquisitions in the global oil and gas sector over the 1985–2015 period from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions database. To identify oil and gas sector acquisitions, I restrict my sample to transactions in which the bidders, or their ultimate parents, have primary Standard Industrial Classification (SIC) codes that correspond to the oil and gas industry and whose targets are also in this industry. My sample is mainly composed of firms with the SIC code "1311: Crude Petroleum & Natural Gas" or other related oil and gas industry

SIC codes.[4] I exclude leveraged buyouts, recapitalizations, spin-offs, self-tender offers, exchange offers, and repurchases. Following Karolyi and Liao (2016), I also exclude bidders that domicile in tax havens, including the Bahamas, the British Virgin Islands, the Cayman Islands, Guernsey, the Isle of Man, Jersey, and the Netherlands Antilles. I further restrict the sample to completed, pending, and withdrawn deals. These filters lead to a sample of 16,238 acquisitions in the oil and gas industry, which are worth approximately US$2.5 trillion in total.

I collect several deal characteristics from the SDC, including the announcement date, the effective date, deal status (e.g., successful, pending, or withdrawn), whether the deal was cross-border, deal value, the percentage of shares acquired, and the method of payment (e.g., stock, cash, or mixed). I also gather bidder and target characteristics from the SDC, including each entities' names, countries of domicile, four-digit primary SIC code, public status (e.g., subsidiary, private, public, government owned, or joint venture partner), and government or Sovereign Wealth Funds (SWF) involvement flags.

I identify government-controlled bidders as those in which the bidder, the immediate, or the bidder's ultimate parent is flagged as "government." According to the SDC, "government" status includes all firms and institutions in which a government (directly or indirectly) owns at least a 50% stake. My sample captures transactions made by major state-owned oil and gas companies worldwide, such as the CNOOC, PetroChina, the China National Petroleum Corporation, China Petroleum and Chemical Corporation, the Indian majority state-owned Oil and Natural Gas Corporation, the

[4] Those SIC codes include: 1321: Natural Gas Liquids, 1381: Drilling Oil and Gas Wells, 1382: Oil and Gas Field Exploration Services, 1389: Oil and Gas Field Services, Not Elsewhere Classified, 2911: Petroleum Refining, 2992: Lubricating Oils and Greases, 4922: Natural Gas Transmission, 4923: Natural Gas Transmission and Distribution, 4924: Natural Gas Distribution.

Mexican state-owned Petroleos Mexicanos, the Norwegian state-owned Statoil, the Saudi Arabian state-owned Aramco, and the Russian state-owned Rosneft.

For my event studies and regression analyses, I rely on a subsample of transactions that involve only public targets. I obtain dividend- and split-adjusted daily total return indices (RI) and their associated total return country market indices from Datastream. I exclude targets that do not have data from Datastream as well as those that feature many missing or zero observations in my estimation and event window. I also exclude contemporaneous investments that involve the same target on the same day. The accounting data for my sample comes from Worldscope, and I exclude firms that have no or insufficient accounting information. The final sample used for event study analysis consists of 110 government bidder purchases and 758 private bidder purchases.

Table 1.1 presents summary statistics concerning the number and total value of acquisition deals in the oil and gas sector considered in this study. It includes the total number of deals, the number of deals with disclosed values, the average and total deal values for deals with data available, the number and percentage of withdrawn deals, complete control deals, minority block purchases, deals involving public targets, and cross-border deals. It also presents deals involving bidders from oil-poor countries (OPCs), which are defined as countries with a dependence on foreign oil ratio that is greater than 50%. The table reveals that in my sample government-controlled bidders constitute 1,445 deals, totaling US$462 billion in value and representing approximately 10% of all corporate-led acquisitions (14,793) and 23% of these acquisitions' total value (US$2 trillion).[5]

[5] Deal values are adjusted to constant 2000 USD.

Three findings emerge from Table 1.1. First, mergers and acquisitions (M&A) in the oil and gas sector have a high rate of completion for both corporate and government-controlled bidders; for example, the percentage of withdrawn deals is 4.11% for corporate bidders and 4.84% for government-controlled bidders. Second, both corporate and government-controlled bidders mostly select private (unlisted) targets; for example, a corporate (government-controlled) bidder chooses a publicly listed target only 14.48% (15.16%) of the time. Third, it is not true that government-controlled bidders from OPCs systematically invest more than their private sector counterparts. In fact, the percentage of bidders from OPCs is quite low: 26.36% for corporate bidders and 33.29% for government-controlled bidders.

Despite these three similarities, corporate and government-controlled bidders also feature different deal characteristics. First, government-controlled bidders tend to pursue larger targets, which are manifested by a higher average deal value of US$699 million (compared to US$219 million for corporate bidders). Second, corporate bidders mostly engage in complete control deals (71.37%); government-controlled bidders act in the opposite manner, engaging in full acquisitions only 40.97% of the time. Third, only 21.21% of the corporate-initiated deals involve minority stakes in the target firm, in comparison to 46.48% of the government-controlled bidders. Fourth, government-controlled bidders invest across borders more often (53.68%) than corporate bidders (32.27%).

Table 1.2 provides a detailed summary of government investments by transaction year and target/bidder nations. Panel A presents the number of deals, the proportion of the total number of deals, and the deals' values (million USD, adjusted to constant 2000

USD). I report separately the numbers of foreign deals, domestic deals, deals from OPCs, and cross-border deals from OPCs. Panel B lists the 20 countries that are the largest targets for government investments by total deal value, whereas Panel C presents the 20 governments that are the largest bidders by total deal value.

Several conclusions can be drawn from Table 1.2. First, a majority of the deals take place later in my sample period of 1985–2015. For example, the deals from 2001 to 2015 account for 77% of all of the deals in the sample, and the total value of the deals for this sub-period account for 91% of aggregate deal values. Second, the deal counts for foreign and domestic deals do not differ much; they are respectively 775 and 670. Third, investments by OPC governments increase significantly over the study period, and most these investments are cross-border deals. Among the 479 deals from OPCs, 75% take place from 2001 to 2015 and 64% are cross border.

III. Acquisition premia for government bidders and private sector bidders

The primary deal premium measure used in this study is the first bid to completion (FBC) premium, which was introduced by Schwert (1996). Specifically, I estimate cumulative abnormal returns (CARs) from 42 days before the first bid to completion based on a market model. According to Schwert (1996), the advantage of this approach to premium estimation is that it includes all of the days when the offer to the target shareholders might have changed and any pre-bid run-up. This method also means it cannot be argued that premium differences somehow result from takeover contests proceeding differently for government bidders than for bidders in the private sector.

For robustness purposes, I also consider three- and five-day cumulative abnormal returns (CAR3 and CAR5) surrounding the deal announcement dates as alternative premium measures. These short-term measures are free from the concern that CARs estimated over a long period might be sensitive to misspecification of the benchmark returns (Kothari and Warner, 2007). I use standard event-study methodology to calculate targets' cumulative abnormal returns around the announcement of government acquisitions. Furthermore, I employ a market model to estimate benchmark returns and estimate model parameters over days (-230, -30), where day (0) is the day of announcement of government or private acquisition. Only firms with trading data for a minimum of 120 days are included in my estimation. A short-term event study is much less sensitive to benchmark specifications (e.g., Brown and Warner, 1985), but it would be biased and incomplete if systematic differences exist between government and private acquisitions in relation to how information about acquisition likelihood and terms is revealed to the market before and after a bid announcement.

In Table 1.3, I compare the acquisition premia for both types of bidders. Panel A, which reports the result for the overall sample, demonstrates that among the three premium measures, the average premium paid by government bidders is significantly lower than that paid by private sector bidders. For example, based on the FBC measure, government bidders on average pay a premium around 13% ($p<0.01$) whereas private sector bidders on average pay around 24% ($p<0.01$); the difference (-11%) is significantly different from zero ($p<0.01$) based on a paired t-test. Looking at the target shareholder gains obtained from narrow windows around the announcement date reveals a similar difference. Based on CAR3, I find that the shareholders of government targets on average earn a premium around 10% over the three-day window surrounding the announcement of an acquisition; in contrast, the shareholders of private sector targets on average earn a premium of 14%. A similar result is also observed for CAR5.

I also examine whether the premium difference depends on a deal's internationality. Since a government has more influence domestically than internationally, this comparison can help to uncover the sources behind the difference in premia. Panel B of Table 1.3 presents estimates of the acquisition premia for domestic deals. The average FBC premium is 17% for government bidders and 22% for private sector bidders, but the premium difference (-5%) is not significantly different from zero. In contrast, consistently significant differences can be observed for the two short-horizon premium measures. For example, the average CAR3 (CAR5) premium is 7% (7%) for government bidders and 13% (14%) for private sector bidders, and the differences are significant at the one-percent level. In contrast, Panel C in Table 1.3 shows estimates of the acquisition premia for foreign deals. The average FBC premium is 10% for government bidders and 29% for private sector bidders; the difference (19%) is significant at the one-percent level. In addition, the average CAR3 premium is 12% for government bidders and 18% for private sector bidders, with the difference (-6%) significant at the five-percent level. The results based on the CAR5 premium measure are similar.

In this section, I document a systematic pattern that government bidders on average pay significantly lower acquisition premia than private sector bidders. This pattern is robust to alternative measures for acquisition premium, such as the long-horizon FBC measure and short-horizon CAR measures. It is also independent of the internationality of the deal, since I find evidence that the pattern holds for both domestic and international deals.

IV. Can deal and target characteristics explain the difference in acquisition premia?

In Panel A of Table 1.4, I compare deal characteristics for government and private sector bidders. My first finding relates to the percentage of target shares to be acquired. I find that among the 110 deals for which I have adequate non-missing observations for all key covariates, government bidders on average acquire 43% of target shares whereas private sector bidders on average acquire 70%; the difference is significant ($p<0.01$) based on a paired t-test. As Allen and Phillips (2000), Fee, Hadlock, and Thomas (2006), and Liao (2014) suggest, a partial equity acquisition may *inter alia* result from a target being financially constrained. Accordingly, the fact that government bidders acquire smaller stakes than private sector bidders can be viewed as an acquisition of more financially constrained targets, which leads to lower premia.[6]

Second, I find that government bidders use cash payments approximately 41% of the time, while private sector bidders use them significantly less frequently (31%; $p<0.05$). However, this difference is not likely the reason for the lower premia paid by government bidders. Myers and Majluf (1984) suggest that managers use cash to finance investments if they view them as value adding, and Travlos (1987) provides empirical evidence. Consequently, cash payments should lead to higher acquisition premia.

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[6] I also consider a zero-dividend dummy for targets to proxy for financial constraint, as suggested by Karolyi and Liao (2016). However, as incorporating this variable significantly reduces my sample size, I only include it later in my multivariate regression analyses.

Third, I discover that government bidders use fewer tender offers than private sector bidders (i.e., 19% versus 25%). The greater proportion of tender offers used by private sector bidders can explain why they on average pay higher premia, as tender offers are generally associated with premia that are larger (e.g., Huang and Walkling, 1987).

Fourth, I find that fewer deals initiated by government bidders (5%) are associated with termination fees than those initiated by private sector bidders (13%), with the difference significant at the one-percent level. Officer (2003) shows that target termination fees lead to significantly larger acquisition premia, which suggests that this is another reason why private sector acquirers pay higher premia on average.

Lastly, my findings reveal that government bidders face significantly less competition than private sector bidders; on average, government targets have 1.04 bids and private sector targets have 1.11 bids ($p<0.01$). Seeing as any competition in the bidding process can drive total gains to a target (e.g., Eckbo, 2009), the higher competition for private sector targets can also be a reason for the higher average premia paid by private sector bidders.

In Panel B of Table 1.4, I compare target characteristics for government and private sector bidders. The first characteristic that I consider is target size (total assets), as Officer (2003) shows that target shareholders gain less when their firm is larger. I find that the average sizes of government and private sector targets are, respectively, US$8 billion and US$2 billion (both in constant 2000 USD); the difference in size between government-acquired targets and private sector targets is significant at the one-percent level. This significant difference in target size can therefore be another cause of the difference in acquisition premia.

Second, I find that government targets have a significantly higher return on assets (ROA) than private sector targets ($p<0.01$). Since more profitable firms tend to accumulate more free cash flows, the insight of Jensen (1986) suggests that the potential higher agency costs of free cash flows can result in lower premia for government bidders.

Third, I compare target leverage for both types of bidders. According to Stulz (1988), leverage can facilitate more concentrated ownership of a target and forces a successful bidder to offer a greater premium (Stulz, 1988). I find no significant differences: the average leverage is 20% for government targets and 18% for private sector targets.

Fourth, I find that government targets have significantly lower growth opportunities, as measured by Tobin's Q. For example, the average Q is 1.36 for government-selected targets and 1.50 for private sector selected targets, with the difference significant at the five-percent level. This variation in growth opportunity can also explain the difference in deal premia. Targets with low growth opportunities but high cash flows are prone to agency problems, as Jensen (1986) emphasizes. For these targets, mergers therefore create less wealth for their shareholders.

Finally, in relation to the buy and hold abnormal return (BHAR) for the target stock over the previous year of merger, I find that the average BHAR is 11% for government targets and -9% for private sector targets; the difference is significant ($p<0.01$). Seeing as a positive BHAR indicates undervaluation, insights from Shleifer and Vishny (2003) suggest that undervalued targets are associated with lower premia.

The above univariate comparisons suggest that significant differences exist between acquisitions by government-owned and private sector firms. The literature suggests that any differences in observed deal and target characteristics can lead to the differences in acquisition premia. To assess the effect of government acquisition on acquisition premium, it is therefore critical to account for the effects of these deal and target characteristics. However, it is also crucial to consider the potential observed and unobserved factors that determine government acquisition decisions in the first place. To address this issue, I employ a Heckman (1979) selection regression.

In Panel C of Table 1.4, I compare the instrumental variables that I implement in the Heckman selection regression. These variables should be direct determinants of government acquisition decisions, but not of acquisition premium. Motivated by the literature (e.g., Rossi and Volpin, 2004; Erel, Liao, and Weisbach, 2012; Karolyi and Liao, 2016), I consider the level of democracy in the bidder's country, the level of democracy in the target's country, and the bidder's legal origin. The political system in a country can influence the acquisition behaviors of government-owned bidders. In particular, in autocratic countries, politicians who manage state-owned firms face less obstacles in decision makings; consequently, state-owned bidders from autocratic countries tend to make more acquisitions on average. I also include the level of democracy in the target's country, because Karolyi and Liao (2016) point out that a larger difference between acquirer and target countries in their political systems would be associated with a lower rate of government-led acquisition activity. Lastly, bidder's legal origin can also influence government-led acquisition activity. I expect a negative relation between government investment and common law, because it would be more difficult for state owners to divert economic resources for social and political agendas in common law countries.

The results in Table 1.4 reveal several insights regarding government acquisition decisions. First, government bidders are more likely to select targets that are domiciled in less democratic countries. For example, the average polity score is 7.89 for the countries in which government targets are domiciled and 9.72 for those in which private sector targets are domiciled; the difference is significant at the one-percent level. Second, governments of less democratic countries are more likely to make acquisitions. For example, the average polity score is 3.39 for countries where government bidders come from and 9.61 for countries where private sector bidders originate; the difference is significant at the one-percent level. Third, government bidders are more likely to stem from civil law countries. For example, only 45% of the government bidders are from common law countries as opposed to 85% of the private sector bidders; the difference is significant at the one-percent level.

My comparison of deal and target characteristics suggests that government ownership is not the only reason why shareholders of government targets receive lower premium than shareholders of private sector selected targets. To investigate whether government ownership in the bidder per se has any effect on acquisition premium, I conduct a battery of regressions. The dependent variable is acquisition premium, and I employ all three premium measures for robustness purposes. I focus on an indicator variable for acquisitions by government-owned companies. For the benchmark regressions, I include the deal and target characteristics that are analyzed earlier. I also include two macroeconomic variables that can influence acquisition premium. The first one is per capita GDP of target nation. The second one is the real oil price. In the second set of regressions, I include three additional deal and target characteristics that are also identified by previous studies (e.g., Leuz, Lins, and Warnock, 2010; Karolyi and Liao, 2016) as determinants of acquisition premium for robustness purposes. These characteristics are *minority block*, *zero dividend*, and *high close-held shares*. In my third set of regressions, I include the inverse Mills ratio λ from the probit regression on government acquisition decision (the estimation result for the probit regression is included in Table A2 in the appendix). Including the inverse Mills ratio enables me to control for the observed and unobserved characteristics that determine government acquisition decisions and thus to obtain consistent coefficient estimates. Furthermore, seeing as my sample spans multiple years, I include year-fixed effects to control for the effects of time-specific market-wide factors on acquisition premium. In the same spirit, I employ a year-cluster robust standard error estimator to mitigate the concern that time-specific market-wide factors may cause error terms to be correlated.

Table 1.5 reports the results of the regression. The coefficient estimates for government acquisition are insignificant in all three sets of regression specifications and for all three measures of acquisition premium, which indicates that government acquisitions are not responsible per se for the lower premia. The fact that the shareholders of government targets receive lower premia is explained by the characteristics of the deals and targets themselves. This finding suggests that government acquisitions in the oil and gas sector are motivated by the same objective as private sector acquisitions, the commercial objective.

The coefficient estimates for control variables are broadly consistent with the univariate analysis results presented in Table 1.4. The positive and significant coefficient for *Sought* suggests that the acquisition premium increases with the percentage of target shares being acquired. Moreover, the positive and significant coefficient for *Cash Deal* suggests that target shareholders on average receive a higher premium if they are paid with cash instead of stock. *Tender Offer* also has a positive and significant coefficient, which suggests that tender offers can lead to higher target shareholder gains. The negative and significant coefficient for *log(TA)* indicates that shareholders of larger targets on average receive a lower acquisition premium. The negative and significant coefficient for *BHAR* suggests that target shareholders on average receive a lower premium if their stocks are undervalued in the year prior to the merger announcement.

Turning to the second regression specification, columns (4) to (6) in Table 1.5 reveal that the coefficients for *Minority Block, Zero Dividend, and High Close-Held Share* are insignificant. As including these three variables also reduces the sample size from 868 to 520, we cannot rule out the possibility that the reduced statistical power associated with the smaller sample size is the reason for the insignificant estimates. In the same spirit, this possibly reduced statistical power also supports the initial decision taken to exclude these three variables from the study's main analyses.

I find consistent evidence that government acquisitions are not associated with significantly different acquisition premia. This agrees with the commercial objective hypothesis that government acquisitions are motivated by the principle of profit maximization, similar to private sector acquisitions. To further explore the merit of commercial objective hypothesis, I examine whether government acquisitions (relative to private sector acquisitions) are associated with significant changes in five target characteristics that provide information about acquisition motives.

The first two characteristics are measures of profitability, namely *return on asset (ROA)* and *return on equity (ROE)*. The political objective hypothesis claims that government-acquired targets should experience declines in profitability due to governments diverting business resources to social and political agendas. The commercial objective hypothesis suggests the opposite; government-acquired targets should either experience no declines in profitability or experience improvements in profitability.

The next three characteristics that I consider are *leverage*, *investment*, and *cash holding*. First, in relation to *leverage,* it is possible for government-acquired targets to exhibit higher leverage in that governments, if motivated politically, may want to tighten controls over targets by increasing leverage and retiring existing shares. This is particularly relevant given that government bidders in my sample on average acquire non-majority shares of the targets (43%, as shown in Table 1.4). In contrast, the commercial objective hypothesis suggests the opposite. Second, in the presence of external financial frictions, financing decisions and investment decisions become interdependent (e.g., Almeida and Campello, 2007; Hennessy and Whited, 2007). In this case, if government acquisitions are motivated by political agendas (e.g., reducing the rate of unemployment), it is possible to see a higher level of investment on average in government-acquired targets. At the same time, on average a lower level of cash holding and a higher level of leverage should also be visible. This should not occur if government acquisitions are motivated commercially.

To measure the change in a characteristic, I consider the difference between its pre- and post-acquisition *N-Year* averages; to be robust, I let *N* range from 1 to 3. In Table 1.6, I present estimation results for the set of difference regressions I conduct on target characteristics. The dependent variables from Panels A to E are changes in *ROA*, *ROE*, *leverage*, *investment*, and *Cash/TA* for each target. In each panel, Columns (1) to (3) show the changes measured over the windows for one, two, and three years before and after the acquisitions. The variable of interest is the indicator of government acquisition. To account for potential observed and unobserved factors that determine governmental selection *ex ante*, I include the inverse Mills ratio (as before). This regression setting resembles the common difference-in-difference regression setting. Nevertheless, by aggregating the time series for each target, my regression is not subject to the serial correlation problem that is highlighted by Bertrand, Duflo, and Mullainathan (2004). Lastly, since I collapse a panel regression into a cross-section regression, I employ the heteroskedastic robust standard error estimator to draw inferences related to statistical significance.

The coefficient estimates for government acquisition in Table 1.6 are unequivocally inconsistent with the political motive hypothesis but are consistent with the commercial motive hypothesis. For example, in Panels A and B, where the dependent variables are *ROA* and *ROE*, the coefficients for government acquisition are not significantly negative, as should be the case according to the political motive hypothesis. Instead, in some cases I even find positive and significant estimates, which indicates that government acquisitions sometimes result in higher profitability relative to private sector acquisitions. This partly improved profitability can be interpreted as a manifestation of the value of the political connection created by government acquisition (e.g., Faccio, 2006) and is consistent with the commercial objective hypothesis. In Panels C and D, the coefficients for government acquisition are not significantly positive for *leverage* and *investment*, as otherwise predicted by the political motive hypothesis. In Panel E, I find positive coefficients for government acquisition in relation to cash holding; the coefficients for changes measured over longer horizons (i.e., two and three years pre- and post-acquisition) are significant ($p<0.1$). This finding is again inconsistent with the political objective hypothesis.

V. Robustness

In this section, I establish the robustness of my main results. A primary concern is that my finding is driven by a particular type of government investments. This concern is valid because government investments in my sample are heterogeneous. For instance, it is possible that government domestic investments and foreign investments are motivated differently. To address this concern, I demonstrate in this section that my main results remain intact for the entire cross section of government investments.

To begin with, I study separately the relationship between government acquisition and acquisition premium for domestic deals and cross border deals and report the results in Table 1.7. In the first three columns, I report the estimates for domestic deals based on all three measures of acquisition premium. In the last three columns, I report the estimates for cross border deals. I incorporate all the explanatory variables from Table 1.5, and I further control for the selection problem by including the inverse Mills ratio. The coefficient estimates for the indicator of government acquisition are insignificant in nearly all models; it is marginally significant ($p=0.08$) for Model (1), which is based on domestic deals and the FBC measure for acquisition premium. Collectively, these estimates indicate that for both domestic and cross border acquisitions, government bidders do not pay significantly higher premia than private sector acquirers. This finding therefore is consistent with the commercial objective hypothesis.

Next, I incorporate several interaction terms with the indicator of government acquisition to capture the entire cross section of government acquisition. Specifically, I consider an indicator of cross border acquisitions, an indicator of bidder nation to be of common law origin, a variable that measures the level of democracy of the bidder nation, an indicator of bidder nation to be oil poor, and a variable that measures the percentage of stake in the target to be acquired. In this case, by incorporating the interaction terms with these variables, I can study the relationships between acquisition premium and different types of government acquisition.

Table 1.8 provides test results. In particular, I estimate an extension of the second regression specification (also with the inverse Mills ratio) in Table 1.5 by including the interaction terms of government acquisition as well as controls. The coefficient estimates for the interaction terms are insignificant in almost all cases. These estimates indicate that the insignificant relationship between acquisition premium and government investment is not sensitive to the particular type of government investment; government investments are not associated with higher acquisition premia, regardless of the particular type of government investment. This finding therefore provides further support to the commercial motive hypothesis.

I show that the relationships between government investment and changes in target characteristics are not sensitive to the particular type of government investment. In Table 1.9, I present estimation results for the set of regressions on changes in target characteristics and the cross section of government acquisitions (as in Table 8). The dependent variables from Panels A to E are changes in *ROA, ROE, leverage, investment,* and *Cash/TA* for each target. However, instead of showing the results for all three time windows (as in Table 6), I focus on the changes measured only over the two-year window before and after the acquisitions. The reason is that it is generally less likely for the effect of government ownership (if it exists at all) to be reflected immediately, especially for sticky variables such as leverage and investment. On the other hand, the loss of information is significantly increased if I consider three years after the acquisitions, which further reduces the statistical power.[7] Next, the variables of interest are the interaction terms with government acquisition; as before I also include the inverse Mills ratio. Lastly, I employ the heteroskedastic robust standard error estimator to draw inferences in relation to statistical significance, as discussed above.

The coefficient estimates for the interaction terms are insignificant in almost all cases. These estimates suggest that government-acquired targets do not exhibit significant changes in their characteristics relative to their private sector counterparts, regardless of the type of government investment. Consequently, this finding provides further support to the commercial motive hypothesis.

VI. Conclusions

In this study, I examine whether the takeover premia paid to target shareholders differ when the bidder is a state-owned oil company instead of a private sector bidder. I first document a pervasive pattern based on my univariate analysis; government-owned bidders on average pay significantly lower premia than corporate bidders. The average

[7] The results for the one- and three-year windows are available from the author upon request.

excess premium paid by private sector bidders can be up to twice as high in the case of cross-border deals.

I provide robust evidence that government ownership per se does not result in significantly lower premia. I find that compared with private sector bidders, government bidders acquire smaller stakes, use more cash payments and fewer tender offers, and include termination fees in fewer deals. In addition, government bidders acquire targets that are larger and more profitable, have lower growth opportunities, and are undervalued the year before. As suggested in the literature (Eckbo, 2009), these deal and target characteristics are associated with lower deal premia. After accounting for these characteristics' effects on deal premia, I find that government acquisition is no longer a significant determinant. This finding is further substantiated by the Heckman regression that addresses the target selection issue associated with government investments.

To further explore the commercial motive hypothesis, I examine the effect of government acquisition on post-acquisition operating performance. In a difference-in-difference analysis, I find no significant differences between government and private sector targets in relation to various aspects of operating performance.

Chapter 2:
Does Economic Policy Uncertainty Affect Capital Structure Choices?[8]

I. Introduction

Fiscal, regulatory and monetary policies of governments influence the business environment and affect corporate decisions (Heider and Ljungqvist, 2015; Graham et al., 2015). Moreover, given the intuition of real options analysis, uncertainty about government policy is likely to affect corporate choices.[9] While previous studies have documented a negative effect of economic policy uncertainty on corporate investment decisions (Rodrik, 1991; Dixit and Pindyck, 1994; Julio and Yook, 2012; Gulen and Ion, 2016), there remains a limited understanding of the effect of economic policy uncertainty on a firm's financing decisions.

This paper examines the link between economic policy uncertainty and capital structure. Specifically, we study how economic policy uncertainty influences adjustments and the nature of corporate debt. There are at least two channels through which economic policy uncertainty can affect capital structure decisions.

First, economic policy uncertainty can affect corporate financing policies through the capital supply channel.[10] In periods of high economic policy uncertainty, investors reduce funding or shift their capital supply to relatively safe assets, generating a credit crunch for firms in general and for risky firms in particular. Furthermore, the cost of

[8] This chapter is based on the collaborative work with Wenbin Cao and Vahap Uysal.
[9] Olivier Blanchard, chief economist of IMF, further suggested that policy makers should tailor policies to reduce uncertainty as the uncertainty has real effects on economic agents. The Economist, January 29, 2009, "Nearly nothing to fear but fear itself".
[10] Among others, Faulkender and Petersen (2006), Massa, Yasuda and Zhang (2013), Custodio, Ferreira and Laureano (2013), and Saretto and Tookes (2013) show that nature of credit supply affects a firm's capital structure.

borrowing increases as investors require higher risk premium in periods of higher economic policy uncertainty (Pastor and Veronesi, 2012, 2013; Brogaard and Detzel, 2015). Thus, firms are more likely to wait longer to issue debt and reduce leverage when economic policy uncertainty increases. Finally, if firms do borrow during periods of high economic policy uncertainty, creditors are likely to shorten the debt maturity as long-term debt is riskier relative to short-term debt (Supply of Capital Hypothesis).

Second, economic policy uncertainty may also lower the demand of firms to issue debt. An increase in uncertainty regarding economic policy generates uncertainty on the firms' future cash flows. The dynamic capital structure theories (e.g., Fischer et al., 1989; Goldstein et al., 2001; Strebulaev, 2007) predict that increased cash flow uncertainty will decrease the optimal leverage for a firm and increase its refinancing threshold. As firms rebalance their capital structures when their profitability exceeds the refinancing thresholds, an increased financing threshold leads firms to wait longer to issue debt. Furthermore, firms are likely to decrease debt ratios during periods of high economic policy uncertainty. Increased uncertainty on future cash flows will also lead firms to borrow short-term to match the timing of cash flows and debt obligations (Demand for Capital Hypothesis).

To assess the effect of economic policy uncertainty on capital structure decisions, we employ the measure of the economic policy uncertainty index (*EPU*, hereafter) developed by Baker et al. (2013). This index incorporates media coverage of policy uncertainty, temporal federal tax codes set to expire, and divergences in analyst economic forecasts on future government purchases and future inflation. Using *EPU* has several advantages over employing election years as a proxy for economic policy uncertainty

(Brogaard and Detzel, 2015). First, studies using election years implicitly assume that uncertainty completely resolves after elections. In fact, a divided house may amplify and prolong the uncertainty even well after the elections. For example, after the elections in 2012, the debt ceiling debate within the divided political system led to government shut down in 2013 in the U.S. In contrast, *EPU* is a continuous measure and does not assume the complete resolution of the uncertainty at any point in time. Second, *EPU* is readily available and comparable over time, whereas the elections occur infrequently. It is also difficult to compare the level of uncertainty among elections. For example, historically high level of uncertainty of the presidential election between Donald Trump and Hillary Clinton in 2016 is not comparable to low level of uncertainty in 1996 when the Republican Party gave up on its presidential nominee Bob Dole.[11] Thus, several recent studies have selected *EPU* to evaluate the effect of policy uncertainty on asset pricing and corporate policies (e.g., Pastor and Veronesi, 2013; Gulen and Ion, 2016; Brogaard and Detzel, 2015).

Our paper provides novel and robust evidence documenting significant effects of economic policy uncertainty on capital structure adjustments. After accounting for the effects of economic conditions, firm and industry characteristics on capital structure, we find that firms have lower debt ratios when economic policy uncertainty increases. Firms are also less likely to issue debt in periods of high economic policy uncertainty. If they do issue debt during these periods, corporate debt maturity shortens. These findings are consistent with both contraction of available funds (Supply of Capital Hypothesis) and lower demand of firms for capital (Demand for Capital Hypothesis).

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[11] See for example "How Bob Dole's Dream Was Dashed" by Adam Nagourney and Elizabeth Kolbert on the New York Times on November 8 1996.

We also conduct a battery of tests to disentangle supply and demand mechanisms of capital structure. Specifically, we examine whether factors that are found to be associated with the supply channel of capital structure moderate the effect of economic policy uncertainty on leverage. Previous studies show that differences in access to public debt markets in general (Faulkender and Peterson, 2006) and bond ratings in particular (Erel et al., 2012) generate variations in the supply of capital for firms. In the light of Faulkender and Peterson (2006), we study whether firms with better access to finance, measured with public debt market access, would be less sensitive to changes in economic policy uncertainty when adjusting capital structures. We find that firms without public debt market access are less likely to issue debt relative to rated firms during periods of high economic policy uncertainty. Notably, debt maturity shortens for non-rated firms even further when economic policy uncertainty increases.[12] In examining the differences in capital structure adjustments among rated firms, we also find that investment grade firms are less sensitive to changes in economic policy uncertainty relative to non-investment grade firms. These findings are consistent with the idea that investors shift investments towards safer assets, generating frictions in the supply of capital which are partially alleviated by having (preferential) access to public debt markets. Overall, these findings lend support to the Supply of Capital Hypothesis, while they are difficult to square with the Demand for Capital Hypothesis.

We also study endogeneity concerns in the paper. If economic policy uncertainty and capital structure adjustments are either determined simultaneously or are codetermined by unobserved factors, then the economic policy uncertainty may not be

[12] Custodio, Ferreira and Laureano (2013) also show that changes in the credit supply led to decrease in utilization of long-term corporate debt in the U.S.

the catalyst of the findings. To address this concern, we conduct two separate analyses. First, we estimate instrumental variable (IV) regressions where we employ the level of political polarization in the United States Senate as an instrument for economic policy uncertainty, as motivated by the political science literature (e.g., McCarty, 2012). Our IV regressions reveal a negative and significant effect of economic policy uncertainty on firm leverage. Second, we assess whether firms with greater economic policy exposures are more sensitive to economic policy uncertainty. If the previously documented effect of *EPU* is principally driven by an omitted variable, then the general economic policy sensitivity should have no effect on the relationship between leverage and *EPU*. We identify defense and energy industries as being relatively more sensitive to economic policy as suggested by Goldman et al. (2009). We find that firms in defense and energy industries reduce their debt ratios more than firms in other industries when economic policy uncertainty elevates. Collectively, these findings lend further support to the view that economic policy uncertainty plays a distinct role in capital structure decisions.

It is possible that the previously documented relationship between capital structure adjustments and economic policy uncertainty is driven by changes in corporate investments. During periods of high economic policy uncertainty, firms are less sensitive to demand shocks and are less likely to make investments (Bloom et al., 2007), which may reflect itself as lower demand for debt financing. Due to a reduced demand for debt financing, leverage may also decrease when economic policy uncertainty elevates. We conduct several tests to mitigate this concern. First, we study the relationship between *EPU* and the yields to corporate bonds at both the aggregate and firm levels to assess whether economic policy uncertainty increases borrowing costs. At the aggregate level in our time series regression, we find that the average credit spread – the average yield difference between Baa-rated bonds and that of Aaa-rated bonds – is positively related to the measure of economic policy uncertainty. At the firm level in our cross-section regressions, the bond issuance credit spread – the yield difference between a newly issued corporate bond and that of a matched U.S. Treasury Bond – is positively related to *EPU*. The positive association between *EPU* and yields suggests that economic policy uncertainty leads to increases in borrowing costs for firms. Furthermore, coupled with the finding of shortened maturity, these findings indicate a contraction of capital supply in periods of high economic policy uncertainty, lending further support to the supply-based theories of capital structure. Second, we estimate a simultaneous regression system involving leverage, investment, and *EPU*. We find that the effect of economic policy uncertainty on leverage is still negative after we allow for investment and leverage to be determined simultaneously. Third, we examine whether firms change their capital structures even when they do not change their investments. We find that firms continue to reduce debt even when they do not change their investments. In sum, these findings collectively suggest that changes in capital structure during high economic policy uncertainty are unlikely to be driven by variations in corporate investments.

We also examine the effect of economic policy uncertainty on the dynamics of migrations among capital structure groups by employing quantile regression. Unlike Ordinary Least Squares (OLS) regressions, which estimate the effects of changes in independent variables on the conditional mean of the dependent variable, quantile regressions estimate that effect on conditional quantiles, such as median or quartiles, of the distribution of the dependent variable (Koenker, 2005). This estimation method allows us to assess whether the effect of economic policy uncertainty on a firm's capital structure depends on the firm's level of leverage. We find that firms in all leverage groups reduce their debt ratios when economic policy uncertainty increases. However, sensitivity to economic policy uncertainty varies among capital structure groups. Specifically, the economic policy uncertainty has stronger effects on highly leveraged firms. This finding suggests that firms in the fourth quartile decrease their debt ratios more than the firms in the third quartile; thereby, firms in the third quartile fill the exodus of highly leveraged firms. Similar leverage adjustment speeds in the first and second quartile firms do not lead to significant migration among firms in these quartiles.

We further study the dynamic nature of migration among leverage groups by employing duration analysis in the spirit of Leary and Roberts (2005). Duration analysis allows us to estimate the effect of economic policy uncertainty on the lengths of the time periods for which firms are highly leveraged, while controlling for traditional determinants of capital structure. It also captures the notion that firms adjust capital structures infrequently (Leary and Roberts, 2005). We find that during periods of high economic policy uncertainty, highly leveraged firms are more likely to move towards low leverage regimes, while firms in the lowest leverage quartile tend to remain in their groups for extended periods. These findings are consistent with the higher speed of leverage adjustment for highly leveraged firms as reported in the quintile regression. We also find that the effect of economic policy uncertainty is more prominent for firms that do not have (preferential) access to debt markets. Overall, these findings are consistent with the supply-based theories of capital structure.

Our results are robust to alternative model specifications, testing methods, and subsample analyses. In addition to implementing book leverage, we use market leverage and target-adjusted leverage. Moreover, we estimate probit models to evaluate partial effects of economic policy uncertainty on probabilities to issue debt. To ensure that small firms and high-growth firms do not drive our results, we further conduct subsample analyses based on firm size and the market-to-book ratio. Our results are also robust to alternative measures of economic policy uncertainty and macroeconomic conditions. Overall, these tests further substantiate the findings of the paper.

Our study contributes to discussion on the supply and the demand mechanisms of capital structure. Faulkender and Peterson (2006) argue that supply of debt plays an important role in capital structure decisions by showing that traditional determinants of capital structure which proxy for the demand of firms for capital do not fully explain the differences in capital structure choices of rated and non-rated firms. In their recent work, Graham et al. (2015) also show that firm characteristics are not sufficient to explain the changes in capital structure choices. Furthermore, Choe et al. (1993), Korajczyk and Levy (2003), and Erel et al. (2012) provide empirical evidence on how firms adjust their capital structures in response to changes in non-firm characteristics including the business cycles and macroeconomic conditions. In particular, Erel et al. (2012) argue that the effect of macroeconomic conditions on capital structure is consistent with the supply channel of capital structure theories. The present paper is distinguished from these papers principally by providing new insights on how firms make financing decisions in response to the uncertainty in economic policies. By documenting the significant effect of economic policy uncertainty on capital structure choices, the paper shows that uncertainty plays a distinct and independent role in the formation and timing of capital structure and that an important source of the uncertainty is generated by policy makers.

The dynamic nature of financing decisions studied in this paper is also related to recent studies that draw attention to leverage regime stability (Lemmon et al., 2008; DeAngelo and Roll, 2015). These studies show that different groups of firms may rebalance capital structure in fundamentally different ways; firms are intrinsically labeled as seeking high leverage or low leverage. However, these studies diverge on the relative time lengths of stable leverage regimes.[13] Our paper relates to these studies by showing that economic policy uncertainty affects the time length of a stable leverage regime in an asymmetric way. For instance, economic policy uncertainty increases the length of the low leverage regime while decreasing the length of the high leverage regime. Furthermore, the amplifying effects of policy risk exposure and inability to access debt markets on the relationship between economic policy uncertainty and the capital structure decisions also suggest that financial frictions contribute to firms' migrations among debt regimes. Overall, the findings in this paper contribute to studies on capital structure stability by showing that leverage stability depends on the level of economic policy uncertainty and how firms internalize the uncertainty.

This paper also contributes to existing studies examining the effect of economic policy uncertainty on corporate decisions. Yonce (2009), Julio and Yook (2012), and Gulen and Ion (2016) show that firms cut investment anticipating economic policy uncertainty. By showing the effect of economic policy uncertainty on capital structure

[13] Lemmon et al. (2008) show that firms tend to remain in their initial leverage quartiles for a long time. DeAngelo and Roll (2015) find that most firms switch among different quartiles over time rather than staying in one quartile.

decisions, our study illustrates that the effect of economic policy uncertainty is not limited to corporate investments, but extends to corporate financing choices.

II. Sample selection and summary statistics

We obtain quarterly U.S. publicly traded firms' data from 1986 to 2015 from Compustat for our leverage adjustment analysis.[14] Following Leary and Roberts (2005) and Halling, Yu and Zechner (2016), we use quarterly data to explore more time series variations. Based on previous studies on capital structure (e.g., Hovakimian et al., 2001; Flannery and Rangan, 2006; Lemmon et al., 2008), we exclude financial firms (Standard Industrial Classification (SIC) 6000–6999) and regulated utilities (SIC 4900–4999). We exclude firms with missing or negative values on total assets, total debt, and market equity, as well as firms with less than 10 million dollars in total assets. All the ratios, such as *EBITDA/TA*, *Market-to-Book*, and *Tangible Asset/TA*, are winsorized at the top and bottom 1% level to mitigate the effect of outliers. In this paper, following DeAngelo and Roll (2015), we primarily focus on *Book Leverage* in part because book values are relatively more stable and more accurately reveal debt adjustments. Furthermore, managers may focus on book values rather than market values in assessing capital structure (Hovakimian, Opler and Titman, 2001). Regardless, we report results based on *Market Leverage* in the robustness section and they remain intact.

In our sample, we restrict *Book Leverage* to be in the unit interval. Based on Leary and Roberts (2005), firms are also required to have at least 16 continuous quarterly

[14]We use this time period because the Economic Uncertainty Index data starts from 1985 and the stock market volatility index, VIX, starts from 1986.

observations to conduct the duration analysis. Our final sample contains 5,929 unique firms and 329,834 firm-quarter observations.

The main explanatory variable is the economic policy uncertainty index (*EPU*) from Baker et al. (2013). *EPU* aggregates three sources of information. The first component is the news coverage about policy uncertainty. Specifically, terms related to economic uncertainty are searched in 10 major newspapers and the counts are summarized. The second component is from reports by the Congressional Budget Office (CBO) that compile lists of temporary federal tax code provisions. The third component draws on the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters on future government purchases and future inflation. Thus, *EPU* captures the overall economic policy-related uncertainty, rather than a specific type of government related uncertainty (fiscal, monetary, social security).

To analyze the cost of debt in the robustness section, we obtain the credit spread time series data from the Federal Reserve Bank of St. Louis, bond issuance data from Mergent FISD, and stock return data from CRSP for the same period. For the bond issuance data in particular, we collect the issuer ID, the date of issuance, the issuance yield, the maturity of an issue, the S&P rating of an issue, and the Treasury bond yield matched by the maturity of the corporate issue. We apply several filters to the raw data set, excluding observations with missing offering yield, offering date, maturity, and security level. We further remove observations with non-US or bankrupt issuers, and those with puttable or convertible features. After matching bond issuance data with macroeconomic variables, Compustat, CRSP, and bond ratings, we have 6,869 new debt issues in the U.S. between 1985 and 2015. Lastly, in light of Campbell and Taksler

(2003), we include *Idiosyncratic Volatility*, measured as the stock volatility of individual stock returns in excess of market return volatility, as a control variable in our firm level credit spread analysis.

Table 2.1 reports the descriptive statistics for all variables used in this study. In Panel A, we summarize firm characteristics. The *Book Leverage* has an average of 0.26 with a standard deviation of 0.24 around the mean. The *Market-to-Book* ratio has a mean of 1.92 and a median of 1.16. The mean Firm *Size* in our sample is $523 million. These statistics are similar to those in previous studies including Lemmon et al. (2008), Frank and Goyal (2009), and DeAngelo and Roll (2015). In addition, only 29% of the firms in our sample possess a credit rating, which is consistent with Faulkender and Peterson (2006). In Panel B, we summarize the economic variables used in our analysis. The *EPU* index has a time series mean of 1.07 with a standard deviation of 0.31 around the mean.[15] The (scaled) *VIX* index series is averaged at 21 percent with a standard deviation of 8 percent. In Panel C, we describe the bond issuance sample. *Credit Spread*, the average yield difference between Baa-rated bonds and that of Aaa-rated bonds, has an average of 1 percentage point. In the bond level data, the average *Offering Yield* is 7.43 percentage points while the mean matched *Treasury yield* is 4.75 percentage points. Furthermore, the average *Maturity* of these corporate bonds is around 10.72 years and the standard deviation is around 7.86 years. The average S&P credit rating of these bonds is between A- and BBB+. These summary statistics for bond issuances are consistent with previous studies that examine bond level data (e.g., Gilchrist and Zakrajšek, 2012).

[15] We scale the original *EPU* index by dividing it by 100.

We next examine whether *EPU* is correlated with traditional macroeconomic indicators in the time series. It is possible that *EPU* may be high during economic downtowns and thereby may be another indicator for economic slowdown. Thus, we further study the relation between the US Monthly *EPU* Index data and the recessions that are identified by the NBER. We use the mean of the index over a quarter to match with our firm data. The data series is normalized by 100 to be comparable with other firm characteristics in scale. In Figure 2.1, we report the time series plot of the index together with the NBER dated recessions. *EPU* is typically counter cyclical. However, it continues to be high even in non-recession years including 2003 and 2011. These findings are consistent with Baker et al. (2013) and provide preliminary evidence that *EPU* is distinct from general business cycle variables. Besides, per Baker et al. (2013), the *EPU* index and the *VIX* index are not perfectly correlated with a correlation coefficient of 0.58. Thus, it is important to note that economic policy uncertainty and stock market volatility are two distinct yet closely related aspects of the general uncertainty faced by firms.

Figure 2.1 also reveals benefits of using a continuous measure over a discrete measure. Prior studies (e.g., Julio and Yook, 2012) have used indicators of election years as a proxy for policy uncertainty; however, the indicator approach does not capture economic policy uncertainty in non-election years, and such uncertainty can be high. For example, *EPU* reached its peak during the debt ceiling debate in a non-election year of 2011. Thus, economic policy uncertainty is not necessarily resolved right after elections and may even increase during the post-election period.

III. The effect of policy uncertainty on capital structure decisions

We begin our inquiries with a set of univariate analyses of leverage over high and low *EPU* periods. We define high *EPU* if the *EPU* index is in the top *EPU* quartile and low *EPU* otherwise. In Panel A of Table 2.2, we report the mean and median of leverage for low and high periods of *EPU*. The mean of leverage is 0.248 in low *EPU* while it is 0.232 in high *EPU*. The difference in leverage between these periods is also statistically significant at the 1 percent level. Similarly, the median debt ratios are higher in low *EPU* periods relative to high *EPU* periods (0.225 vs. 0.204) and the difference in debt ratios continues to be statistically significant. Taken together, these results indicate that firms have lower debt ratios in periods with high *EPU*.

Next, we examine whether the negative relation between economic policy uncertainty and leverage depends on firm characteristics. Panel B of Table 2.2 reports mean debt ratios by *EPU* periods and firm size quartiles. While mean leverage incrementally increases with firm size, firms during high *EPU* periods have lower debt ratios for each firm size quartile. We continue to find lower debt ratios during high *EPU* periods when we sort the data by leverage in Panel C. Furthermore, Panel D shows that the results remain intact in three out of four *Market-to-Book* quartiles when we sort the data by *Market-to-Book* ratio. Collectively, these findings indicate that firm size, leverage and *Market-to-Book* ratio are unlikely to confound the effect of *EPU* on the debt ratio, while also supporting our conjecture that economic policy uncertainty influences capital structure.

Finally, we examine whether the negative relation between economic policy uncertainty and leverage depends on the election year. Panel E reports the mean leverage by *EPU* and election years. The effect of *EPU* on the debt ratio continues to hold in both election and non-election years. However, the effect of election on debt is not uniform. That is, there is no difference in leverage in election and non-election years during periods of low *EPU*. Elections have a significant effect on leverage only when *EPU* is high. These findings suggest that differences in leverage in election and non-election years are generated in part by increased economic policy uncertainty, while further supporting the view that *EPU* is a distinct determinant of capital structure.

We also conduct a multivariate analysis including several factors that are not accounted for in the univariate analysis, but may potentially affect leverage. Table 2.3 reports the coefficient estimates for the regressions of *EPU* on leverage. Standard errors are robust to heteroskedasticity and to clustering within firm over time. In these regressions, we include a variety of variables for the state of the economy. As overall economic conditions, especially the business cycle, can exert a strong effect on a firm's capital structure decisions, we add NBER recession dummies in our analyses. To account for the effect of overall uncertainty in the capital markets, our analysis includes the S&P 100 volatility index (*VIX*). Collectively, this set of control variables allows us to segregate the effects of economic policy uncertainty and economic conditions on capital structure decisions.

We also account for several factors that are found to be important determinants of capital structure choices in previous studies (e.g., Hovakimian et al., 2001; Flannery and Rangan, 2006; Lemmon et al., 2008; Frank and Goyal, 2009). For example, we include the natural logarithm of the total value of book assets as a proxy for *Firm Size*. As large firms are more diversified and have less volatile cash flows, large firms are likely to have higher debt ratios (Rajan and Zingales, 1995). Furthermore, we control for growth opportunities proxied by the *Market-to-Book* ratio, since firms with more growth opportunities tend to have lower leverage (Goyal et al., 2002). Asset tangibility is another important determinant of capital structure. Firms with liquid assets are more likely to borrow against their assets and have lower bankruptcy costs, resulting in higher debt ratios (Titman and Wessels, 1988). We use the ratio of tangible assets to the book value of total assets to account for asset tangibility (*Tangible Assets/TA*). To control for firm profitability, we use earnings before taxes, preferred dividends, and interest payments over total assets variables (*EBITDA/TA*). Following Lemmon et al. (2008), we further include median book leverage for each three-digit SIC industry grouping to account for systematic industry differences in leverage across industries (*Median Industry Leverage*).

After accounting for macroeconomic conditions and traditional determinants of capital structure, we find that leverage decreases when economic policy uncertainty increases. The effect is both statistically and economically significant. Specifically, an increase of one standard deviation in *EPU* decreases *Book Leverage* by 0.5 percentage points in Model 1, which corresponds to a decrease of 2% relative to average *Book Leverage* in our sample. The results remain intact when we include industry fixed effects (Model 2) and firm fixed effects (Model 3). Collectively, these findings suggest that firms account for economic policy uncertainty in capital structure decisions. These results are also consistent with both the supply and demand-based mechanisms of capital structure.

The coefficient estimates for the control variables are largely consistent with previous studies (e.g., Hovakimian et al., 2001, Flannery and Rangan, 2006, Lemmon et al., 2008, Frank and Goyal, 2009). For example, our estimates reveal that *Firm Size* is positively associated with Book *Leverage*, suggesting that larger firms on average have higher debt ratios. *Tangible Asset/TA* also has a positive effect on leverage. This finding is consistent with the idea that firms with more tangible assets are better able to borrow against their assets. *Median Industry Leverage* has a positive effect on leverage, while the coefficient estimate for the dividend payer is positive. Both profitability (EBITDA/TA) and growth opportunities (market-to-book ratio) are negatively associated with debt ratios.

Next, we employ a battery of tests to disentangle supply and demand-based mechanisms of capital structure. Specifically, we examine whether factors that are found to be associated with the supply channel of capital structure moderate the effect of economic policy uncertainty on capital structure choices. Faulkender and Peterson (2006) point out that having access to public debt markets partially eliminates frictions in the supply of capital (e.g., credit rationing in the private debt market) by showing that rated firms have higher leverage relative to unrated firms. Thus, we expect unrated firms to have a different response to heightened *EPU* if economic policy uncertainty affects firms' capital structure decisions through the credit supply channel. Specifically, they should have more difficulty in borrowing; thereby reducing their debt ratios more than rated firms in periods of high economic policy uncertainty. Along the same line, if economic policy uncertainty creates a shift in credit supply towards relatively safe debt securities, below-investment-grade firms are also more likely to be shut out of debt markets and have lower debt ratios compared to firms with investment grade ratings during periods of high economic policy uncertainty.

We test these hypotheses in Table 2.4 by including the interaction term of the *Rating* variable, which takes the value of one if the firm has a rating, and *EPU* in leverage regressions. Model 1 reports a positive coefficient estimate for the interaction term of *Rating* and *EPU*. However, the estimate lacks statistical significance. To further disentangle the effects of supply- and demand-based theories of capital structure, we focus on a subsample of rated firms and estimate the effect of the interaction term of *Investment Grade Rating*, which takes the value of one if the firm has an investment grade rating, and *EPU* on *Book Leverage*. We continue to find a positive and significant interaction term in Model 2, indicating that below-investment-grade firms lower their debt ratios more than their investment grade counterparts when *EPU* increases. These findings reveal that firms that are exposed to more frictions in accessing capital exhibit higher sensitivity to economic policy uncertainty in adjusting capital structures. Collectively, these results are consistent with the supply-based mechanism of capital structure, but are difficult to reconcile with the demand-based theories of capital structure.

Additionally, we examine whether economic policy uncertainty has any impact on the lengths of firms' dormant periods between two consecutive debt-financing spikes and how these impacts vary with the source of finance. Table 2.5 presents the duration models for debt issuance decisions in which the dependent variable is the time between two consecutive debt issuances. Based on previous literature (Hovakimian, Opler, and Titman, 2001; Korajczyk and Levy, 2003; Leary and Roberts, 2005), we identify a debt issuance as having occurred in a given quarter if the net change in debt, normalized by the book value of assets at the end of previous period, is greater than 5 percent. The time between the two consecutive debt issuance dates is the dormant period in our analysis.

The duration models of Table 2.5 present novel evidence suggesting significant adverse effects of economic policy uncertainty on debt issuance decisions. Estimates of Model 1 indicate that a one standard deviation (0.3) increase in *EPU* is associated with a decrease in the probability of issuing debt in the next quarter by 10% ($p<0.01$). That is, firms wait longer to issue debt when *EPU* elevates. We also find that having access to public debt markets moderates the relationship between *EPU* and duration periods. Estimates of Model 2 show that the hazard impact of economic policy uncertainty on nonrated firms is -34.7% ($p<0.01$), yet that on rated firms decreases significantly by only 11% ($p<0.01$). We further examine the differential hazard impacts of investment and non-investment grade firms in a subsample of rated firms. Model 3 reports that the hazard impact of economic policy uncertainty on noninvestment grade firms is -32.1% ($p<0.01$), while that on investment grade firms decreases by 7.5% ($p<0.01$). Collectively, the moderating effects of having access to public debt markets in general and having an investment grade rating in particular reinforce the supply-based mechanisms of capital structure. However, these findings are difficult to reconcile with the demand-based theories of capital structure.

In addition, estimates of the hazard impacts of other control variables are largely consistent with those from previous literature (Leary and Roberts, 2005). Firms that are more profitable and have higher tangible assets ratio wait longer to issue debt. Furthermore, firms with more growth opportunities have longer dormant periods.

Next, we examine whether economic policy uncertainty influences firms' debt maturity structures. Banks use price and non-price terms as complements in contracting, and debt maturity is an important non-price contract term (Dennis, Nandy and Sharpe, 2000). Following prior literature (e.g., Barclay and Smith, 1995), we measure Debt Maturity as the ratio of long-term debt over total debt. In Table 2.6, we report regression estimates for the effect of economic policy uncertainty on Debt Maturity. The coefficient of the EPU index in Model 1 is negative and significant ($p<0.10$), suggesting that the ratio of long-term debt decreases when EPU increases. However, the effect is asymmetric for firms with and without access to public debt markets. Specifically, a positive and significant coefficient estimate of the interaction term of EPU and Rated in Model 2 indicates that the long-term debt ratio of unrated firms decreases more than rated firms when EPU increases. In a subsample of rated firms, Model 3 reports a positive and significant effect of the interaction term of Investment Grade and EPU, suggesting that firms with investment grade ratings are less affected by economic policy uncertainty in determining debt maturity structure. Collectively, these results demonstrate that firms with limited access to supply of debt have difficulty issuing long-term debt in periods of high economic policy uncertainty. These findings lend further support to the supply-based hypothesis regarding the effect of economic policy uncertainty on capital structure adjustments.

IV. Endogeneity

Endogeneity concerns may arise if one believes that economic policy uncertainty and capital structure adjustments are either determined simultaneously or are both determined by unobserved factors. The standard approach to address such concerns is to implement instrumental variable (IV) analysis, in which the selected IV should correlate with economic policy uncertainty but not with capital structure adjustments. Inspired by political science literature, we construct such an IV that measures the level of political polarization in the United States Senate. Conceptually, per McCarty (2012), a higher level of partisan polarization can "make it harder to build legislative coalitions, leading to policy gridlock," and consequently "produce greater variation in policy." In contrast, there is no correlation between the level of political polarization and firms' capital structure decisions. Collectively, these findings validate the political polarization measure as an instrument for our IV analysis.[16]

We empirically measure *Political Polarization* using the *DW-NOMINATE scores* of McCarty et al. (1997). Per Poole and Rosenthal (2000), these scores are designed to track legislators' ideological positions over time and have several dimensions.[17] Here, we focus on the first dimension that reflects legislators' position on government intervention in the economy and is closely related to economic policy uncertainty. Specifically, consistent with prior studies (e.g., Gulen and Ion, 2016), we construct our measure as the average of these scores for the Republican Party members in the Senate minus that for the Democratic Party members in the Senate.

Table 2.7 reports the IV analysis results using the *Political Polarization* measure as an instrument for economic policy uncertainty. We estimate the coefficients by implementing a two stage least square (2SLS) model where the dependent variables are *EPU* and book leverage in the first and second stages, respectively. The focus of this subsection is the second stage regression, while we report the first stage estimates in Appendix. Model 1 presents coefficient estimates for control variables and year fixed effects of the second stage regression. After accounting for macroeconomic factors and

[16] In Appendix B, we provide the estimates for the first stage IV regression.
[17] See McCarty (2011) for a detailed description of the scores.

firm characteristics, we find a negative and significant effect of economic policy uncertainty on leverage. The results remain intact even after including industry fixed effects in Model 2. These findings partially ameliorate the concern that economic policy uncertainty is endogenous while strengthening our conjecture that economic policy uncertainty plays a distinct role in capital structure adjustments.

We further address potential endogeneity concerns by exploiting the cross-sectional differences in firms' sensitivity to economic policy. Goldman et al. (2009) argue that firms in defense and energy industries are more sensitive to government economic policies relative to firms in other industries as these firms are frequent government contractors and heavily regulated, respectively. Thus, uncertainty associated with government economic policies are more likely to affect capital structures of the firms in defense and energy industries if uncertainty plays any role in capital structure decisions. However, if there is an omitted variable that drives both economic policy uncertainty and capital structure adjustments, the effects of economic policy uncertainty on capital structure adjustments are less likely to depend on firms' sensitivity to economic policy.

Subsequently, we examine whether sensitivities to economic policy amplifies the effect of *EPU* on capital structure decisions. Table 2.8 shows the impacts of economic policy uncertainty on debt ratios and debt issuances. Panel A presents OLS estimation results where the dependent variable is *Book Leverage*. We estimate three model specifications; Model 1 includes control variables and year fixed effects, while we add industry fixed effects in Model 2. Finally, we replace industry fixed effects with firm fixed effects in Model 3. We find negative and significant coefficient estimates for the interaction term of *EPU* and *Policy Sensitivity* in all three Models, suggesting that the effect of economic policy uncertainty is stronger for firms that are identified to be more sensitive to economic policy uncertainty. Panel B reports the hazard impacts on firms' debt issuance decisions, where the dependent variable is the spell between two financing spikes. The negative and significant coefficient of the interaction term between the *EPU* and *Policy Sensitivity* indicates that firms that are more sensitive to economic policy uncertainty wait longer to issue debt when economic policy uncertainty heightens. Collectively, these amplified responses of politically sensitive firms to increased *EPU* is difficult to reconcile with the omitted variable explanation while providing further evidence for the distinct role of *EPU* in capital structure decisions.

V. Corporate investments and capital structure decisions

In this subsection, we examine whether the previously documented effect of *EPU* on capital structure is principally driven by changes in corporate investments. Previous studies have shown a negative relationship between corporate investment and economic policy uncertainty (Baker et al., 2013; Gulen and Ion, 2016). Thus, an increase in economic policy uncertainty may decrease corporate investments and such reduction in investments may lead to a decrease in firms' demands for debt financing, potentially manifesting itself as lower corporate debt ratios.

To address this concern, we begin by examining whether economic policy uncertainty has a direct effect on corporate borrowing costs. We assess this effect by employing credit spreads at both the aggregate and the firm levels. At the aggregate level, we estimate the relation between economic policy uncertainty and the *Average Yield Spread*, the yield difference between Baa-rated corporate bonds and Aaa-rated corporate bonds. At the firm level, we employ a regression framework like Campbell and Taksler (2003), where we estimate the relation between economic policy uncertainty and *Bond Issuance Spread*, the yield difference between a newly issued corporate bond and a matched Treasury bond.

Panel A of Table 2.9 reports the estimates of a time series regression of average yield spread on the *EPU* index and other controls. There is a positive and significant relation between economic policy uncertainty and cost of debt at the aggregate level. Specifically, a one standard deviation increase in the *EPU* index leads to a 9 basis points increase in *Credit Spread* ($p<0.01$). We continue to find significant and positive effects of the *EPU* index on the yield spread at the firm level when we run a regression of the issuance yield spread on the *EPU* index and other control variables in Panel B. A one standard deviation increase in the *EPU* index leads to an increase in the *Average Offering Yield* by 100 basis points ($p<0.01$). These findings support our conjecture that economic policy uncertainty increases borrowing costs and exerts a direct impact on financing activities through the supply of capital channel. Coupled with the shortened debt maturity reported in Table 2.6, increasing yields during periods of high economic policy uncertainty indicate a contraction of funds, lending further support to the supply-based mechanism of capital structure.

We also estimate a simultaneous regression system involving Book *Leverage*, *Investment*, and *EPU* in Table 2.10. In the first regression of the system, we regress *Book Leverage* on contemporaneous *Investment* and *EPU* as well as other determinants of Book *Leverage* that are included in Table 2.3. The dependent variables are *Investment* and *EPU* in the second and third regressions, respectively. Model 1 reports negative and significant effect of *EPU* on *Book Leverage* even after accounting for *Investment* and other determinants of capital structure. We also find a negative and significant effect of *EPU* on *Investment*. These findings support the view that *EPU* has a first order effect on capital structure choices.

Finally, we study whether firms change their capital structures in response to changes to economic policy uncertainty, even in periods when they do not change their investments substantially. We construct a subsample by selecting firm-quarter observations in which the change in *Investment* from its value in the previous quarter is less than 1%. This sub-sample analysis allows us to obtain an estimate of the effect of economic policy uncertainty on capital structure, while isolating the effect of a time-varying corporate investment on debt ratios. Table 2.11 reports negative and significant coefficient estimates of *EPU* in this sub-sample. These findings indicate that firms lower their debt ratios in periods of high economic policy uncertainty even in the absence of a change in investments. Collectively, these results lend further support to the view that *EPU* has a first order effect on capital structure choices.

VI. Dynamics of capital structure adjustments in times of high economic policy uncertainty

In this subsection, we examine whether highly leveraged firms are more sensitive to changes in economic policy uncertainty compared to low leverage firms by utilizing quintile regressions. Unlike OLS regressions, which estimate the effects of changes in independent variables on the conditional mean of the dependent variable, quantile regressions estimate thoes effects on conditional quantiles, such as median or quartiles, of the distribution of the dependent variable (Koenker, 2005). Specifically, we estimate the effect of economic policy uncertainty on the 10th, 25th, 50th, 75th, and 90th percentiles of *Book Leverage*. Therefore, by comparing the coefficient estimates for the *EPU* index in the regressions for all five percentiles, we can draw inferences on whether differences in levels of debt generate variations in response to increased economic policy uncertainty.

Table 2.12 reports the coefficient estimates of the quantile regressions. In Model 1, where the dependent variable is the conditional 10th percentile of *Book Leverage*, the coefficient of the *EPU* index is negative but lacks significance. However, the *EPU* index has a negative and significant effect on Book *Leverage* in all other models. Furthermore, the absolute values of the coefficient estimates for *EPU* almost double if we move from the 25th percentile (Model 2) to 75th percentile (Model 4). Specifically, a one standard deviation increase in the *EPU* index is associated with nearly a 20 basis points decrease in the 25th percentile of the leverage distribution, while it generates a decrease of 40 basis points for the firms in the 75th percentile. These estimates further reveal that highly leveraged firms reduce their debt ratios more than firms with relatively low debt ratios.

Motivated by the above finding that the adverse effect of economic policy uncertainty on leverage is stronger for highly leveraged firms, we further study the variation in leverage changes in response to *EPU* by employing duration analysis in the spirit of Leary and Roberts (2005). Duration analysis allows us to estimate the effects of economic policy uncertainty on the lengths of the time periods for which firms are highly leveraged, while controlling for traditional determinants of capital structure. Table 2.13 shows the results from our duration analysis for four leverage regime spells: lowest quartile, mid-low quartile, mid-high quartile, and highest quartile. The dependent variable is the time during which a firm stays in a certain leverage regime (e.g., the lowest quartile). This empirical approach allows us to assess the effect of policy uncertainty on capital structure adjustment more accurately, given these adjustments are infrequent and discontinuous (Leary and Roberts, 2005; Strebulaev, 2007).

We find significant and asymmetric effects of *EPU* on capital structure adjustments. For the lowest leverage spell (quartile 1), a one-standard deviation (0.3) increase in *EPU* corresponds to a 1.5% *decrease* (-0.3×5.1) in the probability of firms ending their underleverage spells in the subsequent quarter (p-value<0.01). In sharp contrast, for the highest leverage spell (quartile 4), a one standard deviation increase in *EPU* is associated with a 1.8% *increase* in the probability of firms ending their overleverage spells in the next quarter. These findings indicate that firms are more likely to leave the highest leverage quartile, but are more likely to stay in the lowest quartile during periods of high economic policy uncertainty. Thus, these results are consistent with previously documented results from quantile regressions, suggesting that the effects of economic policy uncertainty on capital structure mostly come from highly leveraged firms.

Effects of other explanatory variables on capital structure in our analysis are largely consistent with previous studies (Leary and Roberts, 2005). For example, firms are more likely to increase leverage when they are larger and have a higher *Tangible Assets/TA* ratio. Firms in highly leveraged industries are also more likely to increase leverage in the subsequent quarter. Finally, firms with high *Market-to-Book* ratios maintain low debt ratios.

We further use alternative measures of economic policy uncertainty to establish robustness for our main conclusions. Since the *EPU* Index is a summary of three components: divergence of media coverage, tax expiration codes, and economic forecast disagreements, we utilize its three individual components to further examine the nature of the relationship between economic policy uncertainty and capital structure. We present our regression estimates in Table 2.14 in which the dependent variable is *Book Leverage*. All components have negative estimates in leverage regressions while the effect is the strongest for the news-based component. This finding can be interpreted in part by the construction of the news index, which is designed to capture the uncertainty associated with all policy decisions, including those captured by the tax-based component and by the inflation component.[18]

We also use an alternative measure of leverage to establish robustness for our main conclusions, which are based on *Book Leverage*. In Table 2.15, we replicate the panel regression presented in Table 2.3 with *Market Leverage* as the dependent variable. The coefficient estimates of the *EPU* index in Table 2.17 are negative and significant in all three models, which are consistent with the estimates in Table 2.3. Furthermore, the magnitudes of the estimates in Table 2.17 are larger than those in Table 2.3. For example, the coefficient of the *EPU* index is -0.036 in Model 1 of Table 2.17 although it is -0.014 in Model 1 of Table 2.3. Similar relations hold in other models as well. These results reinforce our conclusion that firms have lower leverage when economic policy uncertainty elevates. They also demonstrate that our main conclusions are not sensitive to the choice of the measure of leverage.

[18] Gulen and Ion (2016) also find the majority of the effect of the overall index on investments comes from the news component.

Lastly, we examine how economic policy uncertainty affects firms' target adjusted debt ratios. We estimate a set of dynamic capital structure models that allow firms to move toward their target debt ratios over time (e.g., Fama and French, 2002; Flannery and Rangan, 2006; Lemmon et al., 2008). Table 2.16 presents coefficient estimates of the dynamics models including firm fixed effects. Specifically, Model 1 of Panel A in Table 2.18 reports that a one standard deviation increase in *EPU* reduces the *Target Adjusted Book Leverage* by 9 basis points ($p<0.01$). Flannery and Rangan (2006) and Flannery and Hankins (2013) argue that the fixed effect estimator is subject to endogeneity concerns in the dynamic panels. Thus, we follow Flannery and Hankins (2013) and use the estimator of Blundell and Bond (1998) in Model 2. The result remains intact. The evidence from these models suggests that an increase in economic policy uncertainty reduces a firm's leverage even after accounting for the firm's target capital structure.

We also estimate the market leverage adjustments in Panel B of Table 2.16. There are significant and negative effects of *EPU* on market leverage adjustments in all models. A one standard deviation increase in *EPU* lowers *Market Leverage* by 100 basis points in Model 4. In sum, the findings in Table 2.16 are consistent with the results in previous tables that leverage is negatively associated with *EPU.*

VII. Conclusions

In this study, we analyze the effect of policy-related uncertainty on the capital structure adjustments of U.S. public corporations. By the employing economic policy uncertainty index of Baker et al. (2013), we find a significant effect of economic policy uncertainty on capital structure choices after accounting for the effects of economic conditions, firm and industry characteristics. Specifically, firms delay issuing debt and reduce leverage, corporate debt maturity shortens and borrowing costs increase when economic policy uncertainty increases. We also find that the effects of economic policy uncertainty on capital structure choices are moderated by the supply-side factors including access to debt markets and having an investment grade debt rating. Collectively, the evidence suggests that supply of capital plays an important role in times of high economic policy uncertainty in corporate capital structure choices.

The paper also contributes to the growing literature that examines the impact of government policy uncertainty on the corporate policies by identifying a new channel; corporate capital structure adjustments. Furthermore, our findings add to the discussion on the supply and the demand mechanisms of capital structure. We also demonstrate that the uncertainty generated by policy-makers influence corporate capital structure adjustments distinctively from other macroeconomic factors. Thus, policy-makers should not only worry of making the right decisions, but should also be aware of the uncertainty generated by prolonged discussions on economic policies. Lastly, our paper generates new insights regarding leverage stabilities: leverage stability depends on the level of economic policy uncertainty and how firms internalize the uncertainty.

Chapter 3:
Access to Finance, Bureaucracy, and Capital Allocation Efficiency: Evidence from International Data[19]

I. Introduction

The efficiency of capital allocation is far from ideal in most countries (e.g., King and Levine, 1993; Hall and Jones, 1999; Wurgler, 2000; Levine, 2005), and inefficient capital allocation (hereinafter: misallocation) has profound implications. For example, Hsieh and Klenow (2009) show that if capital in China and India was allocated as efficiently as it is in the U.S., the total factor productivity of manufacturers could increase by up to 50% and 60%, respectively.[20] Despite the significance of misallocation, only scant empirical evidence exists related to quantifying its degree and identifying its determinants. The empirical evidence is even scarcer for developing countries, where misallocation is more pronounced. The present paper fills this void by focusing on a wide spectrum of developing countries and examining three questions: First, what is the extent of misallocation in these countries? Second, what are the underlying sources of misallocation? Third, how quantitatively significant are the influences of these determinants on capital misallocation?

I measure the degree of misallocation using the dispersion of the marginal product of capital across firms. This is based on the idea that the marginal product of capital should be identical in all firms when capital is perfectly allocated (e.g., Melitz, 2003). As

[19] This chapter is based on collaborative work with Scott Guernsey and Scott Linn.
[20] Other important studies include Alfaro, Charlton, and Kanczuk (2008); Banerjee and Duflo (2004); Bartelsman, Haltiwanger, and Scarpetta (2013); and Restuccia and Rogerson (2008).

such, any observed deviations in the marginal product of capital across firms from their benchmark should be a result of distortions in the economy.

To derive a testable empirical model, I utilize the analytical framework considered by Melitz (2003), Dollar and Wei (2007), and Hsieh and Klenow (2009) to study the relations between misallocation and various sources of distortions in a competitive equilibrium. Within this framework, firms—as production units—face heterogeneous distortions in their input markets, their capital and labor markets, and their output markets. Distortions in the markets for capital primarily result from financial frictions, such as access to finance and information asymmetry. Distortions in the output markets largely result from bureaucratic frictions, such as red tape and bribery. In the equilibrium, firms equate their marginal products of capital with their user costs of capital (e.g., the financing costs). Firms facing higher distortions must therefore have higher returns to capital. Moreover, the degree of misallocation increases in the heterogeneity of the distortions they confront.

To cover a wide spectrum of developing countries in which financial constraints and bureaucratic frictions are more prominent, I use the latest harmonized establishment-level data from the World Bank's Enterprise Survey. My sample includes 59 countries, most of which are low- or middle-income countries that are rarely covered in the finance literature before. A main advantage of this data is that it provides direct information on access to finance (e.g., bank accounts, credit lines, and the percentage of assets financed by financial institutions); in contrast, other studies largely rely on imperfect proxies or indirect modeling.[21] Another advantage is that this data contains information on firms'

[21] See for example Kaplan and Zingales (1997), Whited and Wu (2006), Almeida and Campello (2007), and Hadlock and Pierce (2010).

burdens of bureaucracy, such as the time they spend on government and the percentage of revenue they pay informally to government officials. In addition, this dataset covers not only public-listed firms but also private firms, especially small companies that have fewer than 20 employees.

I find that capital misallocation, as measured by the dispersions of the *marginal revenue product of capital* (*MRPK)* across firms, is pervasive in developing countries. I calculate the *MPRK* for each company using firm-level output and capital stocks under the assumption that the production function is Cobb-Douglas. I find that the country-level standard deviation of *MRPK* ranges from 1.83 to 9.38, which indicates significant misallocation—a fact that is not revealed in publicly available aggregate country figures. Having calculated the extent of misallocation, I proceed to examining the difference in return to capital at the firm level within countries and how misallocation varies across countries. In my multivariate regression analyses, I find evidence that financial constraints, bureaucratic frictions, information asymmetry, and gender inequality significantly help to impede the most efficient allocation of capital across firms. I further show that these factors exert greater influences on already highly distorted firms (i.e., those that need capital). In my industry-level analyses, I discover that the dispersion in the return to capital is positively related to the heterogeneities in firms' access to finance and the bureaucratic frictions that they face. These results indicate that eliminating financial frictions, excessive business regulations, and gender inequality can mitigate misallocation and should become first-order policy concerns for the governments of developing countries.

This paper relates to the literature that documents the extent and determinants of capital allocation. Wurgler (2000) studies a country-level sample and finds that a well-developed financial market increases the investment efficiency within a nation. Moreover, he identifies that investment efficiency decreases in relation to the percentage of state ownership in the economy and increases in relation to the amount of firm-specific information and investor protection. At the firm level, Restuccia and Rogerson (2008) extend the neoclassical model to show how plant-level idiosyncratic distortions that result from government policies can lead to misallocation. Finally, Collard-Wexler, Asker, and De Loecker (2011) demonstrate that volatility in total factor productivity is a significant determinant of misallocation across countries.

A firm's access to finance is one of the most studied misallocation-generating factors. For example, several researchers have developed quantitative frameworks to show that financial frictions have a significant impact on capital allocation, including Greenwood, Sanchez, and Wang (2012); Buera, Kaboski, and Shin (2011); and Moll (2014). On the empirical side, many investigators provide evidence that financial development is a key promoter in the capital allocation process, such as King and Levine (1993); Wurgler (2000); Banerjee and Moll (2010); Gilchrist, Sim, and Zakrajsek (2013); and Midrigan and Xu (2014).

In addition to financial market imperfection, researchers claim that political factors such as excessive regulation, rampant corruption, and weak property rights protection are also responsible for preventing resources from being optimally allocated within a country (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). In their model, Restuccia and Rogerson (2007) specify that misallocation originates from policy-induced distortions. Moreover, in studying a sample of 10 African countries Kalemli-Ozcan and Sorensen (2012) find that the strength of property rights and the quality of the legal system are negatively related to country-level returns to capital. Another way to incorporate political factors is to examine whether systematic differences in returns to capital exist among state- and non-state-owned firms. In studies of Chinese companies, Dollar and Wei (2007) and Hsieh and Klenow (2009) find evidence that state-owned firms have lower returns to capital than domestic and foreign-owned firms.

My work extends the existing literature in several ways. First, this study focuses on firms in low- and middle-income countries. These firms are particularly interesting to investigate given that they are most likely to face high distortions in their economies and thus exhibit more severe capital misallocation than firms in developed countries. To the best of my knowledge, no study has systematically calculated the extent of misallocation and its determinants for a large set of low- and middle-income countries using comparable firm-level data; many of the countries in my sample are examined for the first time. Moreover, the harmonized nature of the dataset allows for a direct comparison of the extent of capital misallocation across countries and industries.

Next, this paper is the first to empirically study the role of an owner's gender in the allocation of capital. Gender inequality in education and employment opportunities is prevalent in many developing countries (Dollar and Gatti, 1999) and such inequality may reduce growth and development (Klasen, 1999). I provide evidence that firms with at least one female owner face higher distortion in capital and output markets than other companies.

Finally, this study provides new evidence concerning how much difference in the cost of capital the examined sources of distortion translate to. While establishing the various origins of capital allocative inefficiency in developing countries, I acknowledge that these determinants do not all contribute to the degree of misallocation in the same way. This observation is particularly important to policymakers, as they want to know the most effective methods for eliminating distortion in the economy.

II. Data

To assess the firm-specific marginal product of capital, the degree of misallocation, and the determinants of firm-specific, industry-level, and country-level resource allocative efficiency, I utilize an Enterprise Survey dataset (as available on the World Bank's website). The Enterprise Survey is a harmonized, stratified, randomly sampled establishment-level database compiled from research undertaken by the World Bank in developing countries (as well as in a few developed countries). The survey is conducted through face-to-face interviews with firms' business administrators and owners. Most importantly, the survey's questionnaires are administered within a framework of common guidelines developed in the design and implementation. The aim of the survey is to provide consistent, in-depth evaluations of the various constraints faced by firms around the world and information about how those constraints affect firm performance and economic growth. The dataset thus includes both quantitative and qualitative as well as objective and subjective information concerning various aspects of the business climate faced by firms, including the quality of infrastructure, law enforcement and corruption, red tape, and access to finance. The dataset also provides detailed documentation related to firm characteristics and performance, such as annual sales, investment, input costs, export activity, firm age, and employment.

Two major core surveys consistently measured firm information across countries: one was conducted from 2002 to 2005, the other from 2006 to 2016. While most existing research on the Enterprise Survey dataset made use of the earlier survey, my empirical work relies on the latter one given that it is more up to date and relatively less explored. The original data contains 225 country surveys and covers more than 120,000 firms. However, the sample size drops substantially after I apply my data cleaning criteria. Specifically, I exclude firms with negative, zero, or missing values in relation to key variables (including sales, the replacement cost of capital, the number of permanent employees, the number of full-time temporary workers, raw materials and intermediate goods, and the total cost of labor). I also omit firms with negative value-added sales and any country-year for which the sample contains fewer than 100 firms.

My final dataset includes information on 27,634 firms across 59 countries. Table 1 reports a complete list of all countries, the corresponding survey years, and the number of firms in each country-year. For 18 countries, more than one round of the survey is available. In terms of geographical coverage, 31% of my sample countries are in Latin America and the Caribbean (LAC), 22% are in Sub-Sahara Africa (AFR), 15% are in South Asia (SAR), 13% are in East Asia and the Pacific (EAP), 9% are in the Middle East and Northern Africa (MNA), and 8% are in Europe and Central Asia (ECA). Figure 3.1 presents the visual display of the distribution of firms across these regions. The unit of observation is establishments. The sample of establishments in each country is also stratified by size, sector, and location, which results in the sample being generally representative of the whole economy.

The strength of the dataset is its rich coverage of low- and middle-income countries. Figure 3.2 shows the distribution of firms across four income groups based on the World Bank's income classification scheme. My dataset includes 19 low-income countries, 19 low-middle-income countries, 19 upper-middle-income countries, and 2 high-income countries. To the best of my knowledge, no systematic study calculates the extent of misallocation and its determinants for a large set of low- and middle-income countries using comparable firm-level data. These countries are particularly interesting to investigate, given that they are most likely to face high distortion in their economies. Compared to developed nations, low- and middle-income countries are often characterized by insufficient property rights protection, weak law and order, rampant corruption, and a weak formal financial market; these disadvantages could lead to a large distortion in resource allocation. For example, Hsieh and Klenow (2009) and Dollar and Wei (2007) document that state-owned firms have a lower *MRPK* than domestic private firms. A review of the literature reveals that many of the countries in my sample are being investigated based on the extent of capital allocative inefficiency for the first time.

Another salient feature of the dataset is that it not only covers large or listed firms, but also includes many small and medium-sized enterprises (SMEs) around the world. Figure 3 illustrates the distribution of firm size in my sample. Small firms are defined as having a maximum of 20 employees; medium firms are defined as having more than 20 but fewer than 100 employees; and large firms are defined as having a minimum of 100 employees. My sample includes 11,170 (40%) small firms, 10,461 (38%) medium firms, and 6,003 (22%) large firms.

III. The extent of capital misallocation

To study the extent of capital misallocation in my sample of countries, I first calculate firm-specific *MRPK* (based on the assumption of a Cobb-Douglas production function and competitive markets). The *MRPK* for firm *i* in industry *s* in a country-year is defined as:

$$MRPK_{is} = \alpha \frac{P_{is}Y_{is}}{K_{is}} \quad (3.1)$$

where P_iY_i represents a firm's value-added sale, K_i is measured by a firm's replacement cost of capital, and α represents capital's share of income. By allowing capital's share of income to be industry-country or firm specific, I have two corresponding measures of *MRPK*. For the first one, I calculate the country-level standard deviation of the logarithm of *MRPK*; if capitals were efficiently allocated, it should be close to zero. For the second one, I study the wedges in *MRPK* within a country. The wedge for firm *i* in industry *s* is defined as follows:

$$Wedge_{is} = \frac{MRPK_{is}}{\overline{MRPK_s}} \quad (3.2)$$

where $\overline{MRPK_s}$ represents the industry median level of MRPK. I exclude industries with fewer than six firms. If a company is close to the optimal allocation of capital, its wedge should take the value close to unity. Firms with wedges above unity reflect a lack of capital, whereas firms with wedges below unity reflect having too much capital.

In Table 3.1, I report the summary of *MRPK* by country. The first three columns present the years, the countries, and the number of firms in each country for each year.

The next three columns contain the standard deviation, the median, and the mean wedge of *MRPK* for all the firms in each country for each year. Finally, the last three columns report the percentages of small, mid-sized, and large firms, where small firms are those that have no more than 20 employees and large firms are those that have more than 100 employees.

The standard deviation of *MRPK* is very high in most of the countries considered. Moreover, the average wedge of *MRPK* is above unity in most countries, which indicates that capital misallocation is still common even within narrowly defined industries. In my sample, 18 countries have two rounds of surveys available; moreover, for 13 of them the two rounds cover the time span before and after the 2008 global financial crisis.[22] I use this opportunity to study the revolution of capital misallocations before and after the crisis in these countries. Based on the percentage change in the level of country average wedge, I find that among these 13 countries, only 5 have lower distortion after the crisis than before and 8 countries experience a significant increase in capital misallocation. These findings provide suggestive evidence that financial crisis tends to increase the misallocation of capital, which is in contrast to the creative destruction view that financial crisis helps reduce distortion.

In Table 3.2, I summarize *MRPK* by industry. My industry classification, which is consistent with Saliola and Seker (2011), entails using a firm's main product to determine its two-digit industry code within the International Standard Industrial Classification (ISIC). My sample reflects nine industries, most of which are linked to manufacturing production (although a small number of firms are in the service sector).

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[22] Indonesia, Philippines, Russia, Turkey, and Vietnam are among the countries for which the two rounds of the survey are both conducted during or after the financial crisis.

Sizable variations of *MRPK* within an industry can be observed across both time and industries.

IV. Identifying sources of misallocation: Firm-level evidence

First, I describe the linkage between the firm-level observed return to capital and distortions in capital and output. To do so I use a theoretical framework proposed by Dollar and Wei (2007) and Hsieh and Klenow (2009) that provides the econometric specifications necessary for the subsequent empirical analysis.

Consider a representative firm that faces competitive output and input markets. The goal of a representative firm *i* in industry *s* in a country is to maximize its profit. Let π_i, Y_i, K_i, and L_i represent firm *i*'s profit, output, capital, and labor respectively. Firm *i*'s problem is thus

(3.3) $$Max\ \pi_{si} = p_{si}Y_{si} - r_{si}K_{si} - w_{si}L_{si}$$

where p_{si}, r_{si}, and w_{si} respectively represent firm-specific output price, the rental cost of capital, and wage rate.

Seeing as I focus on the distortions that a firm can face in the economy, following Dollar and Wei (2007) I consider three types of distortion: output (τ_Y), labor (τ_L), and capital (τ_K). These distortions are reflected in the prices; that is, they make a firm's actual output price and input costs deviate from the market prices. For simplicity, I omit the country and year subscripts. Thus,

(3.4) $$p_{si} = p_s\left(1 - \tau_Y^{si}\right)$$

(3.5) $$r_{si} = r_s(1 + \tau_K^{si})$$

(3.6) $$w_j = w_s(1 + \tau_L^{si})$$

where p_s, r_s, and w_s respectively represent the output price, rental cost of capital, and wage rate shared by all firms in the absence of distortion within a sector in a country in a year. The output distortion τ_Y^i originates from nonmarket behaviors that influence product prices and tend to affect both a company's capital and labor choices. For example, a tax on a firm's revenue reflects itself as a positive distortion, whereas a favorable subsidy for a firm's product shows itself as a negative distortion. Moreover, the output distortions faced by firms in developing countries are often high transportation costs, generally poor electricity and water supplies, and bribes paid to government officials. In turn, capital distortion (τ_K) documents all of the factors that affect the cost of capital. For example, if a firm has better access to credit or can enjoy a favorable interest rate on its investment, then τ_K would be negative; on the other hand, if it faces severe constraints on borrowing or a high interest rate charge, τ_K will be positive. Similarly, τ_L shows all distortions in the cost of labor. For example, if a firm faces excessive labor regulations, then τ_L would be positive.

On the production side, the firm-level production function is assumed to be Cobb-Douglas. Moreover, capital and labor's share of income is held constant within an industry. As such, firm-level *TFP* A_{si} captures all differences across firms in the same sector within the same country in a year.

(3.7) $$Y_{si} = f(K_i, L_i) = A_{si} K_{si}^{\alpha} L_{si}^{1-\alpha}$$

where α is the capital elasticity and 1-α is the labor elasticity.

The first-order condition of the firm-maximizing profit implies that a firm will equate its *MRPK* to the firm-specific interest rate (i.e., the rental cost of capital).

(3.8) $$MRPK_{si} = p_{si} A_{si} f'(K_i, L_i) = r_{si}$$

The Cobb-Douglas production function leads to a neat relation between the average revenue product of capital (*ARPK*) and *MRPK*:

(3.9) $$ARPK_{si} = \left(\frac{1}{\alpha_s}\right) MRPK_{si}$$

As Dollar and Wei (2007) argue, the problem faced by econometricians is that not all firm-specific distortions are readily observable—which prevents researchers from obtaining the true measure of *ARPK* directly. In fact, the observed *ARPK* is expressed as

(3.10) $$ARPK_{si}^{o} = \frac{pY_{si}}{K_{si}}$$

Connecting the previous equations leads to

(3.11) $$ARPK_{si}^{o} = \frac{p_{sj}Y_{si}}{(1-\tau_Y^i)K_{si}} = \frac{ARPK_{si}}{1-\tau_Y^i} = \frac{r_s\left(1+\tau_k^{si}\right)}{\alpha_s\left(1-\tau_Y^{si}\right)}$$

Similarly, Hsieh and Klenow (2009) document the expression of $MRPK^{o}$ as proportional to the above *ARPK* expression.

(3.12) $$MRPK^{o} = \frac{r_s\left(1+\tau_k^{si}\right)}{\left(1-\tau_Y^{si}\right)}$$

Intuitively, equation (3.12) shows that keeping everything else constant, the higher τ_k^{si} *and* τ_Y^{si} are, the higher the observed *ARPK* is. To continue my linear regression analysis, equation (3.11) is transformed by a log approximation:

(3.13) $$lnARPK_{si}^{o} \approx \ln\left(\frac{r_s}{\alpha_s}\right) + \tau_k^{si} + \tau_Y^{si}$$

where $\ln\left(\frac{r_s}{\alpha_s}\right)$ represents the industry-common level of the natural logarithm of *ARPK* in the absence of distortions.

Based on the model specification, I investigate underlying sources that generate firm-specific distortions. More importantly, I aim to quantify how extensively this factor will translate into distortions. In my complete empirical investigation, I implement the following regression:

$$lnARPK_{si}^{o} = \beta access\ to\ finance + \beta bureaucracy + \ control\ variables + \sum industry - dummies + \sum country - dummies + error$$

ARPK. Following Dollar and Wei (2007), I define the *ARPK* as the ratio of value added to capital stock:

(3.14) $$ARPK^{o} = VA/K$$

Access to finance. Measures for access to finance constitute my first set of variables of interest. If firms operate optimally by equating *MRPK* with the cost of finance, those with a higher cost of finance should have a higher *MRPK*. As such, measures for access to finance should exhibit negative coefficients in my regression framework. Using information from the survey, I construct the following variables to measure firms' financial constraints:

- *Bank account***.** This dummy variable equals one if the firm has a checking or savings account.
- *Credit line*. This dummy variable equals one if the firm currently has a line of credit or loan. Sufi (2009) shows that the lack of access to a line of credit is a more statistically powerful measure of financial constraints than the traditional measures used in the literature. These two variables therefore capture the degree to which firms are connected to the financial market.
- *Work capital finance***.** This variable is constructed based on firms' reports of the breakdown in their sources of financing for working capital. It measures the share of working capital cost financed by financial institutions and is constructed by

adding the share of working capital borrowed from private and state-owned banks and from nonbank financial institutions. It thus contrasts with self-financing or borrowing from informal money channels (such as friends and relatives) and purchasing on credit from suppliers and customers.

- *Fix asset finance***.** This variable measures the share of fixed investment financed by financial institutions. Similar to the previous variable, it is constructed using the information on the breakdown of firms' sources of financing for fixed investments. I combine the sum of the percentage of borrowing from private and state-owned banks and borrowing from nonbank financial institutions. The higher this variable is, the more firms utilize formal financing channels to cover the cost of investment.

Bureaucracy. Measures for bureaucracy form my second set of variables of interest. In my analysis, bureaucracy and other government frictions can distort product market price. To mitigate the effects of bureaucracy, firms can interact with governments and pay bribes. As such, I expect that companies that spend less time and money combatting bureaucracy face larger distortions and hence exhibit higher MRPK. I use the following variables to measure the burden of bureaucracy and government interactions:

- *Time on government*. To construct this variable, I utilize the following question from the Enterprise Survey: "In a typical week over the last 12 months, what percentage of total senior management time was spent in dealing with requirements imposed by government regulations?"

- *Time on tax*. To construct this variable, I employ the following question from the Enterprise Survey: "Over the last 12 months, how many times was this establishment either inspected by tax officials or required to meet with them?"
- *Informal payment***.** This variable measures the percentage of total annual sales informally paid on average to public officials to accomplish tasks related to customs, taxes, licenses, regulations, or services.

Ownership**.** The first control variable I use is ownership of a firm. As pointed out by Dollar and Wei (2007), government-owned firms can have easier access to finance and face less bureaucratic friction. On the other hand, government ownership is also associated with low operating efficiency (e.g., Megginson and Netter, 2001). To draw consistent inferences on the effects of access to finance and bureaucracy, it is therefore critical to include an indicator for government ownership. An advantage of the data is that it records the decomposition of ownership structure, which allows me to determine ownership types based on the actual breakdown of ownership rather than the firm-ownership registration that is officially recorded. Nevertheless, an important shortcoming in my dataset needs to be addressed. In most parts of the Enterprise Survey, entirely state-owned firms are intentionally omitted, which results in the proportion of wholly state-owned firms being greatly underrepresented. In my sample, approximately 0.1% of the firms are wholly state owned, 0.4% are majority state owned, and 0.8% are minority state owned. As such, the indicator for government ownership captures largely partial state ownerships.

External audit**.** This dummy variable indicates whether the establishment has its annual financial statement checked and certified by an external auditor. It measures a firm's level of information asymmetry: a firm that employs an external independent audit can send a good signal to potential lenders about the reliability and transparency of its financial statement.

***Female*.** Female is a dummy variable that equals one if at least one of the owners is female. Given that gender inequality in education and employment opportunities is prevalent in many developing countries (Dollar and Gatti, 1999) and that such inequality may reduce growth and development (Klasen, 1999), I examine whether firms with at least one female owner face higher distortion in capital and output markets than firms with only male owners.

***Exporter*.** A firm is defined as an exporter if its percentage of direct export to total sales exceeds 20%. Export captures a company's level of integration within the global market. I expect that firms with a higher level of integration face fewer distortions, as the impact of any country-specific distortion is diluted at this wider stage.

Table 3.3 reports summary statistics for these key variables. Panel A summarizes the measures for access to finance. In my sample, 86% of the firms have bank accounts (either checking or saving), but only 40% have lines of credits. Next, 23% of the firms finance fixed asset investments through financial institutions, although many observations are missing in relation to this variable (it has approximately 50% fewer than other variables). For the financing of working capital, 16% of the firms utilize financial institutions. Taken together, these statistics collectively suggest that a significant proportion of the firms in my sample do not have good access to finance.

Panel B then summarizes the measures for bureaucracy. In my sample, managers on average spend nearly 10% of their time dealing with government-related issues;

however, the 3% median suggests a high level of heterogeneity among firms in relation to their interactions with the government. Similarly, the average number of tax agency visits and inspections is twice a year, with a median of once a year. Lastly, we can also see large variation in firms' bribery activities. On average, a company pays approximately 1% of its annual revenue informally to government personnel, and the standard deviation is 3%. These statistics collectively suggest a significant variation in firms' efforts with regard to interacting with the government.

Finally, Panels C and D summarize the key control variables. In my sample, most firms (89%) are owned by the private sector. Approximately 9% have foreign ownership, whereas only 1% of the firms are owned by governments. The average firm age is 21 years (with a standard deviation of 16 years) and the average firm size is 114 employees (with a standard deviation of 413 employees). Approximately 14% of the companies are exporters, and around 52% employ external audit firms. Lastly, approximately 30% of the firms have at least one female owner.

To assess the effects of access to finance and bureaucracy on firms' returns to capital, I first conduct a univariate analysis; its results are reported in Table 3.4. I focus on the logarithm of *ARPK (log(ARPK))*, motivated by the econometric framework and to be consistent with the subsequent regression analyses that I undertake. Panels A through G compare *log(ARPK)* for the two groups defined by the groups' criteria (namely bank account, credit line, percentage of fixed asset financed by institutions, working capital financed by institutions, time spent on government, time spent on tax agency, and percentage of revenue for informal government payment). When the criterion variable is a continuous variable (as in Panels C to G), I define the low group as the first empirical quartile of the criterion variable and the high group as its fourth empirical quartile.

The univariate analysis results indicate significant lower returns to capital for firms that have better access to finance and expend more effort on government. In the first four panels, the average *log(ARPK)* is significantly lower for firms that have either bank accounts or credit lines or utilize institutions more frequently to finance fix capital; however, I do not find a significant difference for the criterion of working capital financed by institutions. In the last three panels, the average *log(ARPK)* is also significantly lower for firms that have more interaction with government or the tax agency or pay higher percentages of their revenues as informal payments to government officials. In all cases, statistical significances are determined based on paired t-tests.

I then proceed to conduct multivariate regressions to formally assess how these financial and administrative distortions affect return to capital. In Table 3.5, I report the estimates for the previously outlined regression specification; the dependent variable is *log(ARPK)*. In the first two models, I include the measures for access to finance; however, I exclude *Fix Asset Finance* in Model (1) given that it has too many missing observations. In Model (3), I include measures only for bureaucracy. In the last two models, I include measures for both access to finance and bureaucracy. In all the models, I incorporate industry, country, and year-fixed effects. Given the nature of my sample, I report heteroscedasticity robust standard errors.

The estimates in Table 3.5 indicate that finance and bureaucratic distortions have significant adverse effects on return to capital. The negative and significant coefficients for the measures of access to finance suggest that firms with better access to finance exhibit lower returns to capital. Moreover, the negative and significant coefficients for the measures of bureaucracy suggest that firms that expend more effort with government exhibit lower returns to capital. Taken together, these results are consistent with my theoretical framework and demonstrate that access to finance and bureaucracy are key distortions for firms' returns to capital.

The estimates for the control variables are informative as well. For instance, firm age is negatively associated with *log(ARPK)*, which indicates that firms that are more mature have lower returns to capital. Seeing as older firms are normally associated with less information asymmetry, they enjoy lower costs of finance and exhibit lower returns to capital. Firm size, as measured by the number of total full-time employees, is statistically significant and positive in predicting the level of *ARPK*. This result is consistent with the findings of Dollar and Wei (2007) and Kalemli-Ozcan and Sorensen (2012), who respectively consider a sample of firms in China and a set of African countries. It is also in line with Busso and Madrigal (2013), who study the productivity of a sample of Latin American countries. The result suggests that to allocate resources most efficiently, capital should be reallocated from small to larger firms. In developing countries, small firms thus in fact have too much capital than they should have in the most efficient allocation. Firms that have their financial statements externally audited have a lower ARPK than those that do not. One plausible explanation is that undergoing an external independent audit sends a good signal to potential lenders about the reliability and transparency of a firm's financial statement, which greatly facilitates the company's borrowing. Moreover, it is interesting that my results indicate that gender may also play a role in the allocation of resources in developing countries. The significant coefficients for female suggest that firms with at least one female owner tend to face a higher cost of capital than other firms. This is not surprising given that gender obstacles are still prevalent in developing countries. Moreover, the effect could be much larger if I consider the selection issue: to attain a top position, female owners must in most cases be exceptionally good at their jobs.

In the previous section I employ OLS regressions to study the underlying sources of firms' capital distortion based on cross-sectional data that covers more than 80 developing countries. However, the OLS results, which focus only on the central tendency of ARPK distribution, do not allow for the possibility that the impact of explanatory variables can differ among firms with various degrees of distortion. In this section, I adopt the quantile regression method developed by Koenker and Bassett (1978) to explore whether explanatory variables have asymmetric effects on firms depending on the severity of the distorted operating environment. The flexibility to allow varying coefficients is of importance to my study. First, return to capital can be thought of as a segmentation variable because firms lying in its distribution tails are considered highly distorted if they have either too much capital (i.e., low ARPK) or too little capital (i.e., high ARPK) relative to labor. Quantile regression enables me to trace the entire distribution of the level of ARPK and pay special attention to the highly distorted firms. Moreover, quantile regression is more robust to outliers, and such robustness is important in establishment-level survey studies in which globally collected datasets tend to contain outliers even after extreme observations are filtered out. Furthermore, quantile regression relaxes the central assumptions for least squares, namely homoscedasticity and normality.

On the basis of these grounds, quantile regression is ideally suited for studying the asymmetric effects.

Table 3.6 reports the results of the quantile regression. Columns (1) through (5) report the estimation results for the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles of the conditional distribution of *log(ARPK)*. As such, the coefficients for the explanatory variables reflect their marginal effects for the firms that are in the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles based on the distribution of *log(ARPK)*. The explanatory variables include measures for both access to finance and bureaucracy as well as other control variables, but I exclude *Fix Asset Finance* due to the missing observation problem. As before, I include industry, country, and year-fixed effects and employ a robust estimator for the covariance matrix.

The coefficient estimates in Table 3.6 reveal significant asymmetric effects regarding access to finance. For the variables *Bank Account* and *Credit Line*, the coefficients in Model (5) are much smaller than those in Model (1), where I compare the marginal effect of having a bank account or credit line on the return to capital for firms that are already having (very) high or (very) low returns to capital. The table reveals that having a bank account can significantly reduce the return to capital by 29 percentage points for firms that already have high returns to capital, whereas the reduction is only 14 percentage points for firms that already have low returns to capital. This sharp contrast once again reinforces the notion that access to finance is an important source of distortion in relation to firms' productivity and demonstrates that the marginal gain in productivity is much higher for companies that are already constrained vis-à-vis finance.

V. Identifying sources of misallocation: Industry-level evidence

In this section, I examine the determinants of misallocation at the industry level. In line with the literature (e.g., Dollar and Wei, 2007), I use the dispersion of the logarithm of *ARPK* within an industry in a country year to measure that industry's extent of capital allocative inefficiency. If capital is efficiently allocated, then *ARPK* should be equalized within a sector in a country. As such, a greater dispersion in *log(ARPK)* means a greater level of distortion in capital.

In calculating the industry-country specific standard deviation of *log(ARPK)*, I exclude industries that contain fewer than six firms; this helps to ensure that the dispersion of *ARPK* reflects the distortion rather than the influence of a few extreme values. I include a total of 615 industry-country observations, and the mean spread over the entire sample is approximately 1.27 (with a standard deviation of 0.3).

To explore the determinants of industry-level capital allocative inefficiency, I estimate an OLS regression with the standard deviation of *log(ARPK)* as the dependent variable. The main variables of interest include the dispersions of access to finance and bureaucratic friction at the industry level. I also include the same set of control variables as in my firm-level analyses. As I do when I measure the dispersion for return to capital, I measure the dispersions of these explanatory variables with their within-industry standard deviations.

My decision to use the dispersions of these explanatory variables (as opposed to their average levels) is consistent with my examination of the dispersion of return to capital. The average level of access to finance or bureaucratic friction within an industry should not have a direct impact on the dispersion of return to capital within that industry.

It should instead be expected that if the firms within an industry have heterogeneous access to finance, they will exhibit distinct returns to capital. Even if the average level of access to finance within an industry is poor, as long as firms have homogenous access to finance, dispersed returns to capital should not be expected.

Table 3.7 reports the results of the industry-level regression. The regression specification is the same as in Table 3.5: in the first two models, I only include measures for access to finance; in the third model, I only incorporate measures for bureaucracy; and in the last two models, I include both sets of measures. The standard errors are calculated with heteroskedasticity robust estimators.

The coefficient estimates in Table 3.7 are consistent with my firm-level evidence that access to finance and bureaucracy are key determinants of capital misallocation. The significantly positive coefficients for the standard deviation of bank account in Models (1) and (2) indicate that in an industry where the heterogeneity of firms' access to bank account increases, the dispersion of return to capital increases as well. Next, in Model (5) it is evident that the coefficients for the standard deviation of both the time spent on government and the percentage of revenue for informal payment are positive and significant. These estimates suggest that in an industry in which the heterogeneity in firms' efforts against bureaucracy increases, the dispersion in return to capital will increase.

VI. Conclusions

Capital allocation efficiency plays a key role in determining total factor productivity and hence economic growth. Nevertheless, capital misallocation is pervasive across countries, especially in the developing world. Misallocation can occur if firms face distortions in their input and output markets. Distortions in the input market (e.g., the market for capital goods) can exist in the form of financial frictions, seeing as firms equate their marginal products of capital to their user cost of capital. Distortions in the output market can exist in the form of bureaucratic frictions, such as red tape and bribes.

In this paper, I study the degree and determinants of investment efficiency across firms using a comprehensive firm-level survey dataset that covers a wide spectrum of developing countries. I document that capital misallocation, as measured by the dispersion in firms' MRPK, is pervasive in firms within the same industry in a country. I find that limited access to finance, bureaucracy, information asymmetry, and gender inequality play important roles in impeding the most efficient allocation of capital across firms. By employing the quantile regression technique, I show that these factors exert greater effects on already highly distorted firms (i.e., those with too little capital). I further find that the industry-level dispersion in return to capital increases in firms' heterogeneities in the financial constraints and bureaucratic frictions that they face. These results have direct policy implications; in particular, governments could achieve a more efficient allocation of capital by eliminating these distortions to enhance economic performance.

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Appendix: Figures and Tables

Table 1.1: Summary statistics

This table presents summary statistics on acquisitions in oil and gas sectors during the period of 1985—2015. I obtain all announcements of acquisitions in oil and gas sectors from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions database. To identify oil and gas sector acquisitions, I restrict my sample to transactions whose bidders or bidders' ultimate parents are in oil and gas industry, and whose targets are in oil and gas industry. I exclude leveraged buyouts, recapitalizations, spin-offs, self-tender offers, exchange offers and repurchases. I also exclude bidders that domicile in tax havens including the Bahamas, British Virgin Islands, Cayman Islands, Guernsey, Isle of Man, Jersey and Netherland Antilles. I further restrict the sample to completed, pending and withdrawn deals.

	Corporate Bidders	Government Bidders
Total No. of Deals	14,793	1,445
No. of Deals with Values Disclosed	9,236	660
Average Deal Value (in Millions, constant 2000 Dollars)	219	699
Total Deal Value (in Millions, constant 2000 Dollars)	2,023,432	461,530
No. of Withdrawn Deals	608	70
Percentage of Withdrawn Deals	4.11%	4.84%
No. of Complete Control Deals	7,798	379
Percentage of Complete Control Deals (out of available control observations)	71.31%	40.97%
No. of Minority Block Purchase	2,304	422
Percentage of Minority Deals (out of available share acquired data)	21.21%	46.48%
No. of Public Target	2,142	219
Percentage of Public Target	14.48%	15.16%
No. of Cross Border Deals	4,774	775
Percentage of Cross Border Deals	32.27%	53.68%
Number of Bidders from Oil Poor Countries	3,896	479
Percentage of Bidders from Oil Poor Countries	26.36%	33.29%

Table 1.2. Intensity of acquisition activity by government-owned bidders

This table reports government investment by year (Panel A), by top target nation (Panel B), and by top bidder nation (Panel C) in the oil and gas sectors for period 1985—2015. In Panel A, from the left to the right, I report for each year the number of deals, the percentage of total deals, the total value of deals, the number of foreign (cross border) deals, the number of domestic deals, the number of deals from oil poor countries (OPC), the percentage of the deals from OPC, the number of cross border deals from OPC, and the percentage of the cross-border deals from OPC. In Panel B and Panel C, I report the top 20 target and bidder countries in terms of deal value respectively.

Panel A: Government Investment by Transaction Year (announced)

Year	Deal Count (#)	Deal Count (%)	Deal Value	Foreign (#)	Domestic (#)	From OPC (#)	From OPC (% all)	Cross Border Deals from OPC (#)	Cross Border Deals from OPC (% all)
1986	9	1%	878	7	2	1	11%	0	0%
1987	12	1%	3923	11	1	6	50%	6	50%
1988	9	1%	5162	8	1	3	33%	3	33%
1989	13	1%	2649	11	2	5	38%	5	38%
1990	24	2%	8723	21	3	16	67%	14	58%
1991	26	2%	2619	20	6	12	46%	11	42%
1992	21	1%	1201	14	7	8	38%	6	29%
1993	21	1%	722	10	11	6	29%	2	10%
1994	17	1%	854	11	6	2	12%	1	6%
1995	20	1%	959	10	10	5	25%	2	10%
1996	24	2%	1427	16	8	7	29%	5	21%
1997	17	1%	4093	8	9	6	35%	1	6%
1998	32	2%	2085	18	14	11	34%	5	16%
1999	31	2%	3833	12	19	15	48%	7	23%
2000	50	3%	3004	16	34	18	36%	4	8%
2001	61	4%	9901	22	39	17	28%	6	10%
2002	70	5%	7588	36	34	31	44%	14	20%
2003	70	5%	6356	44	26	27	39%	16	23%
2004	62	4%	5890	31	31	27	44%	16	26%
2005	66	5%	55577	31	35	17	26%	12	18%
2006	58	4%	12726	30	28	15	26%	11	19%
2007	92	6%	35649	44	48	23	25%	17	18%
2008	83	6%	19733	54	29	13	16%	11	13%
2009	140	10%	26778	54	86	23	16%	12	9%
2010	104	7%	67920	63	41	48	46%	37	36%

(Continued)

2011	80	6%	33364	43	37	31	39%	22	28%
2012	75	5%	82191	44	31	26	35%	18	24%
2013	67	5%	38295	37	30	29	43%	19	28%
2014	56	4%	11553	35	21	24	43%	19	34%
2015	35	2%	5877	14	21	7	20%	5	14%
Total	1445	1	461531	775	670	479	33%	307	21%

Panel B: Top target nations				Panel C: Top bidder nations			
Country	Real Deal value Billion USD	Domestic Deal Number	Foreign Deal Number	Country	Real Deal value Billion USD	Domestic Deal Number	Foreign Deal Number
Russian Fed	111	203	31	Russian Fed	110	201	52
Brazil	53	15	22	China	97	79	115
Canada	51	25	51	Brazil	42	15	31
United States	44	11	74	Canada	31	25	18
United Kingdom	23	3	56	Norway	23	28	43
Kazakhstan	22	19	29	India	18	45	61
Norway	12	28	30	Utd Arab Em	16	6	22
Argentina	11	2	18	Kazakhstan	13	19	12
Australia	11	12	44	Italy	11	6	12
Italy	11	6	10	Malaysia	10	9	29
Spain	9	3	12	South Korea	9	1	23
Nigeria	8	2	13	United States	6	11	20
China	7	89	5	Cyprus	6	1	3
Mozambique	7	0	3	Argentina	5	2	6
Switzerland	6	2	1	Netherlands	5	1	15
Venezuela	6	15	17	Angola	4	4	6
Utd Arab Em	5	6	2	Kuwait	4	0	13
Angola	5	4	5	France	4	4	17
Egypt	5	1	13	Japan	4	10	12
Azerbaijan	4	0	11	Saudi Arabia	3	3	7

Table 1.3: Deal premium measures for government bidders and private sector bidders

This table presents average deal premia paid by government-owned bidders and private sector bidders in the oil and gas sectors for period 1985—2015. FBC is the first bid to completion premium measure of Schwert (1996). CAR3 and CAR5 denote cumulative abnormal returns for a 3-day and a 5-day windows respectively. ***, **, and * indicates significant at the 1%, 5%, and 10% levels based on a test against zero in columns "Government" and "Private-Sector" and based on a paired-test in column "Diff".

Panel A: All deals			
	Government	Private-sector	Diff
FBC	0.13***	0.24***	0.11***
CAR3	0.1***	0.14***	0.4**
CAR5	0.1***	0.15***	0.05***
N	110	758	
Panel B: Domestic Deals			
	Government	Private-Sector	Diff
FBC	0.17***	0.22***	0.05
CAR3	0.07***	0.13***	0.06***
CAR5	0.07***	0.14***	0.07***
N	40	544	
Panel C: Foreign Deals			
	Government	Private-Sector	Diff
FBC	0.1***	0.29***	0.19***
CAR3	0.12***	0.18***	0.06**
CAR5	0.12***	0.18***	0.06**
N	70	214	

Table 1.4: Univariate analyses for government bidders and private sector bidders

This table presents univariate analyses for the sample of government investments and the related benchmark sample of investments by private-sector firms. I require all variables here to have non-missing information. For each sample, I report the mean, the median, the standard deviation (S.D.), and the number of observations. Dollar values are reported in constant 2000 value. In column "Diff", I report the difference between the two sample means. ***, **, and * indicates significant at the 1%, 5%, and 10% levels based on a paired-test.

	Government Bidder				Private Sector Bidder					
Variables	N	Mean	Median	S.D.	N	Mean	Median	S.D.	Diff	
Sought (%)	110	43.15	26.30	37.09	758	70.14	100.00	39.24	-27.00	***
Cash Deal	110	0.41	0.00	0.49	758	0.31	0.00	0.46	0.10	**
Tender Offer	110	0.19	0.00	0.39	758	0.25	0.00	0.44	-0.06	*
Termination Fee	110	0.05	0.00	0.21	758	0.13	0.00	0.33	-0.08	***
Bidder Number	110	1.04	1.00	0.19	758	1.11	1.00	0.38	-0.08	***
Total Asset (U.S. Mn 2000)	110	7726.98	1479.84	18658.51	758	2204.30	207.24	7828.69	5522.68	***
ROA	110	6.68	5.97	15.41	758	-4.48	3.17	37.50	11.16	***
Leverage	110	0.20	0.16	0.19	758	0.18	0.16	0.19	0.02	
Q	110	1.36	1.12	0.63	758	1.50	1.24	1.17	-0.14	**
BHAR_t-1	110	0.11	-0.01	0.55	758	-0.09	-0.17	0.57	0.20	***
Target Nation Democracy	110	7.98	10.00	4.54	758	9.72	10.00	1.48	-1.73	***
Bidder Nation Democracy	110	3.39	9.00	7.95	758	9.61	10.00	2.11	-6.22	***
Bidder Nation Common Law	110	0.45	0.00	0.50	758	0.85	1.00	0.35	-0.40	***

Table 1.5: Does government ownership affect deal premium?

This table reports OLS estimates for determinants of deal premium based on a sample of completed acquisitions in the oil and gas sectors for period 1985—2015. FBC is the first bid to completion premium measure of Schwert (1996). CAR3 and CAR5 denote cumulative abnormal returns for 3-day and 5-day windows respectively. In the first six columns, I report OLS estimates. In the last three columns, I include the inverse Mills ratio λ, estimated from the probit model reported in Table A2. Other variable definitions are in Table A1 in the Appendix. Robust P-values are in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

	OLS			OLS			Heckman		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	FBC	CAR3	CAR5	FBC	CAR3	CAR5	FBC	CAR3	CAR5
Government	0.043	0.007	0.004	0.090	0.002	0.006	0.086	0.018	0.010
	(0.511)	(0.750)	(0.821)	(0.287)	(0.953)	(0.861)	(0.232)	(0.482)	(0.627)
Sought (%)	0.001*	0.002***	0.002***	0.001	0.002**	0.001	0.001	0.001***	0.001***
	(0.057)	(0.000)	(0.000)	(0.431)	(0.028)	(0.196)	(0.161)	(0.000)	(0.000)
Cash Deal	0.098**	0.071***	0.077***	0.078	0.038*	0.053**	0.115***	0.075***	0.079***
	(0.012)	(0.000)	(0.000)	(0.224)	(0.078)	(0.037)	(0.002)	(0.000)	(0.000)
Tender Offer	0.075**	0.028	0.032*	0.041	0.034	0.033	0.069*	0.026	0.031*
	(0.038)	(0.127)	(0.093)	(0.441)	(0.103)	(0.113)	(0.055)	(0.149)	(0.098)
Termination Fee	-0.035	-0.024	-0.015	-0.049	-0.043	-0.044	-0.046	-0.027	-0.017
	(0.439)	(0.292)	(0.552)	(0.442)	(0.202)	(0.248)	(0.315)	(0.234)	(0.512)
Bidder (#)	0.062	-0.026	-0.035*	0.144**	-0.032	-0.031	0.052	-0.028	-0.036*
	(0.226)	(0.149)	(0.068)	(0.035)	(0.245)	(0.310)	(0.317)	(0.125)	(0.063)
log(TA)	-0.029***	-0.009**	-0.010**	-0.020	-0.006	-0.005	-0.019*	-0.006*	-0.008**
	(0.006)	(0.027)	(0.027)	(0.124)	(0.295)	(0.330)	(0.062)	(0.083)	(0.033)
ROA	-0.001	-0.000	-0.000	-0.004**	-0.000	-0.001	-0.001	-0.000	-0.000
	(0.382)	(0.324)	(0.283)	(0.044)	(0.500)	(0.356)	(0.498)	(0.464)	(0.350)
Leverage	-0.005	0.067	0.052	-0.086	0.080	0.060	-0.007	0.066	0.052
	(0.978)	(0.239)	(0.390)	(0.708)	(0.278)	(0.432)	(0.969)	(0.245)	(0.394)
Q	-0.035	-0.004	-0.007	-0.010	0.002	-0.004	-0.036	-0.004	-0.007
	(0.305)	(0.673)	(0.454)	(0.808)	(0.907)	(0.774)	(0.288)	(0.639)	(0.439)
BHAR	-0.282***	-0.041***	-0.052***	-0.287***	-0.033*	-0.043**	-0.264***	-0.037**	-0.050***
	(0.000)	(0.004)	(0.002)	(0.000)	(0.063)	(0.023)	(0.000)	(0.011)	(0.004)
Log Per Capita	-0.002	-0.000	-0.002	0.031	-0.010	-0.003	-0.002	-0.000	-0.002
GDP Target Nation	(0.915)	(0.937)	(0.654)	(0.273)	(0.246)	(0.787)	(0.924)	(0.948)	(0.665)
Real Oil Price	-0.006***	0.001**	0.002***	-0.011***	-0.002	-0.001	-0.006***	0.001***	0.002***
	(0.000)	(0.010)	(0.000)	(0.001)	(0.185)	(0.260)	(0.001)	(0.007)	(0.000)
Minority Block				0.010	0.006	-0.046			
				(0.925)	(0.923)	(0.518)			
Zero Dividend				-0.009	0.014	0.017			
				(0.854)	(0.516)	(0.451)			
Close Held Share				-0.050	-0.017	-0.006			
				(0.390)	(0.388)	(0.787)			
λ							0.067	0.017	0.009
							(0.139)	(0.197)	(0.510)
Constant	0.313*	0.050	0.049	0.368	0.126	0.151	0.128	0.003	0.024
	(0.056)	(0.307)	(0.332)	(0.120)	(0.243)	(0.195)	(0.490)	(0.948)	(0.613)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	868	868	868	520	520	520	868	868	868
R-squared	0.212	0.194	0.186	0.244	0.192	0.191	0.214	0.195	0.186

Table 1.6: Do firms acquired by governments experience improvements in operating performance?

The dependent variables in this table are changes in target operating performances for a sample of completed acquisitions in the oil and gas sectors for 1985—2015. From Panel A to Panel E, I report the results for *Return on assets*, *Return on equity*, *Leverage*, *Investment*, and *cash* (as defined in Table A1 in the Appendix). The horizon notation (-N, +N) for each performance measure indicates that the dependent variable is the N-period average of the performance measure after the acquisition minus the N-period average of the performance measure before the acquisition. Government is a 0-1 indicator, which takes value 1 if the bidder is government-owned. λ is the inverse Mills ratio for government acquisition, constructed from the probit regression in Table A2 in the Appendix. Robust P-values are in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

	Panel A: ROA			Panel B: ROE			Panel C: Leverage		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	(-1,+1)	(-2,+2)	(-3,+3)	(-1,+1)	(-2,+2)	(-3,+3)	(-1,+1)	(-2,+2)	(-3,+3)
Government	12.589*	3.185	4.141**	17.231	10.496*	10.578	0.007	-0.003	-0.017
	(0.059)	(0.109)	(0.032)	(0.173)	(0.066)	(0.186)	(0.745)	(0.870)	(0.444)
λ	7.419	1.240	3.276	13.628*	-1.930	-22.342	0.024	0.017	0.032*
	(0.118)	(0.599)	(0.241)	(0.080)	(0.653)	(0.395)	(0.161)	(0.233)	(0.094)
Constant	-13.457*	-3.070	-6.018	-32.105*	-3.193	16.814	-0.043	-0.022	-0.040
	(0.091)	(0.405)	(0.130)	(0.067)	(0.674)	(0.584)	(0.153)	(0.387)	(0.193)
Observations	346	278	221	331	262	204	345	302	241
R-squared	0.020	0.003	0.011	0.015	0.010	0.010	0.012	0.010	0.037

	Panel D: Investment			Panel E: Cash		
	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	(-1,+1)	(-2,+2)	(-3,+3)	(-1,+1)	(-2,+2)	(-3,+3)
Government	-0.022	-0.013	-0.015	0.023	0.032*	0.029*
	(0.358)	(0.437)	(0.326)	(0.177)	(0.061)	(0.093)
λ	-0.019	-0.021	-0.003	-0.009	-0.022	-0.023*
	(0.273)	(0.106)	(0.866)	(0.527)	(0.120)	(0.073)
Constant	0.020	0.027	0.011	0.001	0.010	0.014
	(0.580)	(0.277)	(0.620)	(0.967)	(0.685)	(0.524)
Observations	335	292	228	346	304	242
R-squared	0.003	0.008	0.001	0.008	0.031	0.046

Table 1.7: Government ownership and deal premium: Domestic deals versus cross border deals

FBC is the first bid to completion premium measure of Schwert (1996). CAR3 and CAR5 denote cumulative abnormal returns for 3-day and 5-day windows, respectively. λ is the inverse Mills ratio for government acquisition, constructed from the probit regression in Table A2 in the Appendix. Robust P-values are in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

	Domestic Deals			Cross Border Deals		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	FBC	CAR3	CAR5	FBC	CAR3	CAR5
Government	0.212*	-0.005	-0.008	-0.011	0.021	-0.003
	(0.079)	(0.879)	(0.834)	(0.926)	(0.813)	(0.973)
Sought (%)	-0.001	0.001**	0.000	0.004	0.001	0.002
	(0.625)	(0.053)	(0.658)	(0.259)	(0.504)	(0.261)
Cash Deal	0.045	0.023	0.037	0.160	0.053	0.078**
	(0.630)	(0.487)	(0.223)	(0.126)	(0.134)	(0.024)
Tender Offer	0.040	0.040	0.042	-0.087	-0.025	-0.052
	(0.613)	(0.151)	(0.156)	(0.318)	(0.652)	(0.348)
Termination Fee	-0.095	-0.050	-0.062	0.043	-0.044	0.005
	(0.222)	(0.240)	(0.195)	(0.788)	(0.484)	(0.946)
Bidder (#)	0.065	-0.062	-0.077*	0.227***	-0.048	-0.005
	(0.628)	(0.185)	(0.089)	(0.010)	(0.298)	(0.907)
log(TA)	-0.015	-0.009	-0.007	0.030	0.018	0.016
	(0.330)	(0.276)	(0.375)	(0.276)	(0.275)	(0.247)
ROA	-0.004*	-0.000	-0.001	-0.002	-0.000	-0.000
	(0.097)	(0.678)	(0.367)	(0.312)	(0.766)	(0.712)
Leverage	-0.031	0.141	0.112	-0.150	-0.135	-0.071
	(0.920)	(0.159)	(0.276)	(0.335)	(0.244)	(0.536)
Q	-0.033	-0.003	-0.014	-0.004	0.012	0.018
	(0.495)	(0.839)	(0.391)	(0.933)	(0.709)	(0.591)
BHAR	-0.214***	-0.003	-0.014	-0.287**	-0.090***	-0.085**
	(0.007)	(0.924)	(0.610)	(0.011)	(0.008)	(0.026)
Minority Block	-0.020	0.024	-0.064	0.233	-0.077	0.001
	(0.891)	(0.681)	(0.376)	(0.369)	(0.540)	(0.993)
Zero Dividend	-0.002	0.016	0.028	-0.000	0.006	0.013
	(0.965)	(0.379)	(0.146)	(0.997)	(0.914)	(0.817)
High Close-	-0.014	-0.022	-0.007	-0.113	-0.022	-0.010
Held Share	(0.866)	(0.382)	(0.767)	(0.209)	(0.581)	(0.827)
Per Capita GDP	0.037	-0.015	-0.009	0.006	-0.021	-0.017
Target Nation	(0.441)	(0.185)	(0.477)	(0.906)	(0.500)	(0.605)
Real Oil Price	-0.025***	-0.006***	-0.006***	0.002	0.002	0.004
	(0.000)	(0.001)	(0.000)	(0.814)	(0.660)	(0.303)
lambda	0.196*	0.039	0.053	0.050	0.071**	0.046
	(0.068)	(0.333)	(0.162)	(0.524)	(0.045)	(0.129)
Constant	0.444	0.169	0.223	-0.695	-0.067	-0.228
	(0.236)	(0.319)	(0.194)	(0.100)	(0.771)	(0.283)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	160	160	160
R-squared	0.269	0.201	0.206	0.474	0.413	0.412

Table 1.8: The cross section of government ownership and deal premium

This table reports estimates for determinants of deal premium based on a sample of completed acquisitions in the oil and gas sectors for period 1985—2015. FBC is the first bid to completion premium measure of Schwert (1996). CAR3 and CAR5 denote cumulative abnormal returns for 3-day and 5-day windows, respectively. Government is a 0-1 indicator, which takes value 1 if the bidder is government-owned. λ is the inverse Mills ratio for government acquisition, constructed from the probit regression in Table A2 in the Appendix. Robust P-values are in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)
VARIABLES	FBC	CAR3	CAR5
Government	0.029	0.004	0.033
	(0.862)	(0.958)	(0.717)
Government×Cross Border	-0.236***	0.009	0.017
	(0.001)	(0.792)	(0.639)
Government×Bidder Nation Common Law	0.077	0.027	-0.003
	(0.617)	(0.668)	(0.968)
Government×Bidder Nation Democracy	0.375***	0.034	0.021
	(0.003)	(0.657)	(0.789)
Government×Bidder Nation Oil Poor	-0.011	-0.002	-0.004
	(0.260)	(0.809)	(0.474)
Government×Stake	0.001	-0.001	-0.000
	(0.333)	(0.534)	(0.604)
Cross Border	0.111**	0.068***	0.073***
	(0.011)	(0.003)	(0.000)
Bidder Nation Oil Poor	-0.044	-0.023	-0.002
	(0.529)	(0.332)	(0.932)
Bidder Nation Common Law	-0.339	0.012	0.036
	(0.183)	(0.917)	(0.745)
Bidder Nation Democracy	-0.031	0.004	0.008
	(0.347)	(0.825)	(0.643)
Stake	-0.001	0.002*	0.001
	(0.651)	(0.089)	(0.280)
λ	0.532	0.003	-0.027
	(0.158)	(0.988)	(0.881)
Constant	-0.368	0.100	0.144
	(0.491)	(0.693)	(0.563)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	520	520	520
R-squared	0.263	0.212	0.212

Table 1.9: The cross section of government ownership and changes in operating performance

The dependent variables in this table are changes in target operating performances for a sample of completed acquisitions in the oil and gas sectors for 1985—2015. I report the results for *Return on assets*, *Return on equity*, *Leverage*, *Investment*, and *cash*. For each performance measure, I examine change as the two-year average of the measure after the acquisition minus the two-year average of the measure before. Government is a 0-1 indicator, which takes value 1 if the bidder is government-owned. λ is the inverse Mills ratio for government acquisition, constructed from the probit regression in Table A2 in the Appendix. Robust P-values are in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

VARIABLES	(1) ROA	(2) ROE	(3) Leverage	(4) Investment	(5) Cash
Gov.	-5.082	-34.060	0.004	-0.010	0.051
	(0.537)	(0.152)	(0.936)	(0.888)	(0.364)
Gov.×Cross Border	0.956	3.011	0.057	0.017	-0.002
	(0.821)	(0.818)	(0.191)	(0.553)	(0.955)
Gov.×Bidder Nation Oil Poor	3.585	32.631**	-0.010	0.021	-0.070**
	(0.528)	(0.028)	(0.827)	(0.624)	(0.034)
Gov.×Bidder Nation Common Law	2.504	31.012*	-0.029	-0.010	0.044
	(0.596)	(0.069)	(0.441)	(0.859)	(0.160)
Gov.×Bidder Nation Democracy	0.608	1.960*	-0.003	-0.001	0.004
	(0.250)	(0.078)	(0.308)	(0.703)	(0.368)
Gov.×Stake	0.030	0.032	0.000	0.000	-0.001**
	(0.610)	(0.814)	(0.826)	(0.243)	(0.046)
Cross Border	0.062	-8.108	0.010	0.015	0.001
	(0.985)	(0.416)	(0.643)	(0.456)	(0.957)
Bidder Nation Oil Poor	-1.150	-20.787	0.001	-0.017	0.036*
	(0.817)	(0.125)	(0.970)	(0.659)	(0.068)
Bidder Nation Common Law	-3.390	-7.988	0.002	0.093	0.036
	(0.475)	(0.697)	(0.955)	(0.195)	(0.206)
Bidder Nation Democracy	-0.737	-1.069	0.005	0.009*	0.002
	(0.240)	(0.523)	(0.138)	(0.062)	(0.693)
Stake	-0.085	-0.205*	0.000	-0.001*	0.001*
	(0.103)	(0.080)	(0.541)	(0.061)	(0.069)
λ	5.130	-2.975	0.010	-0.070**	-0.052**
	(0.311)	(0.816)	(0.698)	(0.049)	(0.025)
Constant	2.243	32.150	-0.062	-0.012	-0.009
	(0.783)	(0.157)	(0.124)	(0.851)	(0.849)
Observations	278	262	302	292	304
R-squared	0.028	0.078	0.029	0.070	0.073

Table 1.A1: Description of the Explanatory Variables in the Empirical Analyses

VARIABLES	Source	Definition
Deal Value	SDC	Total value of the equity investment, in 2000 U.S. dollars (adjusted using the consumer price index, CPI)
Total Assets (log):	Worldscope, WC02999	Book value of total assets in millions of constant 2000 US dollars (adjusted using the consumer price index, CPI)
Return on assets (ROA)	Worldscope, WC08326	Net income/total assets
Sales Growth	Worldscope, WC01001	"Net sales" or "Revenue" minus the previous year's "Net sales" or "Revenue" then divided by the previous year's "Net sales" or "Revenue"
Long Term Debt to Asset	Worldscope, WC03251	Long term debt divided by book value of assets
Market-to-Book	Worldscope, WX02999, WC05491, WC05301, WC08001	(Book value of total assets -book value of equity + market value of equity)/book value of assets
Cross Border	SDC	Binary variable, set equal to one if the bidder country and target country of headquarters are not the same
Stock Return	DataStream, RI	Daily percentage change in the total return index (RI), in U.S. dollars.
Market index return	DataStream, TOTMK	Country level daily percentage change in the total return market index

Target BHAR	DataStream, RI	Buy and hold abnormal return, market adjusted in previous year
Minority Block Acquisition Dummy	SDC	Equals 1 if the deal is a minority block purchase (less than 50% of target firm's shares) and 0 if the deal is majority control acquisition
Real Oil Price	Federal Reserve Bank of St. Louis	Global price of WTI crude, deflated using the consumer price index (CPI)
Bidder Nation Oil Poor	Energy Information Administration (EIA)	Binary variable, set equal to one if an bidder county's dependence on foreign oil ratio is greater than 50%. Dependence on foreign oil ratio is calculated using net oil import divided by oil consumption
Target country GDP per capita	World Bank	GDP per capita is gross domestic product divided by midyear population. Data are in constant 2005 U.S. dollars.
Target country GDP growth	World Bank	Year-to-year change in GDP per capita for the country in which the target's headquarters are located. Data are in constant 2005 U.S. dollars.

Target Nation Common Law	La Porta et al. (1998)	Binary variable, equal to one if the relevant country is of common law origin
Target country Democracy	Polity IV Project	"Democracy" minus "Autarchy" score for the relevant country

Table 1.A2: Determinants of Government Acquisitions

This table presents estimates for probit regressions on government acquisition in the oil and gas sectors for period 1985—2015 (the dependent variable). Variable definitions are in Table A1 of Appendix. Robust P-Values are reported in parentheses. ***, **, and * indicates significant at the 1%, 5%, and 10% levels.

VARIABLES	(1) Government Bidder
Sought (%)	-0.003+
	(0.084)
Cash Deal	0.235
	(0.111)
Tender Offer	-0.096
	(0.574)
Termination Fee	-0.101
	(0.688)
Bidder (#)	-0.163
	(0.526)
log(TA)	0.133**
	(0.000)
ROA	0.005
	(0.278)
Leverage	0.201
	(0.613)
Q	-0.026
	(0.796)
$BHAR_{t-1}$	0.346**
	(0.003)
Target Nation Democracy	-0.015
	(0.507)
Bidder Nation Democracy	-0.122**
	(0.000)
Bidder Country Common Law Origin	-0.816**
	(0.000)
Constant	-0.316
	(0.531)
Observations	868

Figure 2.1: Index of economic policy uncertainty

This figure shows the time series plot of the economic policy uncertainty index for 1985--2015. The data is obtained from Baker et al. (2013). Shaded area indicates recessions dated by NBER.

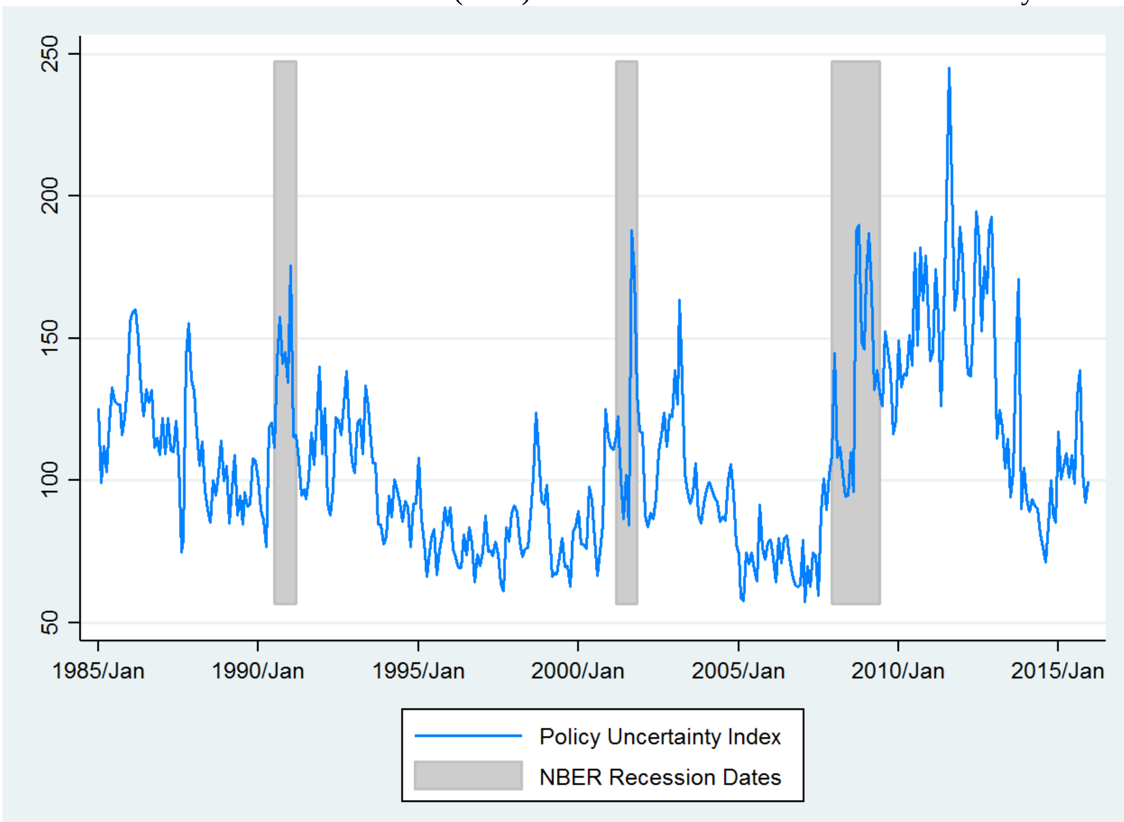

Table 2.1: Summary statistics

This table documents summary statistics for variables used in this study. In Panel A, we report firm characteristics, and the data is from Compustat quarterly in the period 1986—2015. Leverage is the book leverage. In Panel B, we report the economic variables used in our analysis. In Panel C, we report the summary for bond characteristics. We obtain the bond issuance data from Mergent FISD. Rating is the ordinal S&P rating and is given by the following transformation: AAA=1, AA+=2, AA=3, AA-=4, A+=5, A=6, A-=7, BBB+=9, BBB-=10, BB+=11, BB=12, BB-=13, B+=14, B=15, B-=16. See Appendix A for variable definitions. Ratios are winsorized at the one percent level.

Variable	N	Mean	S.D.	Median
Panel A: Firm Characteristics				
Leverage	329,834	0.26	0.24	0.19
EBITDA/TA	329,834	0.04	0.05	0.03
Tangible Assets/TA	329,834	0.33	0.24	0.27
Market-to-Book	329,834	1.97	1.99	1.16
Firm Size	329,834	6.26	1.82	6.05
Industry Median Leverage	329,834	0.21	0.16	0.20
Rated Dummy	329,834	0.30	0.46	0.00
Dividend Dummy	329,834	0.10	0.30	0.00
Panel B: Economic Variables				
Economic Policy Uncertainty (EPU)	124	1.08	0.30	1.02
News Component of EPU	123	1.08	0.34	1.00
VIX Index (%)	120	20.66	8.09	19.45
Panel C: Bond Characteristics				
Credit Spread (Baa-Aaa)	120	0.99	0.38	0.92
Offering Yield (%)	6869	7.43	3.27	7.13
Rating	6869	8.31	3.36	8.00
Stock Volatility	6656	0.02	0.01	0.02
Treasury Yield (%)	6869	4.75	2.10	4.73
Maturity (years)	6869	10.72	7.86	10.00

Table 2.2: Univariate analysis

This table presents univariate analysis of book leverage with respect to high and low regimes of EPU, which is the economic policy uncertainty index of Baker et al. (2013). We define high EPU regimes as the quarters when the EPU index is above its 75th percentile and low regimes as the rest of the quarters. In Panel A, we report the mean and median of book leverage for the whole sample and for both EPU regimes and report the differences over the two regimes. In Panels B, C, and D, we report the mean of book leverage for size, book leverage, and market-to-book (M-B) quartiles and the mean conditional on both EPU regimes, respectively. In panel E, we report the mean of book leverage conditional on election year and for both EPU regimes. See Appendix A for variable definitions. Ratios are winsorized at the one percent level. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Book Leverage over High and Low EPU Regimes

		EPU Regimes			
	Whole Sample	Low	High	Low - High	
Mean Book Leverage	0.244	0.248	0.232	0.015	***
Median Book Leverage	0.221	0.225	0.204	0.022	***

Panel B. Mean *Book Leverage* over *Firm Size* Quartiles

		EPU Regimes			
Size Quartiles	Whole Sample	Low	High	Low - High	
1 (Lowest)	0.176	0.182	0.156	0.027	***
2	0.218	0.223	0.200	0.023	***
3	0.287	0.289	0.281	0.009	***
4 (Largest)	0.295	0.296	0.294	0.003	*

Panel C. Mean *Book Leverage* over *Book Leverage* Quartiles

		EPU Regimes			
Book Quartiles	Whole Sample	Low	High	Low - High	
1 (Lowest)	0.016	0.018	0.011	0.007	***
2	0.146	0.152	0.129	0.022	***
3	0.29	0.295	0.274	0.021	***
4 (Largest)	0.524	0.527	0.516	0.012	***

Panel D. Mean *Book Leverage* over *Market-to-Book* Quartiles

		EPU Regimes			
M-B Quartiles	Whole Sample	Low	High	Low - High	
1 (Lowest)	0.244	0.253	0.215	0.037	***
2	0.292	0.296	0.280	0.016	***
3	0.226	0.224	0.234	-0.010	***
4 (Largest)	0.214	0.218	0.201	0.018	***

Panel E. Mean *Book Leverage* in Election and non-Election Years

		EPU Regimes			
	Whole Sample	Low	High	Low - High	
Election	0.242	0.248	0.224	0.024	***
No Election	0.245	0.248	0.235	0.013	***

Table 2.3: Does economic policy uncertainty affect corporate leverage?

This table reports OLS estimates. The dependent variable across all the columns is book leverage. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)
EPU	-0.014***	-0.010***	-0.007***
	(0.000)	(0.000)	(0.000)
Recession Dummy	-0.002*	0.000	0.001
	(0.086)	(0.955)	(0.198)
VIX Index	-0.000***	-0.000***	-0.000
	(0.000)	(0.001)	(0.323)
EBITDA/TA	-0.142***	-0.176***	-0.168***
	(0.000)	(0.000)	(0.000)
Tangible Assets/TA	0.081***	0.136***	0.128***
	(0.000)	(0.000)	(0.000)
Market-to-Book	0.001	-0.000	0.002***
	(0.225)	(0.663)	(0.000)
Firm Size	0.015***	0.016***	0.030***
	(0.000)	(0.000)	(0.000)
Median Industry Leverage	0.457***	0.322***	0.235***
	(0.000)	(0.000)	(0.000)
Dividend	0.059***	0.059***	0.024***
	(0.000)	(0.000)	(0.000)
Election Year	-0.002**	-0.001*	-0.002**
	(0.030)	(0.079)	(0.033)
Constant	0.055***	0.054***	0.001
	(0.000)	(0.000)	(0.955)
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Firm FE	No	No	Yes
Observations	329,834	329,834	329,834
R-squared	0.209	0.246	0.667

Table 2.4: Does public debt market access moderate the effect of economic policy uncertainty?

This table reports OLS estimates. The dependent variable across all the columns is book leverage. In Model (1), we utilize the full sample. In Model (2), we focus on a subsample of rated firms. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)
EPU	-0.007***	-0.011***
	(0.000)	(0.008)
*EPU*Rated*	0.004	
	(0.290)	
Rated	0.076***	
	(0.000)	
EPU Invest.Grade*		0.015**
		(0.013)
Invest.Grade		-0.084***
		(0.000)
Recession Dummy	0.001	-0.001
	(0.165)	(0.692)
VIX Index	-0.000	0.000**
	(0.284)	(0.047)
EBITDA/TA	-0.163***	-0.170***
	(0.000)	(0.000)
Tangible Assets/TA	0.128***	0.035*
	(0.000)	(0.079)
Market-to-Book	0.002***	0.003***
	(0.000)	(0.000)
Firm Size	0.020***	0.001
	(0.000)	(0.722)
Median Industry Leverage	0.227***	0.191***
	(0.000)	(0.000)
Dividend	0.020***	0.014***
	(0.000)	(0.004)
Election Year	-0.001*	-0.004***
	(0.071)	(0.001)
Constant	0.037**	0.379***
	(0.036)	(0.000)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	340,168	102,013
R-squared	0.675	0.703

Table 2.5: Debt issuance hazards and economic policy uncertainty

This table presents estimates of the Cox proportional hazards model (accounting for right censoring) for debt issuances. The dependent variable is the length of the time periods between two debt issuances. An issuance is defined as having occurred in a given quarter if the net change in debt, normalized by the book value of assets at the end of previous period is greater than 5 percent. The sample used here is Compustat quarterly data for 1986—2015. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. *HI* measures the hazard impact and is defined as $HI_i = (\exp(\beta_i) - 1) \times 100$. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	(1)		(2)		(3)	
VARIABLES	β	*HI*	β	*HI*	β	*HI*
EPU	-0.403***	-33.2%	-0.427***	-34.7%	-0.387***	-32.1%
	(0.000)		(0.000)		(0.000)	
*EPU *Rated*			0.105***	11.1%		
			(0.000)			
Rated			0.081	8.44%		
			(0.117)			
*EPU *Invest.Grade*					0.073***	7.57%
					(0.000)	
Invest.Grade					0.013	1.30%
					(0.887)	
Recession Dummy	-0.130***	-12.2%	-0.126***	-11.8%	-0.057	-5.5%
	(0.000)		(0.000)		(0.160)	
VIX Index	-0.031***	-3.05%	-0.032***	-3.15%	0.016	-1.60%
	(0.001)		(0.001)		(0.339)	
EBITDA/TA	0.471***	60.3%	0.492***	63.7%	0.231	22.4%
	(0.000)		(0.000)		(0.418)	
Tangible Asset/TA	0.196***	21.7%	0.197***	21.8%	0.054	5.4%
	(0.000)		(0.000)		(0.266)	
Market-to-Book	-0.036***	-3.54%	-0.036***	-3.53%	-0.011**	-1.1%
	(0.000)		(0.000)		(0.013)	
Size	-0.065***	-6.72%	-0.083***	-7.96%	-0.120***	-11.48%
	(0.000)		(0.002)		(0.000)	
Industry Median Leverage	0.688***	99.0%	0.664***	94.3%	-0.026	-2.6%
	(0.000)		(0.000)		(0.727)	
Dividend Dummy	0.053***	5.44%	0.042**	4.29%	0.056**	5.6%
	(0.003)		(0.023)		(0.049)	
N	329,834		329,834		99,542	
Log Likelihood	-247539.43		-247516.65		-58861.749	

Table 2.6: Economic policy uncertainty and debt maturity

This table reports OLS estimates. The dependent variable across all the columns is the ratio of long-term debt over total debt. Other variable definitions are in Appendix A. In Models (1) and (2), we utilize the full sample. In Model (3), we focus on a subsample of rated firms. We use Compustat quarterly sample covering 1986—2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)
EPU	-0.009*	-0.019***	-0.029***
	(0.051)	(0.000)	(0.000)
*EPU*Rated*		0.049***	
		(0.000)	
Rated		0.055***	
		(0.000)	
EPU Invest.Grade*			0.053***
			(0.000)
Invest.Grade			-0.115***
			(0.000)
VIX Index	-0.000*	0.000	-0.000**
	(0.065)	(0.893)	(0.013)
GDP Growth	0.737***	0.175**	0.212**
	(0.000)	(0.011)	(0.013)
EBITDA/TA	0.053	0.045	-0.121**
	(0.154)	(0.226)	(0.025)
Tangible Assets/TA	0.193***	0.191***	0.127***
	(0.000)	(0.000)	(0.000)
Market-to-Book	-0.001	-0.001	-0.002*
	(0.179)	(0.174)	(0.065)
Firm Size	0.043***	0.025***	-0.012***
	(0.000)	(0.000)	(0.000)
Constant	0.409***	0.512***	0.932***
	(0.000)	(0.000)	(0.000)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	329,834	329,834	99,542
R-squared	0.094	0.113	0.089

Table 2.7: Instrumental variable analysis of economic policy uncertainty

This table reports the estimates of our IV regression. The dependent variable across all the columns is book leverage. EPU is the economic policy uncertainty index of Baker et al. (2013). We instrument EPU with political polarization, where the first stage estimates are in Appendix B. Other variable definitions are in Appendix We use Compustat quarterly sample for 1986—2015. P values calculated using two-way clustered standard errors are reported in parentheses. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)
EPU	-0.055***	-0.072***
	(0.000)	(0.000)
Recession Dummy	-0.004***	-0.001
	(0.000)	(0.640)
VIX Index	0.000***	0.001***
	(0.009)	(0.000)
EBITDA/TA	-0.127***	-0.158***
	(0.000)	(0.000)
Tangible Assets/TA	0.085***	0.141***
	(0.000)	(0.000)
Market-to-Book	0.001***	-0.000***
	(0.000)	(0.003)
Firm Size	0.014***	0.015***
	(0.000)	(0.000)
Median Industry Leverage	0.462***	0.348***
	(0.000)	(0.000)
Dividend	0.061***	0.062***
	(0.000)	(0.000)
Election Year	-0.002**	-0.002**
	(0.012)	(0.024)
Constant	0.082***	0.090***
	(0.000)	(0.000)
Industry FE	No	Yes
Year FE	Yes	Yes
Observations	329,834	329,834
R-squared	0.206	0.239

Table 2.8: Does economic policy uncertainty affect leverage and debt issuances based on policy uncertainty sensitivity?

In Panel A, we report OLS estimation results. The dependent variable is leverage. In Panel B, we report estimation results for a duration model, where the dependent variable is the length of the time periods between two debt issuances. The sample is Compustat quarterly data for 1986—2015. EPU is the economic policy uncertainty index of Baker et al. (2013). Policy (sensitivity) is an indicator variable, which takes value one if a firm is in either the energy or the defense industry. In Model (2) and Model (3), the coefficients of policy are omitted due to collinearity. Other variable definitions are in Appendix A. The duration spell accounts for right censoring. HI measures the hazard impact and is defined as $HI_i = (\exp(\beta_i) - 1) \times 100$. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	Leverage			Debt Issuance Duration	
VARIABLES	(1)	(2)	(3)	(4)	HI
EPU	-0.012***	-0.009***	-0.009***	-0.009***	-0.90%
	(0.000)	(0.000)	(0.000)	(0.000)	
*EPU*Policy Sensitivity*	-0.022***	-0.024***	-0.024***	-0.117*	-11.04%
	(0.006)	(0.003)	(0.003)	(0.056)	
Policy Sensitivity	-0.019*			0.352***	42.20%
	(0.099)			(0.000)	
Recession	-0.002*	-0.000	-0.000	-0.235***	-20.94%
	(0.088)	(0.956)	(0.956)	(0.000)	
VIX Index	-0.000***	-0.000***	-0.000***	-0.007***	-0.70%
	(0.000)	(0.000)	(0.000)	(0.000)	
EBITDA/TA	-0.144***	-0.176***	-0.176***	0.561***	75.24%
	(0.000)	(0.000)	(0.000)	(0.000)	
Tangible Assets/TA	0.102***	0.136***	0.136***	0.088***	9.20%
	(0.000)	(0.000)	(0.000)	(0.001)	
Market-to-Book	0.000	-0.000	-0.000	-0.023***	-2.27%
	(0.391)	(0.651)	(0.651)	(0.000)	
Firm Size	0.015***	0.016***	0.016***	-0.054***	-5.26%
	(0.000)	(0.000)	(0.000)	(0.000)	
Median Industry Leverage	0.448***	0.323***	0.323***	0.730***	107.51%
	(0.000)	(0.000)	(0.000)	(0.000)	
Dividend	0.060***	0.059***	0.059***	0.043**	4.39%
	(0.000)	(0.000)	(0.000)	(0.015)	
Election Year	-0.002**	-0.001*	-0.001*	-0.002	-0.20%
	(0.037)	(0.081)	(0.081)	(0.874)	
Constant	0.049***	0.053***	0.053***		
	(0.000)	(0.000)	(0.000)		
Year Fixed	Yes	Yes	Yes		
Industry Fixed	No	Yes	No		
Firm Fixed	No	No	Yes		
Observations	329,834	329,834	329,834	329,834	
R-squared	0.212	0.246	0.246	0.246	

Table 2.9: Credit spread and economic policy uncertainty

In Panel A, the dependent variable is the aggregate credit spread, the difference between Baa and Aaa corporate bond yields. EPU is the economic policy uncertainty index of Baker et al. 2013. Control variables include VIX index, GDP growth, and NBER Recession dummies. In Panel B, we examine the bond level credit spread, defined as the difference between bond issuance yield and matched Treasury bond yield. The control variable rating is the ordinal S&P rating and is given by the following transformation: AAA=1, AA+=2, AA=3, AA-=4, A+=5, A=6, A-=7, BBB+=9, BBB-=10, BB+=11, BB=12, BB-=13, B+=14, B=15, B-=16. In Panel A, P values calculated using Newey-West standard errors are reported in parentheses. In Panel B, P values calculated using heteroskedasticity robust standard errors are reported. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: Aggregate Credit Spread

VARIABLES	(1) Credit spread
EPU	0.313***
	(0.000)
VIX Index	0.016**
	(0.000)
GDP growth	-14.974***
	(0.008)
Recession Dummy	0.206
	(0.206)
Constant	0.378***
	(0.000)
Observations	119
R-squared	0.567

Panel B: Bond-level credit spread

	(1)	(2)	(3)	(4)	(5)
EPU	1.064***	1.005***	1.152***	0.857***	0.815***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Book Leverage	5.464***	5.246***	5.476***	4.634***	4.776***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-book	0.202***	0.0207	0.255***	0.124***	0.114***
	(0.000)	(0.523)	(0.000)	(0.000)	(0.000)
Firm Size	-2.492***	-4.884***	-1.667***	-1.250***	-0.939***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EBITDA/TA			-4.465***	-2.587***	-2.350***
			(0.000)	(0.002)	(0.006)
Rating			0.156***	0.0814***	0.0790***
			(0.000)	(0.000)	(0.000)
Benchmark Treasury rate (%)				-0.380***	-0.356***
				(0.000)	(0.000)
Excess return volatility				66.42***	70.51***
				(0.000)	(0.000)
Tangible Asset/TA					-0.457***
					(0.000)
Constant	4.527***	7.958***	0.399	2.863***	2.217***
	(0.000)	(0.000)	(0.432)	(0.000)	(0.000)
Year Fixed Effects	No	Yes	Yes	Yes	Yes
Observations	6,862	6,862	5,414	5,276	5,190
R-squared	0.190	0.419	0.456	0.487	0.502

Table 2.10: Simultaneous regression estimates for leverage, investment, and EPU

This table reports the simultaneous regression estimates for book leverage, investment, and EPU. Variable definitions are in Appendix A. The sample used here is Compustat quarterly data for 1986—2015. Robust P values from three-stage least square estimates are reported in parentheses. RMSE denotes the root mean squared error. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

(1)		(2)		(3)	
VARIABLES	Leverage	VARIABLES	Investment	VARIABLES	EPU
EPU	-0.132**	*EPU*	-0.024**	*Polarization*	1.233**
	(0.000)		(0.000)		(0.000)
Investment	8.608**	*Leverage*	0.074**		
	(0.000)		(0.000)		
Recession	-0.040**	*Q*	0.001**		
	(0.000)		(0.000)		
VIX Index	0.003**	*Cash Flow*	0.075**		
	(0.000)		(0.000)		
EBITDA/TA	-0.843**				
	(0.000)				
Tangible Assets/TA	-1.821**				
	(0.000)				
Market-to-Book	-0.025**				
	(0.000)				
Firm Size	0.068**				
	(0.000)				
Median Industry Leverage	1.324**				
	(0.000)				
Dividend	0.160**				
	(0.000)				
Constant	-0.064**	*Constant*	0.044**	*Constant*	0.111**
	(0.008)		(0.000)		(0.000)
Observations	294,768		294,768		294,768
RMSE	0.728		0.057		0.282

Table 2.11: Leverage and economic policy uncertainty: subsample analysis on firms with no substantial changes in investment

No substantial change in investment is defined as less than 1 percent change in investment. The dependent variable across all the columns is book leverage. Other variable definitions are in Appendix A. The sample used here is Compustat quarterly data for 1986—2015. P values calculated using two-way clustered standard errors are reported in parentheses. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)
EPU	-0.026***	-0.015**	-0.023***	-0.012**
	(0.000)	(0.022)	(0.000)	(0.048)
Recession Dummy	-0.004	-0.003	-0.003	-0.002
	(0.337)	(0.479)	(0.488)	(0.738)
VIX Index	-0.000	0.000	-0.000	0.000
	(0.140)	(0.558)	(0.447)	(0.158)
EBITDA/TA	0.011	-0.026	0.001	-0.039
	(0.750)	(0.457)	(0.985)	(0.326)
Tangible Assets/TA	0.131***	0.131***	0.186***	0.180***
	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-Book	0.001	0.001	0.001	0.000
	(0.129)	(0.335)	(0.619)	(0.939)
Firm Size	0.019***	0.020***	0.019***	0.021***
	(0.000)	(0.000)	(0.000)	(0.000)
Median Industry Leverage	0.459***	0.446***	0.366***	0.334***
	(0.000)	(0.000)	(0.000)	(0.000)
Dividend Dummy	0.069***	0.064***	0.068***	0.063***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.026**	-0.061***	-0.013	-0.089***
	(0.013)	(0.000)	(0.392)	(0.000)
Industry FE	No	No	Yes	Yes
Year FE	No	Yes	No	Yes
N	126,619	126,619	126,619	126,619
R-squared	0.230	0.235	0.268	0.273

Table 2.12: Firm leverage and economic policy uncertainty: quantile regression estimation

The dependent variable in columns is the conditional book leverage at the 10th, 25th, 50th, 75th, and 90th percentiles, respectively. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986—2015. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)
EPU	-0.003	-0.006**	-0.013***	-0.011**	-0.011*
	(0.175)	(0.033)	(0.000)	(0.013)	(0.098)
Recession Dummy	-0.001	-0.001	-0.000	0.003	0.001
	(0.712)	(0.430)	(0.876)	(0.297)	(0.791)
VIX Index	-0.000*	-0.000***	-0.000***	-0.000**	0.000
	(0.074)	(0.007)	(0.003)	(0.038)	(0.652)
EBITDA/TA	-0.069***	-0.098***	-0.129***	-0.209***	-0.247***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tangible Assets/TA	0.076***	0.130***	0.160***	0.127***	0.098***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-Book	-0.002***	-0.002***	-0.003***	-0.000*	0.006***
	(0.000)	(0.000)	(0.000)	(0.075)	(0.000)
Firm Size	0.013***	0.020***	0.020***	0.012***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Median Industry Leverage	0.106***	0.274***	0.405***	0.392***	0.335***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dividend	0.033***	0.044***	0.051***	0.069***	0.085***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Election Year	0.001	0.000	-0.000	-0.001	-0.002
	(0.491)	(0.871)	(0.852)	(0.595)	(0.505)
Constant	-0.088***	-0.137***	-0.072***	0.193***	0.468***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	329,834	329,834	329,834	329,834	329,834

Table 2.13: Does economic policy uncertainty affect leverage spells?

This table presents estimates of the Cox proportional hazards model (accounting for right censoring) for four leverage-quartile spells. The first two columns (Model (1)) show coefficient estimates and hazard impacts of those estimates for Model 1, the first leverage quartile spell (the time that a firm spends in the first leverage quartile). (2), (3), and (4) show estimates for second, third, and fourth leverage quartile spells. The sample used here is Compustat quarterly data for 1986—2015. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. *HI* measures the hazard impact and is defined as $HI_i = (\exp(\beta_i) - 1) \times 100$. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

	(1)		(2)		(3)		(4)	
VARIABLES	β	*HI*	β	*HI*	β	*HI*	β	HI
EPU	-0.053***	-5.16%	0.007	0.70%	0.057***	5.87%	0.059***	6.08%
	(0.000)		(0.471)		(0.000)		(0.000)	
Recession Dummy	-0.018**	-1.78%	0.013*	1.31%	0.021***	2.12%	0.031***	3.15%
	(0.025)		(0.099)		(0.007)		(0.000)	
VIX Index	-0.024***	-2.37%	-0.012***	-1.20%	0.000	0%	0.014***	1.40%
	(0.000)		(0.001)		(0.987)		(0.000)	
EBITDA/TA	-0.546***	-42.1%	-0.950***	-61.3%	-0.169***	-15.5%	0.839***	131.4%
	(0.000)		(0.000)		(0.000)		(0.000)	
Tangible Assets/TA	0.255***	29.0%	-0.128***	-12.0%	-0.205***	-18.5%	-0.070***	-6.76%
	(0.000)		(0.000)		(0.000)		(0.000)	
Market-to-Book	-0.094***	-8.97%	-0.065***	-6.30%	-0.039***	-3.82%	-0.034***	-3.34%
	(0.000)		(0.000)		(0.000)		(0.000)	
Firm Size	0.056***	5.76%	-0.022***	-2.18%	-0.039***	-3.82%	-0.003**	-0.30%
	(0.000)		(0.000)		(0.000)		(0.016)	
Median Industry Leverage	0.708***	103%	0.340***	40.5%	-0.378***	-31.5%	-1.611***	-80.0%
	(0.000)		(0.000)		(0.000)		(0.000)	
Dividend Dummy	0.078***	8.11%	0.040***	4.10%	-0.021***	-2.08%	-0.224***	-20.0%
	(0.000)		(0.000)		(0.004)		(0.000)	
N	329,834		329,834		329,834		329,834	
Log Likelihood	-1775420		-1787876.7		-1787732.9		-1778794.3	

Table 2.14: Leverage and economic policy uncertainty: alternative EPU measures

The dependent variable across all the columns is book leverage. In column (1), we use the news component of the EPU Index. In column (2), we use the tax component of the EPU index. In column (3), we use the CPI component of the EPU index. Other variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)
EPU News	-0.022***		
	(0.000)		
EPU Tax		-0.001***	
		(0.000)	
EPU CPI			-0.001
			(0.344)
Recession	-0.001	-0.006***	-0.006***
	(0.434)	(0.000)	(0.000)
VIX Index	0.001***	-0.000*	-0.000
	(0.000)	(0.059)	(0.173)
EBITDA/TA	-0.466***	-0.466***	-0.466***
	(0.000)	(0.000)	(0.000)
Tangible Asset/TA	0.144***	0.144***	0.144***
	(0.000)	(0.000)	(0.000)
Market-to-Book	-0.015***	-0.015***	-0.015***
	(0.000)	(0.000)	(0.000)
Size	0.010***	0.010***	0.010***
	(0.000)	(0.000)	(0.000)
Median Industry Leverage	0.610***	0.609***	0.608***
	(0.000)	(0.000)	(0.000)
Dividend	0.102***	0.102***	0.102***
	(0.000)	(0.000)	(0.000)
Election	0.004***	0.005***	0.004***
	(0.000)	(0.000)	(0.000)
Constant	0.063***	0.051***	0.046***
	(0.000)	(0.000)	(0.001)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	329,834	329,834	329,834
R-squared	0.308	0.308	0.308

Table 2.15: Market leverage and economic policy uncertainty

This table reports OLS estimates. The dependent variable across all the columns is market leverage. EPU is the economic policy uncertainty index of Baker et al. (2013). Other variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

VARIABLES	(1)	(2)	(3)
EPU	-0.036***	-0.035***	-0.029***
	(0.000)	(0.000)	(0.000)
Recession Dummy	-0.001	-0.000	0.000
	(0.439)	(0.877)	(0.763)
VIX Index	0.000***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)
EBITDA/TA	-0.424***	-0.465***	-0.420***
	(0.000)	(0.000)	(0.000)
Tangible Assets/TA	0.058***	0.145***	0.186***
	(0.000)	(0.000)	(0.000)
Market-to-Book	-0.014***	-0.015***	-0.008***
	(0.000)	(0.000)	(0.000)
Firm Size	0.008***	0.010***	0.037***
	(0.000)	(0.000)	(0.000)
Median Industry Leverage	0.674***	0.608***	0.501***
	(0.000)	(0.000)	(0.000)
Dividend	0.098***	0.102***	0.054***
	(0.000)	(0.000)	(0.000)
Election Year	0.004***	0.004***	0.003***
	(0.000)	(0.000)	(0.000)
Constant	0.104***	0.078***	-0.083***
	(0.000)	(0.000)	(0.000)
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Firm FE	No	No	Yes
Observations	329,834	329,834	329,834
R-squared	0.295	0.308	0.694

Table 2.16: Dynamic leverage adjustments and economic policy uncertainty

This table reports estimates of $L_{i,t} = (1-\lambda)L_{i,t-1} + \lambda\gamma EPU_{t-1} + \lambda\beta X_{i,t} + \mu_i + \epsilon_{i,t}$. In Panel A, we choose book leverage as the dependent variable. In Panel B, we choose market leverage as the dependent variable. EPU is the economic policy uncertainty index of Baker et al. (2013). In each panel, we report the estimates of the above-mentioned dynamic panel regression with the firm fixed effect (FE) estimator in column (1) and the estimates with the Blundell-Bond (BB) estimator in column (2). In columns (3) and (4), we report the estimates by including year fixed effects. Other control variables are the same as those in Table 17. Variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using robust standard errors are in parenthesis. ***, **, and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: Book Leverage				
VARIABLES	(1) FE	(2) BB	(3) FE	(4) BB
Leverage(t-1)	0.882***	0.838***	0.880***	0.852***
	(0.000)	(0.000)	(0.000)	(0.000)
EPU	-0.003***	-0.004***	0.001	0.001
	(0.000)	(0.000)	(0.129)	(0.212)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes

Panel B: Market Leverage				
VARIABLES	(1) FE	(2) BB	(3) FE	(4) BB
Leverage(t-1)	0.883***	0.915***	0.884***	0.930***
	(0.000)	(0.000)	(0.000)	(0.000)
EPU	-0.013***	-0.018***	-0.031***	-0.033***
	(0.000)	(0.000)	(0.000)	(0.000)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes

Table 2.B1: First Stage Instrumental Variable Regression

The dependent variable is the EPU index. Variable definitions are in Appendix A. We use Compustat quarterly sample covering 1986--2015. P values calculated using cluster robust standard errors are in parenthesis. ***, **, and * indicate significantly different from zero at the one percent, five percent, and ten percent confidence level.

	(1)	(2)
VARIABLES	EPU	EPU
Polarization	1.273***	1.320***
	(0.000)	(0.000)
Recession	0.103***	0.093***
	(0.000)	(0.000)
VIX Index	0.013***	0.012***
	(0.000)	(0.000)
EBITDA/TA	0.094***	0.120***
	(0.000)	(0.000)
Tangible Assets/TA	0.003	0.023***
	(0.309)	(0.000)
Market-to-Book	-0.006***	-0.007***
	(0.000)	(0.000)
Firm Size	-0.002***	-0.001***
	(0.000)	(0.001)
Median Industry Leverage	0.133***	0.381***
	(0.000)	(0.000)
Dividend	0.013***	0.015***
	(0.000)	(0.000)
Constant	-0.190***	-0.310***
	(0.000)	(0.000)
Industry FE	No	Yes
Observations	158,100	158,100
R-squared	0.352	0.362

Figure 3.1: Geographical distribution of the countries

This figure shows the geographical distribution of firms in my sample. The region categories are Sub-Sahara Africa (AFR), Europe, and Central Asia (ECA), Latin America and the Caribbean (LAC), South Asia (SAR), East Asia and Pacific (EAP) and the Middle East, and Northern Africa (MNA).

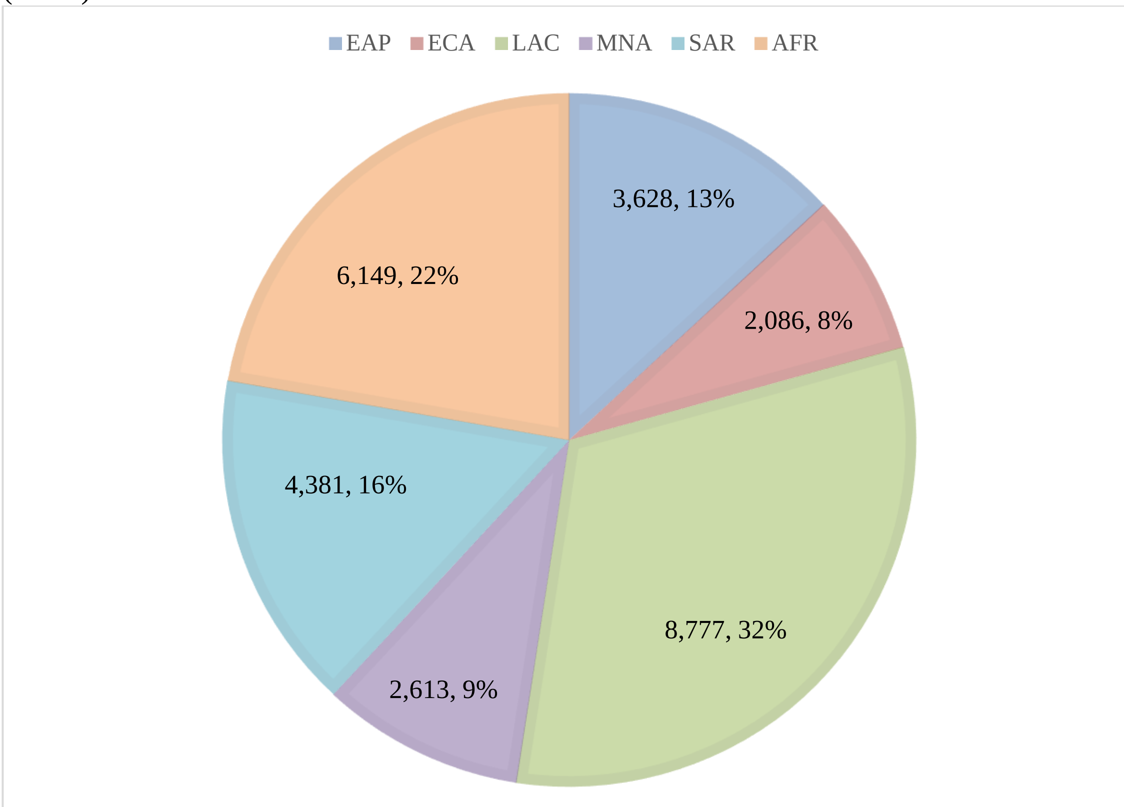

Figure 3.2: Country income distribution

This figure shows the distribution for the countries based on their incomes. The income groups are based on the World Bank income classification.

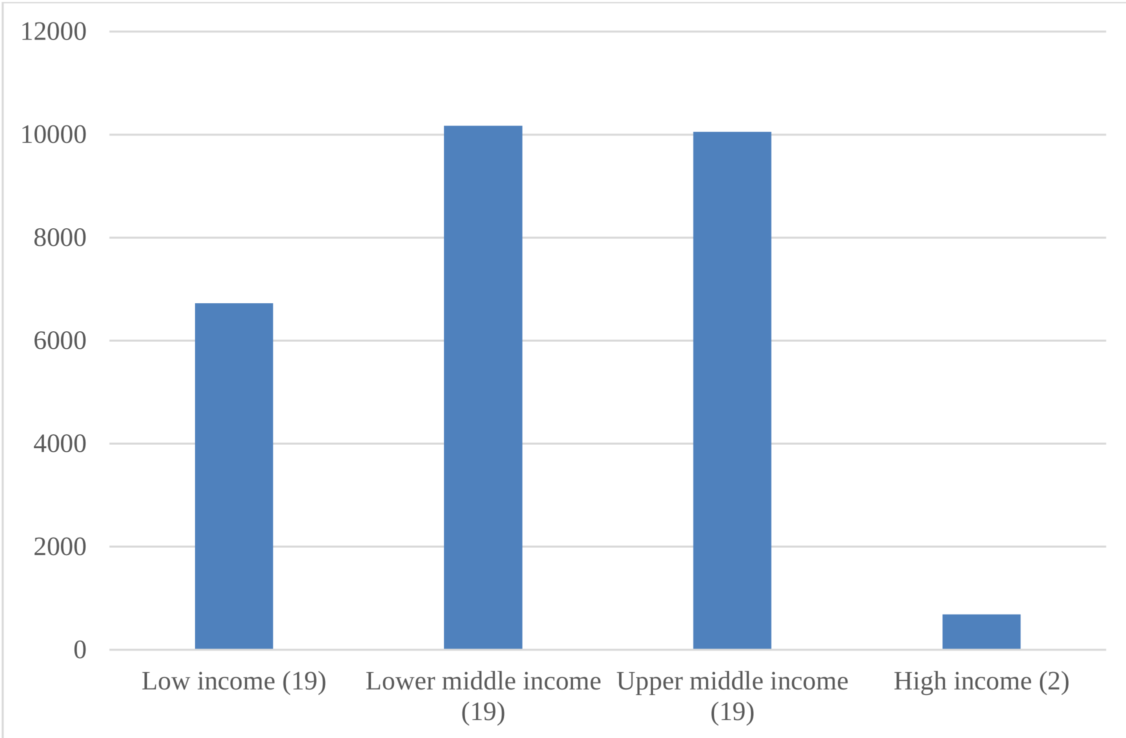

Figure 3.3: Firm size distribution

This figure shows the distribution for firm sizes. Small firms are defined as firms with 20 or fewer employees. Medium firms are defined as firms hiring more than 20 but fewer than 100 employees. Firms hiring over 100 employees are classified as large.

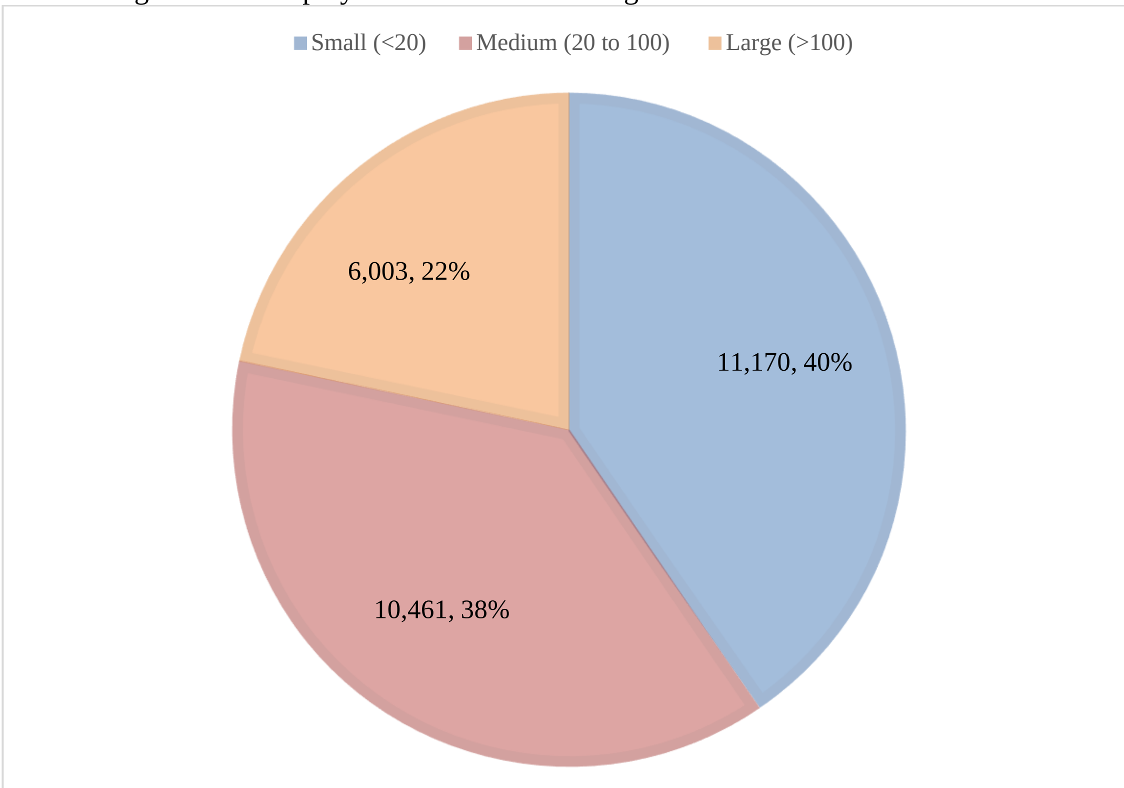

Table 3.1: Country-level summary of MRPK

This table shows the summary of marginal revenue product of capital (MRPK) for each country and year in my sample. The column Firm # reports the number of firms in this country year. S.D. is the standard deviation of MRPK for all the firms in this country year. Median is the median MRPK in this country year. Wedge is the country average wedge calculated by taking the mean value of firm wedges within a country. Wedge for firm *i* in industry *s* is the ratio of the firm's MRPK to the industry median MRPK. Small, Mid, and Large represents the proportion of small, mid-sized, and large firms in the country.

Year	Country	Firm #	S.D.	Median	Wedge	Small	Mid	Large
2006	Angola	198	2.98	0.67	2.82	0.83	0.15	0.02
2006	Argentina	399	5.43	0.90	2.27	0.36	0.41	0.23
2010	Argentina	443	2.95	0.78	2.14	0.27	0.40	0.33
2013	Bangladesh	991	3.82	0.73	2.58	0.28	0.38	0.34
2007	Bulgaria	372	2.62	0.82	2.07	0.37	0.42	0.20
2006	Bolivia	208	3.98	0.76	2.43	0.50	0.36	0.14
2009	Brazil	992	4.26	0.92	2.58	0.34	0.46	0.20
2006	Botswana	105	4.05	0.63	3.17	0.50	0.31	0.19
2006	Chile	430	4.11	0.95	2.61	0.34	0.47	0.19
2010	Chile	571	4.16	0.97	2.30	0.31	0.42	0.27
2009	Cote d'Ivoire	101	6.98	1.00	3.45	0.59	0.32	0.09
2006	Congo	146	2.75	1.09	1.65	0.63	0.31	0.06
2013	Congo	102	8.40	2.96	1.95	0.79	0.17	0.04
2006	Colombia	546	3.74	1.10	2.13	0.50	0.39	0.11
2010	Colombia	530	4.62	1.22	2.21	0.35	0.38	0.28
2010	Costa Rica	181	2.66	0.51	2.69	0.37	0.43	0.20
2006	Ecuador	243	3.01	0.62	2.03	0.44	0.35	0.21
2013	Egypt	1295	3.88	0.79	2.51	0.37	0.40	0.23
2015	Ethiopia	218	3.58	0.41	3.06	0.33	0.37	0.30
2007	Ghana	278	3.30	0.84	2.13	0.65	0.24	0.11
2013	Ghana	167	7.19	1.45	3.08	0.66	0.22	0.12
2006	Guinea	123	7.30	2.03	2.37	0.86	0.10	0.04
2006	Guatemala	262	4.65	0.86	2.81	0.42	0.39	0.19
2010	Guatemala	207	5.38	0.66	3.03	0.37	0.31	0.32
2006	Honduras	190	3.79	0.83	2.27	0.55	0.30	0.15
2007	Croatia	145	2.80	0.66	2.05	0.47	0.30	0.23
2009	Indonesia	524	4.59	1.28	2.21	0.48	0.29	0.23
2015	Indonesia	765	6.04	1.52	2.59	0.36	0.39	0.25
2014	India	2769	5.31	1.29	2.47	0.29	0.50	0.21
2011	Iraq	466	5.44	1.39	2.23	0.76	0.23	0.01
2013	Israel	135	5.48	1.37	2.12	0.44	0.40	0.16
2013	Jordan	241	6.81	1.29	3.19	0.37	0.32	0.32
2007	Kenya	392	4.08	0.58	2.61	0.29	0.38	0.33
2013	Kenya	207	5.57	1.22	3.20	0.26	0.40	0.34
2009	Laos	288	5.53	0.93	2.79	0.51	0.32	0.18
2013	Lebanon	121	5.46	1.07	2.39	0.41	0.45	0.14

(Continued)

2011	Sri Lanka	222	4.94	0.62	3.48	0.55	0.29	0.15
2013	Morocco	103	6.69	1.49	2.33	0.17	0.33	0.50
2009	Madagascar	106	5.41	0.45	4.11	0.30	0.48	0.22
2006	Mexico	798	5.29	1.34	2.56	0.49	0.31	0.20
2010	Mexico	946	5.23	1.12	2.55	0.35	0.33	0.32
2007	Mali	296	3.16	0.94	1.98	0.78	0.20	0.02
2014	Myanmar	177	5.50	0.91	2.86	0.55	0.32	0.12
2009	Mongolia	113	1.83	0.46	2.03	0.26	0.48	0.27
2007	Mozambique	274	3.38	0.50	3.74	0.62	0.31	0.06
2015	Malaysia	286	7.23	2.14	2.03	0.24	0.39	0.37
2007	Nigeria	918	5.19	1.49	2.20	0.68	0.28	0.04
2014	Nigeria	238	8.94	2.56	2.27	0.71	0.24	0.05
2006	Nicaragua	243	5.80	1.02	2.90	0.64	0.31	0.05
2013	Nepal	216	4.89	0.97	3.19	0.37	0.46	0.18
2013	Pakistan	183	9.38	2.10	2.82	0.46	0.40	0.14
2006	Panama	129	4.40	0.84	3.74	0.52	0.36	0.12
2006	Peru	232	5.48	1.07	2.66	0.38	0.42	0.20
2010	Peru	506	4.29	1.18	2.17	0.29	0.39	0.32
2009	Philippines	314	7.43	1.42	2.77	0.26	0.47	0.26
2015	Philippines	247	6.69	1.20	2.68	0.36	0.36	0.28
2006	Paraguay	127	4.18	0.50	3.31	0.42	0.50	0.09
2009	Russia	250	4.64	1.01	2.25	0.18	0.43	0.39
2012	Russia	333	5.54	0.84	3.19	0.39	0.39	0.22
2007	Senegal	250	3.77	0.96	2.08	0.77	0.16	0.07
2006	El Salvador	290	3.43	0.80	2.61	0.39	0.37	0.24
2014	Sweden	216	2.10	0.55	2.23	0.31	0.52	0.17
2013	Tunisia	252	2.77	0.64	2.28	0.22	0.42	0.36
2008	Turkey	405	4.82	0.64	3.38	0.25	0.41	0.34
2013	Turkey	231	6.10	1.11	2.84	0.35	0.43	0.22
2006	Tanzania	245	4.75	0.71	2.96	0.51	0.33	0.16
2013	Tanzania	106	3.30	0.66	2.19	0.45	0.29	0.25
2006	Uganda	290	4.29	0.42	4.04	0.61	0.31	0.08
2008	Ukraine	134	5.57	0.61	3.03	0.37	0.34	0.30
2006	Uruguay	149	3.77	0.77	2.56	0.44	0.48	0.09
2010	Uruguay	155	3.93	1.09	2.80	0.37	0.39	0.24
2009	Vietnam	541	4.21	0.75	2.79	0.14	0.41	0.45
2015	Vietnam	373	3.66	0.70	2.53	0.26	0.38	0.36
2007	South Africa	637	3.36	0.73	2.67	0.33	0.42	0.25
2007	Zambia	286	3.42	0.76	2.28	0.45	0.37	0.18
2013	Zambia	138	6.76	1.06	2.31	0.51	0.38	0.11
2011	Zimbabwe	328	5.72	1.00	2.72	0.34	0.38	0.28

Table 3.2: Industry-level summary of MRPK

This table presents industry classification of firms based on two-digit International Standard Industrial Classification (ISIC) Code defined by the United Nations Statistics Division. The column Firm # reports the number of firms in this country year. S.D. is the standard deviation of MRPK for all the firms in this country year. Median is the median MRPK in this country year. Wedge for firm *i* in industry *s* is the ratio of the firm's MRPK to the industry median MRPK. Small, Mid, and Large represents the proportion of small, mid-sized, and large firms in the country.

Panel A: Industry definitions

Industry	ISIC code	Number of firms	Percentage
Chemicals and Pharmaceuticals	24	2,052	8.89
Fabricated Metal & Machinery	28, 29	3,194	13.84
Garments	18	3,312	14.35
Manufacture of Furniture n.e.c	36	1,467	6.36
Non-Metallic & Basic Metals	25, 26, 27	2,728	11.82
Other Manufacturing		3,004	13.02
Textiles	17	1,556	6.74
Food	15	5,417	23.47
Service	45, 50, 51, 52, 55, 60, 63, 64, 72	348	1.51

Panel B: Industry summary of MRPK

Year	Industry	Firm #	S.D.	Median	Wedge	Small	Mid	Large
2006	Chemicals and Pharmaceuticals	662	4.72	1.37	2.12	0.41	0.42	0.17
2007	Chemicals and Pharmaceuticals	214	2.86	0.74	2.18	0.21	0.50	0.28
2008	Chemicals and Pharmaceuticals	49	3.46	0.87	2.37	0.43	0.41	0.16
2009	Chemicals and Pharmaceuticals	283	6.40	1.68	2.39	0.31	0.43	0.26
2010	Chemicals and Pharmaceuticals	439	5.86	1.75	2.20	0.30	0.34	0.36
2011	Chemicals and Pharmaceuticals	52	3.43	0.80	1.97	0.52	0.25	0.23
2012	Chemicals and Pharmaceuticals	30	6.02	0.84	3.24	0.40	0.43	0.17
2013	Chemicals and Pharmaceuticals	363	5.09	1.13	2.58	0.29	0.43	0.28
2014	Chemicals and Pharmaceuticals	217	4.95	1.28	2.47	0.29	0.48	0.22
2015	Chemicals and Pharmaceuticals	152	5.37	1.36	2.49	0.23	0.37	0.40
2006	Fabricated Metal & Machinery	616	5.15	0.94	2.88	0.51	0.38	0.11
2007	Fabricated Metal & Machinery	551	3.68	0.82	2.22	0.50	0.36	0.14
2008	Fabricated Metal & Machinery	95	4.13	0.58	3.63	0.26	0.35	0.39
2009	Fabricated Metal & Machinery	387	4.77	0.85	2.80	0.21	0.45	0.33
2010	Fabricated Metal & Machinery	718	3.66	0.90	2.33	0.37	0.40	0.22
2011	Fabricated Metal & Machinery	74	5.17	1.45	1.64	0.69	0.22	0.09
2012	Fabricated Metal & Machinery	64	4.55	1.07	2.59	0.27	0.48	0.25
2013	Fabricated Metal & Machinery	426	5.42	1.02	2.54	0.48	0.37	0.15
2014	Fabricated Metal & Machinery	726	4.56	1.00	2.44	0.34	0.50	0.16
2015	Fabricated Metal & Machinery	175	6.06	1.07	2.33	0.31	0.42	0.26
2006	Garments	859	5.35	1.27	2.41	0.54	0.32	0.15
2007	Garments	872	3.40	0.98	2.11	0.73	0.19	0.08
2008	Garments	81	3.93	0.61	2.85	0.31	0.44	0.25
2009	Garments	456	3.24	0.90	2.37	0.28	0.39	0.33
2010	Garments	407	4.21	1.31	2.13	0.34	0.40	0.26
2011	Garments	143	4.04	0.52	3.76	0.50	0.35	0.15
2013	Garments	553	5.09	0.99	2.37	0.28	0.27	0.45
2014	Garments	157	4.66	1.86	1.99	0.25	0.40	0.34
2015	Garments	297	5.72	1.10	2.73	0.36	0.34	0.30
2006	Manufacture of Furniture n.e.c	301	3.50	0.66	3.20	0.71	0.24	0.05
2007	Manufacture of Furniture n.e.c	394	4.35	0.95	2.18	0.70	0.25	0.04
2009	Manufacture of Furniture n.e.c	192	4.12	0.71	2.41	0.39	0.44	0.17
2010	Manufacture of Furniture n.e.c	147	5.97	1.86	2.10	0.37	0.33	0.31
2011	Manufacture of Furniture n.e.c	41	2.33	0.87	2.76	0.80	0.17	0.02

(Continued)								
2012	Manufacture of Furniture n.e.c	27	7.62	1.07	4.27	0.52	0.26	0.22
2013	Manufacture of Furniture n.e.c	314	5.45	1.02	2.35	0.57	0.34	0.09
2014	Manufacture of Furniture n.e.c	92	8.55	0.95	2.45	0.51	0.42	0.07
2015	Manufacture of Furniture n.e.c	64	2.19	0.67	1.69	0.45	0.28	0.27
2006	Non-Metallic & Basic Metals	548	4.24	0.76	2.82	0.53	0.33	0.14
2007	Non-Metallic & Basic Metals	239	4.47	1.08	2.20	0.42	0.38	0.20
2008	Non-Metallic & Basic Metals	66	5.32	0.59	3.48	0.27	0.48	0.24
2009	Non-Metallic & Basic Metals	450	5.44	0.93	2.47	0.28	0.44	0.28
2010	Non-Metallic & Basic Metals	487	4.50	0.72	2.69	0.27	0.35	0.38
2011	Non-Metallic & Basic Metals	225	7.21	1.92	2.60	0.65	0.27	0.08
2012	Non-Metallic & Basic Metals	49	2.75	0.82	2.26	0.49	0.31	0.20
2013	Non-Metallic & Basic Metals	680	5.95	0.89	3.15	0.33	0.44	0.23
2014	Non-Metallic & Basic Metals	827	5.74	1.27	2.53	0.36	0.45	0.19
2015	Non-Metallic & Basic Metals	452	6.00	1.06	2.60	0.31	0.42	0.26
2006	Other Manufacturing	508	4.50	0.68	2.77	0.50	0.34	0.16
2007	Other Manufacturing	394	4.59	0.75	2.89	0.44	0.34	0.21
2008	Other Manufacturing	18	4.41	0.31	2.65	0.50	0.28	0.22
2009	Other Manufacturing	516	5.85	0.83	3.22	0.32	0.41	0.27
2010	Other Manufacturing	337	4.36	0.86	2.91	0.32	0.37	0.31
2011	Other Manufacturing	106	4.85	0.67	3.07	0.61	0.29	0.09
2012	Other Manufacturing	126	4.76	0.68	3.41	0.40	0.40	0.20
2013	Other Manufacturing	795	4.46	0.79	2.73	0.40	0.38	0.22
2014	Other Manufacturing	774	5.51	1.10	2.65	0.32	0.51	0.18
2015	Other Manufacturing	288	6.25	1.15	2.24	0.28	0.41	0.31
2008	Service Coarse	15	3.16	1.56	1.43	0.27	0.33	0.40
2009	Service Coarse	206	5.43	1.12	2.29	0.60	0.29	0.11
2010	Service Coarse	27	2.36	0.76	1.73	0.56	0.33	0.11
2011	Service Coarse	10	6.41	3.51	2.53	0.50	0.50	
2012	Service Coarse	7	14.60	1.49	6.90	0.57	0.29	0.14
2013	Service Coarse	151	7.43	1.59	2.49	0.43	0.43	0.14
2014	Service Coarse	23	9.97	3.79	2.48	0.70	0.22	0.09
2006	Textiles	534	4.02	0.88	2.57	0.45	0.38	0.17
2007	Textiles	76	1.18	0.53	1.73	0.45	0.26	0.29
2008	Textiles	96	5.92	0.58	3.66	0.14	0.36	0.50
2009	Textiles	290	3.84	0.94	2.60	0.38	0.40	0.21
2010	Textiles	230	2.07	0.63	2.24	0.34	0.39	0.27
2011	Textiles	28	3.24	0.78	2.51	0.50	0.25	0.25
2013	Textiles	398	5.13	0.55	2.58	0.27	0.41	0.33
2014	Textiles	241	5.93	1.80	2.23	0.23	0.48	0.29
2015	Textiles	114	5.90	0.87	4.00	0.40	0.32	0.27
2006	food	1323	4.21	0.78	2.69	0.45	0.37	0.19
2007	food	1107	4.23	0.86	2.71	0.47	0.37	0.16
2008	food	115	6.21	0.73	3.59	0.31	0.37	0.32
2009	food	449	4.57	0.89	2.62	0.36	0.37	0.27
2010	food	747	4.42	0.98	2.44	0.31	0.38	0.31
2011	food	337	5.27	1.19	2.44	0.52	0.32	0.16
2012	food	25	7.19	1.15	3.41	0.28	0.32	0.40
2013	food	808	4.85	1.01	2.43	0.35	0.39	0.26
2014	food	343	6.23	1.36	2.32	0.41	0.44	0.15
2015	food	342	5.34	1.04	2.48	0.30	0.37	0.32

Table 3.3: Variable summaries

This table reports summaries for the variables that are determinants of return to capital.

	Number	Mean	Median	Std. Dev.
Panel A: Measures for access to finance				
Bank account	26424	0.856	1	0.351
Line of credit	27420	0.404	0	0.491
Fix asset finance	12353	0.234	0	0.366
Work capital finance	25838	0.155	0	0.259
Panel B: Measures for bureaucracy				
Time on government	26866	9.711	3	17.010
Time on tax	27301	1.843	1	3.017
Informal payment (%)	19132	1.062	0	3.318
Panel C: Ownership				
Government	27634	0.010	0	0.101
Foreign	27634	0.091	0	0.288
Domestic	27634	0.892	1	0.311
Panel D: Firm characteristics				
Age	27629	20.992	16	15.903
Employment	27634	114.024	26	412.963
Exporter	27599	0.143	0	0.350
External audit	27464	0.519	1	0.500
Female	26548	0.298	0	0.457

Table 3.4: Univariate analysis of return to capital

This table presents univariate analysis results for return to capital. In each panel, I report the statistics for the logarithm of ARPK. I also report the statistics from paired t-tests for the differences.

Panel A: Bank account

	No	Yes	Diff
Mean	1.066	0.899	0.167
Std. Err.	0.022	0.009	0.023
N	3,811	22,613	t=7.135

Panel B: Credit line

	No	Yes	
Mean	0.978	0.883	0.095
Std. Err.	0.01	0.012	0.016
N	16,329	11,091	t=5.886

Panel C: Fix capital fin. by inst.

	Low	High	
Mean	0.996	0.839	0.156
Std. Err.	0.015	0.025	0.029
N	8,060	2,619	t=5.393

Panel D: Work capital fin. by inst.

	Low	High	
Mean	0.953	0.942	0.01
Std. Err.	0.01	0.016	0.019
N	16,387	6,244	t=0.549

Panel E: Time spent on gov

	Low	High	Diff
Mean	1.004	0.885	0.119
Std. Err.	0.014	0.017	0.022
N	8,483	5,932	t= 5.315

Panel F: Time spent on tax

	Low	High	
Mean	0.982	0.907	0.075
Std. Err.	0.012	0.017	0.02
N	11,532	5,982	t=3.598

Panel G: Informal payment

	Low	High	
Mean	0.965	0.875	0.09
Std. Err.	0.01	0.022	0.024
N	15,566	3,566	t=3.649

Table 3.5: Determinants of misallocation: Firm-level evidence

This table presents regression results for the determinants of capital misallocation. The dependent variable is *log(ARPK)*. P-values calculated based on heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate significant at the 1 percent, 5 percent, and 10 percent levels.

VARIABLES	(1)	(2)	(3)	(4)	(5)
Bank Account	-0.168***	-0.188***		-0.169***	-0.177***
	(0.000)	(0.000)		(0.000)	(0.003)
Credit Line	-0.076***	-0.126***		-0.106***	-0.151***
	(0.000)	(0.000)		(0.000)	(0.000)
Fix Asset Finance		-0.101**			-0.147***
		(0.014)			(0.003)
Work Capital Finance	0.056	0.073		0.069	0.099
	(0.155)	(0.196)		(0.153)	(0.156)
Time on government			-0.002***	-0.002***	-0.001
			(0.001)	(0.003)	(0.494)
Time on tax			-0.009***	-0.012***	-0.011**
			(0.006)	(0.001)	(0.027)
Informal payment			-0.008**	-0.009**	-0.012**
			(0.023)	(0.014)	(0.013)
Log(age)	-0.050***	-0.059***	-0.058***	-0.046***	-0.085***
	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)
Log(employment)	0.068***	0.059***	0.072***	0.088***	0.065***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exporter	0.030	-0.019	0.035	0.041	0.019
	(0.281)	(0.613)	(0.277)	(0.219)	(0.664)
External Certificate	-0.046**	-0.012	-0.094***	-0.055**	-0.031
	(0.024)	(0.702)	(0.000)	(0.027)	(0.408)
Female	0.033*	0.064**	0.035	0.037	0.078**
	(0.096)	(0.021)	(0.127)	(0.126)	(0.022)
Government	0.087	0.156	0.088	0.043	0.274*
	(0.349)	(0.189)	(0.451)	(0.713)	(0.083)
Foreign	0.048	0.020	0.042	0.019	-0.049
	(0.141)	(0.658)	(0.268)	(0.631)	(0.345)
Constant	1.250***	1.664***	1.100***	1.168***	1.612***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	23,397	10,399	17,986	16,233	7,088
R-squared	0.061	0.069	0.072	0.069	0.088

Table 3.6: Asymmetric effects on misallocation: Firm-level evidence

This table presents quantile regression results for the determinants of capital misallocation. The dependent variable is *log(ARPK)* at its 10th, 25th, 50th, 75th, and 90th percentiles for columns (1) to (5), respectively. P-values calculated based on heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate significant at the 1 percent, 5 percent, and 10 percent levels.

VARIABLES	(1) P10	(2) P25	(3) P50	(4) P75	(5) P90
Bank Account	-0.140***	-0.128***	-0.145***	-0.228***	-0.286***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
Credit Line	-0.039	-0.077***	-0.078**	-0.161***	-0.235***
	(0.134)	(0.010)	(0.016)	(0.000)	(0.000)
Work Capital Finance	0.037	0.026	0.059	0.092	0.228***
	(0.540)	(0.592)	(0.317)	(0.179)	(0.001)
Time on government	-0.004***	-0.003***	-0.003***	-0.001	-0.002**
	(0.000)	(0.000)	(0.001)	(0.162)	(0.020)
Time on tax	-0.017***	-0.015***	-0.010**	-0.008	-0.003
	(0.000)	(0.000)	(0.028)	(0.111)	(0.502)
Informal payment	-0.007***	-0.011***	-0.010**	-0.009**	-0.007
	(0.001)	(0.001)	(0.047)	(0.014)	(0.136)
Log(age)	-0.049***	-0.057***	-0.064***	-0.056***	-0.003
	(0.001)	(0.000)	(0.000)	(0.006)	(0.879)
Log(employment)	0.056***	0.058***	0.094***	0.109***	0.135***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exporter	0.043	0.061*	0.050	0.002	0.013
	(0.142)	(0.077)	(0.211)	(0.961)	(0.831)
External Certificate	-0.049**	-0.070**	-0.067**	-0.049	0.005
	(0.041)	(0.015)	(0.028)	(0.144)	(0.879)
Female	-0.015	-0.011	0.011	0.111***	0.124***
	(0.533)	(0.700)	(0.689)	(0.001)	(0.000)
Government	-0.020	0.026	-0.050	0.067	0.009
	(0.936)	(0.588)	(0.736)	(0.777)	(0.979)
Foreign	-0.063	-0.018	0.046	0.012	0.038
	(0.207)	(0.688)	(0.355)	(0.834)	(0.596)
Constant	-0.285***	0.158	0.934***	2.158***	2.943***
	(0.001)	(0.172)	(0.000)	(0.000)	(0.000)
Industry FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	16,233	16,233	16,233	16,233	16,233
Pseudo R-squared	0.0439	0.0425	0.0410	0.0441	0.0454

Table 3.7: Determinants of misallocation: Industry-level evidence

This table presents regression results for the industry-level determinants of capital misallocation. The dependent variable is the standard deviation of firm level *log(ARPK)* within an industry in a country in a year. All the explanatory variables are also standard deviations of their firm level values within an industry in a country in a year. P-values calculated based on heteroskedasticity robust standard errors are in parentheses. ***, **, and * indicate significant at the 1 percent, 5 percent, and 10 percent levels.

VARIABLES	(1)	(2)	(3)	(4)	(5)
S.D. of Bank Account	0.129*	0.133*		0.105	0.111
	(0.057)	(0.058)		(0.130)	(0.123)
S.D. of Credit Line	-0.042	-0.012		-0.026	-0.002
	(0.744)	(0.926)		(0.841)	(0.989)
S.D. of Fix Asset Finance		-0.001			-0.001
		(0.195)			(0.224)
S.D. of Work Capital Finance	0.001	0.002		0.000	0.001
	(0.641)	(0.298)		(0.982)	(0.610)
S.D. of Time on government			0.002*	0.002*	0.003**
			(0.076)	(0.089)	(0.030)
S.D. of Time on tax			-0.009	-0.011	-0.011
			(0.273)	(0.216)	(0.204)
S.D. of Informal payment			0.014***	0.012**	0.014**
			(0.005)	(0.025)	(0.011)
S.D. of Log(age)	-0.056	-0.063	-0.077	-0.075	-0.090
	(0.524)	(0.482)	(0.388)	(0.413)	(0.334)
S.D. of Log(employment)	0.005	0.009	0.027	0.023	0.032
	(0.915)	(0.856)	(0.558)	(0.638)	(0.513)
S.D. of Exporter	-0.046	-0.056	-0.060	-0.053	-0.063
	(0.560)	(0.482)	(0.461)	(0.526)	(0.451)
S.D. of External Certificate	0.100	0.103	0.105	0.098	0.096
	(0.342)	(0.331)	(0.317)	(0.355)	(0.366)
S.D. of Female	-0.023	0.044	-0.115	-0.077	-0.002
	(0.831)	(0.699)	(0.263)	(0.511)	(0.986)
S.D. of Government	0.199*	0.174	0.161	0.154	0.135
	(0.090)	(0.149)	(0.159)	(0.182)	(0.245)
S.D. of Foreign	0.078	0.111	0.083	0.086	0.115
	(0.318)	(0.166)	(0.297)	(0.309)	(0.182)
Constant	1.219***	1.182***	1.230***	1.210***	1.163***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	485	477	495	469	461
R-squared	0.029	0.034	0.054	0.056	0.070