Is Lobbying Valuable?*

Yoonseok Lee
Syracuse University

William F. Lincoln
Claremont McKenna College

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Abstract

In this study, we consider how financial markets value lobbying by firms. Across descriptive statistics, fixed effects regressions, and our nonparametric econometric approach, we find a negative relationship between lobbying and firm value. New to the literature on this topic, we separate out the effects of selection and treatment, given that lobbying firms are systematically different than others.

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*Lee: Department of Economics, Syracuse University, 426 Eggers Hall, Syracuse, NY 13244, Email: ylee41@maxwell.syr.edu; Lincoln: Robert Day School, Claremont McKenna College, 500 East Ninth Street, Claremont, CA 91711, Email: wlincoln@cmc.edu. We would like to thank George Batta, Andrei Levchenko, Cameron Shelton, and Josh Rosett for helpful comments and suggestions. Financial support from the Lowe Institute of Political Economy is gratefully acknowledged. Grace Lu and Daniel Wang provided superb research assistance. Any errors are entirely our own.

1 Introduction

There exists a long literature looking at the effects of political participation by firms and special interests more generally on policy outcomes. The upstream question of what a firm's decisions to engage in political activity in the first place is less well understood. In this study we consider one such motivation, which has to do with how stock markets value firm political behavior. We focus on one such activity, lobbying the federal government for a favorable disposition towards the firm's interests. Our results suggest something that is perhaps quite surprising: lobbying is associated with a negative effect on firm value. This is found in descriptive statistics, a set of fixed effects regressions, and a nonparametric set of Manski-style bounds estimations that explicitly accounts for selection into lobbying. These results contrast with others in the literature on political activity more generally. We hope that our work contributes to a better understanding of the political process and the forces underlying policy outcomes.

We begin by documenting a number of new stylized facts about firm lobby behavior over the period 1998-2015. We match data on lobbying expenditures made available through the Senate Office of Public Records to the operations of publicly traded firms that are headquartered in the United States in Compustat. Like many prior studies we find that lobbying firms are larger than other firms and this is true even in the year in which they begin to lobby, suggesting that firms might select nonrandomly into lobbying. Lobbying firms are also more profitable even conditioning on size, have lower Tobin's Q, and have higher earnings to price ratios.

To get a preliminary sense of whether the relationships that we find in the descriptive statistics are robust to a series of controls, we estimate a set of regression specifications. These estimations consistently yield negative effects of lobbying on Tobin's Q and positive effects on the earnings to price ratio. These results are consistent with each other, in that a higher earnings to price ratio should be associated with a lower value of Tobin's Q. These results hold true when accounting for firm and year fixed effects, controlling for a wide variety of time varying firm characteristics, or both. These estimations use estimation approaches that are commonly used in the asset pricing literature. They do not, however, explicitly model selection into lobbying. At the same time, wknow from the simple descriptive statistics in Table 1 that lobbying firms have very distinctive characteristics. More generally, ignoring the difference between selection and treatment effects has been an important issue in the asset pricing literature.

We therefore turn to a different estimation approach that explicitly accounts for a selection process into lobbying. This is able to separate out the effects of selection and treatment and allows us to identify the true treatment effects from lobbying. Different from propensity score matching methods, our approach accounts for selection on both observable and unobservable factors that determine firm value. It is also nonparametric in nature, which gives it significant advantages over other types of selection models which often rely on very strong functional form assumptions. This builds on the work of Jun, Lee, and Shin (2016) and extends it to unbalanced panels, dramatically increasing the sample size as well as avoiding different sample selection bias problems that would come from needing to balance the panel. Even after accounting for selection, there is a negative effect of lobbying on firms' Tobin's Q and a positive effect on the earnings price ratio, which are consistent with both each other as well as the regression results in the previous section.

The next section describes the literature to date on this question. Section 3 details the characteristics of our data and documents a number of new stylized facts about the characteristics of publicly traded firms that lobby relative to others. In Section 4 we present a set of regression results that control for a wide range of factors but do not explicitly model selection into lobbying. In Section 5 we detail our main econometric approach and present the results from this estimator. We conclude with a discussion of further open research questions in Section 6.

2 Literature Review

There is an expansive and growing literature on the relationship between corporate political activity and firm stock value, and a majority point to the benefits that political connectedness has on firms. Perhaps one of the most important contributors to the discussion are Cooper, Gulen, and Ovtchinnikov (2010). Utilizing a rich dataset of 1,930 firms and 819,000 contribution records between 1979 to 2004, the authors ran panel regression of annual abnormal stock returns on lagged contribution indexes (contribution strength, ability, and power) and other firm characteristics. The results show a statistically significant positive relationship between firms that contribute to political candidates and future abnormal returns. Furthermore, the contribution indexes indicate a stronger relationship for firms with longer relationships with home and more powerful candidates. Then, the authors find that both contributions to the House and Senate exhibit positive relationships with abnormal returns, and when controlling for contributions to Republican or Democratic candidates, they find an effect for Democrats but no effect for Republicans. Ultimately, the article goes beyond event-based measures of political connectedness and documents the strong correlation between political contributions and future stock returns. On the contrary, Hadani and Schuler (2013) observe a negative relationship between corporate political activity (CPA) and financial performance. With a similarly rich dataset of 1,114 firms from the SP 1500 between 1998 and 2008, the researchers analyze how 1) corporate political investments (lobbying, PAC contributions, soft money contributions), 2) cumulative CPI, and 3) board political service (directors with prior public service) affect market value. The regression analyses reveal that all forms of CPA are negatively associated with firm market value. These findings challenge much of the scholarship that exists with the topic at hand, demonstrating that CPA may not have a positive association with firm value.

Most research papers that consider the intersection between corporate political activity and firm stock value touch upon two types: 1) political connections and 2) political contributions. A couple papers conduct research on both types. Goldman, Rocholl, and So (2009) find that firms connected to the Republican Party through both Board Members and political donations increased in value after a Republican won the 2000 Presidential elections. Similarly, Knight (2006) explores a sample of 70 firms during the Bush and Gore 2000 U.S. Presidential Election. Bush-favored firms were worth more than Gore-favored firms. Then, when exploring political contributions, the authors find that contributions to Bush are associated with a significant increase in market value under a Bush administration.

The following papers examine the role of political connectedness in firm stock value. Faccio (2006) examine firms in 47 countries and measuring political connectedness through shareholders and top officers connected with governments. She finds that stock prices increase in response to announcements of political connections. Furthermore, Hillman, Zardkoohi, and Bierman (1999) finds that personal service (firms with representatives that serve in a political capacity) positively affects firm value while Faccio and Parsley (2009) find that there is a decline in market value for firms connected to a legislator that has passed away. Thus, many papers have revealed the positive relationship between firm political connections and firm stock value.

There has also been an expansive literature on how political contributions have a positive association with market value. Roberts (1990) finds that after the death of Senator Henry Jackson, firms that made campaign contributions and donations decreased in firm value. Similarly, Jayachandran (2006) explores the effect on firms from Senator Jefford's decision to leave, surrendering Senate control to the Democratic Party. As a result, firms that contributed to the Republican Party decreased in value but firms that contributed to the Democratic Party increased in value. Meanwhile, Stratmann and Verret (2015) show that firms with active political spending experienced positive abnormal returns after the Citizens United decision. Huber and Kirchler (2011) also find that companies experienced abnormal positive post-election returns when 1) a higher percentage of contributions to the eventual winner and 2) with a higher total contribution given.

Hill, Kelly, Lockhard, Van Ness (2013) however explore the allocation between firm lobbying and cam-

paign contributions. They find the following results: (1) stocks of lobbying firms significantly outperformed non-lobbying firms (2) the positive effect of campaigns is reduced for firms that also lobby and vice versa: lobbying and campaign contributions are substitutes and (3) ultimately, value is associated with both contributions and lobbying. More scholarship explains the positive relationship between lobbying and firm value. Kim (2008) finds that lobbying firms' equity returns tend to outperform the market average while Chen, Parsley, and Yang (2015) discover that only firms with higher lobbying intensities experience excess returns. Borisov, Goldman, and Gupta (2016) also notice that limiting lobbying for firms negatively affects the value for firms that have lobbied previously.

Much of the past scholarship has found a positive relationship between corporate political activity (political connections, campaign contributions, donations, lobbying expenditures) and firm stock value. However, past studies have also found other firm benefits that arise from firm lobbying or firm political connections. First, Lux, Crook, and Woehr (2011) find that CPA is positively related with firm performance and Gounopoulos, Kallias, Kallias, and Tzeremes (2017) find that lobbying and PAC expenditures are correlated with less underpricing on IPOs for firms. Meanwhile, Goldman, Rochol, and So (2013) and Brockman, Rui, and Zhou (2013) findings show the benefits of political connectedness. The first paper found that companies with boards connected to a winning party have more procurement contracts after an election, and the second paper discovers that politically connected firms' post-merger performance outperform unconnected firms. Faccio, Masulis, and McConnell (2006) contributes to this type of literature, as the likelihood of government bailouts for financially distressed firms increases for firms that have a top officer or shareholder in a government position. Furthermore, Yu and Yu (2011) learn that lobbying firms tend not to be detected of fraud.

Much of the literature discussed thus far is focused on research conducted in the United States. However, a lot of international scholarship has also covered the relationship between corporate political activity and firm value. For instance, Claessens, Feijen, and Laeven (2008) studies Brazilian firms that provided contributions to elected deputies. These firms experienced higher stock returns than firms that did not do so around the 1998 and 2002 elections. Similarly, Fisman (2001) finds that Indonesian firms connected to President Suharto decreased in value following unfavorable announcements. Using a sample of Chinese IPOs, Chen, Guan, Zhang, and Zhao (2017) find that underwriters with political connections increase the likelihood of client IPO approval. While the writers also find a premium charge for underwriting fees, there are no significant differences in the underpricing of IPO deals. On the other hand, Fan, Wong, and Zhang (2007) find a negative relationship between political connections and stock returns. Based on three-year post-IPO returns on firms with politically connected CEOs in China, politically connected firms tend to underperform those without political connections. This is one of the few international research papers that find a negative relationship between corporate political connections and firm stock value.

That said, the discussion naturally shifts to the papers that conversely found either no effect, or a negative effect, between corporate political activity and firm value. Ansolabehere, Snyder, and Ueda (2004) do not find a difference in firm value between those that gave or did not give donations for five events surrounding the Bipartisan Campaign Reform Act, which regulated political campaign financing. Similarly, Fisman, Fisman, Galef, Khurana, and Wang (2012) find no effect on the stock prices for firms with personal ties to Richard Cheney.

While almost all the papers that we have covered highlight the positive effect that corporate political activity has on different aspects of the firm, a lot of scholarship finds the similarly negative relationship between CPA and firm value like Hadani and Schuler (2013). Papers written by Cao, Fernando, Tripathy, and Upadhyay (2018) find that corporate lobbying is negatively associated with firm performance and Hillman (2005) observes mixed support for connected firms and firm performance. Furthermore, both Coates (2010) finds that political activity is strongly negatively correlated with firm value while Aggarwal, Meschke, and

Wang (2012) observe that corporate political donations are negatively correlated with future excess returns. Ultimately however, the relationship between CPA and firm value may not be as simple as a one-sided negative or positive relationship. For instance, Chen, Li, Luo, Zhang (2017) construct a political connection index, and find a negative relationship between political connectedness and firm value for state-owned enterprises (SOEs), but a positive relationship for non-SOEs. Mathur and Singh (2011) also offer comprehensive literature review on past scholarship done on corporate political strategies and finance.

3 Data and Stylized Facts

3.1 Data

We combine data from a number of different sources to perform our estimations. The primary source of information on firms' lobbying expenditures comes from records maintained by the Senate Office of Public Records (SOPR) that were cleaned and organized by the non-profit group the Center for Responsive Politics. These data are made available due to the Lobbying Disclosure Act of 1995 and were initially stored in large numbers of PDF files. The information from these documents can be scraped from the, however, and this has been the source of much of the analysis of lobbying behavior over recent years. On each form, every individual who is registered as a lobbyist is required to disclose the source of their compensation, the amount that they were paid, and general issues on which they lobbied.

Like many studies that consider the operations of financial markets, our main source of information on firm characteristics and financial performance comes from Compustat. To focus the analysis on businesses that operate under the same regulations for lobbying, we limit the sample on firms that are both incorporated and headquartered in the United States. Foreign firms have a different set of rules. We restrict the sample to firms with full information on sales, earnings, firm name, NAICS industry code, and the variables that we need in order to construct a measure of Tobin's Q. We also drop firm-year observations with zero or negative sales to screen out firms that are idling as well as firms that ever report negative employment. Lastly, we drop observations for firms with zero total assets in order to construct Tobin's Q. None of these restrictions affect a large number of observations.

In order to construct our main data set, we also need to make a few restrictions that are not standard in the literature but will allow us to perform our main econometric estimations. This approach extends the estimator developed in Jun, Lee, and Shin (2016) to unbalanced panel data sets. For each firm, we limit the observations to those in the longest stretch of years in which it is in the data. Thus, if a firm is listed in Compustat from 1998-2010 and then 2014-2015, we keep the observations over 1998-2010 but discard those in the later years. This keeps more than 93 percent of the original data and allows us to avoid having to fully balance the panel, which is a common approach using data from Compustat. One of the main reasons that this drops so few observations is that it is not very common to list on a stock exchange, delist, and then list back again. A much more common issue in our case is that there is missing data for one of our main variables and this creates a gap in the data set which limits our ability to observe the firm for as long of a time period. In the appendix, we demonstrate that the characteristics of our sample are quite similar to those without this restriction. The results from our regression analyses are quite comparable using the two different samples as well. To group firms together into industry groupings that were large enough to make such an analysis feasible we take a number of steps. First, we group the four firms in agriculture into the same one digit NAICS code with firms in the Mining and Utilities industries. Second, we combine firms in NAICS one digit industries 6-8 together to focus more broadly on the service sector. Third, we include

conglomerate firms with two digit NAICS code 99 like General Electric with the manufacturing sector as this is often where much of their operations are focused.

Connecting the data on lobbying to Compustat involved a lengthy set of steps. Due to the fact that the lobbying data is scraped from thousands of PDFs, the name of the organization that compensates each lobbyist often differs from file to file. There are thus often several names in the data for a given firm. In order to get the best match possible, we pursued a multistep process. In the first step, we used software from OpenRefine.org to identify potential matches between the firms in the Compustat and lobbying databases. This software was originally developed by Google and then posted online freely as open source software. After some experimentation with different threshold levels we found the optimal balance between type I and type II errors at this stage to be 80 percent. In the second step, we had a research assistant manually go through the two data sets and identify matches in the lobbying data to each firm in Compustat. This helped improve the match significantly as name matching software in general often has trouble identifying matches that would be clear manually. The match between "International Business Machines" and "IBM" is an example.

We took the union of these sets of potential matches as our starting point. We then had several research assistants manually go through the data and determine whether a given pair was actually a match. This involved a substantial amount of work and used a wide range of sources on businesses such as Hoover's. As a quality check, for over one thousand pairs we had more than one research assistant determine whether they were matches. The level of agreement was quite high, with a rate of agreement of 94 percent. In these cases of disagreement, the ultimate determination was made by the author. There is also a correlation between lobbying and higher levels of market capitalization, profitability, and earnings. Lobbying firms have a higher market capitalization value. It is evident from the results that lobbying firms tend to have higher levels of profitability in comparison to non-lobbying firms. Another striking feature is that lobbying firms on average generate 787 million dollars in earnings compared to non-lobbying firms that generate 38 million of dollars.

3.2 Stylized Facts

We detail the basic characteristics of the firms in our sample in Table 1. The values generated offer insight into how lobbying impacts a firm's value. Column (1) begins by presenting the estimates for all firms. In columns (2) and (3) we split the results across firms that lobby and do not. This is done at the firm-year level, so that a given firm may appear in both columns if it switches status. In the appendix, we present these results using the distinction of whether the firm ever lobbied in the sample and some to similar conclusions. Like much of the literature on lobbying to date has established, lobbying firms are significantly larger along almost every metric, including sales, employment, assets, and market capitalization.

Considering our main dependent variables in our econometric estimations, lobbying firms have a higher earnings-price ratio. They also have a lower Tobin's Q using our main measure, which is denoted by M1, or our alternate measure, denoted by M2. As the Q value rises, a firm's stock becomes more expensive than the replacement cost of its assets. Lobbying firms also have lower levels of employment, assets, R&D, and debt relative to sales. Thus, while lobbying firms tend to be larger, once adjusting for firm size we still still significant differences between the two different types of firms.

In the appendix we present a number of firm characteristics for all, non-lobbying, and lobbying firms by industry. These three tables compare assets, market capitalization, profitability, the earnings-price ratio, and Tobin's Q (M1) for firms across the agriculture and mining, manufacturing, wholesale and retail, information and finance, and services industries. Lobbying firms in the agriculture and mining industry have higher levels of assets. On average, they generate 12,138 million in revenue in comparison to non-lobbying firms that yield 2,224 million in revenue. The difference in market capitalization is significant with lobbying firms generating

Table 1: Firm Characteristics

	All Firms	Non-Lobbying Firms	Lobbying Firms
Market Capitalization ($m)	2,996	1,268	15,315
	(14,828)	(5,753)	(37,124)
Profitability	0.11	0.08	0.28
	(25.41)	(27.13)	(0.30)
Earnings ($m)	130	38	788
	(1,116)	(751)	(2,369)
Earnings-Price Ratio	-0.06	-0.07	0.02
	(0.25)	(0.26)	(0.14)
Tobin's Q (M1)	2.73	2.85	1.85
	(3.34)	(3.51)	(1.31)
Tobin's Q (M2)	2.29	2.45	1.28
	(3.69)	(3.91)	(1.34)
Relative Employment	0.03	0.03	0.01
	(0.66)	(0.71)	(0.02)
Relative Assets	17	19	4
	(446)	(477)	(62)
Relative R&D Expenditures	3.20	3.64	0.19
	(145.06)	(155.39)	(4.23)
Relative Earnings	-10.00	-11.434	-0.31
	(253.03)	(271.04)	(7.91)
Relative Debt	2.63	2.77	1.70
	(98.95)	(103.74)	(56.81)

Notes: Estimations consider firms over the 1998-2015 time period. While there is some variation in the number of observations across the different variables due to missing values, on our main dependent variables of the earnings to price ratio and the first measure of Tobin's W, the total number of observations is 50,027, the number for firms that do not lobby is 43,872, and the number for firms that lobby is 6,155.

more than four times the amount of non-lobbying firms. Lobbying firms in this industry also have higher levels of profitability.

When looking at the manufacturing industry, we see similar results. Lobbying firms have higher levels of assets and market capitalization. The difference in these two is even more astounding; lobbying firms have appropriately eighteen times as many assets and nearly twenty-two times as much market capitalization. An interesting stylized fact is that non-lobbying firms have higher levels of profitability. The remaining results are consistent with those we see in the agriculture and mining industry: the earnings-price ratio is higher for lobbying firms and the Tobin's Q value is lower for lobbying firms. Lobbying firms in the wholesale and retail industry have greater amounts of assets and market capitalization. However, lobbying firms have lower levels of profitability. Lobbying firms have a higher earnings-price ratio and a lower value of Tobin's Q. Lobbying in the information and finance industry is also related to a firm's value. It results in nearly fourteen the amount of assets, nearly twenty-two the amount of market capitalization revenue, higher levels of profitability, larger earnings-price ratio, and a lower Tobin's Q ratio. The results for the services industry are consistent with the manufacturing industry.

The results are consistent across the five industries: lobbying firms have higher levels of assets, market capitalization, and an earnings-price ratio. Lobbying firms have lower levels of Tobin's Q (M1). The only difference remains in the magnitudes. For example, lobbying firms in the services industry have about five times the amount of assets as non-lobbying firms. However, in the information and finance industry, lobbying firms generate nearly fourteen times the amount of assets as non-lobbying firms. When looking for how much of a disparity exists between lobbying and non-lobbying firms, results differ depending on the industry and firm characteristic in question. Another noteworthy stylized fact is lobbying firms have a higher profitability than non-lobbying firms in two of the five industries: agriculture and mining, information and finance. However, in the manufacturing, wholesale and retail, and services industry, profitability remains lower for lobbying firms.

4 Panel Estimations

Here we consider specifications of the form:

$$value_{it} = \delta_0 + \delta_1 \cdot lobbying_{it} + X_{it}\beta + \mu_i + \mu_t + \varepsilon_{it}. \tag{1}$$

Here $value_{it}$ is a measure of firm i's value in year t, $lobbying_{it}$ is a measure of the firm's lobbying expenditures, X_{it} refers to are a bevy of firm specific control variables that vary over time, μ_i are firm fixed effects, μ_t are year fixed effects, and ε_{it} is the error term.

Table 2 examines the connection between lobbying and the earnings-price ratio. In the first column, we simply regress the earnings-price ratio against an indicator function for lobbying, finding a positive and statistically significant coefficient. In column (2) we add a bevy of additional controls in the spirit of Fillat and Garetto (2015). When examining the main coefficient, lobbying raises the earnings-price ratio by a factor of .0678, roughly equivalent in magnitude to the average of the variable. Sales and employment are both positively and statistically significant. When we add fixed effects, however, the effect becomes small and statistically indistinguishable from zero. This is likely at least in part due to the fact that lobbying behavior is highly persistent, which reduces the amount of identifying variation, particularly in a fixed effects regression.

Tables 3 and 4 present the same set of estimations, considering Tobin's Q as the dependent variable. In Table 3 we consider our main measure of Tobin's Q (M1) whereas in Table 4 we consider the alternative measure, which we refer to as M2. These two variables are highly correlated in our sample, despite using

Table 2: Lobbying and the Earnings-Price Ratio

	(1)	(2)	(3)	(4)
Lobbying Indicator	0.0916	0.0678	0.0055	0.0023
	(0.0034)	(0.0035)	(0.0052)	(0.0051)
Sales		0.0008		0.0013
		(0.0002)		(0.0004)
Employment		0.1230		0.2001
		(0.0359)		(0.1343)
Assets		0.0000		-0.0001
		(0.0000)		(0.0001)
Relative Debt		-0.0379		-0.0135
		(0.0167)		(0.0195)
Relative Capital Expenditures		0.0941		0.0220
		(0.0405)		(0.0393)
Relative Earnings		0.0884		0.0239
		(0.0067)		(0.0072)
Relative R&D Expenditures		0.0633		0.0171
		(0.0154)		(0.0154)
R^2	0.01	0.02	0.46	0.45
Firm Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes

Notes: Estimations consider firms over the 1998-2015 time period. All coefficients and standard errors besides those associated with the lobbying indicator have been multiplied by 1000 for the purposes of presentation.

Table 3: Lobbying and the Tobin's Q (M1)

	(1)	(2)	(3)	(4)
Lobbying Indicator	-0.9948	-0.5059	-0.1412	-0.1103
	(0.0452)	(0.0397)	(0.0456)	(0.0400)
Sales		-0.0058		-0.0009
		(0.0019)		(0.0030)
Employment		-0.1461		-6.1106
		(0.4126)		(1.0504)
Assets		-0.0015		-0.0004
		(0.0003)		(0.0007)
Relative Debt		0.0868		-0.3671
		(0.1914)		(0.1522)
Relative Capital Expenditures		-0.1546		0.7168
		(0.4650)		(0.3071)
Relative Earnings		-1.7844		-0.4843
		(0.0772)		(0.0562)
Relative R&D Expenditures		-1.9366		-0.7812
		(0.1764)		(0.1207)
R^2	0.01	0.02	0.77	0.75
Firm Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes

Notes: See the notes to Table 2.

Table 4: Lobbying and the Tobin's Q (M2)

	(1)	(2)	(3)	(4)
Lobbying Indicator	-1.1690	-0.5673	-0.1273	-0.0962
	(0.0535)	(0.0471)	(0.0583)	(0.0501)
Sales		0.0007		0.0135
		(0.0032)		(0.0043)
Employment		-0.9377		-4.0626
		(0.4617)		(1.3236)
Assets		-0.0105		-0.0233
		(0.0027)		(0.0035)
Relative Debt		0.2514		-0.2705
		(0.2103)		(0.1787)
Relative Capital Expenditures		-0.1174		0.6991
		(0.5088)		(0.3593)
Relative Earnings		-1.6464		-0.5901
		(0.0844)		(0.0656)
Relative R&D Expenditures		-1.8873		-0.93961
		(0.1927)		(0.1409)
R^2	0.01	0.02	0.73	0.71
Firm Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes

Notes: See the notes to Table 2.

different approaches. The main difference comes from the fact that our main measure is observed for roughly 80 percent of the observations. Throughout our study, we winsorize each of the dependent variables at the 5 and 95 percent levels. Across all of the estimations in Table 3, we find negative and statistically significant effects of lobbying on Tobin's Q. This is true in Table 4 as well. Although the coefficient in the specification in column (4) retains a similar magnitude as in Table 3, the standard error is larger and it thus falls slightly below conventional levels of significance.

Table 5 compares the estimations for the earnings-price ratio, Tobin's Q (M1), and Tobin's Q (M2) across our five industry groupings: (1) agriculture, mining, construction, (2) manufacturing, (3) wholesale and retail, (4) information and finance, (5) services. Here, we take the specification considered in column (2) of Tables 3 and 4 and estimate it across each of these industries separately. The table presents the coefficients drawn from the OLS regressions. We can draw inferences how the results are similar or different or across the estimations and across the table themselves. The effect on the earnings-price ratio ranges from 0.03 to 0.08. The effect on our main measure of Tobin's Q (M1) ranges from -0.47 to -0.01 and on the alternative measure it ranges from –0.98 to 0.02. Effects are largest in Manufacturing and smallest in Wholesale and Retail for the earnings-price ratio. For both measures of Tobin's Q, the effects are largest in Agriculture and Mining as well as Information and Finance. They are the smallest in Services and Wholesale and Retail.

Table 5: Heterogeneity Across Industries

	Dependent Variable		
	Earnings-Price Ratio	Tobin's Q (M1)	Tobin's Q (M1)
Agriculture, Mining, Construction	0.06	-0.47	-0.50
	(0.01)	(0.09)	(0.10)
Manufacturing	0.08	-0.44	-0.33
	(0.01)	(0.07)	(0.07)
Wholesale and Retail	0.03	-0.24	-0.20
	(0.01)	(0.11)	(0.11)
Information and Finance	0.06	-0.46	-0.98
	(0.01)	(0.08)	(0.14)
Services	0.04	-0.01	0.02
	(0.02)	(0.14)	(0.13)

Notes: The table presents results on the coefficient on the lobbying indicator from the OLS regressions presented in column (2) of Tables 2-4 estimated across industries. Standard errors are in parentheses. Additional control variables in each regression are sales, employment, assets, relative debt, relative capital expenditures, relative earnings, and relative RD expenditures.

5 Nonparametric Econometric Approach and Results

5.1 Econometric Approach

The main estimator that we use is developed in Lee and Lincoln (2019). He we simply lay out the main features of the econometric approach. The main estimator that we use is developed in Lee and Lincoln (2019). Here we simply lay out the main features of the econometric approach. Y_{it}^*denotes the outcome of firm i in year t, D_{it}^* indicates the firm's lobbying status, A_{it} is similarly an indicator for whether the firm is observed in the sample and $\overrightarrow{s}_{it} = (s_{i1}, \ldots, s_{it})$ denotes the history of any variable s up to period t. Our main object of interest here is the average treatment effect. $Y_{it}^*(1)$ and $Y_{it}^*(0)$ are the latent values from engaging in lobbying and not doing so, respectively. Our main object of interest here is the average treatment effect

$$E\left[Y_{it}^*(1) - Y_{it}^*(0)\right]. \tag{2}$$

The outcome that is observed is thus

$$Y_{it} \quad = \quad D_{it}^* A_{it} Y_{it}^*(1) A_{it} + (1 - D_{it}^* A_{it}) Y_{it}^*(0) A_{it}$$

We group firms of duration r into subpanels denoted by $T_i = r$. We then make two assumptions to identify the average treatment effect.

Assumption 1 *For each subpanel of duration r, a vector of potentially unobserved factors affecting the outcome $\alpha_{i(r)}$ exists such that, conditional on $\alpha_{i(r)}$, $Y_{it}^*(j)$ is mean independent of $(\overrightarrow{D}_{it}^*, \overrightarrow{A}_{it})$ conditional on $\alpha_{i(r)}$ for $j = 1, 0$.*

Assumption 2 *For each subpanel of duration r, conditional on $\alpha_{i(r)}$, $Y_{it}^*(j)$ the mean of $Y_{it}^*(j)$ is the same for $j = 1, 0$ and all values of t.*

We next define $\widehat{\delta}_1(j,r)$ and $\widehat{\delta}_s(j,r)$ as

$$\begin{aligned}
\widehat{\delta}_1(j,r) &= \frac{1}{n}\sum_{i=1}^{n}\widehat{\delta}_{1,i}(j,r) = \frac{1}{n}\sum_{i=1}^{n} Y_{i1}(j)\,1\{D_{i1}=j\}\,1\left\{\overrightarrow{A}_{ir}=1, T_i=r\right\}, \\
\widehat{\delta}_s(j,r) &= \frac{1}{n}\sum_{i=1}^{n}\widehat{\delta}_{s,i}(j,r) = \frac{1}{n}\sum_{i=1}^{n} Y_{is}(j)\,1\left\{\overrightarrow{D}_{is-1}=1-j, D_{is}=j\right\}1\left\{\overrightarrow{A}_{ir}=1, T_i=r\right\}
\end{aligned}$$

for $2 \leq s \leq r$, and

$$\widehat{p}(j,r) = \frac{1}{n}\sum_{i=1}^{n}\widehat{p}_i(j,r) = \frac{1}{n}\sum_{i=1}^{n} 1\left\{\overrightarrow{D}_{ir}=j\right\}1\left\{\overrightarrow{A}_{ir}=1, T_i=r\right\}.$$

Choosing the bounds $M_L(j|r)$ and $M_U(j|r)$ such that $-\infty < M_L(j|r) < M_U(j|r) < \infty$ allows us to construct the terms $\widehat{L}^j$ and $\widehat{U}^j$

$$\widehat{L}^j = \sum_{r=1}^{T}\left\{\sum_{s=1}^{r}\widehat{\delta}_s(j,r) + M_L(j|r)\widehat{p}(1-j,r)\right\}, \tag{3}$$

$$\widehat{U}^j = \sum_{r=1}^{T}\left\{\sum_{s=1}^{r}\widehat{\delta}_s(j,r) + M_U(j|r)\widehat{p}(1-j,r)\right\} \tag{4}$$

The bound identification of the average treatment effect Δ is then constructed as

$$L^1 - U^0 \leq \Delta \leq U^1 - L^0. \tag{5}$$

Our approach to inference uses the approach of Imbens and Manski (2004). This is given by

$$CI_{1-\alpha}(\Delta) = \left[\widehat{\Delta}_L - c_\alpha\frac{\widehat{\sigma}_L}{\sqrt{n}}, \widehat{\Delta}_U - c_\alpha\frac{\widehat{\sigma}_U}{\sqrt{n}}\right],$$

where $\widehat{\Delta}_L = \widehat{L}^1 - \widehat{U}^0$, $\widehat{\Delta}_U = \widehat{U}^1 - \widehat{L}^0$, and $\widehat{\sigma}_L$ and $\widehat{\sigma}_U$ are the standard errors of $\widehat{\Delta}_L$ and $\widehat{\Delta}_U$. The term c_α satisfies

$$\Phi\left(c_\alpha + \frac{\sqrt{n}\left(\widehat{\Delta}_U - \widehat{\Delta}_L\right)}{\max\{\widehat{\sigma}_L, \widehat{\sigma}_U\}}\right) - \Phi(-c_\alpha) = 1-\alpha$$

for $0 < \alpha < 1$.

5.2 Results

We present the results in Table 6. The estimates are consistent with the regression results in the previous section. We find a positive effect of lobbying on the earnings to price ratio and a negative effect on Tobin's Q. The bound estimates put the average treatment effect on the earnings to price ratio at [0.0511,0.0816] and the average treatment effect on Tobin's Q at [-1.1469,-1.2773]. The confidence intervals both easily rule out an effect of zero, which is a stronger result than is typical with Manski-type bound estimators.

Table 6: Bounds Estimations

Earnings-Price Ratio		
Bounds of E[Y0]	-0.1112	-0.1112
Bounds of E[Y1]	-0.0602	-0.0296
95 percent Confidence Interval of the Bounds of E[Y0]	-0.1189	-0.1036
95 percent Confidence Interval of the Bounds of E[Y1]	-0.0638	-0.0276
Average Treatment Effect Bounds	0.0511	0.0816
95 percent Confidence Interval of the ATE	0.0438	0.0883
Tobin's Q		
Bounds of E[Y0]	1.8918	1.8918
Bounds of E[Y1]	0.6145	0.7450
95 percent Confidence Interval of the Bounds of E[Y0]	1.7737	2.0100
95 percent Confidence Interval of the Bounds of E[Y1]	0.5932	0.7685
Average Treatment Effect Bounds	-1.2773	-1.1469
95 percent Confidence Interval of the ATE	-1.3763	-1.0487

Notes: The table presents the results from the estimation approach described in Section 5.1. This extends the work of Jun, Lee, and Shin (2016) to unbalanced panels. Sample characteristics are described in Table 1. We find a positive effect on the earnings-price ratio and a negative effect on Tobin's Q.

6 Conclusion and Future Directions

In this study, we have demonstrated that lobbying has a negative effect on firm value. This contrasts with a number of studies in the literature. This raises a number of new questions, such as the mechanisms behind the negative effect and how this effects varies over the business cycle. Additional work on these issues would help us understand firms' incentives to lobby much better as well as the dynamics of the policy making process more generally. An understanding of these issues would in turn have significant normative implications for guarding democracy against the undue influence of special interests while at the same time allowing different groups to have their voices heard in a constructive manner in the political process.

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8 Appendix

Table 7: Firm Characteristics By Status Over Entire Sample

	All Firms	Non-Lobbying Firms	Lobbying Firms
Market Capitalization ($m)	2,996	1,051	9,473
	(14,828)	(5,238)	(28,390)
Profitability	0.11	0.05	0.28
	(25.41)	(28.97)	(0.30)
Earnings ($m)	130	30	464
	(1,116)	(620)	(1,993)
Earnings-Price Ratio	-0.06	-0.08	0.01
	(0.25)	(0.27)	(0.15)
Tobin's Q (M1)	2.73	2.96	1.95
	(3.34)	(3.67)	(1.60)
Tobin's Q (M2)	2.29	2.60	1.37
	(3.69)	(4.11)	(1.64)
Relative Employment	0.03	0.04	0.01
	(0.66)	(0.76)	(0.17)
Relative Assets	17	21	6
	(446)	(506)	(139)
Relative R&D Expenditures	3.20	3.96	0.81
	(145.06)	(165.03)	(39.65)
Relative Earnings	-10.00	-12.81	-1.17
	(253.03)	(289.18)	(48.28)
Relative Debt	2.63	3.01	1.42
	(98.95)	(110.76)	(44.81)

Table 8: Firm Characteristics By Industry

	All Firms	Non-Lobbying Firms	Lobbying Firms
Agriculture and Mining			
Assets ($m)	4,219	2,224	12,138
	(9,303)	(5,932)	(14,564)
Market Capitalization ($m)	2,577	1,501	6,849
	(6,278)	(4,583)	(9,472)
Profitability	-0.25	-0.34	0
	(13.54)	(15.14)	(0)
Earnings-Price Ratio	-0.067	-0.089	0.019
	(0.269)	(0.285)	(0.164)
Tobin's Q (M1)	2.44	2.74	1.27
	(3.40)	(3.73)	(0.55)
Manufacturing			
Assets ($m)	2,934	865	15,821
	(20,243)	(7,801)	(48,902)
Market Capitalization ($m)	3,306	849	18,610
	(18,048)	(4,113)	(44,477)
Profitability	0.20	0.18	0
	(15.53)	(16.73)	(0)
Earnings-Price Ratio	-0.089	-0.105	0.015
	(0.261)	(0.272)	(0.139)
Tobin's Q (M1)	3.21	3.38	2.16
	(3.63)	(3.83)	(1.53)

Table 9: Firm Characteristics By Industry

	All Firms	Non-Lobbying Firms	Lobbying Firms
Wholesale and Retail			
Assets ($m)	2,958	1,661	12,475
	(7,852)	(4,067)	(17,031)
Market Capitalization ($m)	3,250	1,861	13,432
	(10,476)	(5,966)	(23,163)
Profitability	0.38	0.38	0
	(3.36)	(3.57)	(1)
Earnings-Price Ratio	-0.008	-0.013	0.031
	(0.205)	(0.212)	(0.129)
Tobin's Q (M1)	2.21	2.28	1.66
	(2.55)	(2.69)	(1.03)
Information and Finance			
Assets ($m)	9,691	4,731	65,930
	(72,103)	(33,053)	(219,880)
Market Capitalization ($m)	2,922	1,563	18,339
	(14,499)	(7,492)	(41,229)
Profitability	0.01	-0.01	0
	(38.76)	(40.44)	(0)
Earnings-Price Ratio	-0.041	-0.047	0.028
	(0.243)	(0.249)	(0.134)
Tobin's Q (M1)	2.45	2.52	1.67
	(3.19)	(3.30)	(1.07)

Table 10: Firm Characteristics By Industry

	All Firms	Non-Lobbying Firms	Lobbying Firms
Services			
Assets ($m)	1,244	788	4,016
	(3,019)	(2,089)	(5,392)
Market Capitalization ($m)	1,479	822	5,475
	(4,976)	(2,380)	(11,066)
Profitability	0.25	0.24	0
	(3.44)	(3.71)	(0)
Earnings-Price Ratio	-0.061	-0.073	0.008
	(0.252)	(0.262)	(0.156)
Tobin's Q (M1)	2.42	2.47	2.17
	(2.60)	(2.73)	(1.58)