DOES CORPORATE LOBBYING AFFECT THE TOTAL FACTOR PRODUCTIVITY?

by

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Abstract

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This study attempts to evaluate the effectiveness of corporate lobbying activity conducted by a firm from a financial perspective. By examining the productivity-lobbying activity relation, this research fills in the gap between the political connections and productivity literature. The panel data on 7466 US firms for a period of 10 years are analyzed as a case. The lobbying expenditures are taken as one of the variables affecting the total factor productivity of a firm. The paper provides a brief synthesis of the literature related to the effects of corporate political activities and presents some methodological issues concerning the estimation of lobbying outcomes. The results of empirical estimation suggest that lobbying has a significant positive effect on the firm's total factor productivity: each 1% increase in lobbying expenditures lead to a growth of productivity by 0,057%. Also, on average, lobbying firms are more productive than non-lobbying companies.

TABLE OF CONTENTS

LIST OF FIGURES

Number *Page*

LIST OF TABLES

Number *Page*

LIST OF TABLES - Continued

Number *Page*

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GLOSSARY

Lobbying. The act of attempting to influence decisions made by officials in the government, most often legislators or members of regulatory agencies[1].

Lobbyists. Individuals who directly attempt to persuade policy makers to take a particular action and who may be full-time employees of a corporation or an interest group.

Lobbying Firm. The entity that has 1 or more employees who are lobbyists on behalf of a client other than that person or entity. The term also includes a self-employed individual who is a lobbyist[2].

Total Factor Productivity (TFP). The portion of output not explained by the amount of inputs used in production.

[1] http://www.thelobbyist.biz/policy-matters/1153-lobby-reform

[2] U.S. Lobbying Disclosure Act of 1995

Chapter 1

INTRODUCTION

Taking into consideration the financial and economic crisis shaking the world's economies the outside political support may help greatly for firm's attempts to survive, so the role of corporate political activity for firm's performance is higher than ever. Governments, being suppressed by different interest groups, sometimes may come to decisions not optimal for the society, but rather beneficial for those persons or organizations that promote their aims better than others. In order to safeguard the social decision-making the public should be aware of consequences of lobbying for the economy as a whole, and for corporate entities, in particular.

In spite of that the corporate interests can inappropriately affect the regulatory and legislative processes (basically via their financial capacity to spend large sums of money on promoting specific regulatory projects), their effect on firm's performance is proved to be positive (as can be inferred from the literature review of this study).

To understand the issue, firstly it's worth pointing out the essence of corporate political activity. Generally speaking, the purpose of lobbying is to influence legislation on behalf of special interest groups. Consequently, such an activity may bring some benefits – for example, tax relaxations. There are a few possible ways of quantifying the lobbying returns, and the most straightforward one is to compare the corporate tax liabilities prior to and after some tax law change. Still, the evidence shows that lobbying activity leads to the net income augmentation of the company either by raising the company's revenues or by decreasing the tax expenditures. Thus, Richter et al. (2009) found: "Firms that spend more on lobbying in a given year pay lower effective tax rates in the next years". A lot of

empirical studies suggest that lobbying should affect not only tax clauses for the companies, but also their market value, terms of loan agreements and financial performance (see Faccio , 2006; Hersch, 2008); Alexander et al., 2009; Hill et al., 2011). As a result, such evidence brings to the idea of investigating the question whether lobbying through its affect on profitability is able to increase firm's production outcomes, since the firm's performance is an indispensable factor in the productivity growth. To the best of our knowledge, there has been no study exploring this issue.

Since political connections are observable at the firm level in terms of lobbying activity, it's possible to measure and provide direct empirical evidence on the utility of such connections and the extent of corporate benefits. So, the question whether lobbying affects firm's total factor productivity can be investigated econometrically. This is a panel study: there are data available for corporate lobbying expenditures from 2001 till 2010, which were provided by American Center of Responsive Politics. This information is presented annually; therefore, the firms' accounting data were also collected for each year. In our analysis the total factor productivity performs the role of a dependent variable; while the firms' corporate lobbying expenditures are used as the main regressor; which will be controlled for other factors – firm-specific and industry-time specific dummies, as well as the company size. The results of estimating whether lobbying has an influence on the firm's productivity are supposed to be positive. Such hypothesis has its source from a simple economic link between the firm's productivity dependent on firm's performance, which in its turn is affected by lobbying expenditures.

On the whole, the outcomes of corporate lobbying are bidirectional: the first effect is related to the social welfare, and the second one results in improving the company's financial state by encouraging favorable policies or outcomes. Our

paper contributes to an emerging body of works on the firm's performance by examining the link between political activities of a company to its total factor productivity. An important innovation of this work is that this is the first study to provide such evidence by taking advantage of uniquely combined dataset, which was compiled specifically for the research purpose.

The rest of the paper is structured as follows. Chapter 2 overviews the theoretical background of the research and is decomposed into two parts: the first one describes the institutional background of lobbying, while the second one is literature review on the studies related to the topic of this work. Chapter 3 comprises the methodology describing basic estimation techniques being used to evaluate the firm's total factor productivity. The data description used for analysis is given in the fourth section. Chapter 5 provides empirical results obtained from the econometric estimation. Finally, the conclusion is supposed to resume the results of the study and draw the main findings of the paper.

Chapter 2

THEORETICAL BASE

2.1. Institutional background of lobbying

Explaining the algorithm of lobbying sets the context for econometric specifications discussed below and provides further justification for examining the total factor productivity affected by lobbying expenditures.

As a broad conception, the corporate lobbying refers to any attempt for influencing legislation by addressing to lobbyists. These actions are directed towards the legislators or government employees who participate in the formation of legislation. The ability of individuals, groups of people and corporations to lobby for policies which favor them, is fully legal and is protected by the right to petition (which is guaranteed by the First Amendment to the federal constitution). The explanation of lobbying process is given by de Figueiredo and Cameron (2009): "As a practical matter lobbying requires the expenditure of money to pay lobbyists, maintain offices, commission studies, hire experts, and so on". In their own turn, lobbyists try to persuade public officials to implement a specific law or policy which may be beneficial for lobbying firms (and as a consequence, for the industry, as a whole). Some lobbyists, however, may resort to more unofficial practices, such as bribery; that is why lobbying activity is heavily regulated in order to prevent or at least to reduce the scope of these practices. Generally, to distinguish usual administrative activity from the lobbying one it's worth pointing out the following: technical assistance, examinations and discussions of broad social, economic, or similar problems, non-partisan analysis or research or any communication that does not attempt to influence specific legislation, do not constitute lobbying (Biemesderfer, 2009).

Corporations have always been among the major players in lobbying activities. The nature of lobbying is that it is financed entirely out of private funds, since legislation does not permit the existence of public funds for lobbying. Moreover, the US federal law does not provide tax subsidies to lobbyists: lobbying expenditures do not qualify for having the tax deductibility as business expenses.

Companies, labor unions, and other organizations annually spend a bulk of their income dollars to lobby Congress and federal agencies. Some companies hire lobbyists, the other ones have lobbyists working for them in-house. These expenditures are similar to campaign contributions to elected officials and political candidates; however, we must distinguish between the concepts of lobbying and campaign contributions. "Lobbying is intended to influence governmental action" (Briffault, 2008), whilst campaign money works with promoting elections of officials. Generally, "lobbying does not always take the form of bribes or even of campaign contributions" (Campos, 2006); in many cases, lobbyists can exert their influence on politicians by providing support or threatening them to affect the voters' convictions.

Campos and Giovannoni (2006) investigated the question why firms lobby and found that lobby membership could be explained by both firm characteristics and institutional features of the country. They identified that company's age, size and type of ownership considerably increase the probability of a firm being a lobby participant in a transition country.

Organizations lobby for different purposes, not all of which imply the immediate adoption of laws or the enactment of regulations. "As with simple instrumental lobbying associated with the profit maximizing model, these other purposes come to the fore when they are related to scarce resources that are vital to an organization's survival as an organization" (Lowery, 2007).

Moreover, the reasons for lobbying may well be quite essential for companies being on the verge of a crash, for which business survival is a matter of grave importance. Many firms are pulled into "defensive lobbying", retaining the lobbyists or sustaining numerous in house operations to keep the status quo; they only vary the sums they spend on lobbying when their lobbyists detect likely new legislative or enforcement occasions that can benefit the company (Richter et al. 2009). To be specific we can cite an example of Microsoft, which keeps its lobbying capacity principally as a kind of insurance against future threats (Lowery, 2007).

Generally, there is some misconception among people who are not versed in political economy concerning the difference between bribery and lobbying (with the last one typical for developed countries). The difference is quite straightforward: bribery is an action of offering money for political decision, while lobbying isn't intended to provide financial assistance; it rather offers political support in the form of votes or expertise. Harstad (2005) provides a logical explanation of lobbying: instead of requesting or bribing (which is quite risky and insecure), the firms may officially spend their funds on lobbying the government for a more reliable and prolonged relaxation of the regulation.

To get a comprehensive view on what differs the lobbying from bribery we can refer to Briffault (2008): lobbying laws may restrict or prohibit auxiliary activities, such as "gifts to public officials, or payments for their meals, entertainment, or travel costs"—which provide private benefits to public functionaries and, thus, can represent a source of inappropriate influence. But these regulations do not limit either the sum of funds that can be allocated on the "research, informational and communication activities at the heart of lobbying", nor do they attempt to restrict the amounts or sources of money spent on lobbying activities.

Thus, despite the fact that lobbying is a core topic within political science, there is still some fundamental controversy in the treatment of lobbying function in democratic systems (Lowery, 2007). Nevertheless, this issue is quite essential for corporate activity and finds its reflection in an impressive amount of academic studies.

2.2. Literature review

A considerable body of literature on corporate political activity provides diverse findings on the role of lobbying in economy as a whole and for firms in particular. Starting with the question of interest group formation (Olson 1965), the next researches examine whether lobbying affects policy choices in an environment with competing interests.

The research on lobbying activity is presented by two broad areas: studies that focus on the association of lobbying with specific *policies* (for instance, Grossman and Helpman, 1994) and those that intend to investigate the effects of rent-seeking activity by special interest groups for firm-specific economic *outcomes*. This study, focusing on lobbying and total factor productivity, applies more closely to the second area.

Hereinafter the literature review is structured as follows: at the beginning, economic effect of lobbying for different policies is discussed; after that, it's compared to firm-specific effects of such activity. As a result, the contribution of this paper into the related research field is highlighted.

Thus, firstly, the policy-connected area of lobbying is discussed. Some recent researches, for instance, Snyder (1992), examine whether political contributions affect legislative voting outcomes. Snyder concludes that "despite years of research by political scientists and economists, the extent to which money actually buys political influence on a regular basis remains a mystery." Given the

difficulties with determination of the true factors of voting outcomes there is a need for studying financial implications of corporate lobbying activities.

Eggers and Hainmueller (2011) extend this literature on political connections by focusing on the equity holdings of Congress members. The research discloses the fact that Congressmen's politically-related investments (i.e. investments into the companies which pay them campaign contributions) outperform the rest of their portfolios.

The study also related to the political economy literature, but primarily focused on "the firms' behavior, rather than the bureaucrats' one" is Harstad's (2005) paper investigating the long-run consequences of the choice between bribing and lobbying. His finding is that firms typically bribe at early stages of their growth and switch to lobbying at maturity of their corporate development. Another research on lobbying by Figueiredo and Cameron (2009) investigates the issue of factors determining the extent of lobbying activity: "special interest groups increase lobbying expenditures when the legislature is controlled by "enemies" rather than "friends".

There is a number of studies evaluating the counteracting behavior of different lobbying groups towards the lobbying efforts of opposing groups in political competition (these are the models developed by Ball (1991), Rasmusen (1991), Potters (1992) and Ainsworth (1993)). A lot of studies on lobbying such as those by Austen-Smith and Wright (1994) and Hojnacki and Kimbell (1998) examine the methods through which firms exert their influence rather than discuss the results of such activity. However, these studies are mostly related to political economy, while this research is aimed at disclosing the role of lobbying as a factor affecting the firm-level characteristics.

The next step of the research is to find out whether there is empirical confirmation that lobbying does affect firm's performance. There is an extensive evidence of cross-country and country-specific researches showing that corporate political activity does matter for a firm value, including the privileged access to financing. Specifically, Kwahja and Mian (2005) found that in Pakistan politically-connected firms obtained preferential bank loans and had much higher default rates. Similar results were obtained by Yeh et al. (2010) in their study of Taiwanese firms.

Moreover, Faccio (2006) detected that politically-connected firms "enjoy privileges such as easy access to debt financing and low taxation, as well as high market share". Igan et al. (2009) extended this idea by analyzing the association between political activity of firms and ex-ante characteristics of loans originated. They found that "lenders that lobby more intensively originate mortgages with higher loan-to-income ratios, securitize a faster growing proportion of loans originated; and have faster growing mortgage loan portfolios". In other words, lobbying firms can use their political leverage to get some beneficial contracts not available to their non-lobbying peers. Such an observation suggests that the financial performance of politically active firms may increase as a result of their lobbying activity. However, this possibility to gain might as well induce the firm's management to moral hazard and at the same time lenders could give loans to the riskier clients. All this taken may lead afterwards to a higher probability of defaults among lobbying firms: therefore, lobbying activity can lead to accumulation of risks in the economy.

The recent study of Tovar (2010) revealed the fact that lobbying expenditures directly affected the determination of trade policies. Frank Yu and Xiaoyun Yu (2010) discovered a remarkable feature of lobbying: such an activity makes a considerable divergence in fraud detection - as against non-lobbying firms,

firms that lobby on average have a much lower hazard rate of being exposed to deception. The scheme of such systematic relationship is that lobbying may directly or indirectly influence economic agents who are presupposed to uncover fraud, and this is the evidence that "political spending does affect the welfare of investors".

Generally, lobbying is not only related to corporate contributions: different organizations also lobby to achieve some particular goals. Thus, de Figueiredo and Silverman (2006) estimated the returns to lobbying expenditures made by universities looking for educational earmarks. Their finding is that "a lobbying university with representatives in the Senate Appropriations Committee (SAC) can obtain an average of 11 to 17 dollars on every dollar they spend lobbying".

Estimating the value of lobbying activities is performed by researchers in various ways, since the investigation of lobbying effect is quite a disputable question. "Clearly, valuing non-monetary policies such as improved education arising from the "No Child Left Behind" legislation is difficult. Even for monetary-based policies such as minimum wage legislation, benefits accruing to private entities can only be roughly estimated" (Alexander et al., 2009). Hence, measuring the effects of lobbying is difficult as well, especially in view of contrasting perceptions concerning the two functions of this activity – persuasion and information (Zeigler, 1969). Nevertheless, many economists have succeeded in measuring the returns to lobbying expenditures, for example, by estimating the shareholders' wealth.

Thus, by Chen et al. (2010), politically active firms get specific benefits from their political relations, and the most important is that the worth of these relations is appraised by the market. The authors studied the relationship between lobbying and market returns according to the portfolio approach developed by Chan, Lakonishok, and Sougiannis (2001), who examined the

stock market valuation of research and development expenditures. They compared the stock returns of companies that lobby according to their "lobbying intensity (lobbying as a proportion of firm size or market value)" with portfolios of specially selected non-lobbying companies, and their discovery is that high lobbying-intensive portfolios outperform their benchmarks of non-lobbying firms.

Still more, Hill et al. (2011) found a strong statistical relationship between the firm value and lobbying activity, testifying to the effect that the market prices the corporate lobbying activity. Hence, by Hill et al. (2011), "lobbying appears to be a worthwhile investment, especially given the market value of research and development expenditures and average internal rates of return on other corporate investments". However, the same research indicates that lobbying is unrelated to the firm's cash flows. The analogous study by Hersch et al. (2008) revealed that firms' Tobin's q (a firm value divided by the corporate net worth) is positively affected by lobbying expenditures; however, this relationship holds only for large firms.

In addition to this we can mention Cooper et al. (2007) who found a statistically and economically significant relationship between campaign contributions (also related to lobbying) and firm's future abnormal stock returns. They showed that contributions are associated with augmentation of the firm value. Also, there is a study by Alexander et al. (2009) who examined the return on lobbying by using audited corporate tax disclosures relating to a tax holiday on repatriated earnings created by the American Jobs Creation Act of 2004. They revealed that companies, which were lobbying for that provision, had a "return in excess of $220 for every $1 spent on lobbying, or 22,000%". Thus, those companies were quite effective in getting profitable tax benefits. However, in comparison with other rent-seeking behavior, the lobbying for such purposes is more

transparent. Altogether, the prevalent perception among both society and lobbyists is that lobbying expenditures ensure high benefits to sponsors (Birnbaum, 2006).

Summing up, we can state that there is a strong empirical evidence that lobbying activity matters for the firm's performance, and especially, for stock market returns, which are typically associated with higher performance. Specifically, lobbying might allow managers to achieve greater profitability by providing better terms of trade or credit (which may not be attainable for other firms), by enhancing the flow of information about optimal timing for performing different projects (given the fact that lobbying companies may know the possibility of some law implementation). If this is really so and such relationship is fully incorporated by the firm's returns, then the production process should adjust to any relevant change in the firm's lobbying expenditures. So, this paper endeavors to make a contribution to the growing literature on lobbying effectiveness for the firm's performance by estimating the firm-level productivity patterns.

Chapter 3

METHODOLOGY

Applied economists often quantify the effect of some economic factors on firm's performance by observing the change in the firm's total factor productivity. For instance, the model of impact of R&D expenditures on TFP growth was elaborated by Mansfield (1980). Konings and Vandenbussche (2008) estimated the impact of antidumping protection on the productivity of domestic import-competing firms, while in the study by Amiti and Konings (2007) the TFP growth was explained by trade liberalization. As a factor affecting productivity growth the extent of foreign ownership in a firm's capital was also analyzed (Javorcik, 2004). Thus, different measures may be used to capture the productivity growth caused by some additional factors besides commonly used capital and labor.

Typically, the output (usually taken as deflated sales or value added) is assumed to be a function of the company's inputs (capital and labor) and its productivity. Commonly, TFP growth is measured by Solow residual arising from the above cited functional relationship, which accounts for the total output change not caused by physical inputs. This residual is then used as a dependent variable for estimating the influence of different policy measures, such as the lobbying activity in our case.

We start with a standard assumption that firm's production is presented in the form of the Cobb–Douglas production function:

$$Y_{it}=A_{it} L_{it}^{a} K_{it}^{\beta} \quad (1)$$

where Y_{it} represents physical output of firm i in period t, K_{it} and L_{it} are inputs of capital and labor, respectively, while A_{it} is the "Hicksian neutral efficiency level of firm i in period t "(Beveren,2010).

Despite the fact that Y_{it}, K_{it} and L_{it} are observed by econometrician, A_{it} is unobservable to the researcher. After taking the natural logs of (1) we get a linear production function:

$$y_{it} = \delta + \alpha l_{it} + \beta k_{it} + \varepsilon_{it}$$

where the lower-case letters l and k denote the natural logarithms of labor and capital, respectively, while the productivity is presented as follows:

$$\ln(A_{it}) = \delta + \varepsilon_{it}$$

where δ measures the average efficiency level across companies and over time; ε_{it} is the time- and firm-specific deviation from that mean, which can then be further divided into observable and unobservable parts:

$$\varepsilon_{it} = v_i + u_{it}$$

This will give the following equation:

$$y_{it} = \delta + \alpha l_{it} + \beta k_{it} + v_i + u_{it} \quad (2)$$

This equation could be estimated by OLS-procedure using a panel data for logarithms of observed proxies for capital and labor. However, for this to be a consistent procedure, labor and capital are supposed to be exogenous variables, i.e. independent of firm's efficiency level, which is not the case. By Marschak and Andrews (1944), inputs chosen for the production function estimation are not independent and are conditional on firm's characteristics. We use OLS as a simple benchmark, but to get rid of time independent effects for each firm

which may be possibly correlated with the regressors we apply Fixed Effect model. However, these models are shown to be inefficient: by Wooldridge (2009), in order to use FE-estimators the inputs must be strictly exogenous - they can't be chosen in response to productivity shocks. To get rid of endogeneity problem we can apply traditional remedies such as instrumental variables approach. Again, there could be some difficulty: "IV estimation relies on an additional assumption that is potentially problematic - productivity evolves exogenously over time" (Van Beveren, 2012). The usual IV estimates of standards errors are inconsistent in the presence of heteroskedasticity. A more efficient model of dealing with heteroskedasticity is Generalized Method of Moments estimation, which is generally appropriate for the data consisting of time span (T=10) and a large firm dimension (N=775).

In this research the Arellano-Bond (1991) and Arellano-Bover (1995)/Blundell-Bond (1998) linear GMM estimators are used – recently they became extremely popular for production function estimation. The advantages of GMM over IV are quite strong: in case of heteroskedasticity GMM estimators are more robust compared to IV estimators; and even in case when there is no heteroskedasticity, GMM estimators are no worse than IV ones asymptotically (Baum, 2003).

Instead of using only exogenous instruments (time dummies) the lagged levels of endogenous regressors in the production function (capital and labor) are also added. Such methodology makes endogenous variables pre-determined and, consequently, not correlated with the residual in equation (2).

In addition to solving the problem of endogeneity, GMM by transforming the regressors eliminates the time-invariant fixed effect contained in the error term from equation (2):

$$\Delta\varepsilon_{it}=\Delta v_i + \Delta u_{it}$$

Since in large T-panels shocks to the firms' fixed effects decline over time, and our dataset is not so large in time dimension, the correlation of the dependent variable with the error term will be quite significant. Another advantage of GMM estimation is that it is consistent even when the measurement errors in inputs and output are present.

As a next step of TFP analysis we may present the sum of firm-level productivity and v_i from equation (2) as an i.i.d. component, so we get:

$$\omega_{iit} = \delta + v_i$$

The estimated productivity is calculated in the following way:

$$\hat{\omega}_{it} = y_{it} - \hat{\alpha} l_{it} - \hat{\beta} k_{it} \qquad (3)$$

Altogether, calculations of TFP lead to an unexplained residual, possibly as a result of under-estimation of physical inputs. In other words, there could be some factor which may affect the total factor productivity after subtracting the amount of its change attributed to physical outputs – capital and labor. The deficiency in explaining factors may be reduced by adding a factor, which increases the firm's efficiency, namely, the lobbying expenditures.

Thus, we can build the following plausible causal chain:

Lobbying expenditures→ firm's performance→ increase in revenues→ technological innovation→ productivity increase.

So, we regress the productivity measure resulting from the equation (3) on lobbying expenditures and other control variables:

$$\ln(TFP)=\lambda+\mu\, Lobby_{i(t-1)} + \eta\, F_i + \gamma\, I_{st} + v_i \quad (4)$$

where *Lobby* is the variable of lobbying expenditures of a firm *i* in period *t-1* (the effects of lobbying often occur with a lag), F_i is the dummy capturing firm-specific fixed effects, I_{st} is the dummy capturing industry-time specific fixed effects (*s* being an index for industry).

As a result, we get three categories of factors in the production function of this study: total lobbying expenditures, capital and labor. To estimate the 2nd equation the following data were chosen: the total number of employees for a firm per year became a proxy for labor; while for capital we have selected 3 proxies - total assets available to the firm, capital expenditures per year and total invested capital per year. We have chosen as the most appropriate measure of capital the firm's total assets (which are nonnegative compared to other indices).The dependent variable from the 2nd equation, total output, is measured by the firm's total revenues, which represents the amount of output.

Chapter 4

DATA DESCRIPTION

To explore the relationship between TFP and lobbying, we rely on a unique and newly collected database obtained by merging the data on lobbying expenditures of those firms which were active from 2001 through 2010 with their financial accounting data.

The accounting data (total revenues, book value of total assets) and the number of employees were taken from the web homepage of Aswath Damodaran[3]. However, the initial sources of this corporate accounting data, which were gathered by the researcher, are the Value Line and Compustat databases, which track all publicly traded US firms.

The data on lobbying became available after the passage of the Lobbying Disclosure Act of 1995, according to which lobbying firms are obliged to provide a good-faith estimate of their spending rounded to the nearest $20,000 of all income related to lobbying in each six-month time period. The data on lobbying expenditures were manually collected from the web-site of the Center for Responsive Politics[4]. The information presented is uniform for all the entities and gathered by the Center in the following way: if organizations "self-file" (i.e. report their expenditures by in-house lobbyists), the data represent their total lobbying expenditure for the period; if an organization does not "self-file," the sum of its contracts with external lobbyists is used to represent their total lobbying expenditures for the period. A company that spends less than $10,000 in any six-month period is treated to

[3] http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html

[4] http://www.opensecrets.org/

have zero lobbying expenditures. In the event that both a parent and its subsidiary companies lobby or hire lobbyists, the lobbying spending is attributed to the parent organization.

As can be observed from the Figure 1 the amount of total spending on lobbying by firms increases every year, so this activity becomes more valuable with the lapse of time.

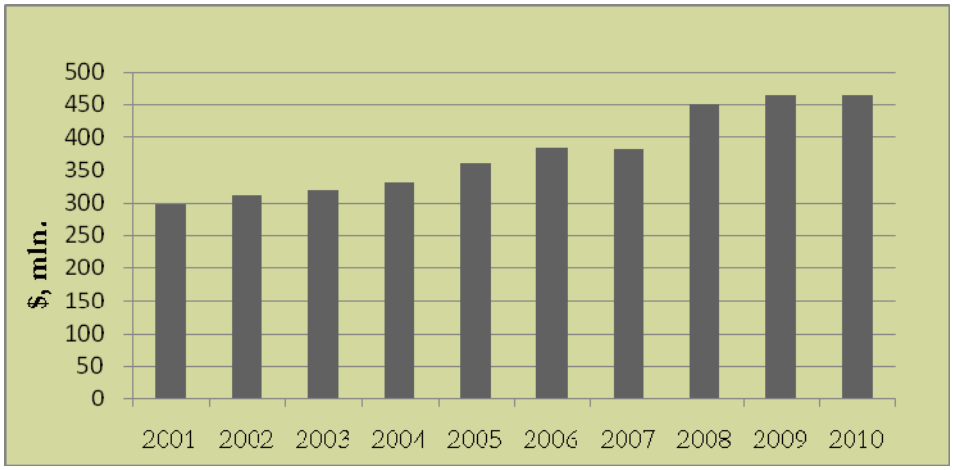

Figure 1. Evolution of total amount of lobbying expenditures (deflated[5]) incured by the companies in the sample.

Initially the accounting data for 10 years were available for almost 15000 firms, whilst the data on employees was given for over 8000 firms. After skipping the missing values and obtaining the balanced panel of 7466 US firms we merged it with available data on 11000 lobbying firms[6], thus, creating a new panel dataset just for 775 lobbying firms.

Thus, we have obtained two datasets: the first one includes both lobbying and non-lobbying companies (Table 1); the second one is the restriction of the

[5] As a baseline for deflator the 2000 year value was taken.

[6] Lobbying firm is denoted here as a firm which has lobbied at least once in the analyzed time horizon

first dataset – it is composed of lobbying firms only (Table 2). Further on the 1st dataset will be used to determine whether lobbying activity matters for firm's productivity, the 2nd one will be exploited to determine the extent of lobbying effect for those firms which spend their funds on that.

The following tables (Table 1 and Table 2) depict the descriptive statistics of the variables used for estimating the firm's productivity[7]. Total output is measured by total revenues, while the amount of total assets was taken as a proxy for capital. Both variables are given in millions of dollars (USD, mln.). Labor is measured by the number of firm's total employees. The data for lobbying expenditures are given in dollars (USD).

Table 1. Descriptive statistics for the whole sample of companies[8]

Variable		N	Mean	St. dev.	Min	Max
Y	Total Revenue ($mln.)	74 660	1 170	6 490	0	353000
L	Labor (№ of employees)	74 660	3 881.86	18 933.53	0	465000
K	Total assets ($mln.)	74 660	4 750	48 500	0	2600000
Lobby	Lobbying expenditures ($)	74 660	50 408.15	55 4847.5	0	36800000

A question may arise how representative is the sample used in this research. As a benchmark for comparison we have taken the Compustat statistics of 23125 US companies[9] for the same time span as for our research sample (10 years – from 2001 till 2010). The mean and standard deviation of the main indicators for those companies is presented in Table A6 (which is contained in Appendix A). There is some upward bias of the sample used in this

[7] All variables (except L) are deflated by CPI available from US Bureau of Labor Statistics.

[8] The sample includes both lobbying and non-lobbying firms.

[9] The statistics is taken from CapitalIQ database.

research (which includes both lobbying and non-lobbying firms) comparatively to a Compustat sample characteristics. However, there is an explanation for that: firstly, our sample includes lobbying firms, which on average have much higher level of revenues and assets than those non-lobbying; secondly, the procedure of sample compiling involved skipping the negative values of total revenues since the following process of estimation suggests finding the logarithms of total revenues (as well as of total assets and employees) which is impossible for negative values. That's why, on average, the indicators of our sample are higher than those reported by Compustat. Nevertheless, the difference between the two samples is not so striking. Thereby, the results of estimation of the lobbying effect, obtained for the sample of 7466 companies, may be extended to the whole population of firms.

Below the statistics for lobbying firms is presented, which proves the fact that the lobbying firms have higher revenues and assets, as well as the number of people employed, comparatively to the average characteristics of the US firms.

Table 2. Descriptive statistics for the sample of lobbying companies.

Variable		**N**	**Mean**	**St. dev.**	**Min**	**Max**
Y	Total Revenue ($mln.)	7 750	6 820	17 100	0	353 000
L	Labor (№ of employees)	7 750	11 976.07	32 774.26	0	428 000
K	Total assets($mln.)	7 750	18 400	97 800	0	1 900 000
Lobby	Lobbying expenditures ($)	7 750	467 078.4	1 612 444	0	36 800 000

More detailed descriptive statistics for *Y, K, L* and *Lobby*, which is sorted by years and industries, is provided in the Appendix A in Tables A1- A4.

Thus, if comparing the size of lobbying and non-lobbying companies from the research sample we may conclude that typically lobbying is the activity carried by larger firms. Figure 2 illustrates the discrepancy between the main financial indicators of 2 groups of firms, which indicates that lobbying firms are those with higher level of assets and revenues. This inference is not occasional: by Islam and Lopez (2011), "firms' size affects their lobbying capacity. A relatively small number of large firms can organize and lobby more effectively than a large number of small firms".

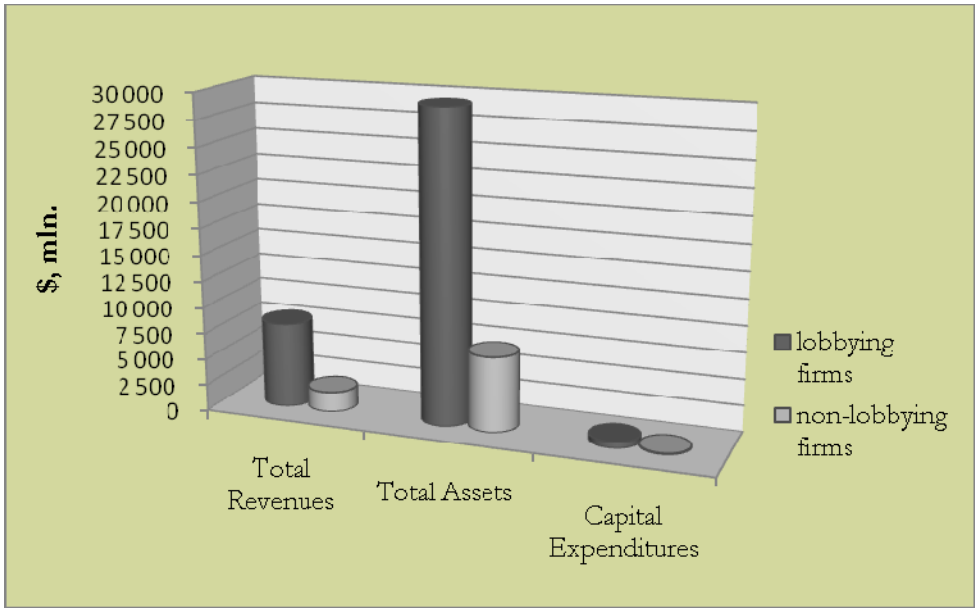

Figure 2. Comparison of financial indicators (average for 10 years separately for lobbying and non-lobbying companies)

Since there level of mamimum total revenues and assets differ for lobbying and non-lobbying firms there may be an issue of selection bias while estimating the effect of lobbying for the firms. For the purposes of elimination of such a bias we have created a dataset for the firms with similar chracteristics (the same maximum level of total revenues both for lobbying and non-lobbying companies, as well as the equal level of maximum total

assets). These firms don't differ much by their size, so this sample would incorporate the firms with approximately similar characteristics (see Table A5).

The final sample of lobbying business organizations is represented by 17 industries, as shown in Table 3. The most numerous amount of lobbying firms is represented by the Pharmaceutical industry and Computer/Internet businesses. However, in terms of the extent of lobbying as a share of total lobbying expenditures in the sample these industries comprise only 8% of the funds spent.

Table 3. Decomposition of the sample of lobbying firms by sector.

Industry	**Number of entities**
Air transport	32
Automotive	24
Computers/Internet	120
Defense Aerospace	6
Education	10
Electric Utilities	73
Health Professionals	7
Hospitals/Nursing Homes	11
Insurance	43
Misc Manufacturing & Distributing	97
Oil&Gas	69
Pharmaceuticals/Health Products	136
Real Estate	44
Securities & Investment	34
Telecom Services & Equipment	35
Telephone Utilities	14
TV/Movies/Music	30
Total	**785**

The most heavily lobbying industries are Insurance, Automotive industry, Air Transport and TV/Movies/Music (as can be seen from the figure B1 in the Appendix B). When comparing the mean lobbying expenditures spent by each

firm (refer to Figure 3), it can be noticed that on average firms represented by Telephone and Electric Utilities, TV/Movies/Music and Insurance spend more than others on promoting their interests.

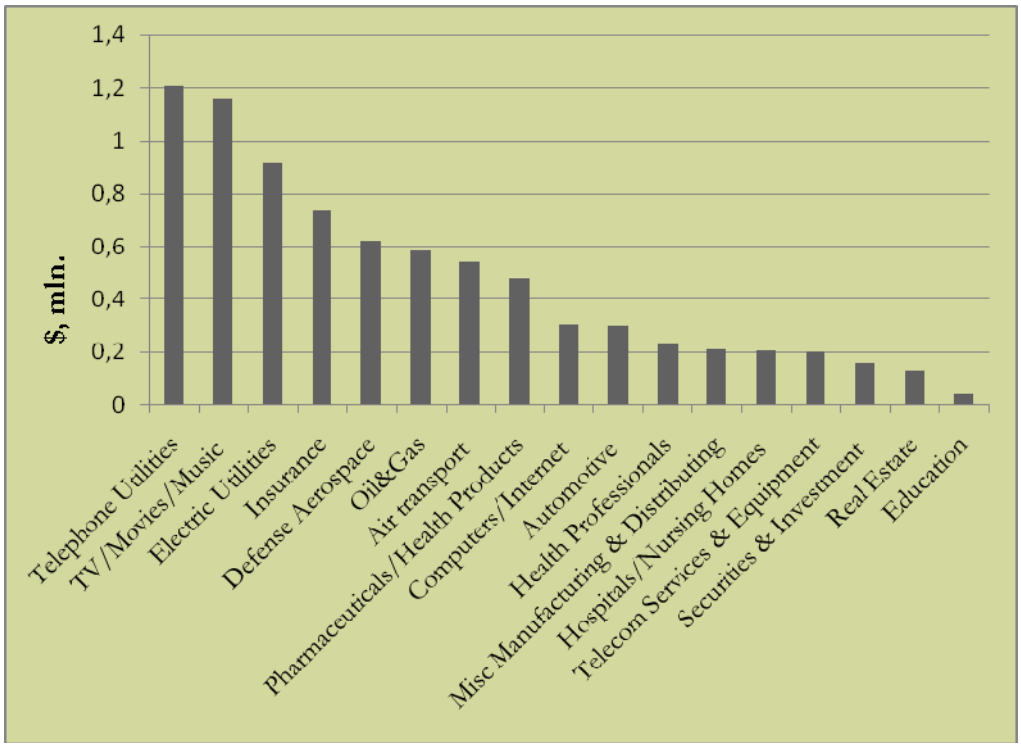

Figure 3. Firm's average lobbying expenditures across industries.

For estimation purposes the firms-outliers with the number of employees higher than 99th percentile were excluded from our sample. In addition, the firms with capital and labor exceeding the 90th percentile of the sample have been classified as large ones. The reason for creation the dummy *Large* has theoretical support: according to Alam et al. (2008) "large firms show higher productivity growth than small and medium firms". This variable is supposed to help *Lobbying* explain the residual variation of the firm's productivity growth.

Chapter 5

EMPIRICAL RESULTS

Firstly, to analyze the lobbying effect on productivity growth, the production function should be estimated. Several methods were applied to calculate the production function estimates, and the results are summarized in Table 4.

As a benchmark for the production function estimation the OLS-regression was used. This establishes the primary result that marginal increase in firms' inputs leads to the output growth, resulted from the production process. The inputs' estimates are proved to correspond to standard results: they are positive and significantly different from zero. However, these estimates of labor and capital are biased because of endogeneity arising from the equation: inputs are not exogenous. The Fixed Effect estimation, as well as the OLS-estimation, produces positive significant estimates for capital and labor. The results presented in Table 4 for OLS and FE models are robust to heteroskedasticity and autocorrelation (with autocorrelation being treated by industry-clustering the data). However, with weak instruments these methods lead to simultaneity bias so we should not rely excessively on the results obtained for OLS and FE models.

Thus, since capital and labor proxies are assumed to be endogenous – the causality may run in both directions. To solve this problem one would use the instrumental variable approach, which, taking as instruments the lagged values of output and inputs, removes the above mentioned problem. In addition, while running OLS and FE regressions, the heteroskedasticity in the error terms was found, so as to deal efficiently with this, we prefer GMM estimation to usual IV approach. The reason for using the lags of capital and labor in GMM-estimation is that they are not systematically correlated with

changes in productivity and can be valid instruments for current values of inputs. The only question is how many lags of variables to use as instruments. In our analysis we would refer to the methodology developed by Blundell and Bond (1998) who used 2 and 3 lags of capital and labor as instruments for explaining the variation in output.

Table 4. Estimation results for production function for the whole sample.

Estimation technique	**1**	**2**	**3**	**4**	**5**	**6**
Method	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
k_t	0.777***	0.820***	0.647***	0.741***	0.662***	0.821***
	(0.003)	(0.006)	(0.031)	(0.047)	(0.034)	(0.048)
l_t	0.467***	0.307***	0.388***	0.252***	0.396***	0.221***
	(0.007)	(0.014)	(0.052)	(0.073)	(0.052)	(0.065)
l_{t-1}			-0.165***	-0.086*	-0.157***	-0.075
			(0.029)	(0.041)	(0.029)	(0.039)
k_{t-1}			-0.236***	-0.424***	-0.278***	-0.534***
			(0.026)	(0.050)	(0.030)	(0.050)
y_{t-1}			0.476***	0.588***	0.495***	0.640***
			(0.015)	(0.028)	(0.013)	(0.023)
cons	0.555***	0.498***			0.013	0.010
	(0.042)	(0.066)			(0.018)	(0.019)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd)	74660	74660	59728	59728	67194	67194
R^2	0.913	0.880				
R^2 *adj.*	0.913	0.880				

Note: Robust standard errors in parentheses
***Statistically significant at the 1% level. ** Statistically significant at the 5% level.
*Statistically significant at the 10% level.

When applying Blundell-Bond estimation technique of GMM we get positive and significant capital and labor estimates for the difference GMM, as well as for the two-step GMM, both of which use (t-2) and (t-3) lagged values of *y, k* and *l* as instruments. As can be inferred from the all results, capital has higher

effect on the variation of firms' output compared to labor estimates. The coefficients for inputs seem to be persistently the same for all the models, which suggests that the production function employed in this research is correctly estimated. Standard errors reported for GMM estimators are consistent with panel-specific autocorrelation and heteroskedasticity.

As can be inferred from the results of tests for GMM robustness (Table C1), the overall fit of each of the models is quite good. Specifically, low p-values and high F-statistics suggest that the estimates of each of the models are jointly significant at 5% level. However, there is autocorrelation in first differences of the error terms and instruments are not jointly exogenous.

The next step of our analysis is checking whether lobbying has any effect on productivity (the estimates are presented in the Table 5).

The results of OLS regression of dummy *Lobby* on the residuals obtained from the production function estimation lead to the conclusion that the firms that lobby on average have higher productivity growth compared to those that don't lobby. It's interesting to notice that lobbying effect is quite robust for all the residuals of production function, regardless of the procedure by which it was estimated (either OLS or Fixed Effect or GMM). This leads to a strong conclusion that lobbying indeed affects the productivity growth. Some of the results may seem to contradict to theoretical predictions - larger firms in this sample have lower productivity. However, these are the extremely large firms with capital and labor exceeding (90^{th} percentile) -thus, all other things being equal, this may indicate that firms which have attained a certain level of size have stopped growing comparatively to smaller firms.

Table 5. Estimation of lobbying effect on productivity for the entire sample.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***
Lobby (dummy)	0.164***	0.451***	1.336***	1.192***	1.205***	0.760***
	(0.028)	(0.026)	(0.033)	(0.029)	(0.032)	(0.026)
Large (dummy)	0.111***	-0.097***	-1.667***	-1.214***	-1.467***	-0.460***
	(0.021)	(0.021)	(0.023)	(0.022)	(0.023)	(0.021)
cons	0.514***	0.506***	3.787***	2.547***	3.416***	0.991***
	(0.034)	(0.034)	(0.036)	(0.035)	(0.035)	(0.034)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N (thsd).	74660	74660	74660	74660	74660	74660
R^2	0.004	0.004	0.120	0.071	0.100	0.015
R^2 *adj.*	0.004	0.004	0.120	0.071	0.100	0.015

Note: Robust standard errors in parentheses.
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

All the models have coefficients of determination around 10% - this is not so high, however, this is expected since there could be some other factors besides lobbying expenditures which may explain the residual variation in productivity (such as material costs, level of technology, characteristics of human capital, methods of organizing production process etc.).

As it was already mentioned in the data description part of this research, we have created a dataset for lobbying and non-lobbying firms with similar level of total revenues and assets. After analyzing the effect of lobbying on TFP in the same two-step procedure, we have found statistically significant results for this relationship. Moreover, the estimates are not heavily different from the estimates for the whole sample. As can be inferred from the Table C3 in the Appendix C, among firms with similar characteristics, those which lobby, on average, have higher productivity growth. Thus, no matter which sample was

used, the results show that lobbying firms are more productive comparatively to their non-lobbying peers.

Once finding the positive effect of lobbying on productivity we estimate the extent of this impact by analyzing the sample of 775 lobbying firms. To ensure the robustness of the key results in Table 6 we add an additional control variable – the dummy for the large firms - which are those with labor and capital exceeding 90th percentile of samples values.

Table 6. Estimation results for production function for lobbying firms.

Estimation technique	1	2	3	4	5	6
Method	*OLS*	*Fixed Effect*	*Difference GMM (t-2)*	*Difference GMM (t-3)*	*System GMM (t-2)*	*System GMM (t-3)*
k_t	0.836***	0.815***	0.654***	0.581***	0.675***	0.588***
	(0.012)	(0.038)	(0.096)	(0.113)	(0.091)	(0.111)
l_t	0.273***	0.255**	0.226	0.344	0.264	0.399
	(0.027)	(0.076)	(0.266)	(0.368)	(0.234)	(0.280)
k_{t-1}			-0.236**	-0.255*	-0.229***	-0.280**
			(0.073)	(0.111)	(0.069)	(0.102)
l_{t-1}			-0.102	-0.244	-0.102	-0.260
			(0.152)	(0.221)	(0.139)	(0.200)
y_{t-1}			0.459***	0.595***	0.473***	0.622***
			(0.045)	(0.075)	(0.040)	(0.063)
cons	0.770***	1.327***			0.012	0.023
	(0.162)	(0.297)			(0.092)	(0.097)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd.)	7750	7750	6200	6200	6975	6975
R^2	0.847	0.777				
R^2 *adj.*	0.846	0.777				

Note: Robust standard errors in parentheses
***Statistically significant at the 1% level. ** Statistically significant at the 5% level.
*Statistically significant at the 10% level.

Generally, all techniques presented in Table 6 produce significant results for capital estimates. The labor estimates of GMM approach are not significantly different from zero. However, the insignificance of labor estimates does not come as a surprise in empirical research. Thus, while estimating the productivity of labor for Pakistan corporate data, Kiani (2008) has got insignificant coefficients for labor, so that it implied that "the small and large farm sizes have the more land productivities then middle farms". Moreover, Ekbom and Sterner (2008) pointed to the abundance of labor for productivity growth in their agricultural study of marginal productivity of labor (the average elasticity of output to labor was statistically insignificant in all models). The lag of the dependent variable used as an instrument has a positive significant impact on the current level of output which suggests that the series of output level is quite persistent through the lapse of time.

GMM estimates of the production function are the most consistent among those obtained – they get rid of autocorrelation, heteroskedasticity and fixed effects. However, system GMM is more efficient comparatively to difference GMM since this approach exploits two moment conditions (i.e., for the equation in differences and for the equation in levels), relying on exogeneity assumptions concerning lagged inputs and output needed to generate instruments. The following table (Table 7) presents the results of specification tests for GMM estimators.

All the models have high goodness of fit according to the large values of F-statistics. The test for overidentifying restrictions is performed using the J-statistic of Hansen, which is the most common diagnostic exploited in GMM estimation to evaluate the fitness of the model. The results of Hansen test with null hypothesis that "the instruments as a group are exogenous" for all the cases of GMM estimation show that we should not reject the null of valid

over-identifying restrictions since the p-values are higher than the 5% significance level. So, the GMM models are not weakened by many instruments, i.e. they satisfy the conditions of orthogonality needed for instruments' usage, which means that they are appropriate in our analysis.

Table 7. GMM robustness checks of the production function estimation for the sample of lobbying companies.

Estimation technique	**1**	**2**	**3**	**4**
Method	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
F-statistics	497.86	493.70	5879.04	6426.25
Hansen test	0.243	0.572	0.251	0.700
Arellano-Bond test for AR(1) in first differences	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2) in first differences	0.434	0.347	0.416	0.319

The Arellano-Bond test for autocorrelation has a null hypothesis that there is no autocorrelation and is applied to the differenced error terms of GMM estimation. According to the results of tests presented in Table 7, the test for AR (1) process in first differences suggest rejecting the null hypothesis, but this is anticipated since $\Delta u_{it} = u_{it} - u_{i,t-1}$ and $\Delta u_{i,t-1} = u_{i,t-1} - u_{i,t-2}$ both have $u_{i,t-1}$ (Mileva, 2007). The test for AR(2) in first differences is more essential since it reveals the autocorrelation in levels. The results don't suggest rejecting the null hypothesis – so there is no AR(2) in first differences, consequently, each of GMM models is appropriately estimated.

The next step of lobbying effect calculation is the estimation of a usual OLS regression of lobbying on the residual obtained from the production function estimation. This residual is that part of the production growth, which is left unexplained by the standard set of inputs (capital and labor), so it may be partially explained by some other factors, such as lobbying expenditures.

Before referring to the estimation of lobbying effect we can't leave the question of potential endogeneity of lobbying unsettled. It may be the case that not only lobbying activity may affect the productivity potential of a firm, but also productivity issues may induce the firms to lobby. For example, firms in low-productivity industries may lobby for the government protection, which is a reverse causality: the productivity level may affect the firm decision whether to lobby or not. For the purpose of checking whether there exists endogeneity problem the correlation between *Lobby* and the error term was tested, but it was proved to be statistically not different from zero. However, in order to be consistent, we would use the instrumental variable approach to get rid of simultaneity bias (results are presented in Table 9). As a remedy for potential endogeneity of lobbying we may use a proxy that doesn't suffer from the same problem: although lobbying may potentially be endogenous to productivity, it is unlikely that its past values are subject to the same problem. Moreover, the effect of lobbying on productivity may be delayed over time and not be instantaneous, so the first lag of *Lobby* should be a valid instrument. The usage of the first lag has a theoretical explanation: institutional hurdles in changing policies entail future pay-outs to lobbying; this is proved by results indicating that the firm's "financial operating performance is directly related to prior period lobbying (Chen, Parsley, and Yang (2009)). Industry-time dummies were also included into regression to remove industry-specific and time-invariant fixed effects.

As can be inferred from Table 8, the signs of the coefficients are remarkably stable across the models, indicating some robustness to the results shown. The statistically significant marginal value of lobbying estimate has an important economic implication as it suggests that each additional per cent of increase in lobbying expenditures increases the total factor productivity by roughly 0,057% (for our preferred model System GMM (t-2)). The resulting figure is not so

high, however, the corporate political activity does not attempt to have large economic effect on productivity, otherwise, the essential inputs (capital and labor) would not have had the main influence on output growth, as it is usually the case.

Table 8. Estimation for the effect of lobbying (in logarithms) on TFPG among lobbying firms.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***
$Ln(Lobby)_t$	0.019	0.026**	0.066***	0.069***	0.057***	0.061***
	(0.010)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
$Ln(Lobby)_{t-1}$	-0.006	-0.002	0.019	0.018	0.014	0.012
	(0.010)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)
Large (dummy)	-0.034	-0.305***	-1.965***	-2.171***	-1.611***	-1.875***
	(0.076)	(0.077)	(0.092)	(0.100)	(0.089)	(0.097)
cons	1.033***	1.596***	5.173***	5.815***	4.463***	5.259***
	(0.242)	(0.244)	(0.278)	(0.296)	(0.271)	(0.294)
Industry-time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N (thsd.)	6975.000	6975.000	6975.000	6975.000	6975.000	6975.000
R^2	0.030	0.034	0.135	0.148	0.106	0.123
R^2 *adj.*	0.008	0.012	0.115	0.128	0.086	0.103

Note: Robust standard errors in parentheses.
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

If expressing the effect of lobbying in absolute terms, the coefficient of interest is the incremental change in TFP attributable to an additional $1mln. spent on lobbying in the current year. According to results presented in Table C3 it may be concluded that when the lobbying expenditures increase by $1mln., the productivity growth accounts for about 10.5%.

As it was already noticed, lobbying firms are simply better at predicting the adoption of certain legislation and thereby lobby more intensively in expectation of the necessary policy regulations. Theoretically, this fact may cause a spurious significant and positive relation between productivity growth and lobbying. Thus, to address this concern we analyze whether the direct relation between TFP and lobbying (equation (4) in methodology part) is robust after accounting for firm-specific fixed-effects. The fixed effect estimation, by dropping the time invariant industry effects, should take into account the heterogeneity across firms in their ability to forecast the passage of necessary policies, an effect that may be attributed to the lobbying variable. The coefficients for the marginal value of lobbying expenditures using FE-specification (see Table C4) don't differ too much from the OLS coefficients. Hence, after accounting for fixed-effects, the direct relation between TFP and lobbying is still economically and statistically significant.

Hereinbelow the results of IV estimation of the lobbying effect are presented (see Table 9) – they statistically support the fact that the higher are expenditures on lobbying the higher is productivity. In particular, for system GMM (t-2) estimator the numbers infer that each 1$ mln. of lobbying expenditures allow to increase the productivity by 21.2% (this effect is even higher for IV approach than for OLS estimation). Moreover, not only contemporaneous effect of lobbying is observed, but the lagged effect is also present – both $\ln(Lobby_t)$ and $\ln(Lobby_{t-1})$ are statistically different from zero. Thus, regardless of model which has been used for the estimation of lobbying effect (OLS, FE or IV) the effect of lobbying, as well as of its lagged values, seems to be stably significant and positive, which indicates to the fact that positive coefficients obtained are not biased due to the model misspecification.

Table 9. Estimation of lobbying effect on productivity (IV approach) among lobbying firms.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***IV***	***IV***	***IV***	***IV***	***IV***	***IV***
Lobby	-0.029**	0.016	0.274***	0.279***	0.212***	0.222***
	(0.010)	(0.010)	(0.021)	(0.022)	(0.018)	(0.019)
Large (dummy)	-0.020	-0.323***	-2.177***	-2.397***	-1.779***	-2.062***
	(0.078)	(0.079)	(0.095)	(0.102)	(0.091)	(0.100)
cons	0.653***	1.237***	4.990***	5.727***	4.261***	5.170***
	(0.127)	(0.127)	(0.131)	(0.133)	(0.130)	(0.132)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd.)	6975	6975	6975	6975	6975	6975
R^2	0.002	0.006	0.104	0.119	0.077	0.096
R^2 *adj.*	0.001	0.005	0.103	0.118	0.076	0.095

Note: Robust standard errors in parentheses.
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

There may arise a question within which industry the effect of lobbying activity is higher. For these purposes we have merged the industries by their common area of business into more aggregate sectors (for more detailed classification the reader may refer to the Table B2 in the Appendix B); and have estimated the effect of lobbying for each of those sectors. As a dependent variable the residual of the production function from system GMM approach (t-2) was used, since this model was discussed to be the most consistent one among those proposed for production function estimation. The estimates of lobbying effect on TFP for different sectors are presented below in Table 10.

Table 10. Estimation of lobbying effect on TFP (OLS regression by sectors).

System GMM (t-2)				
Lobby	0.100**	0.106**	0.107**	0.107**
	(0.037)	(0.037)	(0.037)	(0.037)
$Lobby_{t-1}$	0.098*	0.097*	0.098*	0.098*
	(0.039)	(0.039)	(0.039)	(0.039)
cons	4.522***	4.615***	4.578***	4.578***
	(0.136)	(0.136)	(0.133)	(0.138)
Utilities sector dummy	0.265***			
	(0.079)			
Services sector dummy		-0.188*		
		(0.086)		
Manufacturing sector dummy			-0.014	
			(0.091)	
High-tech sector dummy				-0.018
				(0.076)
Year dummy	Yes	Yes	Yes	Yes
N	6975.000	6975.000	6975.000	6975.000
R^2	0.079	0.078	0.078	0.078
R^2 *adj.*	0.077	0.077	0.076	0.076

Note: Robust standard errors in parentheses.
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

As can be inferred from the above presented table the lobbying effect is especially significant in the sector of utilities (Oil&Gas and Electric utilities). This does not come as a surprise since the utilities sector is usually the one operating in an environment with limited competition (typically, oil and gas industries, as well as electric utilities are natural monopolies). With profits highly dependent on the probabilities of new competitors' entrance, companies operating in these industries lobby for barriers for new entrants. Compared, for instance, with high-tech sector, where companies may increase their productivity by investing in R&D, utilities sector has lower possibilities to perform in the same way due to the limited ability to expand. Therefore, the lobbying activity is of a higher importance for such industry.

To resume, we may point out that the findings of this study are quite robust to all the models used both for estimation of production function, and for the evaluation of lobbying effect. Thus, lobbying indeed has a positive influence on the firms' productivity growth. Other things being equal, among companies of the same size, those which lobby have higher TFP growth, and even more, the extent of this effect rises with the increase of expenditures on corporate lobbying. Since, to the best of our knowledge, nobody else has estimated the effect of lobbying on TFP yet, we can't compare our findings with similar studies. However, if referring to the theoretical study of Islam and Lopez (2011), who argued that "rent-seeking activities reduce the rate of growth of total factor productivity because they contribute to reducing the stock of labor power engaged in creating productive new ideas", we may provide quite the opposite results: lobbying, being a kind of rent-seeking activity, improves the productivity growth, especially in utilities sector. It may be the case that the TFP growth, resulted from a firm's financial improvement due to the promotion of company's interests, would exceed the TFP decrease caused by a reduction in some research and development activities. This finding seems to provide a new look onto the consequences of lobbying on corporate activity and may stimulate the firms' managers to pay greater attention to promoting the interests of their companies.

Moreover, if drawing a parallel between the current research and a study by Konings and Vandenbussche (2008), who investigated the effect of antidumping protection on the TFP of domestic import competing, we may find a common feature that political control indeed is able to affect the firms' productivity growth in a positive way. Thus, in addition to all the studies evaluating the effect of lobbying on a firm's value, stock returns, financial performance, this research has supplemented the investigation of lobbying consequences by shedding the light on its effect on productivity growth.

Chapter 6

CONCLUSIONS

This paper is the first attempt to analyze the productivity growth caused by firms' lobbying activity. The research was held on the sample of 7466 US firms, 775 out of which were lobbying during a 10-year period. Summarizing the findings of the paper it's worth pointing out that the output increases not only as a result of standard set of inputs, such as labor and capital, but due to some non-operational actions carried out by a firm, particularly, corporate political activity (through its impact on productivity growth). This activity was measured by individual annual expenditures on lobbying.

Our empirical results suggest that by increasing lobbying expenditures by 1% firms, on average, should increase their productivity by 0.057%. This finding leads to a conclusion that firm's expenditures on lobbying, at the beginning generating cash outflows, afterwards lead to an increase in firm's efficiency by enhancing business conditions for every-day operations. Spending funds on lobbying for favorable policies, firms are getting more chances for improving their business environment. Beneficial conditions in competition ensure the increase in firm's profitability and performance, as a whole, which, in its turn, improves the production process. Thus, such a finding is quite useful and may even induce some managers to pay more attention to corporate political activity conducted by their firms. However, this study raises additional questions concerning the optimal amount of lobbying expenditures which should be carried by companies. These issues are left for the further researches on the related topics.

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APPENDIX A

Table A1. Descriptive statistics for the sample of lobbying companies for Total Revenues (*Y*) and Total Assets (*K*) by year ($mln.).

Year	N	Y		K	
		Mean	Standard deviation	Mean	Standard deviation
2001	775	7860.733	15603.13	16153.7	64289.05
2002	775	7263.513	14955.88	16337.54	67468.79
2003	775	6875.734	15195.03	16600.47	72191.22
2004	775	7422.372	16786.83	17790.74	89058.79
2005	775	7325.704	18514.46	18240.82	92991.76
2006	775	7002.809	18300.84	19629.51	104481.2
2007	775	6774.651	18918.11	20426.28	117020.5
2008	775	6369.46	19880.27	19191.55	115406.2
2009	775	5474.527	15034.2	19668.42	116532.7
2010	775	5862.149	17097.39	19794.95	116903.9
Total	7750	6823.165	17118.6	18383.4	97756.01

Table A2. Descriptive statistics for the sample of lobbying companies for Total Revenues (*Y*) and Total Assets (*K*) by industry ($mln).

Industry	N	Y		K	
		Mean	Standard deviation	Mean	Standard deviation
Misc Manufacturing & Distributing	970	4519.013	7974.704	12130.08	71280.09
Pharmaceuticals/Health Products	1360	8504.614	14112.69	7498.561	16191.91
Insurance	410	10171.27	14636.13	86581.59	236060.7
Computers/Internet	1190	4824.37	10577.87	5272.126	10360.63
TV/Movies/Music	300	5872.849	14938.06	13552.52	35303.56
Automotive	240	9456.534	28767.88	13985.84	47713.79
Securities & Investment	310	3944.756	9601.957	64580.53	229893.1
Air transport	320	6026.221	9576.142	7387.603	10555.01
Health Professionals	70	996.4673	1306.578	922.2539	1318.827
Electric Utilities	730	6018.705	10805.04	15199.73	26761.19
Oil&Gas	690	13429.6	39584.03	12861.92	29442.85
Real Estate	400	5922.664	12722.81	58502.85	241561.5
Defense Aerospace	60	7973.325	9668.757	9502.837	11950.93
Telecom Services & Equipment	350	3489.739	8727.794	4858.704	10749.71
Education	100	4919.343	12446.74	1133.216	5715.63
Hospitals/Nursing Homes	110	2626.033	2771.998	2743.431	3130.361
Telephone Utilities	140	8974.315	19832.93	20046.01	44280.94
Total	7750	6823.165	17118.6	18383.4	97756.01

Table A3. Descriptive statistics for the sample of lobbying companies for Total Lobbying Expenditures (*Lobby* - in $) and Labor (№ of workers) by year.

Year	N	Lobby		Labor	
		Mean	Standard deviation	Mean	Standard deviation
2001	775	369999.5	1263117	12128.85	33625.62
2002	775	381609.4	1199597	11591.21	30339.71
2003	775	381648.4	1165082	11663.34	30333.6
2004	775	396433.7	1196559	11707.22	31365.84
2005	775	438482.4	1606686	12188.06	32269.87
2006	775	473424.1	1765836	12444.14	34193.28
2007	775	473036.2	1544033	12390.87	34739.82
2008	775	563176.8	1927189	12266.42	34348.72
2009	775	594783.9	1977298	11616.38	32999.21
2010	775	598189.4	2103841	11764.18	33341.95
Total	7750	467078.4	1612444	11976.07	32774.26

Table A4. Descriptive statistics for the sample of lobbying companies for Total Lobbying Expenditures (*Lobby* - in $) and Labor (№ of workers) by industry.

Industry	N	Lobby		Labor	
		Mean	Standard deviation	Mean	Standard deviation
Misc Manufacturing & Distributing	970	211886.9	574162.7	14508.24	23366.09
Pharmaceuticals/Health Products	1360	483164	1483339	6867.441	18253.94
Insurance	410	735684.1	1216512	19673.88	47001.62
Computers/Internet	1190	307459.4	1027859	8828.72	20501.88
TV/Movies/Music	300	1161094	3937861	16897.02	49572.65
Automotive	240	303122.5	1271815	25977.27	59597.06
Securities & Investment	310	161159.6	328703.3	10747.64	32849.5
Air transport	320	542534.3	1159066	27218.3	69997.57
Health Professionals	70	233984.7	408432.3	2846.886	2236.152
Electric Utilities	730	913223.5	2289605	11716.68	32850.4
Oil&Gas	690	588441.9	2173273	8186.746	17978.65
Real Estate	400	130252.9	353563.2	8500.532	32897.61
Defense Aerospace	60	620215.4	1817590	36239.03	46004.85
Telecom Services & Equipment	350	201565.7	589440.8	3282.594	8187.52
Education	100	43119.54	86778.27	3874.83	5542.401
Hospitals/Nursing Homes	110	205585.8	328099	21787.08	22611.97
Telephone Utilities	140	1208737	3158555	25537.44	58611.09
Total	7750	467078.4	1612444	11976.07	32774.26

Table A5. Descriptive statistics for sample of similar lobbying and non-lobbying firms.

Year	Y			K			Labor		
	N	**Mean**	**St.dev.**	**N**	**Mean**	**St.dev.**	**N**	**Mean**	**St.dev.**
2001	7176	17,9497	2,8494	7451	18,7118	2,94811	5723	6,08550	2,4240
2002	6587	18,0701	2,8425	6836	18,8340	2,9742	5472	6,11391	2,4479
2003	6094	18,1871	2,8589	6330	18,9793	2,98458	5639	6,05394	2,4476
2004	5688	18,3141	2,9045	5884	19,1377	2,97300	5213	6,13501	2,4549
2005	5238	18,4731	2,8774	5422	19,3039	2,92320	4892	6,23481	2,4576
2006	4812	18,5818	2,9101	4956	19,4485	2,90509	4476	6,36533	2,4561
2007	4385	18,7238	2,8494	4528	19,5864	2,8932	4038	6,44737	2,4480
2008	4037	18,7763	2,8788	4162	19,6227	2,92610	3666	6,54997	2,4269
2009	3784	18,7639	2,8752	3928	19,7003	2,97307	3422	6,57166	2,4382
2010	3508	18,9410	2,8465	3641	19,8087	2,93866	3241	6,62713	2,4661
Total	51309	18,4055	2,8859	53138	19,2298	2,96928	45782	6,27775	2,4545

Note: Y and K are in $mln.

Table A6. Descriptive statistics for Compustat data on 23125 US companies[10]

Variable		N	Mean	St. dev.
Y	Total Revenue ($mln.)	231 250	503.97	4 412.28
L	Labor (№ of employees)	231 250	1 796.03	13 093.89
K	Total assets ($mln.)	231 250	2 386.16	33 943.39

[10] This is shown to compare with statistics of the sample used in this study.

APPENDIX B

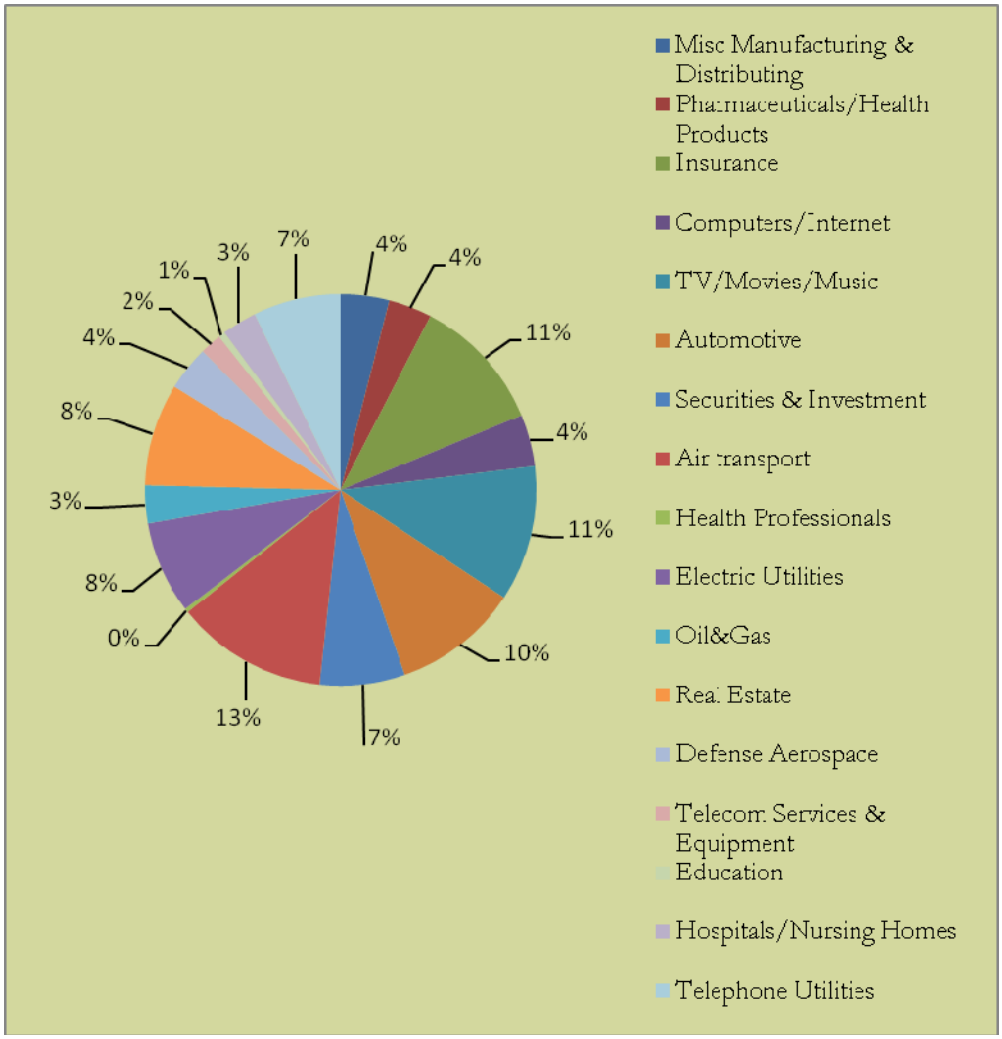

Figure B1. Decomposition of lobbying expenditures (as a percentage of total expenditures in the sample) by industries.

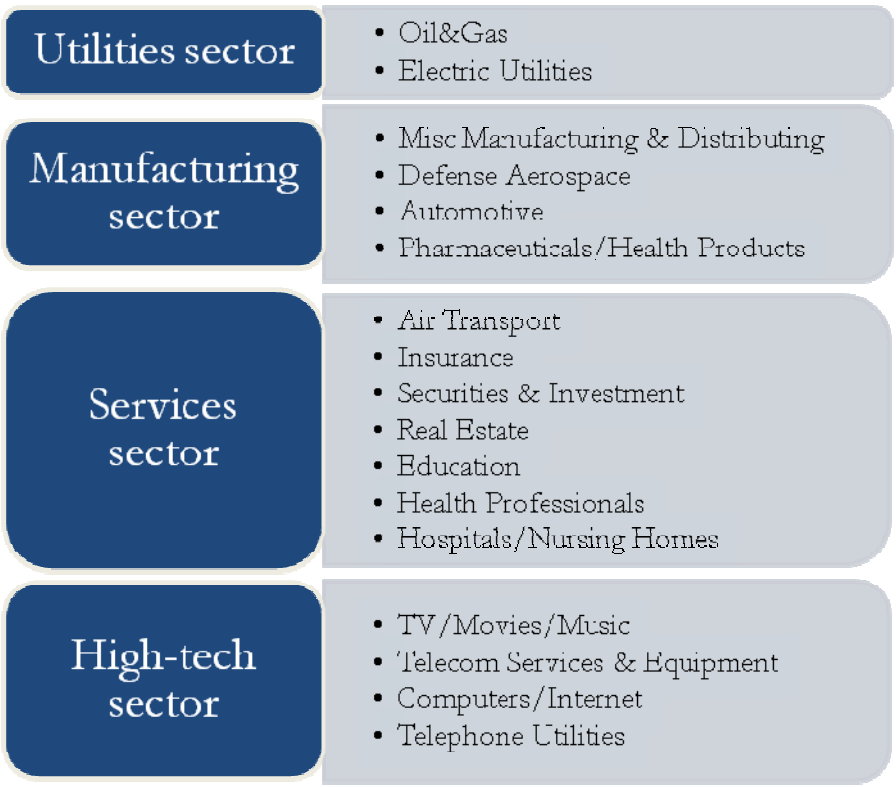

Figure B2. Classification of industries by sector (sample of lobbying firms).

APPENDIX C

Table C1. GMM robustness checks of production function estimation for the whole sample.

Estimation technique	1	2	3	4
Method	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
F-statistics	10104.88	12221.00	79048.46	114018.25
Sargan test	0.000	0.000	0.000	0.000
Hansen test	0.000	0.358	0.000	0.002
Arellano-Bond test for AR(1) in first differences	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2) in first differences	0.000	0.000	0.000	0.000

Table C2. Estimation results for production function for the sample of similar lobbying and non-lobbying firms.

Estimation technique	**1**	**2**	**3**	**4**	**5**	**6**
Method	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
k_t	0.355***	0.416***	0.240	0.204	0.062	0.199
	(0.004)	(0.020)	(0.153)	(0.155)	(0.104)	(0.153)
l_t	0.737***	0.404***	-0.301	0.083	1.233***	0.751**
	(0.004)	(0.027)	(0.264)	(0.270)	(0.164)	(0.253)
l_{t-1}			0.195	0.023	-0.809***	-0.447
			(0.187)	(0.236)	(0.145)	(0.243)
k_{t-1}			0.113	0.296*	-0.023	-0.096
			(0.097)	(0.134)	(0.096)	(0.154)
y_{t-1}			0.399***	0.363***	0.587***	0.636***
			(0.040)	(0.066)	(0.027)	(0.036)
cons	6.931***	7.774***			4.313***	2.891***
	(0.053)	(0.304)			(0.517)	(0.600)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd)	44788	44788	30246	30246	36789	36789
R^2	0.861	0.335				
R^2 *adj.*	0.861	0.335				

Note: Robust standard errors in parentheses
***Statistically significant at the 1% level. ** Statistically significant at the 5% level.
*Statistically significant at the 10% level.

Table C3. Estimation of lobbying effect on productivity for the sample of similar lobbying and non-lobbying firms.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***
Lobby (dummy)	0.272***	0.546***	1.597***	1.230***	0.178***	0.498***
	(0.014)	(0.016)	(0.035)	(0.027)	(0.018)	(0.016)
Large (dummy)	-0.275***	0.936***	4.532***	3.023***	-1.394***	0.193***
	(0.011)	(0.011)	(0.022)	(0.017)	(0.014)	(0.012)
cons	6.940***	7.713***	15.019***	13.506***	9.566***	9.764***
	(0.014)	(0.016)	(0.034)	(0.025)	(0.017)	(0.015)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N (thsd).	44788	44788	44788	44788	44788	44788
R^2	0.009	0.082	0.282	0.239	0.105	0.024
R^2 *adj.*	0.009	0.081	0.281	0.239	0.105	0.024

Note: Robust standard errors in parentheses
***Statistically significant at the 1% level. ** Statistically significant at the 5% level.
*Statistically significant at the 10% level.

Table C4. Estimation results for the effect of lobbying (in levels) on TFPG among lobbying firms.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***	***OLS***
$Lobby_t$	-0.007	0.014	0.134**	0.136**	0.105**	0.109**
	(0.011)	(0.012)	(0.046)	(0.048)	(0.037)	(0.040)
$Lobby_{t-1}$	-0.018	0.003	0.127**	0.128*	0.097*	0.099*
	(0.012)	(0.013)	(0.048)	(0.050)	(0.039)	(0.042)
Large (dummy)	-0.035	-0.335***	-2.167***	-2.377***	-1.772***	-2.042***
	(0.078)	(0.078)	(0.095)	(0.103)	(0.091)	(0.101)
cons	1.106***	1.721***	5.603***	6.253***	4.820***	5.629***
	(0.240)	(0.242)	(0.276)	(0.294)	(0.268)	(0.291)
Industry-time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd.)	6975	6975	6975	6975	6975	6975
R^2	0.029	0.031	0.127	0.140	0.099	0.116
R^2 *adj.*	0.007	0.009	0.107	0.120	0.079	0.096

Note: Robust standard errors in parentheses
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.

Table C5. Estimation of lobbying effect (FE approach) on productivity among lobbying firms.

Technique for production function	***OLS***	***Fixed Effect***	***Difference GMM (t-2)***	***Difference GMM (t-3)***	***System GMM (t-2)***	***System GMM (t-3)***
Method	***FE***	***FE***	***FE***	***FE***	***FE***	***FE***
$Lobby_t$	0.029*	0.038*	0.098**	0.111**	0.079**	0.103**
	(0.013)	(0.015)	(0.036)	(0.041)	(0.029)	(0.038)
$Lobby_{t-1}$	0.026*	0.033**	0.078**	0.093**	0.066**	0.088***
	(0.012)	(0.012)	(0.026)	(0.028)	(0.020)	(0.026)
Large (dummy)	0.423*	0.047	-1.968***	-2.082***	-1.184***	-1.665***
	(0.197)	(0.199)	(0.227)	(0.245)	(0.218)	(0.242)
cons	0.678***	1.352***	5.302***	6.055***	3.998***	5.459***
	(0.114)	(0.114)	(0.122)	(0.127)	(0.119)	(0.125)
Industry-time dummy	Yes	Yes	Yes	Yes	Yes	Yes
N(thsd.)	6975	6975	6975	6975	6975	6975
R^2	0.022	0.024	0.103	0.117	0.064	0.097
R^2 *adj.*	0.003	0.004	0.084	0.099	0.045	0.078

Note: Robust standard errors in parentheses.
*** Statistically significant at the 1% level. ** Statistically significant at the 5% level.
* Statistically significant at the 10% level.