EUROPEAN CENTRAL BANK
EUROSYSTEM

Working Paper Series

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Lobbying in Europe: new firm-level evidence

No 2071 / June 2017

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Abstract

Lobbying can provide policy makers with important sector-specific information and thereby facilitating informed decisions. If going far beyond this, in particular if successfully influencing policy makers to unnecessarily tighten regulation or not opening already excessively regulated markets, it could potentially reduce overall economic welfare. We create a unique firm-level database on EU lobby activity and firm characteristics. We tend to find that firms in more protected sector, e.g. firms from non-tradable or higher regulated sectors tend to spend more for lobby activities. Also such firms tend to have higher profit margins and lower productivity, as often the case in sheltered sectors.

JEL classification: D72, D78, O38

Keywords: lobbying, regulation, political economy

Non-technical summary

Lobbying activities can serve an important purpose namely to provide policy makers with sectoral knowledge to enable more informed policy decisions. However, where lobbying goes far beyond such motives and instead aims to convince policy makers to unnecessarily restrict regulation for the benefit of incumbent firms or prevent opening excessively regulated markets, lobbying can become welfare decreasing. The incentives for firms to act in this way have been demonstrated in theoretical contributions of the literature (e.g. the private interest theory of regulations proposed by Stigler, 1971 or Peltzman, 1976), but it is difficult to find robust empirical evidence for it given that lobbying is most often not transparently exercised and therefore not well documented.

When comparing reforms in different sectors, it seems that the influence of firms to prevent reforms in product markets is larger, at least when looking at track record of reform implementation in euro area countries. Product market reforms fell significantly back in recent years compared to labour market reforms. The same is true for reforms of countries under an economic adjustment programme. In this light, several observers, such as international institutions, have argued that product market reforms in programme countries were not successfully implemented given the strong resistance from vested interests, a hypothesis also shared among national politicians.

We aim to shed some light on lobbying activities in the EU, by creating a unique firm-level dataset of European firms, which draws on lobbying activity recorded by the Brussel-based Transparency Register merged with firm-level characteristics derived through AMADEUS.

We find significant correlation between firms' lobbying intensity and their size, both as measured by employment and turnover (or value added). Most importantly, however, we also present evidence that suggests that firms from non-tradable or higher regulated sectors tend to be more engaged in lobbying than firms from export-oriented or more competitive markets. Also firms with higher lobbying expenditure seem to have a higher profit margin and are less productive, which according to the literature, tend to be features of firms operating in closed or highly concentrated markets.

With this in mind, we also contrast reform implementation in higher regulated sector in recent years with respective lobbying activity in these sectors as identified through our dataset. A negative, although rather weak, relation indeed seems to exist, suggesting that fewer reforms were implemented in those sectors with higher lobbying expenditure.

While stressing the caveats of our analysis and highlighting correlation rather than necessarily causality, still the evidence presented in this paper tends to support the prevailing view in the literature, namely that caution is needed when dealing with lobbying activity. Policy makers face the difficult balance between receiving valuable sectoral information, but at the same time avoiding that lobbying activity undermines competition in sectors where regulation seems excessive.

1. Introduction

In market economies regulations are often needed to prevent market failure and preserve social cohesion, and therefore play a significant role in determining economic structures, for example in labour or product markets. While they can are in principle welfare-enhancing (e.g. in the case of natural monopolies), too much regulation could create the wrong incentives for investors, firms and employees, so that labour or capital is not used where it is most useful from a welfare perspective. Necessary reforms to reduce excessive regulation and increase competition are said to be often blocked by influential lobbying activity (also so-called vested interests).

Vested interests exist in both labour and product markets. The bulk of the firm-level lobbying (and their associations) is however in practice undertaken to influence product market regulations. The incumbent firms in higher regulated product markets aim to lobby vis-à-vis responsible politicians for keeping regulations high as liberalisation would increase competition and reduce incumbents' excess rents. Labour market regulations are said to be less of the focus of firm lobbing. By contrast, trade unions lobby for employment protection legislation defending the interests of their constituencies, i.e. contracted employees.

Looking at labour and product market reform implementation in euro area countries, product market measures fell significantly back in recent years compared to labour market reforms (ECB, 2016). This is true for the euro area as a whole, but also specifically for reforms of countries under an economic adjustment programme. Product market reforms in programme countries were not successfully implemented given the strong resistance from vested interests as for example argued by the European Commission (2015, 2016), or the ECB (see Praet, 2014; Coeuré, 2016). Although the overall hypothesis that lobbying can prevent reform implementation seems to be shared among national politicians and institutions (see e.g. Cameron, 2010; IMF, 2004; Dombrovskis, 2016), it is difficult to find robust empirical evidence for it given that lobbying is most often not transparently exercised, and therefore not well documented.

A larger literature exists for the US (e.g. Lenway et al., 1995; Grier et al., 1994; Hill et al., 2013; Chen et al., 2015), in particular making use of campaign contribution data (e.g. Grier et al., 1994; Hill et al., 2013), given that firms are required to register such national lobby activity. The literature on lobbying in Europe is less developed, mainly due to lack of available data on lobby activity. Most studies remain exploratory or descriptive (Coen, 2007). In this view, some studies (e.g. Klüver, 2013) tried to overcome the lack of data by making use of textual analysis of documents sent for consultation to Commission Services. Mahoney (2007) instead used a small set of interviews in US and EU firms to gain evidence on their lobby activity. Bernhagen and Mitchell (2009) is one of the few studies also relying on firm-level data in the EU (although using a smaller sample).

This paper tries to gather empirical evidence for lobbying activity in Europe by making use of a new EU lobby database, registering lobbying activity in particular in Brussels, and combining them with firm-level characteristics.

Section 2 will elaborate on the possible determinants of firm lobbying. Section 3 will introduce the two parts of the dataset, while Section 4 will elaborate on the methodology applied and outline the main results. Section 5 takes up the derived results and poses the question whether there might be a relation between lobbying and the lack of structural reforms in product markets. Section 6 concludes.

2. What influences the likelihood of firm lobbying?

The private interest theory of regulations (Stigler, 1971; Peltzman, 1976) laid the basis for the expectations that firms have a financial incentive to lobby for protection. Stigler (1971) describes that the state has the power to tax, subsidize, and regulate economic agents, here mainly firms. This can selectively benefit or disadvantage particular firms or industries. Lobbying can generate positive returns for firms if they are able to e.g. secure direct subsidies or lower taxes, government contracts, or limiting competition. For the latter, the rent-seeking private firms try to maximise these rents by shaping, twisting or preserving these regulations.

The EU in fact, as pointed out by Bernhagen and Mitchell (2009), attracts lobbyist from firms' head-quarters given the sheer amount of legislations it produces for the various sectors in EU member states, which are most often binding, in particular as regards Directives under the Single Market. Hence, firms bear the costs or obtain the benefits of these actions (Majone, 1996). Yet, not all firms might have the same incentives and the same resources to undertake lobbying in the EU, in particular if this is also beyond national borders (Bernhagen and Mitchell, 2009).

Lobbying clearly can be done already by one dedicated employee, but obviously more resources can be set aside if the firm has a higher turnover. Therefore, we assume that firms are more likely to undertake lobbying the larger they are. This would be also in line with evidence gathered for the US (Grier et al. 1994; Kerr et al., 2014; or de Figueiredo and Tiller, 2001). We will use different proxies for firm size. Most importantly, we will rely on turnover data, but also cross-check with data on value added and employment.

In line with the standard profit seeking argument, firms are more inclined to lobby if they assume that legislative and regulatory action will provide them with excess rents, which is most often the case in smaller, in particular more concentrated markets with limited competition. This is in line with what Grier et al. (1994) or Hill et al. (2013) find for the US and what Bernhagen and Mitchell (2009) concludes for a smaller panel of EU firms. One option is to measure this with indicators gauging industry concentration. However, they have

been subject of repeated criticism (see e.g. Brasher and Lowery, 2006).[1] Instead, we use two instruments. First, a dummy for the non-tradable sector, as the literature (e.g. Amador and Soares, 2012) shows that non-tradable sectors are usually more concentrated giving larger market power to fewer firms.

At the same time, as e.g. shown in Bottini and Molnár (2010), these non-tradable sectors have particularly high mark-ups, which are also an expression of the higher concentration, i.e. the lower competition. In view of the latter we also instrument concentration by an indicator of profitability, assuming that firms in more sheltered markets are able to generate the above mentioned excess rents and therefore tend to exhibit higher profit margins. This is in line with the literature (e.g. Heger and Kraft, 2008) which tends to find that profitability is higher in markets with less competition.

In the same vein, but with a somewhat different focus, we also control for productivity of firms. We would expect firms in protected markets to be less productive as they are not under the same cost pressures of companies in competitive markets.

In addition, and most importantly against the background of the hypothesis mentioned above, namely that firms aim to lobby for keeping protective regulations, we also explicitly control for the rigidity of sectoral regulation. However, there is not one index which homogeneously measures regulation across sectors. We apply the OECD FDI restrictiveness index, as this is the index available for the largest set of sectors. We thereby assume that the restriction vis-à-vis foreign capital is a reasonable proxy for the overall intensity of regulation in the given sector.

Are firms which lobby likely to be less or more innovative? The literature seems split on this question. On the one hand, innovative firms are likely to be more inclined to lobby to protect their innovation. Also a positive correlation could be expected as EU firms are significant recipients of research and development funds under the EU framework funds (Hix and Høyland, 2011). It could therefore be hypothesised that firms lobby in Brussels for those funds. Following these line of arguments, we could expect a positive link between lobbying and innovative capacity. Yet, on the other hand, it might be argued that firms in protected markets are less under pressure to innovate, and therefore tend to undertake fewer efforts to do so than firms in industries under high competition. The latter was found by Lenway et al. (1995) for American manufacturing firms. In our empirical analysis in the next section we will proxy innovative capacity by the number of patents per firm per year.

[1] Brasher and Lowery (2006) argue that similar measures of concentration or competition within an industry have generated very inconsistent results across the literature.

3. Creating a unique firm-level dataset on lobbying activities and firm characteristics

3.1 Lobbying through the eyes of the Transparency Register

Naturally firms do not tend to be voluntarily transparent when it comes to reporting their attempts to influence policy makers' decisions. Against this background the literature on lobbying activity is relatively scarce as homogeneous datasets of firms' lobbying activities have not at all been available for a long time. For the US the literature is somewhat more extensive. Researchers (e.g. Grier et al. 1994 or Hill et al., 2013) drew here on the Federal Election Database for corporate campaign contributions. Others tried to proxy lobbying activities through small-scale surveys (e.g. Mahoney, 2007). For Europe, there the literature is by far more limited, and was at the beginning mainly limited to textual analysis (Klüver, 2013), with a few exceptions such as Bernhagen and Mitchell (2009).

The Transparency Register is a new database covering lobbying activities in the EU and is managed by the Joint Transparency Register Secretariat (JTRS) formed by the Commission and the European Parliament following the Commission's European Transparency Initiative in 2005. It was set-up to address the issue of source diversity for information on lobbying in the EU before 2008, namely the CONECCS (European Commission) database, the Phillip and Landmarks directories which suffered from methodological and substantive differences.

The Register is a living document covering firms and organizations which are registered in Brussels and national member states. Registration is voluntary, but necessary to gain access to EU institutions, data, public consultations, meetings with Members of the European Parliament, Commissioners, Cabinet Members or representatives of the Commission Services (e.g. Director Generals).

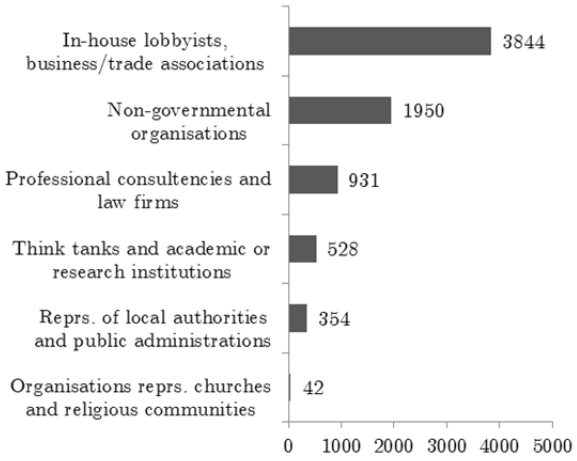
The data firms have to provide when registering are clarified in the Transparency Register Implementing Guidelines (JTRS, 2015), which in turn have their legal basis in the Interinstitutional Agreement between European Commission and European Parliament.[2] According to these guidelines, firms have to insert their annual lobbying expenses either as an absolute amount or select a respective expense interval, of which 32 are available from zero to above ten million. Firms' lobbying budget includes both direct (e.g. contact of Commission or Parliament officials) and indirect (e.g. through other channels such as media, public events) lobbying activities. The budget is meant to cover all costs of an office located in Brussels and in their national country as long as the activity is carried out with the objective "of directly or indirectly influencing the formulation or implementation of policy

[2] Agreement between the European Parliament and the European Commission on the transparency register for organisations and self-employed individuals engaged in EU policy-making and policy implementation, Official Journal L 277, 19.9.2014, p. 11–24.

and the decision-making process of the EU institutions".[3] Accordingly, the lobbying expenses are only covering the efforts to influence political decisions at EU not at national level. However, the resources can be spent by e.g. offices and staff in Brussels or in the national member state. Moreover, according to the Register's guidelines, firms have to update their data once a year at least, but are advised to do so even more timely where possible.

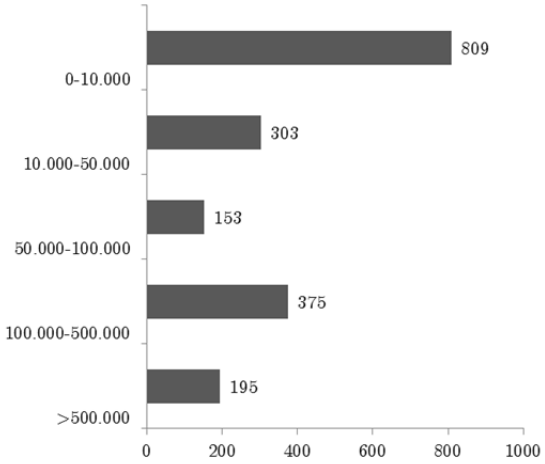
Unfortunately the Register does not keep track of past data. Against this background, we are limited to a cross-sectional analysis using the latest available vintage, while a panel analysis for different years is not possible. As with most micro-level databases, before starting the empirical analysis we undertook a significant cleaning of the Transparency Register with a view to account for erroneous entries in the database and match the firms to respective NACE classified sectors.

Chart 1: Lobbying by type of registered entity



Source: Transparency Register.

Chart 2: Firm distribution of private sector lobbying expenditure (in EUR)



Source: Transparency Register.

Overall, beginning of 2016, the Transparency Register contained a total of around 7700 registered entities. Chart 1 shows that the largest sub-set contains the private sector lobbying activities ('direct lobbying') with a total of around 4000 firms and another ca. 1000 consultancies or law-firms lobbying on behalf of other firms ('indirect lobbying'). Another 2000 NGOs are as well registered in the database. The remaining part of the Register is small and contains think tanks, academic institutions and a small number of organisations representing local, regional and municipal, or religious authorities. For the purpose of this study, namely gauging the impact of lobbying on firm characteristics and regulation intensity, we focus on private sector lobbying, i.e. the 5000 firms covered under direct and indirect lobbying by companies. We further restrict the sample by focussing on EU registered companies, bringing the set of firms down to around 4800 firms.

[3] JTRS, 2015, p. 9.

Firms registered in the Transparency Register overall spend a total of EUR 1.14 bn per year on lobbying activities, implying a budget of EUR 238.000 on average per firm registered. However, the average figure hides a skewed distribution with 70% of firms spending up to EUR 100.000. Conversely, a set of 102 spend equal to or above one million euro.

3.2 Matching the Transparency Register with firm characteristics

Aside of the information on lobbying expenses, the Transparency Register entails very limited information about firm characteristics. With a view to better understand which enterprises lobby, we match the firms in the Register with the AMADEUS database (maintained by Bureau van Dijk). We manage to successfully identify about 2000 out of 4774 which report to lobby (directly or indirectly). This enables us to look at their firm characteristics. In Section 4.3, as a robustness check to the baseline regressions, we investigate in greater detail the possibility of a selection bias comparing our sample to a sample of firms not registered in the Transparency Register.

In line with our hypothesis and the existing literature, as elaborated in Section 2 we focus on turnover, value added, employment, profitability, innovative activities (proxied by the number of patents), and productivity growth. We also match firms to the respective regulatory intensity, as measured by the OECD FDI restrictiveness index.[4] Unfortunately, not all firms report all variables we are interested in. Thus, although around 2000 firms have been successfully matched, we will see in the regression analysis that the number of observations can be lower depending on how many variables are jointly included as regressors.

Table 1: Correlation between disaggregate lobbying expenditure groups and average firm characteristics

	turnover	value added	employees	profit margin	patents	productivity growth	regulation intensity
lobby expenditure	0.549	0.5812	0.4591	0.1904	0.041	-0.1871	0.2210

Source: author's calculation based on Transparency Register and Amadeus data.

Table 1 looks at the correlation between firm's lobby expenditure groups and compares them to the firms' average value in terms of the respective firm characteristics in the given bracket. In terms of sign all correlation coefficients point in the direction expected in Section 2 (leaving aside innovative capacity where we were ambiguous ex-ante).

[4] As noted above, we chose the OECD FDI restrictiveness index as it has the largest availability through sectors and countries. Alternatively, we could have chosen the OECD PRM index, which however would further reduce the sample size significantly.

Data indeed indicate a close link between the amount of lobbying put forward annually and the size of the firm, as expressed for example through firm's turnover, value added or number of employees. The correlation between the profitability of a firms (expressed as the profit margin, i.e. the income in percent of total revenues) and lobbying expenses is less strong though. Still the coefficient indicates that there is positive link between a firm's profit margin indicator and lobbying expenditure. The correlation coefficient of productivity is similarly weak, but negative and therefore in line with expectations put forward in Section 2. For innovative capacity the correlation is close to zero, but positive. This does not seem to reveal a clear direction between the two variables. The correlation between lobbying expenditure and regulatory intensity (proxied by the FDI restrictiveness indicators) is positive and somewhat higher again. Overall, it also points to a link between higher lobbying activity and higher regulatory intensity.

The correlation between lobbying and firm characteristics becomes stronger when focussing more on an aggregate picture by condensing lobbying expenditure into five groups.

Table 2: Correlation between lobbying expenditure aggregated in five groups and average firm characteristics

	turnover	value added	employees	profit margin	patents	productivity growth	regulation intensity
lobby expenditure	0.9533	0.9207	0.8195	0.9322	0.7046	-0.8854	0.4616

Source: author's calculation based on Transparency Register and Amadeus data.

Table 2 create correlation coefficients as shown in Table 1 but with the more aggregate perspective. In particular the size and profitability correlations become much stronger, but also productivity growth and regulatory intensity turn out much closer correlated with overall increases in lobbying expenditure compared to the disaggregated brackets.[5]

4. Econometric model and results

4.1 Baseline regressions

Before we start elaborating on the methodology used and the results derived, it is essential to address the possibility of endogeneity in our regressions. For many of the variables we try to associate with lobbying activity of firms a two-way causal relationship might be possible. Firms in highly regulated sectors might have a higher incentive to lobby. Yet again, lobbying can also be conducted by firms in more competitive sector, which, if successful, might lead to more regulation in a given sector. Similarly, low profitability is here taken as an instrument

[5] In addition to the correlation coefficients, Annex A also plots the respective charts linking all explanatory variables to the firms' respective lobbying expenditure grouped into the five brackets.

for highly protected sector where the restricted access of new firms allows the incumbent to earn excess rents. Yet again, causality could also be the opposite, namely that successful lobbying shields certain firm from competition, in turn, increasing profitability. As we will discuss in more detail below, to some extent a similar argument could be taken for the size variable. We assume that larger firms have more resources to lobby. However, one could also argue that successful lobbying restricts competition, which in turn reduces the pressure to control (e.g. labour) costs.

Given the cross-sectional dimension of our dataset, it is fairly difficult to test for endogeneity, e.g. through Granger causality tests. We aim to partially address the issue of endogeneity by looking at multi-year averages of our right-hand side variable, given that AMADEUS (in contrast to the Transparency Register) allows extracting firm characteristics for a number of years.

Yet, this will not solve the potential endogeneity bias completely. However, this is not essential given that we try to make the argument that there is a correlation of lobbying activity and certain firm characteristics. Whether firms in closed markets cause higher lobbying activity or whether firms successfully lobby to restrict competition in their sector is secondary to our analysis. We therefore carefully try to avoid statements which imply too strong causality from our regression analysis, but instead highlight the correlation between the variables used.

Having outlined these caveats, we now turn to the regression analysis. We are confined to cross-sectional analysis, as data from the register are not available in a time dimension, as described in Section 3.1. For the regression analysis we apply simple Ordinary Least Squares (OLS).

$$(1)\quad \text{lobexp}_i=\alpha+\beta_1\text{tover}_i+\beta_2\text{empl}_i+\beta_3\text{profit}_i+\beta_4\text{pat}_i+\beta_5\text{prod}_i+\beta_6\text{comp}_i+\varepsilon_i$$

The dependent variable (lobexp_i) is the expenditure firm i assigns to lobbying purposes. We use the mid-point of the indicated bracket, in case no absolute amount is indicated. In line with the variables identified in the previous sections, we include the following regressors: (i) turnover of the respective firm, tover_i (here we also use value added as robustness check); (ii) the number of employees, empl_i, (iii) the profit margin, profit_i; (iv) the innovative activity of a firm as proxied by the number of patents, pat_i; (v) productivity growth, prod_i; and (vi) an indicator of competition in the respective sector, comp_i, as proxied either by a dummy variable which is one in case the firm's main area of business is in the non-tradable sector or an indicator of regulatory intensity (see Section 2 for further details). For the variables turnover (and value added), we use the natural log to account for diminishing marginal effects and to improve model fit (in line with Bernhagen and Mitchell, 2009).

For all right-hand-side variables we use average values for the years 2008-2014. We do so mainly to account for possible endogeneity, as described above. Yet, there is also the risk that not all firms have updated their data contained in the database to the latest values. Hence, also from this perspective it is more cautious to look at lagged values as well.

Table 3 summarises the main regression results. Our approach is incremental in order to transparently describe how adding further variable changes the estimation results. We start in column (1) and (2) by looking at the indicator for firm size, turnover[6] and employment. The regression results seem to confirm the preliminary indication derived from the correlation coefficients in Section 3.2, namely that larger firms tend to have higher lobbying expenditure than smaller firms. This is in line with the existing literature for other country groups and other datasets. Chong and Gradstein (2007) and Campos and Giovannini (2007) both find this for a group of mostly transition countries using the World Bank Business Environment and Enterprise Performance Survey. Also Kerr et al. (2014) and De Figueiredo and Tiller (2001) confirm that size matters for lobbying expenditure looking at US data. It is interesting, though, that when adding employment to turnover on the right-hand-side, both turnover and employment variables keep being significant, although both are proxies for size. We will come back to this below when we dwell into productivity growth below.

Table 3: Regression of lobbying expenditure on firm characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover	0.153***	0.119***	0.136***	0.134***	0.152***	0.168***	0.182***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Employees		0.006***	0.006***	0.005**	0.011***	0.010***	0.016*
		(0.001)	(0.002)	(0.019)	(0.001)	(0.001)	(0.065)
Profit margin			0.008*	0.008*	0.029***	0.029***	0.036***
			(0.060)	(0.057)	(0.001)	(0.001)	(0.003)
Patents				0.000**	0.000	0.000	-0.000
				(0.027)	(0.599)	(0.418)	(0.800)
Productivity					-0.091**	-0.093**	-0.174***
					(0.019)	(0.015)	(0.004)
Dummy non-tradable secto						0.518**	
						(0.032)	
Regulation intensity							12.753*
							(0.090)
Constant	8.963***	9.240***	8.939***	8.958***	8.460***	7.945***	7.912***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,215	909	811	811	284	284	135
Adj. R^2	0.09	0.08	0.10	0.10	0.23	0.24	0.33

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets.

Looking at profitability, productivity, and various indicators of competition in a sector, the regression results seem to support the notion that firms from protected sector lobby more than other firms. First, more profitable firms, as measured by our profit margin indicator (i.e.

[6] Using value added instead of turnover leaves the overall results unchanged.

the income in percent of total revenues), in turn, seem to be inclined to assign more resources to lobbying. In line with the high correlation coefficient, also the estimates in the various regression models point to a robust positive relation. This finding is in line existing studies e.g. for the US (Chen et al., 2015; Hill et al., 2013) which conclude that indeed there is a positive relation between profitability and lobbying activity.

Second, firms with high productivity growth are less likely to lobby much, as indicated by the negative, but significant coefficient. The result for productivity growth and the significant and positive coefficient for employment can also be seen as evidence of employment guarantees or excessive employment levels which in the literature are often argued to be implicitly included in the firm-politician relationship (e.g. Desai and Olofsgard, 2008).

Third, we account for the level of competition in a sector, by either adding a dummy for the non-tradable sector or explicitly accounting for the degree of regulation. Both the non-tradable dummy and the regulation indicator are positive and significant. This could be read as confirming the positive correlation between rather closed or protected sectors (as often the cased in non-tradable sectors) and lobbying activities of firms. Also these results are in line with the literature: Chong and Gradstein (2007) for some transitions economies, Bernhagen and Mitchell (2009) for a smaller panel of EU firms and Grier et al. (1994) or Hill et al. (2013) for US data confirm that higher regulatory environment and higher concentration in sectors tend to increase the extent of lobbying activity. Also Faccio (2009) finds similar results. She examines international firms in which shareholders or top managers have political positions and concludes that politically-connected firms enjoy privileges among others are a higher market share.

In terms of innovation, the correlation coefficient suggested a positive relation between patents and lobbying activity. Also the regression analysis, the result in column 4, seems at first to lend support to this hypothesis. Yet, when adding further control variables, the number of patents is not significant anymore, suggesting that one should be cautious in claiming that there might be a positive link between the two variables. As already noted in Section 2, this would also well reflect the existing literature which does not identify a clear relationship yet. While Kerr et al. 2014 finds a positive relationship, Lenway (1995) finds the contrary, both focussing on US data.

In addition to the general caveats we mentioned above in terms of the regression analysis, we applied a battery of robustness checks. In particular we check the importance of sectors and countries in our dataset (Section 4.2) and we investigate the existence of a possible selection bias (Section 4.3).

4.2 Controlling for sector and country specificities

As noted above, our dataset has unfortunately no time dimension. However, the cross-section analysis can be enriched by including country and sector fixed effects into the baseline regressions. Such fixed effects will to the extent possible help to address an omitted variable bias generated by unobservable country-level or sectoral heterogeneity. Despite this advantage, including country and sector fixed effect will likely impact the significance of the our non-tradable dummy as also the regulation index, as both do not vary among firms, but only across sectors (the former), and across sectors and countries (in case of the latter).

Table 4 summarises the robustness check regressions with country and sector fixed effects. The results remain highly robust compared to our baseline regressions. The coefficient for patents even increases somewhat, suggesting a higher elasticity than in the baseline regression. As already envisaged above, however, both the non-tradable dummy and the regulation intensity variable drop out insignificant due to the high collinearity with the fixed effects included.

Table 4: Regression of lobbying expenditure on firm characteristics – robustness check: *including country and sector fixed effects*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover	0.178***	0.138***	0.152***	0.154***	0.157***	0.157***	0.144**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.035)
Employees		0.006***	0.006***	0.004**	0.011***	0.011***	0.014
		(0.002)	(0.003)	(0.037)	(0.002)	(0.002)	(0.108)
Profit margin			0.009*	0.009*	0.036***	0.036***	0.042***
			(0.057)	(0.058)	(0.000)	(0.000)	(0.004)
Patents				0.045***	0.024	0.024	0.000
				(0.006)	(0.231)	(0.231)	(0.401)
Productivity					-0.091**	-0.091**	-0.173***
					(0.019)	(0.019)	(0.005)
Dummy non-tradable secto						-0.496	
						(0.670)	
Regulation intensity							-2.462
							(0.823)
Constant	8.528***	8.834***	8.556***	8.538***	10.415***	10.415***	10.657***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,215	909	811	811	284	284	135
Adj. R^2	0.134	0.123	0.136	0.143	0.312	0.312	0.406

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets

Interestingly, the adjusted R^2 increased compared to the baseline regressions, suggesting that country and sector fixed effect help to increase the explanatory power somewhat. Also against this background, it would be insightful to see which specific sectors in fact tend to have higher lobby expenditure than others. We therefore include sector dummies for the largest sectors using one-digit NACE codes.

Table 5: Regression of lobbying expenditure on firm characteristics – robustness check: *including sector dummies*

	(1)	(2)	(3)	(4)	(5)	(7)
Turnover	0.176***	0.137***	0.150***	0.152***	0.158***	0.159***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Employees		0.006***	0.006***	0.004**	0.011***	0.011***
		(0.002)	(0.002)	(0.031)	(0.002)	(0.002)
Profit margin			0.009*	0.009*	0.035***	0.036***
			(0.051)	(0.051)	(0.000)	(0.000)
Patents				0.045***	0.024	0.025
				(0.007)	(0.224)	(0.225)
Productivity					-0.089**	-0.090**
					(0.020)	(0.020)
Dummy non-tradable sector						-0.337
						(0.746)
Agriculture	0.038	0.244	0.483	0.468	0.616	0.349
	(0.948)	(0.739)	(0.537)	(0.548)	(0.588)	(0.804)
Mining	0.153	0.356	0.285	0.294	1.652	1.381
	(0.823)	(0.641)	(0.709)	(0.699)	(0.148)	(0.330)
Manufacturing	0.013	0.119	0.071	-0.018	0.119	-0.158
	(0.959)	(0.684)	(0.813)	(0.953)	(0.799)	(0.871)
Energy	0.516	0.724	0.477	0.495	-0.060	-0.344
	(0.250)	(0.145)	(0.351)	(0.332)	(0.939)	(0.769)
Construction	-0.685	-0.742	-0.914	-0.924	-0.853	-0.800
	(0.301)	(0.344)	(0.245)	(0.237)	(0.464)	(0.497)
Whole/retail sales	-0.190	-0.081	-0.108	-0.111	-0.044	0.016
	(0.526)	(0.819)	(0.767)	(0.760)	(0.939)	(0.978)
Transportation	-0.033	-0.213	-0.208	-0.201	-0.618	-0.893
	(0.930)	(0.645)	(0.655)	(0.664)	(0.342)	(0.405)
Accomodation	1.152	1.021	1.045	1.176	-0.400	-0.675
	(0.201)	(0.335)	(0.322)	(0.264)	(0.787)	(0.693)
Communication	0.128	0.184	0.076	0.071	0.684	0.748
	(0.650)	(0.584)	(0.824)	(0.836)	(0.182)	(0.174)
Financial services	0.514*	0.462	0.493	0.498	0.459	0.515
	(0.081)	(0.181)	(0.168)	(0.162)	(0.458)	(0.424)
Real estate	0.124	-0.458	-0.710	-0.729	-2.271*	-2.211*
	(0.836)	(0.573)	(0.417)	(0.402)	(0.050)	(0.060)
Professional services	0.350*	0.388	0.296	0.294	0.890*	0.947*
	(0.091)	(0.136)	(0.276)	(0.277)	(0.063)	(0.064)
Other services	-0.022	-0.021	-0.257	-0.271	0.145	0.203
	(0.927)	(0.946)	(0.429)	(0.403)	(0.803)	(0.739)
Constant	8.557***	8.698***	8.184***	8.190***	9.605***	9.662***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,215	909	811	811	284	284
Adj. R^2	0.136	0.126	0.139	0.146	0.323	0.320

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets.

Table 5 captures the result with sector dummies (but also again including country fixed effects). Fully in line with Table 4, and - given the similarity of the approach to that on Table 4 - as expected, our main determinants remain robust.

Looking at the various sector dummies, the first observation is that hardly any sector exhibits significant coefficients. The exceptions are real estate and professional services. The positive sign of the profession services dummy could be read as firms from that sector tend to spend more than the average firm over the sample. Professional services are usually defined as professions that require special training in the arts or sciences, such as lawyers, engineers, architects, or accountants. Interestingly, most of these professional services are among the most regulated sectors in many EU countries (Canton et al., 2014). This could be one explanation for why firms in those sectors tend to spend more for lobbying than the average firm in the dataset.

In addition to the robustness checks above, as noted in the description of the dataset in Section 3, the Register covers a lot of small and medium-sized enterprises, and only a small set of very large companies. In order to verify that these larger companies do not drive our baseline results, we exclude all firms with a turnover above EUR 1bn. Table 7 (in Annex B) shows that results again remain largely unchanged. The only difference is that the two size parameters, turnover and employment are not jointly significant in all regressions anymore.

Moreover, the dataset also comprises a small set of sector associations which lobby on behalf of their members. Table 8 (in Annex B) depicts the results of regressions when excluding these firms. Results remain highly robust.

4.3 Controlling for possible sample selection bias

In our baseline regressions we look at a sample of firms registered to lobby and their associated firm level characteristics. The implicit assumption of this regression is that this is a random sub-sample of the population of firms. If this should not be the case, we might have a sample selection bias which might distort the econometric results. With a view to investigate whether such a bias exists we draw a set of control firms from AMADEUS which are not registered in the Transparency Registers, which results in a sample size of roughly 4500 observations in total.

The classical sample selection framework is formalised as follows:

$$(2)\ y_i^* = x_i\beta + \varepsilon_i$$

$$(3)\ d_i^* = z_i\gamma + \vartheta_i$$

$$(4)\ d_i = 1 \text{ if } d_i^* > 0;\ d_i = 0 \text{ otherwise}$$

$$(5)\ y_i = y_i^* * d_i$$

The equation (2) is an ordinary regression equation. However, as in our baseline regression, for some firms we do not observe the dependent variable for this equation. This is denoted by the indicator function or, later in the empirical estimation, the dummy variable d_i. While equation (2) is of primary interest, equation (3) is the reduced form of the latent variable capturing the sample selection. Following from Section 4.1 our main aim is to estimate β consistently, i.e. the vector of parameters capturing the firm-level determinants for lobby expenditure. However, as noted above, estimating β in an OLS framework over the subsample $d_i = 1$ could potentially lead to inconsistent estimates due to the possible correlation between x_i and ε_I operating through the relationship between ε_i and ϑ_i, i.e.

$$(6)\ \mathrm{corr}(\varepsilon_i, \vartheta_i) = \rho \neq 0.$$

We follow Heckman (1979) in addressing this sample selection bias via maximum likelihood estimation, which entails assumptions about the distributions of the two disturbances. This estimation technique comes close to a related estimation method for such cases of censored samples, the Tobit estimator.

Table 6 captures the results of the Heckman estimation. While the selection equation mainly serves to yield un-biased estimates, we still start the description of the Heckman estimation result with it. The selection equation usually contains the same variables, or more, which also determine the main equations.[7] In our case, the likelihood to lobby is well explained through size (turnover or employment), a higher profit margin and the fact whether firms below to the non-tradable, i.e. usually more regulated sector. Only the variable productivity growth yields a different estimation for the likelihood to lobby in the entire sample, given its positive sign which is contrary to our baseline equation 1. We also include sector and country-fixed effects into regressions and even control for clustered standard errors to enhance robustness.

Turning to the main equation (upper part of Table 6), the results of the Heckman maximum likelihood estimator are very robust compared to our baseline regression and also the robustness checks in the previous Section. Only the non-tradable dummy is not significant, which (as already argued in Section 4.2) is due to the inclusion of sector and firm dummies in the regression.

The χ^2 likelihood-ratio test of independent equations (denoted at the bottom of Table 6) is equivalent to a rest of $\rho = 0$ (i.e. assuming no correlation between the disturbances). For all

[7] We decided to not include patents in our selection regression, as only a relatively small number of firms with entries in AMADEUS could be found and this would have reduced the control sample too much. Yet, we did some robustness checks including patents (i.e. with the much smaller control group) and find that overall results remain nearly unchanged (this table is available from the authors upon request as well).

estimations the null can be safely rejected, suggesting the validity of the Heckman selection equation for the data at hand.

A similar exercise to control for a sample which is drawn from a restricted population is to undertake truncated regressions. Under the normality assumption for the whole population, the error terms in the truncated regression model have a truncated normal distribution, which is a normal distribution that has been scaled upward so that the distribution integrates to one over the restricted range. As a further robustness check, we also run truncated regressions, which entirely confirm the results of our baseline and that of the Heckman regressions (see Table 9 in Annex B)

Table 6: Regression of lobbying expenditure on firm characteristics – robustness check: *Heckman two-stage selection model*

	(1)	(2)	(3)	(4)	(5)	(6)
main equation - dependent variable: lobby expenditure						
Turnover	0.075	0.219***	0.219***	0.223***	0.019	0.019
	(0.678)	(0.001)	(0.001)	(0.001)	(0.811)	(0.811)
Employees		0.017***	0.018***	0.015***	0.003	0.003
		(0.000)	(0.000)	(0.000)	(0.476)	(0.476)
Profit margin			0.039***	0.039***	0.027***	0.027***
			(0.000)	(0.000)	(0.000)	(0.000)
Patents				0.000***	0.000***	0.000***
				(0.003)	(0.001)	(0.001)
Productivity					-0.216***	-0.216***
					(0.000)	(0.000)
Dummy non-tradable sector						-0.480
						(0.740)
Constant	12.658***	6.830***	6.307***	6.318***	13.671***	14.151***
	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Selection equation - dependent variable: lobby dummy						
Turnover	0.077	0.089*	0.089*	0.089*	0.083	0.083
	(0.132)	(0.090)	(0.090)	(0.090)	(0.108)	(0.108)
Employees	0.010**	0.009**	0.009**	0.009**	0.010**	0.010**
	(0.017)	(0.027)	(0.026)	(0.025)	(0.028)	(0.028)
Profit margin	0.007***	0.003	0.005**	0.005**	0.004**	0.004**
	(0.004)	(0.129)	(0.021)	(0.020)	(0.033)	(0.033)
Productivity	0.076	0.097*	0.096*	0.097*	0.092*	0.092*
	(0.200)	(0.084)	(0.083)	(0.083)	(0.081)	(0.081)
Dummy non-tradable sector	0.146*	0.138*	0.140*	0.141*	0.137	0.137
	(0.081)	(0.092)	(0.089)	(0.086)	(0.105)	(0.105)
Constant	-2.588***	-2.696***	-2.702***	-2.703***	-2.642***	-2.642***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\chi 2$ Test of independent equations	1.366	5.939*	8.784***	7.575***	15.43***	15.43***
Observations	4,590	4,590	4,590	4,590	4,590	4,590
Country FE	YES	YES	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES	YES	YES

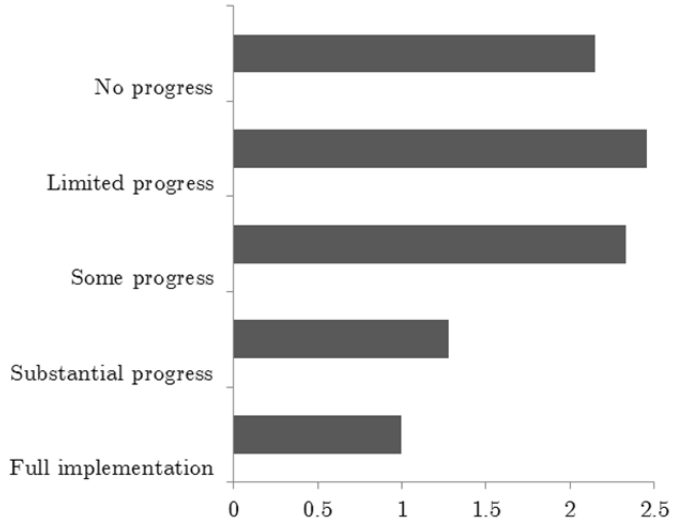
Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets.

5. Lobbying, protected sectors and structural reforms

The preliminary evidence we derived from the unique European firm-level dataset suggests that firms in protected sectors tend to have higher expenditure for lobbying activities than firms in more competitive or tradable sectors. However, not all regulation is per se negative or unwarranted. By contrast, regulations can be welfare improving, as discussed above, for example when dealing with market failures. Yet, excessive or inefficient regulation or protection could end-up in holding back productivity and output growth, job creation, and thereby limit overall economic welfare and a swift response to adverse shocks.

Against this background, various national and international institutions regularly conduct such stock-taking exercises of excessive regulations. For example the OECD's Going for Growth reports or the European Commission Country-Specific Recommendations (CSRs)[8] regularly and publically analyse the regulatory landscape in their respective member states and propose reforms when they identify unjustified regulation and a need for policy action to rectify them.

Chart 3: Lobbying and CSR implementation



Source: authors' calculations based on Transparency Register, Amadeus, European Commission.

Our preliminary results discussed above raise the key question whether firms successfully lobby with policy makers to tighten regulation or at least prevent an opening up of the markets they are acting in. It is however very difficult to approach this question empirically. While there is a literature which aims to identify the factors promoting the implementation of structural reforms (see for an overview Agnello et al., 2015), they are conducted on a macro level. Linking them to lobbying activity would require a harmonised measure of lobby intensity per sector and country. However, as already argued above, given the in-transparent nature of lobbying only limited firm-level data is available which cannot be consistently matched with such macro data.

[8] The analysis of the policy gap is not captured in the CSRs, but included in the accompanying Staff Working Documents or Country Reports. On the basis of these report the Commission subsequently derives policy suggestions in the form of CSRs.

While we therefore cannot undertake a systematic empirical analysis, a rough match of the firms of our small sample to areas in which regulatory reforms have been proposed could indicate whether there is a correlation between limited reforms and lobbying intensity for EU countries.

We look at two years of European Commission Country-Specific reform Recommendations (CSRs) and the Commissions respective assessment one year later to what extent those reform were subsequently implemented by member states or not. CSRs cover policy recommendations in various areas, including reforms of fiscal policies, in labour markets, in product markets and to some extent also financial sector reforms. We look at CSR implementation for the years 2012/13 and 2013/14 and distil 215 recommendations which concern sector-specific regulations, as we argue that these are the reform recommendations which firms are specifically concerned. We then assign these sector-specific reforms recommended to a certain country to the respective firms acting in these sectors in the respective country. This is possible as most CSRs are sector-specific, i.e. they are geared to e.g. the retail sector, the electricity sector, the financial, the transport sector, or towards (certain) professional services. For example, the CSR recommendation to Italy in 2014 to remove remaining barriers in the retail sector was assigned to Italian firms in the Register database whose main field of activity is the retail sector.

Chart 3 depicts the lobbying intensity matched with the reform momentum in sectors and countries across the EU. It summarises the lobbying intensity in a given sector (as proxied by the median lobbying expenditure in percent of value added) and plots it vis-à-vis the regulatory reform progress. Looking at the chart, it could be argued that there is a weak but negative link between lobbying intensity and reforms in a sector.

While it cannot be stressed enough that this is a pure 'eye balling' of a small sample from which no causality should be derived from, it at least provokes the question whether lobbying indeed prevents reform implementation (as has been claimed by many international institutions and even national politician) and it stimulates further research aiming at more systematically linking reform progress to firms' lobbying activities.

6. Conclusions

Lobbying activities can serve an important purpose namely to provide policy makers with sectoral knowledge to enable more informed decisions. However, where lobbying goes far beyond such motives and instead aims to convince policy makers to unnecessarily restrict regulation for the benefit of incumbent firms such as through restricting the access to certain markets, lobbying might become welfare decreasing. The incentives for firms to act in this way have been demonstrated in theoretical contributions of the literature (e.g. the private interest theory of regulations proposed by Stigler, 1971 or Peltzman, 1976), but it is difficult

to find robust empirical evidence for it given that lobbying is most often not transparently exercised.

We aimed to shed some light on lobbying activity in the EU, by creating a unique firm-level dataset of European firms, which draws on lobbying activity recorded by the Brussel-based Transparency Register merged with firm-level characteristics derived through Amadeus.

We find that firms' lobbying intensity is associated to their size. Moreover, we conclude that firms from the non-tradable or higher regulated sectors tend to be more engaged in lobbying than firms from export-oriented or more competitive markets. Also firms with higher lobbying expenditure seem to have a higher profit margin and are less productive, which according to the literature indeed tend to be features of firms operating in closed or highly concentrated markets.

With this in mind, we also contrast reform implementation in higher regulated sector in recent years with respective lobbying activity in these sectors according to our dataset. A weak negative correlation seems to exist, suggesting that fewer reforms were implemented in those sectors with higher lobbying expenditure. Of course it cannot be stressed enough that one should not draw too much conclusions from such correlations which on top are also derived from a fairly small sample.

Also given the possibility of endogeneity, we therefore stress throughout our paper that we find correlation rather than the causality between the variables. This notwithstanding, our findings at least tends to support the view that caution is needed when dealing with lobbying activity. Policy makers have to make sure that lobbying mainly serves to provide necessary sectoral information, but does not undermine competition in sectors where regulation seems excessive.

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Annex A

Chart 4: Lobbying expenditure and turnover

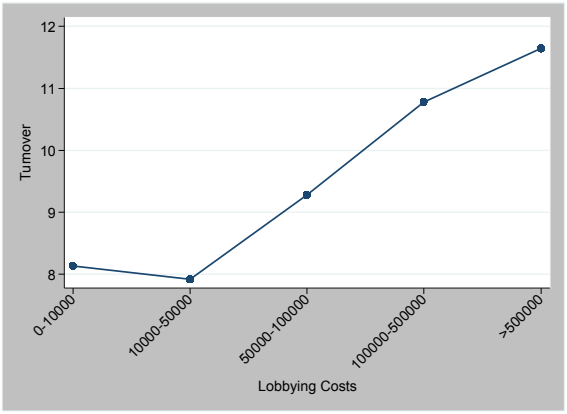


Chart 5: Lobbying expenditure and value added

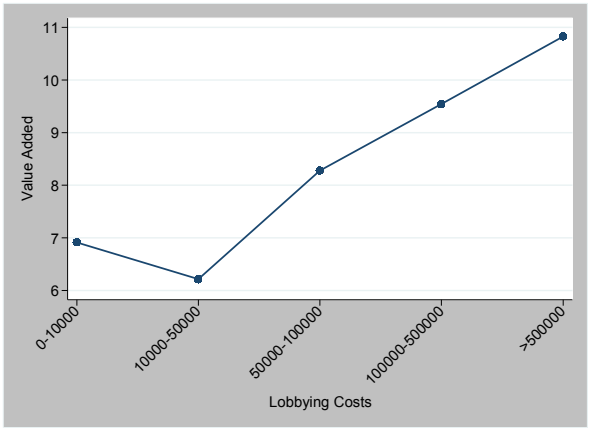


Chart 6: Lobbying expenditure and employment

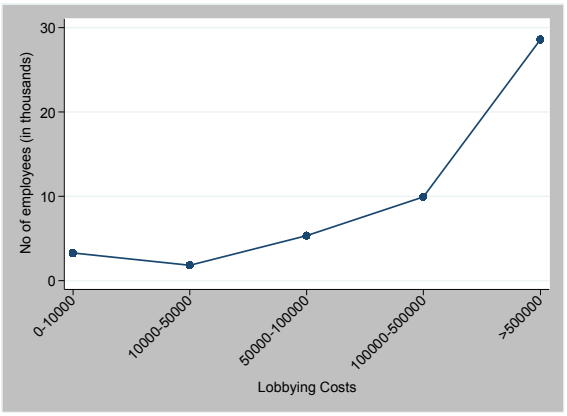


Chart 7: Lobbying expenditure and profitability

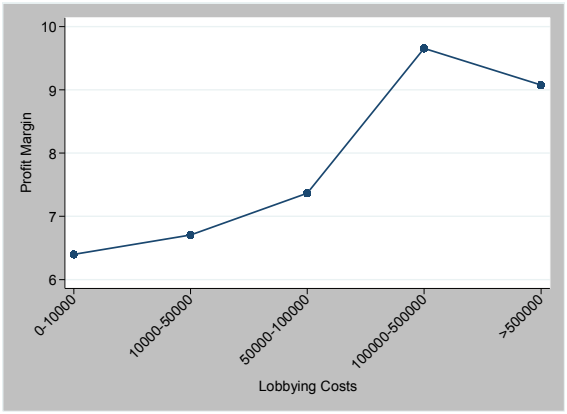


Chart 8: Lobbying expenditure and innovation

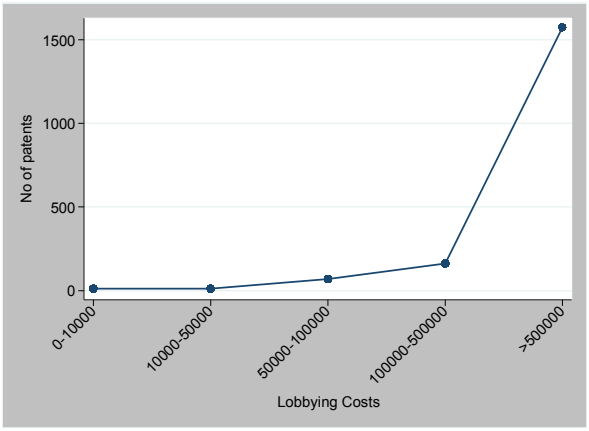


Chart 9: Lobbying expenditure and productivity

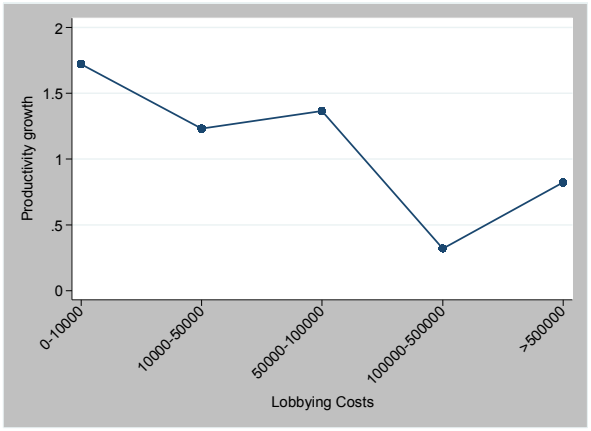
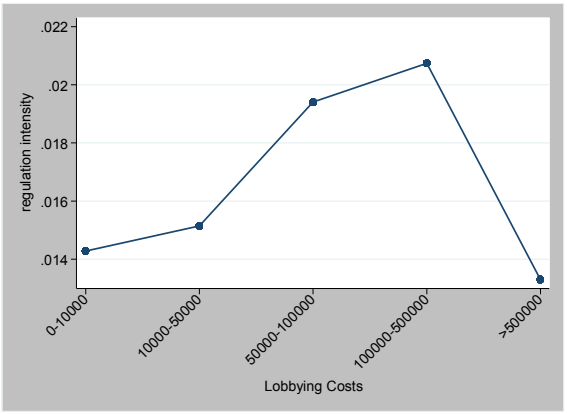


Chart 10: Lobbying expenditure and regulation intensity



Annex B

Table 7: Regression of lobbying expenditure on firm characteristics – robustness check: *excluding the largest firms with turnover above EUR 1bn*

	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	0.120***	0.091***	0.106***	0.104***	0.053	0.080*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.221)	(0.078)
Employees		0.003	0.003	0.001	0.044***	0.040***
		(0.345)	(0.378)	(0.846)	(0.000)	(0.001)
Profit margin			0.008*	0.008*	0.029***	0.029***
			(0.080)	(0.077)	(0.001)	(0.001)
Patents				0.000*	-0.000**	-0.000*
				(0.063)	(0.029)	(0.069)
Productivity					-0.082**	-0.084**
					(0.036)	(0.032)
Dummy non-tradable secto						0.525**
						(0.045)
Constant	9.187***	9.456***	9.196***	9.214***	9.366***	8.749***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,135	832	734	734	248	248
Adj. R^2	0.05	0.03	0.04	0.04	0.17	0.18

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets. We exclude the regression with the regulatory indicator given that without larger firms this would reduce the sample size too much.

Table 8: Regression of lobbying expenditure on firm characteristics – robustness check: *excluding associations*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover	0.151***	0.114***	0.137***	0.135***	0.152***	0.168***	0.182***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Employees		0.006***	0.006***	0.005**	0.011***	0.010***	0.016*
		(0.001)	(0.003)	(0.020)	(0.001)	(0.001)	(0.065)
Profit margin			0.008*	0.008*	0.029***	0.029***	0.036***
			(0.066)	(0.062)	(0.001)	(0.001)	(0.003)
Patents				0.000**	0.000	0.000	-0.000
				(0.027)	(0.600)	(0.418)	(0.800)
Productivity					-0.091**	-0.093**	-0.174***
					(0.019)	(0.016)	(0.004)
Dummy non-tradable secto						0.519**	
						(0.033)	
Regulation intensity							12.753*
							(0.090)
Constant	8.995***	9.297***	8.938***	8.957***	8.462***	7.943***	7.912***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1,179	880	798	798	283	283	135
Adj. R^2	0.09	0.08	0.10	0.10	0.24	0.25	0.33

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets.

Table 9: Regression of lobbying expenditure on firm characteristics – robustness check: *truncated regressions*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover	0.175***	0.133***	0.145***	0.147***	0.143***	0.143***	0.125***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)
Employees		0.006*	0.006	0.004	0.011***	0.011***	0.016***
		(0.086)	(0.115)	(0.158)	(0.000)	(0.000)	(0.000)
Profit margin			0.007***	0.007***	0.028***	0.028***	0.027**
			(0.008)	(0.007)	(0.000)	(0.000)	(0.046)
Patents				0.000***	0.000**	0.000**	0.000*
				(0.000)	(0.018)	(0.018)	(0.073)
Productivity					-0.086***	-0.086***	-0.167***
					(0.000)	(0.000)	(0.000)
Dummy non-tradable sector						0.509	
						(0.767)	
Regulation intensity							-2.802
							(0.496)
Constant	8.567***	8.940***	8.620***	8.613***	8.861***	8.352***	9.146***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,214	908	810	810	283	283	134

Note: * p<0.1 ** p<0.05 *** p<0.01. Standard errors in brackets.

Acknowledgements

Many thanks to the very valuable suggestions received by an anonymous referee of the ECB Working Paper Series. We are also indebted to Ana Bairo, Lisa Kamstra, Jante Parlevliet, Mathilde Périnet, and Giacomo Pongetti for the assistance in creating the firm-level dataset, as well as to Beatrice Pierluigi, Isabel Vansteenkiste and to the participants of an internal ECB seminar for helpful comments and suggestions.

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ISSN	1725-2806 (pdf)	DOI	10.2866/831953 (pdf)
ISBN	978-92-899-2793-2 (pdf)	EU catalogue No	QB-AR-17-083-EN-N (pdf)