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Emma Aisbett[1] and Carol McAuslandy[2]

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[1]Research School of Economics and Crawford School of Economics and Government, Australian National University emma.aisbett@anu.edu.au
[2]Food and Resource Economics, University of British Columbia, Vancouver, British Columbia, Canada Carol.McAusland@ubc.ca

Firm Characteristics and Influence on Government Rule-Making: theory and evidence

Emma Aisbett*and Carol McAusland†

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Abstract

An adversarial game is used to model the amount of influence a firm has over a government regulator, and its equilibrium level of regulation, as a function of firm fundamentals. The effective influence of a firm is identified as comprising both intrinsic and exerted components; where the latter involves distorting regulation via a transfer to the regulator. Understanding the source of a firm's high influence is found to be important for — among other things — predicting whether it faces higher or lower regulatory constraint than other firms. Data from the World Business Environment Survey provides strong evidence in support of model hypotheses across a wide range of government agents, countries, and regulatory areas. Of particular relevance to public debate, large firms are found to be more likely to be influential, but also more likely to experience regulatory constraint than smaller firms.

Keywords: Political Economy; Regulation; Influence

*Research School of Economics and Crawford School of Economics and Government, Australian National University emma.aisbett@anu.edu.au

†Food and Resource Economics, University of British Columbia, Vancouver, British Columbia, Canada Carol.McAusland@ubc.ca

1. Introduction

> "The scope, the extent, the insidious nature of corporate influence in regulatory agencies of government - this question of regulatory capture - is something we should attend to here. It is the lesson. And it raises the question, beyond the Minerals Management Service, how far does this corporate influence reach into our agencies of government?" Senator Sheldon Whitehouse (D-Rhode Island), June 17, 2010.

Are corporations able to use carrots such as campaign contributions to wriggle their way out of regulatory constraints? Public opinion, mirrored in the comments of Senator Whitehouse, certainly suggests politically active firms are able to buy their way out of environmental regulations and other forms of scrutiny. But at the same time, many of the same firms complain they are subject to intense interference by regulators. Is this just political posturing? Or are these two world views compatible? Might some firms be simultaneously more influential and subject to *more* regulatory constraint?

It is well understood in the literature as well as in public debate that political influence is a means for interest groups and firms to achieve an ends. In the case of firms, the desired end is a more profitable operating environment - not necessarily a socially optimal outcome. For this reason there is an extensive political science literature which examines both the determinants of firm attempts to achieve influence - notably contributions to political action committees (PAC) in the US - and the impacts of these transfers - notably on US congressional voting patterns. The latter literature, while extensive, remains inconclusive and conventional wisdom is that there is little effect of firms' PAC contributions on voting behavior when models are well specified (Hall and Wayman 1990, Potters and Sloof 1996, Wawro 2001, Roscoe and Jenkins 2005).

Recently there has been a number of studies which ask similar questions about the determinants and impacts of influence for a range of countries (Hellman et al. 2003, Chong and Gradstein 2007, Campos and Giovannoni 2007, Desbordes and Vauday 2007, Desai and Olofsgard 2008). This growth in the literature has been facilitated by the World Bank's World Business Environment Survey (WBES) and Business Environment and Enterprise Performance Surveys (BEEPs) which ask managers of firms in a wide range of countries about their relationship with the national government, including how much influence the firms have over rules, laws, regulations and decrees of importance to the firm's operations.

In order to understand the sources and consequences of firm influence, we distinguish between two types. Firstly, a firm may be influential if the government sees eye to eye, or has overlapping interests with, the firm. Firms may have such *intrinsic* influence for a number of reasons including perceived positive spillovers, government shareholdings and - as shown by Faccio (2006) - personal connections. A firm may also be influential if the regulator and firm disagree on the principles but the firm is able to divert the regulator from her ideal though some form of transfer. This *exerted* influence is the focus of the political science literature on PAC contributions and (often implicitly) the political economy of regulation literature following Stigler (1971). The challenge for the empirical literature using either PAC contributions or survey-based measures of influence, is that *exerted* influence is endogenous.

We illustrate the endogeneity of influence by building a simple model of a single firm that makes a binding take-it-or-leave it offer to the regulator.[1] The offer consists of a transfer from the firm to the government and a level of regulatory constraint to be imposed on the firm. The regulator accepts the offer only so long as its welfare is at least as high as it would be if it rejected the offer, forwent the transfer, and imposed its threatpoint, regulation on the firm. As is standard in the political economy of regulation literature we assume the government puts more weight on the transfer received than it does on the firm's cost of making the transfer (Stigler 1971, Grossman and Helpman 1994, Besley and Coate 2001). In our model there may also be frictions in transferring rents to the regulator.

Exerted influence in our model is close to Becker (1983), who defined a group's influence as the deadweight costs to society of the subsidy the firm receives; Becker assumed the influence exerted by a group depends on endogenous variables, including a group's expenditures on achieving its political objectives. We define a firm's exerted influence as the gap between the equilibrium regulation and the regulator's *threatpoint* regulation, where the latter is the amount of regulatory interference to which the firm would be subjected *but for* the political relationship.

The common understanding of political influence, however, encompasses more than influence exerted through transfers. As noted in a recent U.K. House of Commons Select Committee Report (2009, p.5):

> "The practice of lobbying in order to influence political decisions is a legiti-

[1] In order to make our model general, unlike many of the sophisticated political economy models in the literature we do not restrict the type of government agent. The agent may be she may be a political executive, member of legislature, part of a ministry or regulatory agency. Thus we use the terms "government", "regulator", "policy-maker" and "policy-setter" interchangeably throughout.

> mate and necessary part of the democratic process. Individuals and organisations reasonably want to influence decisions that may affect them, those around them, and their environment. Government in turn needs access to the knowledge and views that lobbying can bring...however..there is a perception that commercial corporations and organisations have an advantage over not-for-profit bodies, an advantage which is related to the amount of money they are able to bring to bear on the political process rather than the cogency of their case."

We integrate the different types of influence—exerted and intrinsic—into a single metric we call *effective* influence, defined as the gap between equilibrium regulation and the regulation which would be chosen if transfers are not allowed and the policy-maker is ignorant of the impacts of regulation on profits and positive spillovers generated by the firm.

Our model delivers predictions as to how primitive firm characteristics such as size, ownership structure and number of competitors affect equilibrium regulation and the different types of influence. Our model suggests that the relationship between a firm's political influence and its level of regulatory constraint depends on the source of its influence. For example, lowering the number of competitors and increasing firm size will both independently increase a firm's influence. However, while lower competition is a source of regulatory slack, larger size may actually lead to increased regulatory constraint.

We test our theoretical predictions using the WBES data. The richness of the WBES data allows us to test the robustness of these relationships across a range of regulatory areas, most notably environmental regulations, health and safety standards, business taxes and trade and foreign exchange regulations. The influence data is available for four different branches of government, Executive, Legislature, Ministry, and Regulator. Our model performs well empirically. Treating stated influence and regulatory constraint as independent variables in separate regressions, we find support for many of the theoretical predictions of our model and in no case do we find significant results contrary to our predictions.

2. Influence and Interference

A firm and a regulatory play a two-stage game. In the first stage, the firm makes the regulator a take-it-or-leave-it offer of a transfer, T, to be received by the regulator in exchange for a level of regulatory stingency, X. Higher values of X denote stricter regulation. The firm's net rents are $R = \delta\pi(X) - gT$ where π measures unit operating profits with $\pi' < 0 > \pi''$, $\delta > 0$

is a measure of economic scale, and $g - 1 \geq 0$ measures the deadweight loss associated with transferring one dollar to the regulator. We implicitly assume away interactions between the firm-regulator relationship modeled and any other firms in the economy.[2]

The regulator's payoff is $G(X,T) = \delta\left[s(X) + b\pi(X) + nN(X)\right] - e(X)z(\delta) + T\left[\gamma - cg\right]$ where s measures regulation-augmented benefits to the Rest of Society (ROS) from firm's activities; we assume $s' > 0 \geq s''$. ROS benefits include, for example, tax revenue, avoided damages from industrial emissions, and reduced worker injuries. N measures regulation-inhibited benefits to ROS, for example positive spillovers such as foreign exchange acquisition and knowledge generation, with $N' < 0 > N''$. b, n, c and γ are positive, exogenous parameters measuring the relative importance of producer surplus[3], spillovers, transfer costs and transfers received. $e(X)z(\delta)$ measures the regulator's costs of imposing and enforcing regulation; we assume $e' > 0 < e''$ while $z' > 0 > z''$. By assuming $0 > z''$, we allow for economies of scale in regulation. We assume throughout that $\gamma - cg > 0$. In the interest of brevity, we also assume s'', π'', N'' and e'' are each constants.

2.1 Stage 2

We solve the model in reverse. If the regulator rejects the firm's offer, she receives no transfer and gets welfare $G(X^G, 0)$ where X^G solves

$$\delta\left[s'(X^G) + b\pi'(X^G) + nN'(X^G)\right] - e'(X^G)z(\delta) = 0 \tag{1}$$

with associated second order condition

$$\Delta_1 \equiv \delta\left[s'' + b\pi'' + nN''\right] - e''z(\delta) < 0. \tag{2}$$

[2]We focus on the relationship between a single firm and a single regulator, assuming along the way that this relationship is unaffected by the presence of other firms or lobbyists in the economy. This is equivalent to Grossman and Helpman (1994) in which there lobby groups are "functionally specialized" (Aidt 1998) and each firm forms its own lobby. Abstracting from political competition, our model deviates from the previous literature; however we do not think it is unreasonable in the context of actions by individual firms. Individual firms are likely to achieve their influence through targeted pressure on individual or small groups of government actors. Furthermore, the types of regulatory changes they aim to achieve are more likely to be low visibility ones such as lax enforcement of regulations or the insertion of a beneficial loophole in a regulation under development. These sorts of actions are specifically designed not to be observed by other political actors.

[3]If we adopt a Utilitarian welfare function, then $b < 1$ corresponds to the regulator discounting the firm's compliance costs—a form of fiscal illusion. If instead the government puts excess weight on the firm's rents, such as when the firm and regulator have personal connections, we would expect $b > 1$.

We will refer to X^G as the Regulator's *threatpoint* regulation, and $G(X^G, 0)$ as her *threatpoint welfare.*[4]

Suppose the firm offers the regulator the following pair: $\{T^*, X^*\}$; the regulator will accept the offer if and only if $[\gamma - cg]\, T^* \geq G(X^G, 0) - G(X^*, 0)$ where $G(X^*, 0)$ measures the Regulator's welfare with stringency X^* but no transfers; we call this the Regulator's *uncompensated* welfare. Because transfers are costly, we can write the Regulator's participation constraint in terms of the minimum transfer consistent with the Regulator accepting the Firm's offer:

$$\begin{aligned} T^* &= \frac{G(X^G, 0) - G(X^*, 0)}{\gamma - cg} \\ &= \frac{\delta\left[s(X^G) + b\pi(X^G) + nN(X^G)\right] - e(X^G)z(\delta) - \{\delta\left[s(X^*) + b\pi(X^*) + nN(X^*)\right] - e(X^*)z(\delta)\}}{\gamma - cg} \end{aligned} \tag{3}$$

In words, the firm must offer the regulator a transfer proportionate to the gap between her uncompensated welfare under threatpoint and proposed stringency.

Below we'll make use of the following derivative: differentiating (3) yields

$$\frac{dT^*}{dX^*} = -\frac{\left[\delta\left[s'(X^*) + b\pi'(X^*) + nN'(X^*)\right] - e'(X^*)z(\delta)\right]}{\gamma - cg}. \tag{4}$$

2.2 Stage 1

At the first stage the firm chooses $\{T^*, X^*\}$ so as to maximize R subject to the Regulator's participation constraint (3). Invoking (4), X^* thus solves the first order condition

$$\delta\pi'(X^*) + \frac{g\left[\delta s'(X^*) + b\delta\pi'(X^*) + \delta nN'(X^*) - e'(X^*)z(\delta)\right]}{\gamma - cg} = 0 \tag{5}$$

which has associated second order condition

$$\Delta_2 \equiv \delta\pi'' + \frac{g\Delta_1}{\gamma - cg} < 0. \tag{6}$$

Equations (1), (3) and (5) jointly define equilibrium regulation and transfers, X^* and T^*, as well as threatpoint regulation X^G. We devote the next section to analyzing how these equilibrium values vary with the characteristics of the firm.

[4]We assume that $R(X^G) \geq 0$ such that the firm's participation constraint is never binding.

3. Co-Determinants of Regulation and Influence

One of our central questions is whether influence and regulation are negatively correlated. If we only look at the Regulator's participation constraint, then we would expect a firm must transfer more resources to regulators in order to achieve commensurately laxer regulation. But the size of the transfer is endogenous. Moreover, transfers are a *means* to influence, not a measure of influence *achieved*.

We identify two alternate metrics of influence. The first metric, $X^G - X^*$, measures influence *exerted*: how far is the firm able to divert stringency away from the level that would occur *but for* the lobbying process?

While some firms must rely on transfers in order to induce favourable policy, others enjoy lenient threatpoint regulation because the firm and regulator already see eye-to-eye. Although these *intrinsically* influential firms may offer transfers to the regualtor nonetheless, the full extent of their influence will not be captured by our metric of *exerted* influence. We therefore define a metric of *effective* influence: $X^0 - X^*$, where X^0 maximizes $G^0(X) \equiv \delta s(X) - e(X)z(\delta)$; X^0 is the stringency that would be chosen by a regulator who receives no transfers and has a narrow mandate, i.e. a regulator that weighs the direct costs and benefits of regulation—enforcement costs versus reduced pollution damages—but ignores indirect effects on firm profits and ancilliary spillovers. For future reference, note that X^0 solves

$$\delta s'(X^0) - e(X^0)z(\delta) = 0; \tag{7}$$

with associated second order condition for an interior optimum $0 < \frac{d^2G^0}{dX^2} = \Delta_1 - \delta b\pi'' - nN'' \equiv \Delta_3$.

3.1 Size

In the rhetoric regarding lobbying and regulation, many commentators implicitly suggest that big firms wield more influence.[5] Size is captured in our framework by δ, which measures the scale of activity associated with a given firm. Differentiating the system formed by (1), (3),

[5]Public debate also focuses on regulator corruptibility, which depends on state and country-level characteristics. Our model's predictions regarding regulator corruptibility are standard: we find regulation will be weaker in countries with more corruptible regulators, and that firms will report greater exerted and effective influence. Specifically, differentiating the system formed by (1), (3), (5) and (7) gives

$$\frac{dX^G}{d\gamma} = \frac{dX^0}{d\gamma} = 0$$

(5) and (7) yields

$$\frac{dX^G}{d\delta} = \frac{e'(X^G)F}{-\Delta_1} > 0 \tag{8}$$

where $F \equiv \frac{z(\delta)}{\delta} - z'(\delta) \geq 0$; the weak concavity of z ensures F is non-negative.[6] F measures economies of scale in regulation. If, as the number of units (of economic activity) regulated rises, the cost of imposing/enforcing regulation on a unit of activity declines, this will reduce the marginal cost of regulatory stringency, inducing stricter threatpoint regulation. The strength of regulatory scale economies likely varies across types of regulation. For example, with environmental, health, and safety regulations, there are non-convexities in the labor-requirements for onsite inspections. Similar non-convexities occur in assembling teams for prosecuting violators judicially. In the case of environmental regulations, there may also be non-convexities in detecting illegal dumping, as detection probabilities increase with the size and frequency of disposals. Thus it is common for environmental reporting and compliance requirements —including Toxic Release Inventory and Environmental Impact Assessment requirements—to have threshold outputs below which firms are exempt.

Like threatpoint regulation, equilibrium stringency is also increasing in δ:

$$\frac{dX^*}{d\delta} = -\frac{ge'(X^*)F}{\Delta_2[\gamma - cg]} > 0. \tag{9}$$

As δ rises, the marginal cost of regulatory stringency declines, and equilibrium regulation becomes more stringent.

Taking the difference between (8) and (9) and rearranging gives

$$\frac{d[X^G - X^*]}{d\delta} = F\frac{g\Delta_1[e'(X^*) - e'(X^G)] - \pi''\delta[\gamma - cg]e'(X^G)}{\Delta_1\Delta_2[\gamma - cg]} > 0. \tag{10}$$

Because $e'(X^G) - e'(X^*) \geq 0$ by the weak convexity of e, $\frac{d[X^G - X^*]}{d\delta}$ is unambiguously positive: the regulatory gap *grows* along with the scale of economic activity. Similarly, our measure of effective influence also increases:

$$\frac{d[X^0 - X^*]}{d\delta} = F\frac{g\Delta_1[e'(X^*) - e'(X^0)] - \pi''\delta[(\gamma - cg)e'(X^0) + bge'(X^*)] - nN''\delta ge'(X^*)}{\Delta_3\Delta_2[\gamma - cg]} > 0 \tag{11}$$

$$\frac{dX^*}{d\gamma} = -\frac{d[X^G - X^*]}{d\gamma} = -\frac{d[X^0 - X^*]}{d\gamma} = -\frac{\delta\pi'(X^*)}{\Delta_2[\gamma - cg]} < 0.$$

[6] Similarly, $\frac{dX^0}{d\delta} = -\frac{e'(X^0)F}{\Delta_3} > 0$.

Combined, (9), (10) and (11) have straightforward empirical implications: provided there are some economies of scale in regulation, larger firms will exert more influence (and be more influential overall) yet face stricter regulation nonetheless. This prediction directly contradicts presumptions that regulation and influence are negatively correlated. In the case of size, at least, we see that the same forces that widen the gap between the regulator's ideal and actual stringency—namely, scale economies in regulation—also increase equilibrium regulation.

Even though stringency and influence are unambiguously increasing in δ, we cannot say whether the equilibrium transfer grows more or less than proportionately with size. Differentiating the system formed by (1), (3), (5) and (7) gives

$$\frac{dT^*}{d\delta} = \frac{T^*}{\delta} + \left[e(X^G) - e(X^*) - \frac{\delta \pi'(X^*) e'(X^*)}{\Delta_2} \right] \frac{F}{\gamma - cg}. \tag{12}$$

As per the first term on the right hand side, an increase in δ has a simple scale effect: if the sector gets twice as large, so too does the gap between ROS and producer surplus when regulation is unfettered versus influenced. Accordingly, the transfer required for the Regulator to participate in the political relationship must double as well, other things—namely regulatory stringency—equal. The rise in δ also means that the cost savings arising from lax regulation—measured by $[e(X^G) - e(X^*)]z(\delta)$—decline. These cost-savings are capitalized into the transfer, and so a reduction in these cost-savings argues in favor of a larger transfer. Finally, equilibrium regulation is now more stringent, shrinking the regulatory distortion and arguing in favor of a smaller transfer. Which dominates—increased scale, reduced cost savings, or diminished regulatory distortion—is ambiguous. If regulatory economies are small (i.e. if F is close to zero) then the transfer rises approximately proportionately with scale. If regulatory economies are instead large, T^* may rise more or less than proportionately with δ, depending on whether the reduced cost savings dominate the diminished regulatory distortion.

The ambiguity concerning changes in the equilibrium transfer is not exclusive to changes in firm size; the sign of dT^* is ambiguous for all comparative statics we conduct in the sections to follow. Moreover, because we focus on influence achieved, not the means to influence,—and because we do not have data measuring transfers—we do not report comparative static results concerning T^* from this point onward.

3.2 Franchise

The parameter b reflects the weights the regulator places on the firm's rents, and so an increase in b reflects an increase in the firm's franchise. Differentiating the system formed by (1), (3), (5) and (7) gives

$$\begin{aligned}
\frac{dX^*}{db} &= -\frac{g\delta\pi'(X^*)}{\Delta_2[\gamma - cg]} < 0 \\
\frac{dX^G}{db} &= -\frac{\delta\pi'(X^G)}{\Delta_1} < 0 = \frac{dX^0}{db} \\
\frac{d[X^G - X^*]}{db} &= -\frac{\delta\left[\pi'(X^G)[\gamma - cg]\delta\pi'' + g\Delta_1[\pi'(X^G) - \pi'(X^*)]\right]}{\Delta_1\Delta_2[\gamma - cg]} < 0 \\
\frac{d[X^0 - X^*]}{db} &= \frac{g\delta\pi'(X^*)}{\Delta_2[\gamma - cg]} > 0
\end{aligned} \tag{13}$$

confirming that threatpoint and equilibrium stringency, as well as exerted influence, are all decreasing in b, while effective influence is increasing in b. We discuss each result in turn.

A rise in b raises how much the regulator values the firm's compliance costs, reducing the regulator's aversion to lax regulation regardless of whether transfers are offered. As a consequence, both threatpoint and equilibrium stringency decline with b. In contrast, by construction the preferred stringency of an indifferent regulator is unaffected by changes in b and so $dX^0/db = 0$.

A rise in b pushes exerted and effective influence in opposite directions. b measures the firm's *intrinsic* influence, i.e. the extent to which the firm's rents are internalized by the regulator. As b rises, the firm's and regulator's interests become more closely aligned, and the gap between each party's ideal regulation contracts. Accordingly, our model predicts that firms with higher *intrinsic* influence will have lower *exerted* influence, simply because firms that are intrinsically influential do not face stringent threatpoint regulation to begin with. What happens to influence overall? As per (13), we find that a rise in the firm's intrinsic influence dominates the reduction in *exerted* influence, such that the firms *effective* influence rises with b.[7]

[7]Normatively, increasing b also increases the likelihood that equilibrium regulation will we laxer than the level that maximizes Utilitarian welfare $W^u \equiv \delta[s(X)+\pi(X)-nN(x)]-e(X)z(\delta)$. Define $X^u \equiv \text{argmax}W^u$; it is straightforward to show $X^* > X^u$ if and only if $b > 1 - [\gamma - cg]$.

3.3 Lobbying Efficiency

The parameter g reflects the deadweight loss associated with transferring each dollar's worth of benefits to the regulator. Variation in g can originate from a variety of sources, including spillovers in the lobbying process. For example, multinational firms that have engaged in lobbying overseas may be more efficient at transferring rents than are firms without outside experience. Similarly, marginal lobbying costs may be lower for older, established firms. We can interpret reductions in g as increases in lobbying efficiency. Differentiating the system formed by (1), (3), (5) and (7) gives

$$\begin{aligned} \frac{dX^G}{dg} &= \frac{dX^0}{dg} = 0 \\ \frac{dX^*}{dg} = -\frac{d[X^G - X^*]}{dg} &= -\frac{d[X^0 - X^*]}{dg} = \frac{\delta\pi'(X^*)\gamma}{g\Delta_2[\gamma - cg]} > 0 \end{aligned}$$

Lowering g lowers the firm's marginal cost of buying weak regulation[8], resulting in lower equilibrium stingency. In contrast, changes in g have no effect on either X^G or X^0, since these are calculated independently of any lobbying relationships. Accordingly, our model predicts equilibrium stringency is unambiguously decreasing in lobbying efficiency while both exerted and effective influence are increasing.

3.4 Spillovers

Although the tone of our discussion thus far suggests ROS welfare is increasing in regulatory stringency, firm activity may also generate positive spillovers. For example, the foreign exchange earnings of exporting firms can alleviate devaluation pressures on local currencies. Alternately, innovative firms generate knowledge spillovers that can raise factor productivity sector-wide. We capture the tendency of a firm to generate regulation-inhibited spillovers to

[8] As g falls, the firm's costs, gT, of delivering rents T to the regulator fall. Provided the regulator puts positive weight on the firm's transfer costs, then a fall in g also raises her net valuation, $T - cgT$, of the transfer received.

ROS via the parameter n. Differentiating (1), (3) and (5) gives

$$\begin{aligned}
\frac{dX^*}{dn} &= -\frac{g\delta N'(X^*)}{\Delta_2[\gamma - cg]} < 0 \\
\frac{dX^G}{dn} &= -\frac{\delta N'(X^G)}{\Delta_1} < 0 = \frac{dX^0}{dn} \\
\frac{d[X^G - X^*]}{dn} &= \frac{\delta\left[\frac{g\Delta_1}{\gamma - cg}\left[N'(X^*) - N'(X^G)\right] - \delta\pi'' N'(X^G)\right]}{\Delta_1\Delta_2} < 0, \\
\frac{d[X^0 - X^*]}{dn} &= \frac{g\delta N'(X^*)}{\Delta_2[\gamma - cg]} > 0.
\end{aligned}$$

Because regulation inhibits production and sales, when spillovers are large the regulator prefers lax regulation. This moves the regulator's preferred stringency in the direction of the firm's. This increased coincidence of interests reduces both threatpoint and equilibrium stringency, with the former falling faster such that exerted influence falls. The other metric of influence, $X^0 - X^*$, on the other hand, rises, since X^0 ignores spillovers and profits and thus $dX^0/dn = 0$. In sum, our model predicts firms that generate positive spillovers will face less regulatory interference, exert less influence but enjoy greater effective influence.

3.5 Competition

Thus far we have implicitly assumed regulations are firm-specific. In reality, businesses also face regulatory interference in the form of sector-wide regulations that impinge on all firms active in the firm's industry. This makes it costly to weaken regulations across the board for the benefit of the politically active firm—holding constant the scale of that firm's activity—when there are a large number of other firms active in that same sector. A more thorough treatment of the multiple-firm problem would model the potential for collective action, allowing for the endogenous formation of (multiple) lobby groups, a vector of regulations (some of which are firm-specific and some of which are sector-wide), and interactions between firms in downstream markets. This is outside the scope of our analysis. However, we can offer some predictions as to how the presence of industry-level competition affects a single firm's equilibrium influence and interference if we are willing to impose the following assumptions on our model. Specifically, we assume that the firm's competitors do not lobby the regulator themselves, competition does not affect $\pi'(X)$ (i.e. the marginal effect of regulation on the firm's own profits), and regulatory scale economies occur at the plant level only. In what follows we also hold constant the scale of the politically active firm's

activity, setting $\delta = 1$ for clarity. Under the aforementioned assumptions, we can adapt the model to account for industry-wide regulation by introducing a simple scale parameter ψ and writing $G(X,T) = \psi[s(X) + nN(X) + b\pi(X) - e(X)z] + T[\gamma - cg]$, where $z = z(1)$, and keeping the form of R unchanged from before. In this formulation, regulation-augmenting and -inhibiting spillovers are increasing in ψ, as are regulatory costs and sector-level profits; the politically-active firms own profits are independent of ψ. Under this formulation, we have

$$\frac{dX^G}{d\psi} = \frac{dX^0}{d\psi} = 0$$

while

$$\frac{dX^*}{d\psi} = -\frac{d[X^G - X^*]}{d\psi} = -\frac{d[X^0 - X^*]}{d\psi} = \frac{\pi'(X^*)}{\psi\Delta_4} > 0$$

where $\Delta_4 \equiv \pi'' + \frac{g}{\gamma - cg}\psi[s'' + b\pi'' + nN'' - e''z] < 0$. One proxy for the scale of other-firm activity is the number of competitors in the firm's industry. Under this interpretation, our model suggests that a firm's equilibrium regulation will be increasing in the amount of competition it faces, while its exerted and effective influence will decline.

4. Data

Our empirical analysis uses the World Business Environment Survey (WBES), a survey of over 10,000 firms in 80 countries and one territory conducted in 1999-2000. The survey was conducted though face-to-face interviews with firm managers and owners and covers a large range of questions concerning the firm's relationship with the government, including perceptions of regulations, corruption, influence, macroeconomic policies, competition, and infrastructure.[9] We use data from all countries except those in Africa and the Middle East as these regions do not have data on firm beliefs about influence on government. The countries for which there was at least one firm with all the data required for our base specification are listed in Table 17 in the Appendix. Definitions and summary statistics for the variables used in our analysis are discussed in this section. Motivation for choice of variables and hypotheses are given in Section 5.

[9]Permanent url http://go.worldbank.org/RV060VBJU0

4.1 Influence over Government

Our first empirical question is how influence depends on firm characteristics. The WBES asked managers for each of the Executive, Legislature, Ministry and Regulatory Agency of the national government of the country in which they were operating:

> "When a new law, rule, regulation, or decree is being discussed that could have a substantial impact on your business, how much influence does your firm typically have at the national level of government on the content of that law, rule, regulation or decree? Would you say very influential, frequently influential, influential, seldom influential or never influential?"

Summary statistics reported in Table 1 show that for all four branches of government most firms feel that they are "Never" influential. The four branches of government appear to have very similar levels of susceptibility to influence.

Table 1: Influence Data Summary. Percentage of firms in each category and total observations. The four branches of government appear to have very similar levels of susceptibility to influence and in all branches almost two thirds of firms feel that they are "Never" influential.

Variable	**Never** %	**Seldom** %	**Sometimes** %	**Often** %	**Always** %	**Obs.**
Influence Executive	61	21	10	4	3	6095
Influence Legislature	63	21	9	4	3	6104
Influence Ministry	62	21	10	5	3	6094
Influence Regulator	60	21	12	5	3	5971

A high degree of co-linearity between the four measures of influence in Table 1[10] suggests that treating them as four separate dependent variables would amount to duplication and limit the space available for other analysis and robustness checks. However, the ordinal nature of the variables means that creating a composite variable by averaging or adding them is not appropriate. Additionally, we have no means by which to judge which of the four measures of influence is the most important for any given firm, since the most important branch of government over which to exert influence is likely to vary by firm and country of operation. Thus we present our base regression for influence for all four branches separately and for a variable constructed from the maximum reported influence over any branch of

[10]Pair-wise correlations for the four influence variables range from $0.77 - 0.83$.

government for each firm (henceforth referred to as the 'maximum-influence variable').[11] In order to save space all variations on our base regression (for robustness checks etc.) use only the maximum influence as the dependent variable.

4.2 Regulatory Constraint

The second set of dependent variables of interest is the constraint caused by different types of regulations. The WBES interviewers asked managers:

> "Please judge on a four point scale how problematic are these different regulatory areas for the operation and growth of your business...Environmental Regulations, Business Licensing, Customs/Foreign Trade Regulations in your country, Labor Regulations, Foreign Currency/Exchange Regulations, Fire & Safety Regulations, Tax Regulations/Administration, High Taxes".

Possible responses for each regulatory area were: 1 (No Obstacle), 2 (Minor Obstacle), 3 (Moderate Obstacle), or 4 (Major Obstacle).

Table 2 shows that High Taxes are a major obstacles for more than half the firms. The next most constraining regulatory area was Tax Regulations/Administration followed by Labor Regulations and Business Licensing.

Table 2: Regulatory Constraint Data Summary. Percentage of firms in each category, mean, and total observations. Median response for each variable shown in bold.

Variable	**No**	**Minor**	**Moderate**	**Major**	**Mean**	**Obs.**
	%	%	%	%		
Environment Reg.	41	**28**	21	10	2.01	7710
Labour Reg.	35	**28**	24	14	2.18	7990
Fire, Safety Reg.	44	**31**	18	07	1.88	7903
Business Licensing	40	**23**	23	14	2.10	7821
High Taxes	09	11	22	**58**	3.29	7985
Tax Regs., Admin.	17	20	**31**	32	2.78	8029
Foreign Exchange Reg.	48	**23**	17	11	1.91	7237
Customs, Trade Reg.	37	**23**	26	14	2.18	6882

[11] For example, if a firm reports influence scores of 1, 1, 2, and 3 for the Executive, Regulator, Legislature and Ministry respectively, then the maximum-influence variable takes a value of 3 for that firm.

4.3 Explanatory Variables

The WBES data contains a number of firm characteristics which we might expect to be associated with a firm's ability to influence government decisions and its experience of regulatory constraint. The motivation for including and hypotheses related to each of the selected right hand side variables is discussed in Section 5. In the current section we describe the variables and present summary statistics. The variables on the right hand side in our base regressions are:[12]

- Size: coded 1 for small ($5-50$ employees), 2 for medium ($51-500$ employees) and 3 for large (>500 employees),
- Government: coded 1 if firms reported having any share of government ownership, 0 otherwise,
- Exporter: coded 1 if firms export some product, 0 otherwise,
- Foreign: coded 1 if firms report at least 10% foreign ownership, 0 otherwise,
- Multi-country: coded 1 if firms report having operations or holdings in other countries, 0 otherwise,
- Age: coded 1 for $0-5$ years, 2 for $6-20$ years, and 3 for more than 20 years firm age,
- Sector: manufacturing, services, agriculture, construction, and other,
- Number of competitors: coded 0 for no competitors, 1 for one to three competitors and 3 for more than three competitors,[13] and
- Country of operation of respondent firm.

Since the variables are categorical they are summarized as their component binary variables in Table 3 where the mean value is the fraction of reporting firms which are in that category. Countries included in the analysis are listed in Table 17 in the Appendix. Table 3 shows that sample size and proportion in each category are sufficient for identification of regression coefficients. In some cases - for example foreign firms - this is the result of intentional over-sampling in the survey design.

[12]We also make use of a number of other variables from the WBES in our robustness checks. Variables used in the robustness checks are discussed in Section 7.

[13]There were also codings for various forms on non-response. Dummies for these were included in the regression in order to minimize potential selection bias due to non-response but coefficients are not reported in the regressions.

Table 3: Summary of Binary Explanatory Variables. Mean value is the fraction of reporting firms which are in that category. N represents the number of valid responses to the question from which the binary fraction was generated. The mean multiplied by N gives the number of firms in each category.

Variable	**Mean**	**N**
Small	0.414	8,132
Medium	0.420	8,132
Large	0.166	8,132
Government	0.125	8,057
Exporter	0.327	7,996
Foreign	0.148	8,081
Multi-country	0.158	8,072
Young	0.311	7,956
Middle-aged	0.332	7,956
Old	0.357	7,956
Manufacturing	0.380	7,611
Services	0.462	7,611
Other sectors	0.158	7,611
No competitors	0.069	7,367
Few Competitors	0.143	7,367
Many Competitors	0.788	7,367

Given that much of the political economy literature has concentrated on the action of groups rather than firms, we may be concerned that only large firms have any political influence. Table 4 presents a cross-tabulation of firm size with our maximum influence variable and shows that while larger firms tend to be more influential, there are non-negligible proportions of small and medium sized firms which also consider themselves influential. Even among small firms nearly 40% report having at least some influence.

Table 4: Maximum Influence proportion of responses "Never" and "Very" influential by size category. While larger firms tend to be more influential, they are not the only influential firms.

	Size Category			
Max. Influence	Small	Medium	Large	All
Never Influential	0.63	0.50	0.30	0.51
Very Influential	0.04	0.05	0.07	0.05
Total	2,372	2,767	1,108	6,247

5. Empirical Approach

The empirical part of this paper treats firm characteristics as explanatory variables in regressions in which *either* a measure of influence *or* a measure of regulatory obstacle is the dependent variable. Although we explicitly model influence and regulatory constraint, our model does not provide a handy exclusion restriction or instrument which would allow us to cleanly identify the impact of exogenous changes in influence on the observed regulatory constraint. Nor do we claim the WBES data contains sufficient controls for the endogenous determinants of influence that we can claim that residual influence is exogenous.[14] Thus our objectives are more humble, namely to show that not all characteristics which increase a firm's influence will decrease the regulatory constraint it faces; and to show that the empirical relationships we observe are consistent with a very general model in which variations in the government's costs and benefits of regulating a firm induce variations in the firm's influence over the government.

The results presented in the body of this paper are discrete effects from binary probit models. A range of alternative models were considered, including ordered probit, logit, partial proportional odds, heterogeneous logit, and probit with a Heckman correction for selection bias. The Appendix discusses each of these estimators and reports coefficient estimates for regressions with dependent variables Maximum Influence, and constraints from Environmental Regulations, and High Taxes. The standard probit model results were chosen for presentation in the body of the paper as there was no clear preferred estimator, all of the alternative estimators had substantively the same qualitative results, and the calculation and interpretation of effects is most straightforward for the binary probit model.

In order to estimate a probit model, the responses for each of the dependent variables were aggregated to form binary groupings. Since at least 60% of firms report Never being influential, the influence categories Seldom-Always were aggregated. For all the regulations repsonses No and Minor obstacle were aggregated to form one group, and responses Moderate and Major were aggregated to form the other.[15]

[14] When we did test including influence on the right hand side in the regulatory constraint regressions we found it weakly positively correlated with constraint.

[15] An alternative approach would be to aggregate the response categories so that as near as possible to half the sample was in each of the two new groups. As can be seen from Tables 1 and 2 the appropriate aggregation varied by dependent variable. For all Influence variables the groups remain divided between "Never" and "Seldom" influential. For environmental, fire, business licensing and foreign exchange regulations the division was between "No Obstacle" and "Minor Obstacle". For labor, tax regulation & administration, and customs & trade regulations the division was between "Minor Obstacle" and "Moderate Obstacle". This approach leads to essentially the same conclusions as the approach reported here.

The explanatory variables in our base regressions are defined in Section 4.3. All categorical explanatory variables were included in the regressions as sets of dummies. The remainder of this section motivates the inclusion of each of these explanatory variables and states hypotheses about the sign of the coefficients based - where possible - on the comparative statics in Section 3. Robustness checks are discussed in Section 7.

Firm size has the most direct connection to our model of any of the variables in the WBES survey. Firm size is measured small, medium, or large according to the number of workers and is the best available measure of the parameter δ in our model. Accordingly, we expect size to be correlated positively with both influence and regulatory constraint when there are economies of scale in regulation. We classify Environmental, Labor and Fire regulations as areas with high economies of scale for the regulator since travel for on-site inspection is required for monitoring.

Government ownership also has a fairly direct interpretation in our model. Governments internalize costs and benefits to firms (or parts thereof) which they own, which we interpret as a higher franchise b in the theoretical model. The comparative static results are that higher franchise raises effective influence and lowers equilibrium regulation. Furthermore, because governments are more likely to own firms which provide public goods, we expect government owned firms to have higher n on average, which also reduces equilibrium regulation and increases effective influence.

Exporting firms earn foreign exchange which empirical evidence suggests many governments view as a positive spillover. This suggests n is higher for exporters which should lead to greater effective influence and less regulatory constraint. However, as per Melitz (2003), exporters may have higher productivity than average, suggesting δ is higher for them if inputs (i.e. workers) are held constant. High δ argues in favor of greater effective influence but more regulatory constraint. On net, exporters are predicted to have high influence but an ambiguous correlation with regulatory obstacles.

Multi-country firms (those which have operations or holdings in other countries) have been argued to be particularly proficient political operators due to factors such as scale economies and learning by doing in lobbying efforts (Boddewyn 1988, Desbordes and Vauday 2007). In our model lobbying efficiency is represented by lower values of g, suggesting greater influence and lower regulatory constraint. However, similarly to exporting firms, new international economics suggests multi-national firms are the most productive firms. Thus δ is higher for them if inputs (i.e. workers) are held constant constant, which suggests

higher influence but more regulatory constraint.

Foreign owned firms, like firms that operate abroad, may have lower lobbying costs, g, due to scale economies arising from lobbying activities overseas. Lower g leads to increased influence and decreased equilibrium regulation. A substantial literature also assumes that foreign firms are more likely to be politically disenfranchised, leading to low intrinsic influence b. Lowering b lowers effective influence and increases equilibrium regulation. Countering the effect of disenfranchisement is the possibility, also supported by a significant literature, that foreign multinationals bring positive spillovers via technology and knowledge transfer. This corresponds to high n which increases influence and lowers equilibrium regulation. Finally, consistent with the discussion for multi-country firms, foreign-owned firms may have high δ, causing higher influence and higher regulatory constraint. Overall, we cannot make any unambiguous predictions about the relationship between foreign ownership and either influence or equilibrium regulation.

Competition. The degree of competition in a sector reflects the amount of extra-firm activity affected by sector-wide regulations constraining an individual firm. Stated differently, the number of competitors proxies the extent of collective action failures. Accordingly, we expect firms with competition to exhibit higher ψ, face greater regulatory constraint, and exert less influence.

Tables 5 and 6 summarize our empirical predictions.

Table 5: Correspondence between WBES variables, model parameters, sign of comparative statics and signs of regression coefficients for influence as dependent variable.

WBES Variable	**Model Parameter(s)**	**Predicted Sign**	**Empirical Correlation**
Size	δ	Positive	Positive
Govt. Ownership	b, n	Positive	Positive
Exporter	n, δ	Positive	Positive
Foreign Owned	n,$-b$,$-g$,δ	Ambiguous	None
Multi-country	$-g$,δ	Positive	Positive
Competition	ψ	Negative	Negative

6. Results

Table 7 reports discrete effects and standard errors for the base specification for influence. The dependent variables in columns $1-4$ respectively are influence over Executive, Leg-

Table 6: Correspondence between WBES variables, model parameters, sign of comparative statics and signs of regression coefficients for regulatory constraint as dependent variable.

WBES Variable	**Model Parameter(s)**	**Predicted Sign**	**Empirical Correlation**
Size	δ	Positive or None[a]	Positive or None[a]
Govt. Ownership	b, n	Negative	Negative or None
Exporter	n,δ	Ambiguous	None[b]
Foreign Owned	n,$-b$,$-g$,δ	Ambiguous	Negative or None
Multi-country	$-g$,δ	Ambiguous	Negative or None[b]
Competition	ψ	Positive	Positive or None

[a] Positive where there are economies of scale in regulation (i.e. environment, labor and fire regulations), no correlation where there are no obvious scale economies for the regulator.

[b] Excluding Foreign Exchange and Customs & Trade regulations, which affect exporting firms and firms with overseas operations more for obvious reasons.

islature, Ministry, and Regulator.[16] The dependent variable in column 5 is the Maximum Influence reported by the firm across any of the four branches of government. The results in all five columns are consistent in terms of sign and significance[17], and two-sample t-tests cannot reject the null that the effects are the same across the columns. In light of this consistency we run all our robustness checks using only the "Maximum Influence" dependent variable and focus on these results in the following discussion.

Consistent with one of our model's central predictions, medium and large firms are significantly more influential than small firms (the excluded category) in all columns of Table 7. The results in column 5 show that medium-sized firms are around 10% less likely and large firms are around 20% less likely to report never being influential over government decisions of importance to their firm. The difference between the medium and large firm effects is statistically as well as economically significant.

Also consistent with our model's predictions, the effects for Government, Exporter, and Multi-country operations are positive and significant in all columns of Table 7. Government ownership is associated with a 12% increase in the probability of being influential and Exporter and Multi-country are respectively associated with increases of around 5% and 6%.

The results for the impact of increasing competition for a firm are also consistent with our predictions, though somewhat less statistically significant. Firms with Few or Many competitors are respectively around 5% and 7% more likely to report never influencing government than firms with no competitors (the excluded group). Finally for Table 7 we

[16] Discrete effects are the appropriate counterpart to marginal effects for categorical explanatory variables.

[17] With the exception of the effect of having "many competitors" when "Influence on the Regulator" is the dependent variable.

Table 7: Probit regressions using firm characteristics to predict probability of having influence (>"never") on different branches of government. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Executive	Legislator	Ministry	Regulator	Max
Medium	0.0828**	0.0619**	0.0800**	0.0833**	0.0951**
	(0.0151)	(0.0152)	(0.0151)	(0.0154)	(0.0152)
Large	0.201**	0.171**	0.215**	0.189**	0.215**
	(0.0222)	(0.0222)	(0.0224)	(0.0225)	(0.0213)
Government	0.114**	0.125**	0.118**	0.0995**	0.120**
	(0.0211)	(0.0212)	(0.0210)	(0.0216)	(0.0206)
Exporter	0.0405**	0.0417**	0.0603**	0.0450**	0.0544**
	(0.0155)	(0.0155)	(0.0155)	(0.0160)	(0.0159)
Foreign	-0.00366	-0.0171	0.00240	0.0307	0.0199
	(0.0194)	(0.0191)	(0.0192)	(0.0200)	(0.0203)
Multi-country	0.0809**	0.0721**	0.0885**	0.0678**	0.0625**
	(0.0196)	(0.0194)	(0.0194)	(0.0198)	(0.0198)
Few Compet.	-0.0418	-0.0513	-0.0372	-0.0291	-0.0537
	(0.0287)	(0.0276)	(0.0280)	(0.0296)	(0.0295)
Many Compet.	-0.0532*	-0.0636*	-0.0607*	-0.0489	-0.0721**
	(0.0263)	(0.0256)	(0.0257)	(0.0266)	(0.0259)
Observations	5214	5220	5210	5110	5363

Standard errors in parentheses

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

see that Foreign ownership appears to be uncorrelated with influence. This suggests that if foriegn firms are politically disenfranchised, its impact is balanced by foreign firms lobbying experience and/or their perceived positive spillovers.

Tables 8 and 9 report coefficients for the probit regressions of whether regulations were at least a "Moderate" (i.e. > "Minor") obstacle to the operation and growth of the firm's business. The regulatory areas reported in Table 8 are Environment, Labor, and Fire - all of which we suggest are characterized by economies of scale for the regulator since they require on-site inspection. The regulatory areas in Table 9 are Business Licensing, High Taxes, Tax Administration/regulation, Foreign Exchange regulations, and Customs & Trade regulations. We classify these areas as being less characterized by economies of scale in regulation. Across the eight regressions in Tables 8 and 9 all of the statistically significant results confirm our model's predictions.[18]

[18]The results are consistent with our model with the exception of Multi-country firms finding Customs & Trade regulations more of an obstacle and Exporting firms finding both Foreign Exchange and Customs & Trade regulations more of an obstacle than otherwise similar firms. The obvious reason for these exceptions

Table 8: Probit regressions using firm characteristics to predict probability of constraint (>"minor") by regulations in areas characterized by economies of scale. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Environment	Labor	Fire
Medium	0.0361**	0.0447**	0.0321*
	(0.0136)	(0.0131)	(0.0128)
Large	0.0701**	0.0443*	0.0197
	(0.0201)	(0.0186)	(0.0188)
Government	0.00889	-0.0259	-0.00261
	(0.0183)	(0.0177)	(0.0173)
Exporter	0.00276	0.0108	-0.0207
	(0.0136)	(0.0131)	(0.0125)
Foreign	-0.00406	-0.0453**	0.00909
	(0.0170)	(0.0158)	(0.0164)
Multi-country	-0.0318	-0.000736	-0.00816
	(0.0167)	(0.0163)	(0.0162)
Few Compet.	0.0470	0.0658*	-0.00217
	(0.0290)	(0.0280)	(0.0260)
Many Compet.	0.0273	0.0516*	-0.00523
	(0.0236)	(0.0229)	(0.0228)
Observations	6773	7019	6945

Standard errors in parentheses

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

Consistent with our model but possibly contrary to popular expectation, medium and large firms find the regulations at least as much of an impediment to the operation and growth of their business as otherwise similar small firms. Large and Medium-sized firms are respectively 7% and close to 4% more likely to identify Environmental regulations as at least a moderate obstacle. The corresponding size effects for Labor regulations are both around 4%, while for Fire regulations we identify significantly more of a constraint for Medium-sized firms only. The lack of effect identified for Large firms is likely due to insufficient variation in the binary variable created by grouping "No" and "Minor" together since Fire regulations are generally the least constraining of all. When the probit regression is run with "No" obstactle as one group and "Minor"—"Major" as the other, the Medium-sized firm effect is close to 6% and the Large-size effect is over 9%; both are significant at the 1% level.

Also consistent with our model and of no surprise, government-owned firms generally find regulation less of an obstacle, though this effect is stronger in Table 8 then in Table 9. The

is the significantly higher exposure of these globalized firms to these types of regulations.

Table 9: Probit regressions using firm characteristics to predict probability of constraint (>"minor") by regulations in areas not characterized by economies of scale. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Bus.Lic.	H.Tax	TaxAd.	ForEx	Customs
Medium	-0.0156	-0.00959	0.0115	0.00194	0.0224
	(0.0136)	(0.0110)	(0.0135)	(0.0134)	(0.0150)
Large	0.0251	-0.00568	-0.0203	-0.0271	0.0208
	(0.0198)	(0.0154)	(0.0193)	(0.0182)	(0.0211)
Government	-0.0490**	-0.0574**	-0.0426*	-0.0244	-0.0607**
	(0.0186)	(0.0161)	(0.0186)	(0.0179)	(0.0198)
Exporter	-0.0171	0.00971	0.00448	0.0577**	0.0874**
	(0.0137)	(0.0108)	(0.0136)	(0.0135)	(0.0149)
Foreign	-0.0116	-0.0205	-0.0155	0.00505	0.00611
	(0.0175)	(0.0140)	(0.0172)	(0.0163)	(0.0182)
Multi-country	0.0176	-0.0424**	-0.00664	0.0294	0.0493**
	(0.0180)	(0.0145)	(0.0173)	(0.0171)	(0.0187)
Few Compet.	0.0255	0.0424*	0.0705**	0.0534	0.0690*
	(0.0288)	(0.0188)	(0.0252)	(0.0299)	(0.0310)
Many Compet.	0.0556*	0.101**	0.0917**	0.0540*	0.0784**
	(0.0241)	(0.0203)	(0.0237)	(0.0234)	(0.0254)
Observations	6868	7017	7052	6322	6005

Standard errors in parentheses

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

significant negative effects associated with government ownership are for Business Licensing, High Taxes, Tax administration, and Customs & Trade regulations. Government firms do not seem to enjoy any regulatory slack in the areas of Environmental, Labor, or Fire safety; possibly because these areas are the most visible and sensitive to the public.

Interestingly, despite their substantially higher reported influence, Exporters generally report at the same levels of regulatory constraint as other firms. The exceptions to this result are Foreign Exchange and Customs & Trade regulations, which exporters are significantly more likely to identify as at least a moderate constraint. The reasons for the exception in these areas is self-evident. The lack of identifiable regulatory advantage enjoyed by exporters may, paradoxically, be because they are more efficient. More efficient firms will generally be 'larger' than other firms with the same number of workers, which may mean that the exporter coefficient is capturing some size effects from our model.

Foreign ownership is generally associated with slightly lower regulatory constraint, though this effect is only statistically significant with regard to Labor regulations. Multi-country

firms — i.e. those which have operations or holdings in other countries — are generally very slightly and statistically insignificantly less constrained by regulations. The exceptions are High Taxes, which multi-country firms find significantly less of an obstacle, and Customs & Trade regulations which they find more of an obstacle than otherwise similar firms. The negative correlation with tax constraint may indicate that multi-country firms employ their superior lobbying capabilities primarily to reduce tax burden. This is plausible since high taxes are the highest obstacle for almost all firms. Alternatively the low tax constraint may indicate that multi-country firms are able to employ techniques such as transfer pricing to avoid legislated tax burdens. The positive and significant correlation of overseas operations with Customs & trade regulations likely arises because they are disproportionately exposed due to intra-firm trade.

Finally in Tables 8 and 9 we see that in all regulatory areas except Fire, the effects of having Few Competitors or Many Competitors are positive as predicted, and in most cases significantly different from zero.[19] The lack of significant effect of increased competition observed in the regressions for Environmental and Fire regulations is likely due to the relative lack of variation in our binary dependent variable for these regulations. The ordered probit estimator in Table 11 and the generalized ordered probit estimates in Table 14 both make use of the full variation in responses for constraint from Environmental regulations, and both find positive and significant coefficients for the competition variables.

7. Additional controls and Regional differences

Numerous additional variables from the WBES dataset were used to test the robustness of the results obtained in our base specification. Some of these robustness checks addressed potential omitted variable biases due to other determinants of influence, while others addressed potential survey-related biases such as representativeness of sampling and general optimism of the respondent.

Table 16 in the Appendix shows the robustness of the results to controlling for additional potential determinants of influence. Each of the additional controls was identified in at least one other recent paper using the same or similar data (Chong and Gradstein 2007, Campos and Giovannoni 2007, Desai and Olofsgard 2008), however none of them have been included in our base regression because of concerns about data quality and/or endogeniety (explained

[19] "No Competitors" is the excluded category.

in the footnotes to this paragraph). Column 1 of Table 16 reports the coefficient estimates for our base regression whose discrete effects are reported in column 5 of Table 7. Column 2 controls for the concentration of ownership in the firm.[20] Column 3 controls for the legal organization of the firm.[21] Column 4 controls for two measures of the firms perceptions of corruption.[22] Column 5 controls for the location of the firm's headquarters.[23] None of these controls substantively affect our results.

The next empirical concern addressed in our robustness checks is the issue of respondent heterogeneity affecting ordinal responses. Desai and Olofsgard, p.13 pay close attention to this issue, noting that

> "Different respondents may interpret concepts such as "influence" in vastly different ways based on unobservable characteristics ("culture," socialization, etc.). Ordinal scales may mean different things to different respondents based on idiosyncratic factors such as mood or overall optimism."

One way of ameliorating problems caused by respondent heterogeneity is to control for the overall optimism of the respondent by including variables which believe should affect all firms equally. Following Desai and Olofsgard we use managers' responses to questions about the degree to which they view macroeconomic instability (specifically inflation) as a constraint to their business as a proxy for the propensity of the respondent to complain.[24] We also checked the robustness of our results to two alternative proxies for the overall optimism of the respondents which we consider posed less of an endodgeniety problem that the inflation variable, namely how problematic they consider street crime/theft/disorder, and organized crime/Mafia for the operation and growth of their business.

Finally, with regard to respondent heterogeneity, we considered unobserved variation in

[20] The ownership concentration question was asked differently in the Eastern European sample so interaction terms are included to allow different coefficients on concentration. Response rate was low for this question.

[21] "What is the legal organization of this company?" Options were: Single proprietorship, Partnership, Cooperative, Corporation, privately-held, Corporation listed on a stock exchange, Other. The "Other" category significantly overlapped with the Government ownership variable in our base regression.

[22] We included responses to two questions. "Changes in rules, laws and regulations are: completely predictable,..., completely unpredictable." and "It is common for firms in my line of business to have to pay some irregular additional payments to get things done: always, ..., seldom." We had concerns about the endogeneity of these two variables in our context, a concern which was validated by the fact that firms who thought bribery was more common were likely to be less influential.

[23] Response rate for this question was low leading to a substantial reduction in sample size.

[24] It is not altogether clear *ex ante* that the impact of macroeconomic instability should be the same for all types of firms. In particular, it seems likely that the impact of these variables might vary systematically with some of our variables of interest, such as foreign connections.

the respondents' general attitudes specifically toward the government in the country of operation. These attitudes may vary for cultural or historical reasons, or due to the respondent's personal experiences outside the management of their firm. Including proxies for these attitudes in the base regression specification is not justified as reverse causality from success in influencing government to general attitudes may bias the coefficients. On the other hand, ignoring this source of heterogeneity may lead to omitted variable bias. Thus we run an additional robustness check in which we include a number of proxies for general attitude toward government, namely the responses to the questions:

- Please evaluate the following statement: "The process of developing new rules, regulations or policies is usually such that businesses are informed in advance of changes affecting them." This is true: always, mostly, frequently, sometimes, seldom, never.
- Do you regularly have to cope with unexpected changes in economic and financial policies which materially affect your business? Responses were on a six-point scale from completely predictable to completely unpredictable.
- Please rate your overall perception of the relation between government and/or bureaucracy and private firms on the following scale. "All in all, for doing business I perceive the state as": very helpful, mildly helpful, neutral, mildly unhelpful, very unhelpful. The question was asked separately for national and local governments.

Since none of our attempts to address unobserved respondent heterogeneity had a material effect on our results we do not report them in the paper.[25] Our interpretation of the finding of no effect on our coefficients of interest is that although unobserved respondent heterogeneity is certainly present, it did not cause bias because it was not correlated with our explanatory variables of interest.

Our final robustness consideration is regional differences. Our model has been designed with minimal institutional assumptions in order to be applicable to a wide variety of different government around the world. This does not, however, preclude significant regional differences in the model parameters, such as weights in the governments objective function. Particularly where the model's predictions are ambiguous we might expect the empirical results to vary regionally. Results for probit regressions run on the regional subsamples are given in Tables 18-20 in the Appendix. While there is some regional variation in the coefficients, the main difference between the regional results and the pooled results is the increase

[25] Please contact the authors for these results.

in standard errors due to reduced sample size.[26] The only coefficient in Tables 18-20 which is not consistent with our model predictions is that for Large firms in the High Tax constraint regression for the OECD sample. It appears larger firms in the OECD either face less tax burden or are able to creatively manage their accounts in order to substantially avoid the legislated burden.

8. Conclusion

Do corporations influence regulators? Probably. Do influential firms fare better than less influential ones? Maybe—it depends on why these firms are influential in the first place. We employ a simple but general theoretical model that highlights the different forms of influence: intrinsic and exerted. We identify firm-level primitives including size, ownership, and exporter status, which simultaneously determine the extent to which the firm influences, and faces interference from, regulators. Our model predicts that when high influence is the result of positive production spillovers, low lobbying frictions, market monopoly, or high enfranchisement, influence and regulatory obstacle correlate negatively as one would expect. However, when a firm's influence is driven by its size, our model predicts a positive correlation between influence and regulatory interference.

We test our predictions using the World Bank's World Business Environment Survey (WBES). We find that our model correctly predicts firm-level determinants of influence surprisingly consistently across a wide range of countries and across legislative, executive, ministerial, and regulatory branches of government. While influence is not exclusive to large firms, we find that larger firms are more likely to report being influential at all levels of government. We also test the generality of our model by applying it across the full range of regulatory areas in the dataset. Large firms are no less likely — and in some regulatory areas significantly more likely — to experience at least moderate levels of regulatory obstacle to the operation and growth of their business. We similarly find that while exporting and multi-country firms report high levels of influence, there is only occasional evidence that these outward-oriented firms face less regulatory constraint. In contrast, government-owned firms do enjoy significantly greater influence and lower regulatory constraint in many areas,

[26] An alternative approach to the standard errors would have been to run the pooled regression and include a full set of interaction terms. This would have maintained the assumption that the standard errors were equal across the samples. If this assumption were correct then the pooled regression with interaction terms would be more efficient than running the regressions on separate samples. However, if the assumption were violated then it could bias the coefficient estimates given the nonlinear estimator.

likely reflecting such firms' high *intrinsic* influence.

Our analysis has implications for the empirical literature on influence on regulatory outcomes. The ambiguity of our comparative statics concerning transfers suggests that the indeterminacy of the empirical relationship between political contributions and voting behavior may never be resolved. However, direct survey measures of influence aren't necessarily superior. A firm's overall influence is endogenous; it derives from a variety of sources; and it correlates ambiguously with regulatory constraint.

While our analysis is largely positive, our results also carry normative implications relevant to public debate and academic study. Within one model we are able to rationalize both how large firms may claim to be carrying more than 'their share' of regulatory burden, and how critics can claim large firms use transfers to achieve 'disproportionate' influence, thereby diverting regulations away from their social optimum. Meanwhile firms that are intrinsically influential because their welfare is valued highly by the policy-setter (e.g. government-owned firms) may enjoy inefficiently lax regulations from a Utilitarian perspective, without exerting much influence through transfers. Finally, firms which produce positive spillovers may cause little distortion relative to the Utilitarian optimum while still being highly influential and enjoying lower regulatory constraint. Thus we conclude that understanding the source firms' influence is important for correctly identifying the normative motivation for research in this field.

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9. Appendix

Tables 10-15 report coefficient estimates from a variety of estimation techniques for the dependent variables Maximum Influence, constraint from Environmental Regulations, and constraint from High Taxes. We briefly summarize what we view as the empirical implications of these results in the respective table headers. The remainder of this section briefly discusses the different estimators and their reason for inclusion in the robustness checks.

Table 10: Maximum Influence: coefficient estimates from a range of estimators are essentially consistent. The probit estimator in column 1 is the basis of the discrete effects reported in the body of the paper. Dummies for sector, country, and age category included but results not reported.

	Probit	Heck.Prob.	Ord.Prob.	Het.Ord.	Logit
Medium	0.285**	0.271**	0.231**	0.273**	0.466**
	(0.0448)	(0.0449)	(0.0410)	(0.0603)	(0.0744)
Large	0.642**	0.623**	0.468**	0.512**	1.058**
	(0.0628)	(0.0629)	(0.0526)	(0.0971)	(0.105)
Government	0.346**	0.316**	0.311**	0.294**	0.564**
	(0.0599)	(0.0608)	(0.0484)	(0.0641)	(0.0990)
Exporter	0.157**	0.148**	0.136**	0.107**	0.255**
	(0.0451)	(0.0449)	(0.0389)	(0.0408)	(0.0745)
Foreign	0.0420	0.0353	0.0181	0.0131	0.0732
	(0.0580)	(0.0576)	(0.0473)	(0.0427)	(0.0965)
Multi-country	0.182**	0.178**	0.183**	0.150**	0.292**
	(0.0561)	(0.0558)	(0.0453)	(0.0482)	(0.0928)
Few Compet.	-0.170	-0.168	-0.190**	-0.145*	-0.291*
	(0.0874)	(0.0865)	(0.0727)	(0.0705)	(0.145)
Many Compet.	-0.222**	-0.220**	-0.228**	-0.214**	-0.371**
	(0.0745)	(0.0738)	(0.0625)	(0.0674)	(0.123)
Observations	5456	7238	5456	5456	5456

Standard errors in parentheses

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

The first column in Tables 10-12 reports coefficient estimates and standard errors which correspond to the discrete effects reported in the body of the paper and can be considered our base estimator. The second column reports estimates from a probit model with Heckman correction for selection bias due to non-random missing responses. The firm's proportion of all questions with missing responses was used as an instrument in the selection equation. While the test statistic rejected the null of no bias, the results in Tables 10-12 show that the bias was not substantive. In the one case in which the selection-corrected results differed in terms of significance from our base regression, the corrected results were more in line with our model's predictions.

The third column in Tables 10-12 reports estimates from an ordered probit model. Ordered logit or probit models are a popular choice for ordered survey response dependent

Table 11: Constraint from Environmental Regulations: coefficient estimates from a range of estimators are essentially consistent. The probit estimator in column 1 is the basis of the discrete effects reported in the body of the paper. Dummies for sector, country, and age category included but results not reported.

	Probit	Heck.Prob.	Ord.Prob.	Het.Ord.	Logit
Medium	0.109**	0.0997*	0.127**	0.118**	0.186**
	(0.0412)	(0.0413)	(0.0343)	(0.0305)	(0.0688)
Large	0.207**	0.199**	0.223**	0.189**	0.349**
	(0.0579)	(0.0579)	(0.0473)	(0.0432)	(0.0961)
Government	0.0269	0.0143	-0.00411	-0.0243	0.0445
	(0.0553)	(0.0554)	(0.0469)	(0.0349)	(0.0921)
Exporter	0.00839	0.00190	0.0272	0.0240	0.0127
	(0.0413)	(0.0412)	(0.0344)	(0.0243)	(0.0685)
Foreign	-0.0124	-0.00395	-0.0426	-0.00856	-0.0227
	(0.0519)	(0.0519)	(0.0402)	(0.0278)	(0.0858)
Multi-country	-0.0985	-0.103*	-0.0705	-0.0475	-0.168
	(0.0525)	(0.0523)	(0.0413)	(0.0291)	(0.0874)
Few Compet.	0.140	0.135	0.172*	0.0924	0.240
	(0.0847)	(0.0844)	(0.0710)	(0.0548)	(0.143)
Many Compet.	0.0837	0.0770	0.123*	0.0535	0.150
	(0.0732)	(0.0730)	(0.0620)	(0.0480)	(0.124)
Observations	6773	7165	6774	6774	6773

Standard errors in parentheses

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

variables such as the ones used in this paper. However, statistical tests suggested that the parallel lines assumption required by ordered logit or probit estimators did not hold in our data.[27]

The forth column in Tables 10-12 reports estimates from the heteroskedastic ordered probit model estimator of Williams (2009). The test built into Williams's OGLM command in Stata indicated that the homoskedasticity assumption was violated for some of our variables of interest, leading to potentially biased coefficient estimates. Comparison for the Heteroskastistic Ordered model estimates to the other columns in Tables 10-12 suggests the induced bias was not substantial.

The final column in Tables 10-12 reports logit model estimates which suggest that the choice of assumed error variance — while not immaterial — does not qualitatively affect our conclusions.

Given that the parallel lines assumption does not hold for at least some of our explanatory variables, a generalized ordered probit model may an appropriate alternative to the ordered

[27]Wolfe and Gould's "omodel" approximate likelihood ratio test for Stata reported p-values of less than 0.02 for all dependent variables. Brant tests of the parallel regression assumption after ologit were also significant for at least some explanatory variables of interest for each dependent variable.

Table 12: Constraint from High Taxes: coefficient estimates from a range of estimators are essentially consistent. The probit estimator in column 1 is the basis of the discrete effects reported in the body of the paper. Dummies for sector, country, and age category included but results not reported.

	Probit	Heck.Prob.	Ord.Prob.	Het.Ord.	Logit
Medium	-0.0403	-0.0449	0.0457	0.0103	-0.0805
	(0.0461)	(0.0458)	(0.0367)	(0.0261)	(0.0820)
Large	-0.0237	-0.0231	-0.0431	-0.0540	-0.0421
	(0.0638)	(0.0632)	(0.0487)	(0.0339)	(0.112)
Government	-0.227**	-0.218**	-0.258**	-0.177**	-0.407**
	(0.0606)	(0.0601)	(0.0489)	(0.0461)	(0.107)
Exporter	0.0411	0.0411	-0.0303	-0.0221	0.0560
	(0.0458)	(0.0454)	(0.0356)	(0.0248)	(0.0812)
Foreign	-0.0842	-0.0778	-0.111**	-0.0752*	-0.135
	(0.0562)	(0.0558)	(0.0428)	(0.0305)	(0.0982)
Multi-country	-0.170**	-0.174**	-0.101*	-0.0696*	-0.291**
	(0.0558)	(0.0554)	(0.0428)	(0.0295)	(0.0965)
Few Compet.	0.188*	0.177*	0.236**	0.152*	0.314*
	(0.0887)	(0.0882)	(0.0745)	(0.0601)	(0.156)
Many Compet.	0.399**	0.386**	0.384**	0.222**	0.686**
	(0.0764)	(0.0760)	(0.0648)	(0.0618)	(0.134)
Observations	7017	7162	7018	7018	7017

Standard errors in parentheses

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

probit model. The estimates for such a model are presented in Tables 13-15. [28] Given that the results observed differences in coefficients across the columns in Tables 13-15, the basic probit model was preferred for its parsimony, ease of interpretation and ease of calculation of marginal effects.

[28]Estimates were produced using Williams's 2006 gologit2 command in Stata.

Table 13: Maxium Influence. Partial proportional odds model allowing all coefficients to vary across columns. While some coefficients vary substantially, none of the results contradict our qualitative conclusions. Dummies for sector, country, and age category included but results not reported.

	$> Never$	$> Seldom$	$> Sometimes$	$> Often$
Medium	0.482**	0.324**	0.150	0.284
	(0.0735)	(0.0834)	(0.111)	(0.167)
Large	1.075**	0.743**	0.477**	0.610**
	(0.104)	(0.107)	(0.141)	(0.202)
Government	0.606**	0.607**	0.419**	0.395
	(0.0971)	(0.102)	(0.142)	(0.224)
Exporter	0.244**	0.209**	0.141	-0.0218
	(0.0736)	(0.0797)	(0.108)	(0.157)
Foreign	0.0141	0.0925	-0.0264	-0.300
	(0.0928)	(0.0969)	(0.127)	(0.213)
Multi-country	0.332**	0.287**	0.437**	0.494**
	(0.0913)	(0.0936)	(0.119)	(0.181)
Few Compet.	-0.302*	-0.268	-0.478*	-0.507
	(0.143)	(0.151)	(0.196)	(0.300)
Many Compet.	-0.354**	-0.384**	-0.563**	-0.466
	(0.122)	(0.128)	(0.165)	(0.241)
Constant	-1.764**	-2.039**	-3.246**	-38.73
	(0.471)	(0.591)	(0.919)	(2103.5)
Observations	5456			

Standard errors in parentheses

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

Table 14: Firm characteristics explaining constraint from environmental regulations: coefficient estimates from partial proportional odds model. Coefficients were constrained to be equal across the columns if Wald tests on unconstrained estimates failed to reject the null of equality at 5% significance. Null was rejected for the coefficients on Large and Foreign but none of the results contradict model predictions. Dummies for sector, country, and age category included but results not reported.

	$> None$	$> Minor$	$> Moderate$
Medium	0.219**	0.219**	0.219**
	(0.0572)	(0.0572)	(0.0572)
Large	0.569**	0.332**	0.0600
	(0.0920)	(0.0895)	(0.122)
Government	-0.0259	-0.0259	-0.0259
	(0.0777)	(0.0777)	(0.0777)
Exporter	0.0537	0.0537	0.0537
	(0.0577)	(0.0577)	(0.0577)
Foreign	0.0304	-0.0681	-0.326*
	(0.0834)	(0.0836)	(0.128)
Multi-country	-0.125	-0.125	-0.125
	(0.0725)	(0.0725)	(0.0725)
Few Compet.	0.308**	0.308**	0.308**
	(0.117)	(0.117)	(0.117)
Many Compet.	0.213*	0.213*	0.213*
	(0.102)	(0.102)	(0.102)
Constant	-0.911*	-2.080**	-3.419**
	(0.366)	(0.367)	(0.371)
Observations	6774		

Standard errors in parentheses

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

Table 15: Constraint from High Taxes: coefficient estimates from partial proportional odds model. Coefficients were constrained to be equal across the columns if Wald tests on unconstrained estimates failed to reject the null of equality at 5% significance. Null was rejected for the coefficients on Medium, Large, Government, and Many Competitors. The coefficient on Large in column 3 contradicts model predictions and may indicate that Large firms (similarly to Foreign and Multi-country firms) have accounting means to avoid major tax obstacles. Dummies for sector, country, and age category included but results not reported.

	$> None$	$> Minor$	$> Moderate$
Medium	0.190	-0.0759	0.0884
	(0.104)	(0.0778)	(0.0659)
Large	0.339*	-0.0363	-0.224*
	(0.133)	(0.103)	(0.0919)
Government	-0.699**	-0.369**	-0.425**
	(0.128)	(0.102)	(0.0901)
Exporter	-0.0597	-0.0597	-0.0597
	(0.0616)	(0.0616)	(0.0616)
Foreign	-0.202**	-0.202**	-0.202**
	(0.0750)	(0.0750)	(0.0750)
Multi-country	-0.177*	-0.177*	-0.177*
	(0.0752)	(0.0752)	(0.0752)
Few Compet.	0.389**	0.389**	0.389**
	(0.123)	(0.123)	(0.123)
Many Compet.	0.784**	0.722**	0.576**
	(0.128)	(0.114)	(0.108)
Constant	2.483**	0.706	0.402
	(0.686)	(0.413)	(0.392)
Observations	7018		

Standard errors in parentheses

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

Table 16: Probit regressions for Maximum Influence >"Never": Robustness Checks for sensitivity to inclusion of additional determinants of influence. Dummies for sector, country, and age category included but results not reported.

	(1)	(2)	(3)	(4)	(5)
Medium	0.285**	0.285**	0.251**	0.284**	0.301**
	(0.0448)	(0.0565)	(0.0475)	(0.0481)	(0.0697)
Large	0.642**	0.532**	0.550**	0.630**	0.635**
	(0.0628)	(0.0806)	(0.0671)	(0.0673)	(0.116)
Government	0.346**	0.254**	0.240**	0.396**	0.243**
	(0.0599)	(0.0832)	(0.0787)	(0.0667)	(0.0772)
Exporter	0.157**	0.165**	0.145**	0.140**	0.235**
	(0.0451)	(0.0556)	(0.0473)	(0.0482)	(0.0720)
Foreign	0.0420	0.0925	0.0263	0.0367	-0.0118
	(0.0580)	(0.0687)	(0.0589)	(0.0619)	(0.113)
Multi-country	0.182**	0.161*	0.167**	0.199**	0.265*
	(0.0561)	(0.0708)	(0.0574)	(0.0599)	(0.118)
Few Compet.	-0.170	-0.00823	-0.123	-0.0892	-0.0899
	(0.0874)	(0.117)	(0.0995)	(0.0950)	(0.113)
Many Compet.	-0.222**	0.00158	-0.145	-0.194*	-0.205*
	(0.0745)	(0.102)	(0.0859)	(0.0818)	(0.0925)
Constant	-1.038**	-1.126**	-0.944**	-1.262**	-1.079**
	(0.271)	(0.302)	(0.296)	(0.313)	(0.282)
Extra Controls	None	Owner. Conc.	Legal Org.	Corruption	H.Q. in city
Observations	5456	3650	5051	4848	2512

Standard errors in parentheses

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

Table 17: Countries with data included in the base regression by WB Region

Region	**Country**
Transition Europe	Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Rep, Estonia, Georgia, Hungary, Kazakhstan, Kyrgizstan, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Turkey, Ukraine, Uzbekistan
East Asia	China, Malaysia, Indonesia, Singapore
South Asia	India
Latin America	Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Peru, Trinidad & Tobago, Uruguay, Venezuela
OECD	Canada, France, Germany, Italy, Portugal, Spain, Sweden, United Kingdom, United States

Table 18: By Region: Probit regressions for Maximum Influence >"never". While there is some regional variance in effects all results are consistent with the model except for South Asia which is likely suffering bias due to a very small sample. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Trans.Eur.	E.Asia	S.Asia	Lat.Am.	OECD
Medium	0.102**	0.102*	-0.0647	0.0777*	0.124**
	(0.0233)	(0.0441)	(0.123)	(0.0304)	(0.0350)
Large	0.229**	0.120*	-0.0382	0.208**	0.367**
	(0.0403)	(0.0490)	(0.146)	(0.0346)	(0.0436)
Government	0.0932**	0.0865	.	0.162*	0.194**
	(0.0271)	(0.0639)	.	(0.0710)	(0.0609)
Exporter	0.0699**	0.0285	0.220	0.0481	0.0478
	(0.0250)	(0.0475)	(0.117)	(0.0292)	(0.0375)
Foreign	0.00905	-0.0324	-0.101	0.0632	-0.0437
	(0.0366)	(0.0544)	(0.148)	(0.0334)	(0.0455)
Multi-country	0.0609	0.114*	0.0475	0.0450	0.0222
	(0.0387)	(0.0505)	(0.115)	(0.0312)	(0.0451)
Few Compet.	-0.0271	0.102	0.679**	-0.139*	-0.234*
	(0.0372)	(0.0931)	(0.0521)	(0.0651)	(0.0919)
Many Compet.	-0.0673*	0.0503	0.335**	-0.114	-0.208*
	(0.0321)	(0.0984)	(0.0531)	(0.0600)	(0.0850)
Observations	2593	459	74	1517	801

Standard errors in parentheses

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

Table 19: By Region: Probit regressions for Environmental Regulations >"minor" obstacle. Significance of effects has been lowered by increasing standard errors from smaller samples. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Trans.Eur.	E.Asia	S.Asia	Lat.Am.	OECD
Medium	0.0471*	0.0411	0.0447	0.0250	0.0232
	(0.0201)	(0.0319)	(0.0771)	(0.0317)	(0.0397)
Large	0.0787*	0.0501	0.0107	0.0603	0.133*
	(0.0374)	(0.0447)	(0.0925)	(0.0364)	(0.0577)
Government	0.0247	-0.0213	-0.105	0.0449	-0.0256
	(0.0231)	(0.0666)	(0.0854)	(0.0705)	(0.0614)
Exporter	0.0210	0.0150	-0.0252	-0.0145	-0.0324
	(0.0213)	(0.0328)	(0.0656)	(0.0287)	(0.0396)
Foreign	-0.00168	-0.0253	0.00433	0.0128	0.0103
	(0.0325)	(0.0332)	(0.0758)	(0.0327)	(0.0483)
Multi-country	-0.0424	-0.0492	-0.117	-0.0200	-0.00354
	(0.0310)	(0.0374)	(0.0734)	(0.0311)	(0.0459)
Few Compet.	0.0800*	-0.0461	0.320	-0.0679	0.141
	(0.0375)	(0.0930)	(0.184)	(0.0674)	(0.103)
Many Compet.	0.0387	-0.139	0.325*	-0.0472	0.145
	(0.0273)	(0.0813)	(0.132)	(0.0644)	(0.0772)
Observations	3111	1119	273	1472	794

Standard errors in parentheses

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

Table 20: By Region: Probit regressions for High Taxes > "minor" obstacle. Average discrete effects for change in dummy variables from 0 to 1 reported. Dummies for sector, country, and age category included but results not reported.

	Trans.Eur.	E.Asia	S.Asia	Lat.Am.	OECD
Medium	0.000232	-0.0105	-0.0666	-0.00236	-0.0532
	(0.0148)	(0.0337)	(0.0710)	(0.0227)	(0.0348)
Large	0.0228	0.00683	0.0499	-0.00507	-0.154**
	(0.0225)	(0.0443)	(0.0804)	(0.0260)	(0.0554)
Government	-0.0362*	-0.161*	0.00918	-0.0426	-0.114
	(0.0176)	(0.0758)	(0.0764)	(0.0560)	(0.0658)
Exporter	0.0244	0.000827	-0.00782	-0.0185	0.0538
	(0.0143)	(0.0350)	(0.0591)	(0.0213)	(0.0325)
Foreign	-0.0178	0.0153	-0.0956	-0.0221	-0.0362
	(0.0240)	(0.0365)	(0.0700)	(0.0257)	(0.0421)
Multi-country	-0.0707**	-0.0620	-0.00438	-0.0374	0.0159
	(0.0274)	(0.0433)	(0.0688)	(0.0246)	(0.0372)
Few Compet.	0.0505**	0.109	0.0480	-0.0219	-0.00599
	(0.0177)	(0.0877)	(0.225)	(0.0509)	(0.0871)
Many Compet.	0.107**	0.124	0.0668	0.0768	0.0277
	(0.0234)	(0.0797)	(0.229)	(0.0513)	(0.0773)
Observations	3270	1115	289	1522	818

Standard errors in parentheses

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