WORKING paper

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# Joint Ownership of Production Projects as a Commitment Device against Interest Groups

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## ABSTRACT

This paper investigates an unexplored rationale for joint ownership of a production project. We model projects with autocorrelated productivity shocks as creating an option value of investing over time so that later investments benefit from the information revealed by the realization of earlier investments. However, internal and external interest groups may pressurize owners into paying out early revenues. Joint ownership provides a commitment mechanism against them, thereby enabling more efficient levels of investment. The Business Environment and Enterprises Performance survey data corroborate the model's prediction that organizations under interest group lobbying pressure are more likely to choose joint ownership.

Keywords: Commitment Mechanism, Joint Ownership, Joint Venture, Lobbying, Interest Group

JEL classification: D23, F21, G32, L14, L24

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# NON-TECHNICAL SUMMARY

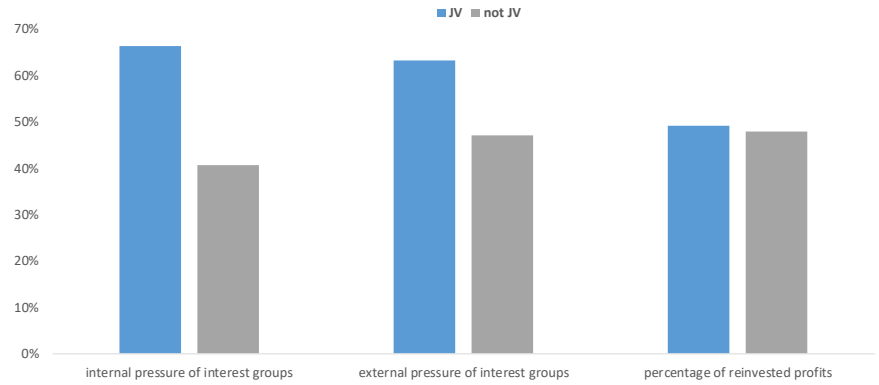
Many projects involve cooperation between partners. Sometimes this cooperation is contractual. Often, though, it takes the form of joint ownership of production projects by two or more firms. This is a puzzle: joint ownership is typically considered inefficient, because interests often diverge and strategies target different objectives among partners. So why does it happen? The answer we explore in this paper is that joint ownership may have advantages, even in absence of asset specificity or incomplete information, when it helps the parties resist pressure from internal or external interest groups to redistribute too soon the fruits of investment.

In our theoretical framework, we assume that firms have the opportunity to invest in a project that yields revenue in two stages. The results of the first stage are informative about the likely results of the second stage, due to autocorrelation in productivity shocks. However, there are interest groups that demand payouts. Lobbying may be internal (some divisions of the firm may have divergent interests) or external (there may be political pressure, or demands from trade-unions or from upstream or downstream trading partners). Internal or external interest groups may pressurize owners into paying out early revenues from such investments when the autocorrelation of productivity implies they should be reinvesting them in the project.

If the project is not wholly owned but instead jointly owned with one or more partners, giving in to lobbying pressure is more expensive and less likely to occur in our model. Indeed, payouts or more general resource allocation decisions that favor one partner's interest groups are more difficult to make without also satisfying the demands of the interest groups of the other partner. As the perceived cost of any payout increases when an economic agent is only part-owner of the project, interest groups end up scaling down their efforts at persuasion and waste fewer resources in such activities. The main predictions are that in the presence of effective lobbying groups, joint ownership of a production project, which in practice often takes the corporate governance structure of a joint venture (JV), helps the firm to resist their pressure.

Since our theoretical framework suggests that JVs can provide a commitment device against lobbying, we would expect the corporate governance structure of JV to be more often chosen by firms that feel severe pressure either from outside the organization or from other interest groups inside it. Based on a sample of almost 20 thousand firms interviewed in the context of the European Bank of Reconstruction and Development - World Bank Business Environment and Enterprise Performance Surveys (BEEPS), in the regions of CIS, Baltic, Eastern-Central and Southern-Eastern Europe, we find descriptive and econometric evidence that firms operating in contexts where internal and external pressure is probably greater are more likely to choose a JV structure. Moreover, although JVs appear to suffer more from internal reallocation of resources and external pressure through overdue payments by trading partners, they nevertheless do not reinvest less their profit than other firms.

**Figure 1. Characteristics of Firms by Corporate Governance Structure**




Note: Sample of 19130 firms interviewed in the context of the BEEPS between 1999 and 2005 in 28 countries. More than 10% of firms in the sample are joint ventures, defined as firm established as or that agreed to a JV with private partner(s). Pressure of interest groups within the firm is proxied by the reallocation of resources across departments within the firm. Pressure of interest groups external to the firm is proxied by the existence of overdue payments to resolve.

# La structure de propriété jointe de projets de production comme mécanisme d'engagement contre la pression des groupes d'intérêt

## RÉSUMÉ

Nous explorons une potentielle raison pour les entreprises de choisir une structure de propriété jointe pour un projet de production. Nous modelons les projets avec des chocs autocorrélés de productivité comme une valeur d'option d'investir de façon répétée dans le temps. Ainsi, les investissements postérieurs bénéficient de l'information révélée par la réalisation des antérieurs. Cependant, des groupes d'intérêt internes ou externes à l'entreprise peuvent exercer de la pression sur les propriétaires du projet pour en extraire les profits initiaux. La propriété jointe d'un projet de production offre dans ce cas un mécanisme d'engagement contre la pression des groupes d'intérêt et protège le projet en garantissant des niveaux efficaces d'investissement dans le temps. Les données de l'enquête Business Environment and Enterprises Performance corroborent les prédictions du modèle théorique. En effet, les organisations qui souffrent le plus de la pression de groupes d'intérêt ont une probabilité plus élevée de choisir une structure de propriété jointe.

Mots-clés : mécanisme d'engagement, propriété jointe, coentreprise, lobbying, groupes d'intérêt

# 1 Introduction

Many projects involve cooperation between partners. Sometimes this cooperation is contractual. Often, though, it takes the form of joint ownership of production projects by two or more firms. This is a puzzle: joint ownership is typically considered inefficient, because interests often diverge and strategies target different objectives among partners. So why does it happen? The answer we explore in this paper is that joint ownership may have advantages, even in absence of asset specificity or incomplete information, when it helps the parties resist pressure from internal or external interest groups to redistribute too soon the fruits of investment.

Joint ownership of a production project is particularly common in technologically intensive industries, like pharmaceutical and infrastructure, that face highly uncertain returns to (large) investments[1] and in which, as a result, investments tend to be spread out over time in order to benefit from the option value of learning from the success of initial investments about the prospects for later ones. This translates in our theoretical framework into the assumption that a number of firms[2] have the opportunity to invest in a project that yields revenue in two stages. The results of the first stage are informative about the likely results of the second stage, due to autocorrelation in productivity shocks: a project that is successful in the first round is more likely to have good outcomes in the second round, too. This means that investing available resources can be expected to be particularly profitable in the second round if productivity has been high in the first round.

However, there are interest groups that demand payouts. Lobbying may be internal (some divisions of the firm may have divergent interests) or external (there may be political pressure, or demands from trade-unions or from upstream or downstream trading partners). Payouts may be agreements to favor an interest group in making decisions (*e.g.*, internal resource allocation)[3] or direct financial payments such as dividends. The demands of interest groups are likely to be the more vociferous the higher are the revenues from the first round. A successful first round therefore creates a tension: it implies a strong reason to reinvest the revenues, but it also gives

[1] Moskalev and Swensen (2007) show that between 1990 and 2000 54.5% of joint ventures were concentrated in ten industries that are technologically intensive.

[2] For simplicity, in what follows we are going to use in general the term firm, but a similar reasoning applies for other types of decision-making organizations as well (*e.g.*, country governments in international infrastructure projects).

[3] A wholly owned research project that starts to yield positive profits may risk being treated as a cash cow by jealous divisions in the parent company, at a potential cost to its own long-term investments needs.

rise to intense lobbying to distribute the revenues instead.[4]

For instance, infrastructure projects require considerable and sustained investments that are highly visible, having a cost structure that is typically heavily weighted toward fixed (sunk) costs, and their profits are extremely sensitive to the regulatory and political context in which organizations operate. Infrastructure projects are often subject to strong political pressure to keep prices low or to other rent-seeking manoeuvres, once investments are sunk. Weak institutions and powerful interest groups make it even more difficult to resist political pressures to claw back profits resulting from the success of initial tranches of investment.

This may occur through caps on tariffs in the name of allowing the citizens (even if this means mainly rich farmers and industrialists) to share in the prosperity generated by the investments. Or it may occur through repayments of dividends to the public budget, which has many urgent claims on the revenues generated other than reinvestment. However, it is precisely at the time when the project has succeeded that it is most important to reinvest some of its earnings, since the project's success is a positive signal that further investments in similar conditions are also likely to be successful.

If the project is not wholly owned but instead jointly owned with one or more partners, giving in to lobbying pressure is more expensive and less likely to occur. Indeed, payouts or more general resource allocation decisions that favor one partner's interest groups are more difficult to make without also satisfying the demands of the interest groups of the other partner. As the perceived cost of any payout increases when an economic agent is only part-owner of the project, interest groups end up scaling down their efforts at persuasion and waste fewer resources in such activities. Thus, joint ownership of a production project allows the owners of a project to resist lobbying - not completely, but to some extent. We show that the likelihood that the joint venture improves the efficiency of investment is greater when there is a higher degree of autocorrelation of the productivity shocks.

As in practice joint ownership often takes the corporate governance structure of a joint venture (JV),[5] an important implication of our model

[4]In line with the arguments of Meyer et al. (1992), lobbying creates a bias toward distribution and away from reinvestment. This effect is even stronger when the interest groups' goals are at least partially shared by the decision makers in the firm itself.

[5]As far as this paper is concerned, JVs are defined as having the following characteristics: *(i)* each party has an ownership interest in a jointly owned business, and *(ii)* the parties share the profits (or losses) of the jointly owned business. This definition is a more general version of Hewitt (2008) definition of equity JV, as opposed to collabo-

is that organizations under tough (internal or external) pressure of interest groups should tend to choose that corporate governance structure.

From the theoretical framework it also emerges that symmetric ownership is crucial in providing incentives against distribution of early revenues or *ex post* expropriation.[6] Indeed, asymmetry in the shares held by the parent firms may weaken the ability of joint ownership to provide a commitment device. Even symmetric ownership may not be enough, when it is not accompanied by equal sharing of costs and benefits. Examples abound in the hydro-power sector. For instance, in the case of Itaipú, a JV between Paraguay and Brazil,[7] and of Yacyretá, a JV between Paraguay and Argentina,[8] the asymmetry in benefits from infrastructures dramatically weakened the commitment ability of the parties not to lobby for benefits *ex post*. The lack of commitment in turn hindered the undertaking of new infrastructure projects.[9]

The paper is structured as follows. Section 2 situates the paper in the literature on corporate governance and JVs. Section 3 sets out the model and derives the main results. Section 4 illustratively investigates a cru-

rative JV, which only involves agreements by companies to cooperate without affiliation through stock ownership.

[6]Moskalev and Swensen (2007) provide consistent evidence that partners in JVs have a preference for equal asset ownership. Indeed, 87% of JVs between 1990 and 2000 had two partners, and only 9.1% had three.

[7] At the time of construction, Brazil bore most of the costs in terms of financial and technical contributions. Both countries signed an agreement on repayment of Itaipú whereby no profit would be distributed until the 50 year loan was completely paid off. Initial arrangements benefited Brazil in that they stated that each country has the right to use 50% of the energy produced, but if not, the excess must be sold to the other partner at a price based on production cost. Since Paraguay needs only a tiny fraction of its share (about 12%), it sells the rest to Brazil at a predetermined (low) rate. Brazil purchases almost all of the plant's power, which accounts for about 15% of its energy consumption. After twelve years of indecision about how to adjust the low prices that the countries had negotiated in the 1973 original treaty, in 1985 Paraguay and Brazil signed several revisions of financial compensation. More recently, former president Lugo threatened to end the contractual obligations that require Paraguay to sell its unused electricity to Brazil at well below the market rate and a deal saw Brazil agree to triple yearly payments to Paraguay. Paraguay gained significantly from those revisions, but most analysts considered that it deserved still greater compensation for its electricity. In a few years the loan will be paid off so that each country would be free to charge market prices.

[8]Something similar happened between Paraguay and Argentina with the hydro-plant of Yacyretá. In the words of a BBC reporter "Argentina has good reason to be worried too, as it has its own Yacyretá hydro-electric JV with Paraguay".

[9]Several hydro-electric power plant projects along the Río Paraná, including Corpus Christi (expected to be comparable in size to Yacyretá) and Itatí-Itá-Corá, which would be JVs between Paraguay and Argentina, have been under discussion for decades.

cial theoretical prediction of the model, namely that organizations under tough internal or external pressure of interest groups tend to choose a JV structure, based on European Bank of Reconstruction and Development - World Bank Business Environment and Enterprise Performance Surveys (BEEPS) data from 27 countries. Section 5 concludes.

# 2 Literature review

The main point of this paper, that joint ownership of production projects may be useful as a commitment device against interest groups and that this will be particularly important for projects in which there is high autocorrelation of productivity shocks across periods, links two strands of the literature. The first strand concerns commitment mechanisms available to firms. Indeed, the success of a project may be hindered in the absence of a strong enough commitment. For instance, Bresnahan et al. (2011) show through detailed case studies of IBM and Microsoft that established firms seeking to enter new technology markets can sometimes be handicapped by the fact that some existing organizational assets have to be shared with their new divisions, and that even very determined commitments to organizational autonomy, such as was enjoyed by IBM's PC division in its early years, may not be enough to prevent reabsorption of the new venture into the existing firm at a later stage.

Some governance structures have been shown to be better than others at resisting pressure. For example, Crémer (1995) argues that 'arms-length relationships' are better at committing subsidiary divisions or managers to making people work hard, since they make credible the refusal to consider (even valid) excuses for poor performance. Other contributions have focused on the role of organizational frontiers as commitment devices. Meyer et al. (1992), for instance, argued that demergers and spin-offs are often a good way for firms to lower the costs of internal influence-seeking. While many types of commitment mechanisms are possible within the firm (*e.g.* incentive contracts, delegated decision making, etc), as far as we are aware, the role of the joint ownership of a production project as commitment device is new to the present paper.[10]

The second strand of the literature to which this paper contributes aim to understand the emergence of JVs.[11] An early attempt to provide

[10]Neven et al. (1998) set out a purely verbal form of the present argument.

[11]Moskalev and Swensen (2007) report that 60,446 JVs took place around the world between 1990 and 2000 alone.

theoretical foundations for JVs was proposed by Kogut (1988). His main contribution is based on a transactions cost framework, defined by Gibbons (2005) as a rent-seeking theory of the firm. According to Kogut, JVs allow partners to solve situations with high uncertainty about the contracting parties' behavior, thanks to the unification of control rights in the new hierarchical structure.

In the property rights theories of the firm, due to Grossman and Hart (1986), Hart and Moore (1990), and Hart (1995), joint ownership arises from specific investments. Indeed, if returns from relationship-specific investments can be appropriated by the non-investing partner, *ex ante* investment incentives are distorted and the classical hold-up problem arises. More recently, Cai (2003) finds that when general and specific investments are substitutes, efficient levels of relationship-specific investments can be achieved. On the other hand, when investments are complements the standard conclusion of property rights theories holds.[12]

Although our model does not appeal explicitly to relationship-specific investments, they are there in the background: after all, some form of relationship-specific investment must be necessary in our model to explain why a project takes place within a parent firm at all rather than being a purely independent entity that transacts with the parent firm entirely through the market. However, relationship-specific investments play no part in our explanation of why there is joint ownership of a project rather than ownership by a single parent. The mechanism we have highlighted is completely independent of any considerations about whether the choices of either the project or the parent firm(s) create any kind of hold-up problem with respect to each other. The only form of hold-up that occurs in our model is between the project and parent firm(s) on one side and the interest groups on the other.

Within the framework of property rights theories other explanations for joint ownership have been proposed. Halonen (2002) suggests that in a repeated game joint ownership grants the toughest punishment to suboptimal investments. Hauswald and Hege (2003) show that in a setup with just one type of investment and where higher levels of investment erode rent-seeking activity, regimes characterized by 50%-50%, 50% plus one, and majority ownership can coexist in equilibrium and each can be optimal for wide set of different JVs. Similar implications based on the trade-off between revenue sharing and control allocation effects are drawn by Wang and Zhu (2005) in a dynamic framework. Finally, international

[12]Similarly, Schmitz (2008) shows that joint ownership can be optimal if the parties have private information about the payoffs.

JVs (IJVs) may result from national policies. For example, Abe and Zhao (2005) study the impact of a country's emission taxes on the formation of international IJVs or fully owned FDI.

Our paper contributes to this literature on rationales for joint ownership by proposing a hitherto unexplored explanation based on commitment against rent-seeking by interest groups. However, it does not assess its quantitative relevance with respect to other rationales for forming JVs that have been already explored by the literature, nor does it develop a cost-benefit analysis of joint ownership.[13] Developing a fully general model of the determinants of joint ownership that nests the various theories that have been proposed to date and allows them to be tested against each other would be a formidable undertaking[14] that is beyond the scope of this paper. We undertake a more modest exercise - namely, showing that it is possible to develop a rationale for JVs that does not require asset specificity and predicts that they may arise in preference to ownership by either parent.

The mechanism whereby a joint ownership may be provide commitment against influence-seeking activity relies on the assumption that dispersed control increases the lobbying costs of interest groups. This idea is similar to one developed in Gutierrez and Philippon (2018), although the context is different. These authors model the design of EU institutions and show that the equilibrium degree of independence from lobbying and political pressures is strictly higher when two countries set up a common regulator than when each country has its own regulator. The key insight is that politicians are more worried about the regulator being captured by the other country than they are attracted by the opportunity to capture the regulator themselves.

Their prediction that independent institutions decrease the incentives and returns to corporate and political lobbying, which is corroborated by empirical evidence that US firms spend substantially more on lobbying and are far more likely to succeed than European lobbyists, is analogous to the phenomenon in our model whereby joint ownership weakens pressure by interest groups, though different mechanisms are involved. This suggests to us that our assumption is reasonable, but it is important to recognize that in different conditions it might no longer be appropriate. For instance, in

[13]There are of course disadvantages in joint ownership. For instance, it might be cheaper to manage centrally different tax systems than to respond to each of them separately; by a parallel argument, it may be cheaper to plan a worldwide production than to coordinate each JV partner to achieve the same goal; finally, JVs pose a constant threat of undesired technology transfers due to weak property rights legislation.

[14]Gibbons (2005) undertakes such an exercise for theories of asset ownership but does not look at the case of joint ventures that are independent of either parent

the presence of rational inattention and dispersed control rights the stake of each decision maker may be low enough that lobbying becomes easier (something similar happens in the model of Choi and Gerlach (2018) due to information externalities).

# 3 The Model

There are $M$ firms, $i = 1, ...., M$.[15] The firms have first to decide whether to firm a joint venture among themselves, and conditional on this decision, they have to decide how much to invest, in two consecutive periods. Within each firm $i$ there are $n$ interest groups, which have to decide how much to invest in lobbying activities after they see the outcome of the first roound of investment.

There are four time periods, $t = 0, 1, 2, 3$. Actions take place over time as follows:

- Period 0: Firms decide whether or not to form JVs.
- Period 1: Firms choose levels of investment $k_i^1$.
- Period 2: Output $Q_i^2$ is realized, then interest groups choose how much $r_i^n$ to invest in persuasion, and request a payout $p_i^n$.
- Period $2'$: Firms then decide whether to grant the payout or not, and choose levels of investment $k_i^2$.
- Period 3: Output $Q_i^3$ is realized.

Firms are risk-neutral, and maximize the present discounted sum of profits, which are discounted in period 2 relative to profits in period 1, and in period 3 relative to profits in period 2. In the general case, the lapse of time between investment and results may differ between the first and the second stage of investment. So we define discount factors $\beta$ for the weight of profits in period 2 relative to profits in period 1, and $\gamma$ for the weight of profits in period 3 relative to profits in period 2; these two discount factors need not be the same.

At $t = 1, 2$ each firm makes investments $k_i^t \geq 0$ costing $bk_i^t + d\left(k_i^t\right)^2$, which result in output $Q_i^t$ one period later, namely at $t = 2, 3$. The cost

[15] As explained in section 1, the term 'firm' is used as a shortcut to indicate the decision maker of a firm or of another type of organization. For instance, in the case of JVs for infrastructure projects, national or local governments are likely to own part of the project, especially in developing countries.

function is strictly increasing and strictly convex so $b, d > 0$.[16]

Output depends on investment and on a random productivity shock as follows. Investments made in period 1 give rise to output in period 2 according to the following production function:

$$Q_i^2 = \theta_i^1 k_i^1 \tag{1}$$

where $\theta_i^1$ is an initial productivity shock distributed on $\left[\underline{\theta}, \overline{\theta}\right]$ with an expected value of $H$. In order for there to be a positive level of investment, $H$ must be large enough otherwise firms will make higher expected profits hoarding their endowments and not investing at all. We derive below in Proposition 1 the precise condition for $H$ to be large enough for there to be positive investment in period 1.

Productivity shocks are autocorrelated, which makes expected returns on investment in period 2 depend on the realization of the productivity shock in period 1. We model this in the simplest way possible by making the expected value of the productivity shock in period 2 proportional to the realized value of the shock in period 1. This autocorrelation is what creates the fundamental tension in the model between alternative uses of the output that is realized in period 1: the more output there is, the more the interest groups will lobby for it to be distributed to them, but the more output there is the higher are the returns to reinvesting it so as to produce even more output in period 2.

In addition we assume that capital is durable, so that investments made in period 1 lead to output in period 3 as well as in period 2 (nothing of importance in the qualitative results turns on this assumption). Thus, output in period 3 is given by the following production function:

$$Q_i^3 = \theta_i^2 \left(k_i^1 + k_i^2\right) \tag{2}$$

where $\theta_i^2$ is a second productivity shock and $\mathbb{E}\left(\theta_i^2 \mid \theta_i^1\right) = A\theta_i^1$, with $A$ (for "autocorrelation") being the constant of proportionality .

Each firm has an initial endowment $E_i^1$ out of which it finances period 1 investment; period 2 investment must be financed out of period 2 output. Normalizing output price to 1, we can therefore write the firm's problem as that of choosing $k_i^1$ and $k_i^2(\theta_i^1) \geq 0$ to maximize $\Pi = \pi_i^1 + \beta\pi_i^2 + \beta\gamma\pi_i^3$ subject to the budget constraints in the three periods:

[16]Strict convexity is necessary since we assume output to be linear in investment. We could alternatively have made costs linear and output concave in investment; nothing important would turn on this.

$$bk_i^1 + d\left(k_i^1\right)^2 + \pi_i^1 = E_i^1 \tag{3}$$

$$bk_i^2 + d\left(k_i^2\right)^2 + \pi_i^2 = Q_i^2 \tag{4}$$

$$\pi_i^3 = Q_i^3 \tag{5}$$

and to the non-negativity constraints $k_i^1, k_i^2, \pi_i^1, \pi_i^2, \pi_i^3 \geq 0$.

We begin with the strategies and payoffs of firms in the absence of interest groups, which we shall introduce and describe later. That is, we consider what the project should and would do if its investment and other decisions could be made without any lobbying pressure (section 3.1). We then introduce interest groups and describe how firms will behave differently when they know interest groups are active (section 3.2). Finally, the possibility of creating JVs is taken into account (section 3.3).

## 3.1 Investment without interest groups

Our first result concerns the optimal choice of investments that each firm would make in the absence of lobbying activity. We begin by considering the optimal choice of investments without interest groups, solving the model backwards as usual, beginning in period 2 and then, assuming that the firm anticipates what it will do in period 2, solving the model for period 1.

The first order condition for optimization at period 2 is:

$$k_i^2 = \frac{\gamma A \theta_i^1 - b}{2d} \tag{6}$$

The first order condition for optimization at period 1 is:

$$k_i^1 = \frac{\beta H\left(1 + \gamma A\right) - b}{2d}. \tag{7}$$

For there to be strictly positive investment in periods 1 and 2 for all realizations of $\theta_i^1$ (including at the lowest realization $\theta_i^1 = \underline{\theta}$, it follows that we must assume:

$$A > \frac{b}{\gamma \underline{\theta}} \tag{8}$$

and

$$H > \frac{b}{\beta(1+\gamma A)} \tag{9}$$

An implication of equation 8 is that without autocorrelation of productivity shocks there would be no investment at all in period 2: indeed, the durability of investment implies that all investment would be undertaken in period 1. The trade-off we have described between reinvestment of output and payouts to interest groups would not therefore exist.

We summarize these findings in the following proposition:

**Proposition 1.** *In the absence of lobbying, and provided equations 8 and 9 hold, each firm chooses strictly positive investment levels in periods* 1 *and* 2 *given by* $k_i^1 = \frac{\beta H(1+\gamma A)-b}{2d}, k_i^2 = \frac{\gamma A\theta_i^1 - b}{2d}$. *Both investment levels are decreasing in the level and convexity of the cost of investment and increasing in the autocorrelation* $A$ *of productivity shocks as well as in the discount factor* $\gamma$. *In addition first-period investment is increasing in expected productivity and in the discount factor* $\beta$, *while second-period investment is increasing in the realization of the first-period productivity shock.*

It is important to note that optimal investment is greater when first-period output is high, not because of profit-smoothing considerations (since utility is linear in profit) but rather because of $A$, the auto-correlation in productivity. However, it is precisely this which causes problems once interest groups enter the picture, since interest groups will assume that high output provides opportunities for high payouts. Payouts to lobbies will therefore compete directly with investment in the second period for the resources made available by the output produced by investments in period 1.

## 3.2 Introducing interest groups

Now suppose that for each firm there exist $n$ interest groups $n_i = 1, ..., n$. These interest groups may be internal to the firm or external to it; nothing in the present analysis depends on this difference. For simplicity we assume the number of interest groups is the same for each firm, though as will be seen nothing in the argument depends on this. Each interest group can ask for a payout $p_i^n$ at period 2,[17] to be paid out of the output produced by investments in period 1.

[17] We assume that interest groups only have one chance to do so, or equivalently that they are equally impatient. Indeed, otherwise a common pool problem would arise.

Before asking for the payout the interest group can invest resources $r_i^n$ in 'persuasion'. It may lobby politicians and regulators directly, or it may engage in high-profile campaigning in the press designed to pressurize the firm into accepting that the profits of the project should be 'returned to the people'.

The effect of persuasion is to increase the amount that the firm will be willing to pay out to the lobbies. There are various ways in which this might be formalized. We could make the payout directly a function of persuasion (among other variables), or alternatively make it a strategically chosen variable by the firm that chooses to avoid a procedural or reputational cost. We take the latter path here, interpreting the outcome of lobbying as making the payout request "hard to refuse". Formally we assume that lobbying imposes on the firm a cost $\lambda k_i^2 r_i^n$ of refusal, which must be compared to the resource cost of satisfying the request. This cost of refusal is increasing in three variables:

- $r_i^n$, the resources devoted to persuasion;
- $k_i^2$, the amount the firm intends to invest in the second period;
- a parameter $\lambda$, which is the effectiveness of lobbying.

The idea behind the dependence of the cost of refusal on the level of investment is that the more the firm is investing in the project, the harder it is to justify refusing the interest group's request ("if you can invest so much in your prestige project surely you can do this for us...").

The idea behind varying the effectiveness of lobbying (captured by the parameter $\lambda$) is that it allows us to capture different institutional characteristics that may determine how susceptible the firm is to lobbying. If $\lambda$ is too low, the interest groups will not invest in lobbying at all, but we shall see that once it is above a certain threshold they all do so, and as a result the firm invests less in the second period.

One other factor that determines the effectiveness of lobbying is something we model separately, as it has a distinct and intuitively useful interpretation. This is the idea that, to varying degrees, lobbyists can "capture" the decision-makers in the firm so that they internalize some proportion $\alpha$ of the benefits to the interest groups. We can describe the parameter $\alpha$ as the extent to which the firm is captured by the aims of the interest groups. We shall see that, paradoxically, the more the firm is captured by the interest groups' aims, the harder it finds to resist their requests, and therefore the more inefficiently it chooses investment levels.

Finally, we should note that we have abstracted from any potential externalities between the activities of interest groups, as well as from any potential externalities between the efforts of firms in resisting pressure from interest groups. One interest group's persuasion activities do not make it any more or less likely that another interest group will receive a payout, for example. In reality there may be free-rider effects among interest groups, and there may be free-rider effects in monitoring of management by multiple owners, and in a realistic application of the arguments of this paper it might be important to take these considerations into account.

We can now solve the model with interest groups. The objective function of the firm therefore becomes:

$$\Pi = \pi_i^1 + \beta\left(\pi_i^2 + \alpha a_i p_i^n\right) + \beta\gamma\pi_i^3 \tag{10}$$

The interest group's payoff function is simply the expected value of payouts minus investments in persuasion.

We can rewrite the second-period budget constraint to take account of payouts to interest groups:

$$bk_i^2 + d\left(k_i^2\right)^2 + \pi_i^2 = Q_i^2 - a_i p_i^n - \left(n - a_i\right)\lambda k_i^2 r_i^n \tag{11}$$

where $a_i$ is the number of payout requests that the firm accepts.

We can now solve the model as before, but this time taking the actions of interest groups into account.

First it is evident that in period 2, given its investment in persuasion, each interest group asks for the maximum payout that the firm will give. That is:

$$\left(1 - \alpha\right) p_i^n = \lambda k_i^2 r_i^n \tag{12}$$

Thus, we can re-write the firm's period 2 optimization as:

$$Max_{k_i^2}\mathbb{E}\left\{\pi_i^2 + \alpha a_i p_i^n + \gamma\left[\theta_i^2\left(k_i^1 + k_i^2\right)\right] \mid \theta_i^1\right\}$$

subject to $a_i = n$, and to equations (11), (1), and (12), which is equivalent to:

$$Max_{k_i^2}\left\{\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 - n\lambda k_i^2 r_i^n + \gamma A\theta_i^1\left(k_i^1 + k_i^2\right)\right\}$$

for which the first order conditions are:

$$k_i^2 = \frac{\gamma A\theta_i^1 - n\lambda r_i^n - b}{2d}$$

We now consider the choice of $r_i^n$ by the interest groups. Each interest group $Max_{r_i^n}(0, p_i^n - r_i^n)$, which is equivalent to:

$$Max_{r_i^n}\left(0, \frac{\lambda r_i^n\left(\gamma A\theta_i^1 - n\lambda r_i^n - b\right)}{2d\left(1-\alpha\right)} - r_i^n\right)$$

for which the first order conditions at an interior solution are $\frac{\lambda\left(\gamma A\theta_i^1 - 2n\lambda r_i^n - b\right)}{2d(1-\alpha)} = 1$, implying that:

$$r_i^n = Max\left[0, \frac{\lambda A\theta_i^1 - \lambda b - 2d\left(1-\alpha\right)}{2n\lambda^2}\right] \tag{13}$$

Note that $r_i^n > 0$ if and only if $\lambda > \frac{2d(1-\alpha)}{\left(\gamma A\theta_i^1 - b\right)}$.

The choice of investment in period 2 is given by:

$$\begin{aligned} k_i^2 &= \frac{\gamma A\theta_i^1 - b - Max\left[0, \frac{1}{2\lambda}\left(\lambda\gamma A\theta_i^1 - \lambda b - 2d\left(1-\alpha\right)\right)\right]}{2d} \\ &= \frac{\gamma A\theta_i^1 - b}{2d} - Max\left[0, \frac{\lambda\left(\gamma A\theta_i^1 - b\right) - 2d\left(1-\alpha\right)}{4d\lambda}\right] \end{aligned} \tag{14}$$

Comparing it to the efficient level (6), we can see that investment is lower than the efficient level if and only if $\lambda > \frac{2d(1-\alpha)}{\left(\gamma A\theta_i^1 - b\right)}$, and it is lower by the amount $\frac{\lambda\left(\gamma A\theta_i^1 - b\right) - 2d(1-\alpha)}{4d\lambda}$.

Note also that if the choice of persuasion by interest groups had been made in period 1, before $\theta_i^1$ were realized, the choice of $r_i^n$ would have been:

$$r_i^n = Max\left[0, \frac{\lambda\gamma AH - \lambda b - 2d\left(1-\alpha\right)}{2n\lambda^2}\right]$$

Comparing it with expression (13), it is qualitatively similar to the choice of persuasion actually made in period 2, except that if $\lambda > \frac{2d(1-\alpha)}{(\gamma AH - b)}$ the interest groups would always have invested in persuasion, whereas in fact they may fail to do so for low realizations of $\theta_i^1$ if $\lambda < \frac{2d(1-\alpha)}{(\gamma A\underline{\theta} - b)}$.

Replacing (1) into (11), (2) into (5), (3), and (13) into (10), firm's

optimization at period 1 now requires:

$$Max_{k_i^1}\mathbb{E}\left\{\begin{array}{c} E_i^1 - bk_i^1 - d\left(k_i^1\right)^2 \\ +\beta\left\{\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 - n\lambda k_i^2 \cdot Max\left[0, \frac{\lambda\gamma A\theta_i^1 - \lambda b - 2d(1-\alpha)}{2n\lambda^2}\right]\right\} + \\ +\beta\gamma\left[A\theta_i^1\left(k_i^1 + k_i^2\right)\right] \end{array}\right\}$$

subject to (14), for which the first order condition is still $k_i^1 = \frac{\beta H(1+\gamma A)-b}{2d}$.

We summarize these results in the following proposition:

**Proposition 2.** *If $\lambda > \frac{2d(1-\alpha)}{\left(\gamma A\theta_i^1 - b\right)}$, the presence of interest groups induces investment in persuasion by each interest group equal to $r_i^n = \frac{\lambda\gamma A\theta_i^1 - \lambda b - 2d(1-\alpha)}{2n\lambda^2}$, which is increasing in the first-period productivity shock, in the autocorrelation A of productivity, and in the degree to which the firm internalizes the payout to the interest groups. It also reduces $k_i^2$ below the efficient level by an amount $\frac{\lambda\left(\gamma A\theta_i^1 - b\right) - 2d(1-\alpha)}{4d\lambda}$, which is increasing in these same parameters. First-period investment is unaffected by the presence of interest groups, and both total investment in persuasion and the reduction in second-period investment are independent of the number of interest groups.*

It is striking that lobbying has a more damaging effect on investment in the project if the interest groups are ones with which the firm sympathizes. It is also worth noting that additional interest groups do not affect the total amount of lobbying activity: more interest groups just undertake less investment each, with the same overall results. While this latter finding might be different with a differently specified model, the result that interest groups by which the firm is more captured do more damage to investment is a result that seems to be quite general. It is hard to resist pressure from people you like!

## 3.3 The effect of joint ventures

What is the effect of a JV? Consider a JV among $M$ partners.[18] This obliges a part owner to make a payout to the partner each time it chooses to make a payout to itself. What are captured here in the form of payouts may also, in realistic contexts, include many internal resource allocation decisions that affect the welfare of different interest groups (such as decisions which research project to fund or which set of managers to put in charge of a new venture). This makes payouts more expensive to the firm, and makes it more expensive to the interest group to invest in persuasion.

[18] In this setting intermediate coalitions do not arise since for simplicity no coordination costs are taken into account.

To see this, note that the cost to the firm of granting a payout $p_i^n$ to interest group $n_i$ is now $Mp_i^n$, and furthermore this second payout benefits recipients whose utility does not enter at all into the firm's objective function. This reduces the maximum payout that the firm will be willing to grant:

$$(M-\alpha)\, p_i^n = \lambda k_i^2 r_i^n$$

This means that the period 2 objective function of the firm becomes:

$$Max_{k_i^2}\left[\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 - \frac{n\lambda k_i^2 r_i^n\,(1-\alpha)}{(M-\alpha)} + \gamma A\theta_i^1\left(k_i^1 + k_i^2\right)\right]$$

for which the first order conditions are:

$$k_i^2 = \frac{\gamma A\theta_i^1 - n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b}{2d}$$

The interest groups' problem becomes:

$$Max_{r_i^n}\left\{0, \frac{\lambda r_i^n\left[\gamma A\theta_i^1 - n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b\right]}{2d\,(M-\alpha)} - r_i^n\right\}$$

for which the first order condition is $\frac{\lambda\left[\gamma A\theta_i^1 - 2n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b\right]}{2d(M-\alpha)} = 1$. This implies that:

$$r_i^n = Max\left[0, \frac{\left(\lambda\gamma A\theta_i^1 - \lambda b - 2d\,(M-\alpha)\right)(M-\alpha)}{2n\lambda^2\,(1-\alpha)}\right]$$

so that if $\lambda > \frac{2d(M-\alpha)}{\gamma A\theta_i^1 - b}$ :

$$k_i^2 = \frac{\gamma A\theta_i^1 - b}{2d} - Max\left[0, \frac{\lambda\left(\gamma A\theta_i^1 - b\right)}{2d} - (M-\alpha)\right] \tag{15}$$

which is strictly higher than without the JV whenever the presence of interest groups reduces investment below the efficient level.

The following proposition summarizes the results of forming a JV and shows how they vary according to the parameter $\lambda$ that measures the effectiveness of lobbying.

**Proposition 3.** *In the presence of interest groups, a JV between M firms results in second-period investments $k_i^2$ that compare with those undertaken by firms acting in the absence of the JV as follows:*

*a) When $\lambda \leq \frac{2d(1-\alpha)}{\gamma A\theta_i^1 - b}$, investment levels are efficient with or without the joint venture;*

*b) When $\frac{2d(1-\alpha)}{\gamma A\theta_i^1 - b} < \lambda \leq \frac{2d(M-\alpha)}{\gamma A\theta_i^1 - b}$, investments are efficient with the JV*

*but below the efficient levels without the JV;*

*c) When* $\lambda > \frac{2d(M-\alpha)}{\gamma A\theta_i^1 - b}$*, investment levels with the JV are below the efficient level but above those without the JV.*

We can summarize verbally the effect of varying parameters on the desirability of forming a Joint Venture either in terms of varying levels of $\lambda$, holding other parameters constant, or in terms of varying levels of the other parameters, holding $\lambda$ constant.

To take the first approach, for given levels of the other parameters, Proposition 3 shows us that if lobbying is relatively ineffective, JVs are unnecessary. If lobbying is somewhat effective, JVs can prevent it from having any effect on investment. If it is highly effective, JVs can limit the damage done by lobbying to investment, but not avoid such damage altogether. These results suggest therefore that JVs may be more appropriate for firms whose ability to commit themselves is particularly weak. In the case of infrastructure projects in developing countries, where governments' commitment ability is often very limited, the above theoretical prediction is especially relevant.

If we take the second approach, for a given level of effectiveness of lobbying, joint ventures will have a beneficial, efficiency-improving impact on firms' investment if $A$, the degree of autocorrelation in productivity shocks, is large, and also if $\alpha$, the degree to which the firm's decision makers are captured by the interest groups, is large.

Interestingly, although the number of interest groups has no impact on the behavior of firms, the number of JV partners is positively related to second-period investment. This has an interesting implication for the role of symmetry in the distribution of the benefits of the arrangement. Asymmetric JVs will be less effective as commitment device than symmetric ones, for a very simple reason. This is that in an asymmetric JV the partner with the largest share will act as though it was a partner in a JV with fewer than $M$ partners. Therefore $\lambda$ is more likely to exceed the upper bound in condition $b$) of Proposition 3, so that investment levels are more likely to fall below the efficient level.

# 4 Is joint ownership chosen more often by firms under pressure?

Our theoretical framework suggests that JVs can provide a commitment device against lobbying. Therefore, we would expect the corporate governance

structure of JV to be more often chosen by firms that feel severe pressure either from outside the organization or from other interest groups inside it. This section illustratively investigates this prediction of the model. The objective is to assess whether firms subject to tough internal or external pressure are more likely to choose the corporate governance structure of JV, rather than other structures.

The analysis is based on a publicly available large dataset of firms interviewed in the context of the European Bank of Reconstruction and Development - World Bank Business Environment and Enterprise Performance Surveys (BEEPS). We consider data from 4 waves (1999, 2002, 2004, and 2005)[19] and from 28 countries[20] in the regions of CIS, Baltic, Eastern-Central and Southern-Eastern Europe for a total of 19,130 observations. More than 10% of firms in the dataset are JVs, defined as firm established as or that agreed to a JV with private partner(s).[21]

A simple exploration of the data reveals that JVs do indeed tend to differ from other firms in some dimensions, as shown in table 1. Concerning the external environment, JVs suffer on average from tougher pressure by their trading partners than other firms. Indeed, 63% of JVs had to resolve overdue payments in the previous 3 years, while less than half of other firms had to do so.

The dataset also provides some descriptive evidence that the JV structure is more likely to be chosen by firms that face pressure for the internal reallocation of resources. Reallocation of responsibility and budgetary resources between departments is much more common for JVs than for other firms. Indeed, 66% of JVs had over the previous 3 years some or major reallocations of responsibility and resources between departments or a com-

[19]The resulting dataset is a pooled cross section of firms.

[20]Russia, FYROM, Serbia and Montenegro, Albania, Croatia, Turkey, Bosnia and Herzegovina, Slovenia, Poland, Ukraine, Belarus, Hungary, Czech Republic, Slovak Republic, Romania, Bulgaria, Moldova, Latvia, Lithuania, Estonia, Georgia, Armenia, Kazakhstan, Azerbaijan, Uzbekistan, Tajikistan, and Kyrgyz Republic. Interviewed firms operate in different sectors: manufacturing; construction; real estate, renting and business services; wholesale, retail, repairs; hotels and restaurants; transport storage and communication; and mining and quarrying.

[21]More precisely, we classify as JV a firm that either was established as a JV or has agreed to form a JV in last 3 years. This piece of information derives from two questions in the survey: "How was the firm first established?" answered by "joint venture" and "Has your company undertaken any of the following initiatives in the last 3 years?" answered by "agreed a new joint venture". Although unfortunately this information does not match precisely our theoretical definition of whether a firm is part of a JV, the questionnaire does not provide further specifics on the contractual characteristics of the JVs.

pletely new organizational structure, while this happened for 41% of other firms.

Finally, there is also some evidence in favor of the model's prediction that JVs manage to reinvest a larger share of their profits. Indeed, the percentage of reinvested profit in the subsequent year is slightly larger in JVs than in other firms. That is, although JVs appear to suffer more from internal reallocation of resources and external pressure through overdue payments by trading partners, they still seem somewhat more likely to reinvest their profit than other firms.

While some characteristics of the phenomenon have already emerged from the simple exploration of the data, a multivariate analysis is clearly necessary to investigate whether firms suffering greater internal or external pressure are more likely to choose a JV structure. In tables 2 and 3 we thus estimate probit models, where the dependent variable is whether a firm is part of a JV or not, and the main variables of interest are proxies for respectively internal and external pressure.[22] We interpret 'reallocation of resources across departments within the firm' as proxying internal pressure that may deprive a project of its early profits to redistribute them to other departments.

External pressure is instead proxied by 'any overdue payments to resolve'. Indeed, payments that trading partners owe to the firm can be seen as a form of rent extraction. Column [I] reports the estimates including time dummies, while we add regional dummies in column [II] and country dummies in column [III]. The results are qualitatively very similar.
Confirming the descriptive statistics, firms operating in contexts where internal and external pressure is probably greater are more likely to choose a JV structure. [23]

While the coefficients proxying external and internal pressure are large and significantly different from zero in table 2 and 3, these variables are likely to be endogenous. Notice that the theoretical framework suggests that the coefficients are likely to be biased downwards. Indeed, although

[22]Notice that variable are based on direct questions in the survey, which refer to the preceding 3 years of firm's activity. Unfortunately, no further details on their nature and extent are provided.

[23]Notice that the results of these simple probit estimations are basically unchanged when taking into account jointly internal and external pressure (results available upon request). We choose separate probit models as the benchmark due to convergence problems in the instrumental variable probit estimation taking into account that both internal and external pressure may be endogenous. Obviously this cannot help to decide whether internal or external pressures are more important.

Table 1: Some Characteristics of Sampled Firms by Corporate Governance Structure.

| | Corporate governance structure: not JV | JV | Δ | Obs. |
|---|---|---|---|---|
| number of firms | 17,087 | 2,043 | · | 19,130 |
| any overdue payment to resolve (proportion) | 0.472 | 0.633 | *** | 20,725 |
| | (0.499) | (0.482) | | |
| any reallocation between departments (prop) | 0.406 | 0.664 | *** | 24,306 |
| | (0.491) | (0.473) | | |
| profit % reinvested | 47.873 | 49.209 | | 11,769 |
| | (38.689) | (38.546) | | |
| sales % from: mining and quarrying sector | 0.786 | 1.574 | *** | 20,775 |
| | (8.371) | (11.914) | | |
| construction sector | 11.133 | 7.957 | *** | 20,775 |
| | (30.378) | (25.653) | | |
| manufacturing sector | 30.929 | 38.706 | *** | 20,775 |
| | (44.177) | (46.004) | | |
| transport sector | 5.655 | 9.434 | *** | 20,775 |
| | (22.368) | (28.337) | | |
| wholesale, retail sector | 29.289 | 24.943 | *** | 20,775 |
| | (43.201) | (40.051) | | |
| real estate sector | 9.748 | 9.748 | | 20,775 |
| | (28.820) | (28.417) | | |
| hotel sector | 7.219 | 3.878 | *** | 20,775 |
| | (25.410) | (18.686 ) | | |
| other sector | 5.242 | 3.759 | | 20,775 |
| | (20.837) | (17.058) | | |
| number of employees: 0-1 (prop) | 0.175 | 0.256 | *** | 3,429 |
| 2-49 (prop) | 0.660 | 0.431 | *** | 11,953 |
| 50-249 (prop) | 0.115 | 0.189 | *** | 2,289 |
| 250-9999 (prop) | 0.050 | 0.124 | *** | 1,066 |
| year: 1999 (prop) | 0.000 | 0.100 | *** | 204 |
| 2002 (prop) | 0.287 | 0.413 | *** | 5,753 |
| 2004 (prop) | 0.233 | 0.173 | *** | 4,333 |
| 2005 (prop) | 0.480 | 0.314 | *** | 8,840 |
| region: CIS (prop) | 0.407 | 0.486 | *** | 6,155 |
| Baltics (prop) | 0.071 | 0.082 | | 1,067 |
| Central Europe (prop) | 0.220 | 0.116 | *** | 3,074 |
| South-East Europe (prop) | 0.237 | 0.261 | ** | 3,546 |

Note: Standard deviation in brackets. Significance levels: *: 10% **: 5% ***: 1%.

JVs are more necessary when a firm is under potential lobbying pressure, they should also serve to reduce the effects of such pressure. Table 4 and 5 aim to test this conjecture more directly by estimating an instrumental

Table 2: JVs and Internal Pressure.

| Depend. var.: firm is part of JV | [I] | [II] | [III] |
|---|---|---|---|
| any reallocation between departments | 0.365*** | 0.341*** | 0.356*** |
| | (9.38) | (8.34) | (10.01) |
| sales % from: mining and quarrying sector | 0.002 | 0.002 | 0.003 |
| | (1.00) | (1.24) | (1.40) |
| construction sector | -0.003*** | -0.003*** | -0.004*** |
| | (-4.69) | (-4.12) | (-4.36) |
| transport sector | 0.002** | 0.002** | 0.002* |
| | (2.22) | (2.29) | (1.68) |
| wholesale, retail sector | -0.002*** | -0.001** | -0.002*** |
| | (-2.74) | (-2.24) | (-2.72) |
| real estate sector | -0.000 | -0.001 | -0.001 |
| | (-0.42) | (-0.82) | (-1.41) |
| hotel sector | -0.004*** | -0.004*** | -0.005*** |
| | (-4.23) | (-3.62) | (-3.86) |
| other sector | -0.002** | -0.002** | -0.002** |
| | (-2.47) | (-1.97) | (-1.96) |
| number of employees: 2-49 | 0.058 | 0.081* | 0.074* |
| | (1.22) | (1.74) | (1.69) |
| 50-249 | 0.565*** | 0.586*** | 0.584*** |
| | (9.32) | (9.39) | (8.58) |
| 250-9999 | 0.777*** | 0.755*** | 0.738*** |
| | (10.46) | (9.97) | (9.84) |
| intercept | -1.719*** | -2.053*** | -1.990*** |
| | (-11.73) | (-12.92) | (-25.49) |
| time dummies | yes | yes | yes |
| region dummies | | yes | |
| country dummies | | | yes |
| N | 18587 | 14277 | 14277 |
| Pseudo $R^2$ | 0.0831 | 0.0846 | 0.1137 |
| Log-likelihood | -5400 | -4277 | -4141 |

Note: Robust t-statistic in brackets, clustered by country.

Significance levels: *: 10% **: 5% ***: 1%.

variable probit model.

Table 4 reports the estimates resulting from a probit, where we use instrumental variables to predict the vulnerability of firms to internal pressure as proxied by resource reallocation.[24] The instruments are the capacity uti-

[24]To limit the size of the instrumental variable tables, the estimated coefficients of sectoral sales percentage and number of employees are not reported.

Table 3: JVs and External Pressure.

| Depend. var.: firm is part of JV | [I] | [II] | [III] |
|---|---|---|---|
| any overdue payments to resolve | 0.216*** | 0.274*** | 0.241*** |
| | (4.69) | (5.52) | (5.49) |
| sales % from: mining and quarrying sector | 0.002 | 0.003 | 0.003 |
| | (1.18) | (1.44) | (1.59) |
| construction sector | -0.004*** | -0.004*** | -0.004*** |
| | (-5.24) | (-4.59) | (-4.65) |
| transport sector | 0.002** | 0.002** | 0.002* |
| | (2.21) | (2.31) | (1.68) |
| wholesale, retail sector | -0.002*** | -0.002** | -0.002*** |
| | (-2.86) | (-2.29) | (-2.81) |
| real estate sector | -0.000 | -0.001 | -0.001 |
| | (-0.55) | (-0.84) | (-1.40) |
| hotel sector | -0.004*** | -0.004*** | -0.004*** |
| | (-4.12) | (-3.32) | (-3.65) |
| other sector | -0.002** | -0.002* | -0.002* |
| | (-2.49) | (-1.82) | (-1.91) |
| number of employees: 2-49 | 0.046 | 0.077* | 0.077* |
| | (0.99) | (1.69) | (1.75) |
| 50-249 | 0.590*** | 0.604*** | 0.611*** |
| | (9.47) | (9.23) | (8.79) |
| 250-9999 | 0.820*** | 0.772*** | 0.768*** |
| | (11.48) | (10.22) | (10.14) |
| intercept | -1.116*** | -2.121*** | -1.315*** |
| | (-11.35) | (-13.41) | (-18.33) |
| time dummies | yes | yes | yes |
| region dummies | | yes | |
| country dummies | | | yes |
| N | 18701 | 14368 | 14368 |
| Pseudo $R^2$ | 0.0716 | 0.0781 | 0.1043 |
| Log-likelihood | -5512 | -4339 | -4215 |

Note: Robust t-statistic in brackets, clustered by country.

Significance levels: *: 10% **: 5% ***: 1%.

lization and the percentage hold by the largest shareholder. Indeed, a low utilization of the installed capacity increases the probability that resource reallocation is undertaken to improve efficiency. The decision to reallocate resources from a department to another may instead be less likely when the largest shareholder owns larger shares of the firm. As we conjectured, when the endogeneity of resource reallocation is taken into account, the estimated coefficient of the regressor becomes much larger (compare the

Table 4: JVs and Endogenous Internal Pressure.

| | [I] | [II] | [III] |
|---|---|---|---|
| Depend. var.: any reallocation between departments | | | |
| capacity utilization % | -0.001*** | -0.001** | -0.001** |
| | (-3.56) | (-2.13) | (-2.16) |
| largest shareholder % | -0.001*** | -0.001*** | -0.001*** |
| | (-3.30) | (-4.05) | (-5.23) |
| intercept | 0.426*** | 0.283*** | 0.818*** |
| | (5.32) | (5.85) | (17.48) |
| Depend. var.: firm is part of JV | | | |
| any reallocation between departments | 1.252*** | 1.421*** | 1.363*** |
| | (3.85) | (4.72) | (4.54) |
| intercept | -1.777*** | -1.906*** | -1.962*** |
| | (-14.16) | (-9.23) | (-16.59) |
| sector % sales | yes | yes | yes |
| firm size dummies | yes | yes | yes |
| time dummies | yes | yes | yes |
| region dummies | | yes | |
| country dummies | | | yes |
| $\rho$ | -0.473** | -0.593*** | -0.534** |
| | (-2.23) | (-2.60) | (-2.52) |
| Wald test of exogeneity | 4.99** | 6.74*** | 6.38** |
| N | 14710 | 13634 | 13634 |
| Log-likelihood | -14282 | -13133 | -12832 |

Note: Robust t-statistic in brackets, clustered by country.

Significance levels: *: 10% **: 5% ***: 1%.

second probit estimates of table 4 with table 2). This result is consistent with the idea that joint ownership can help to protect firms against internal pressures and JVs are therefore more likely to be chosen.

Similarly, table 5 reports the estimates resulting from a first probit, where we use instrumental variables to predict the vulnerability of firms to external pressure as proxied by overdue payments. In this case the instruments are the firm perception of courts rapidity, their confidence in the legal system, the number of cases a firm has in court as plaintiff, and whether the interpretation of laws is perceived as unpredictable. Indeed, the more a firm can rely on the legal system to mitigate external pressure, the less problems with overdue payments are expected. Similarly to what happens with internal pressure, the role played by external pressure as a determinant of JVs is stronger when its likely endogeneity is taken into account - a result that is expected if the effect of JVs is to better to resist

Table 5: JVs and Endogenous External Pressure.

| | [I] | [II] | [III] |
|---|---|---|---|
| Depend. var.: any overdue payments to resolve | | | |
| courts are quick | -0.122*** | -0.088*** | -0.072*** |
| | (-5.84) | (-5.31) | (-4.99) |
| confidence in legal system | -0.038*** | -0.033*** | -0.029*** |
| | (-2.98) | (-2.81) | (-2.83) |
| number of cases in court as plaintiff | 0.018*** | 0.016*** | 0.015*** |
| | (10.43) | (9.47) | (8.22) |
| law interpretation is unpredictable | 0.033*** | 0.031*** | 0.030*** |
| | (2.94) | (3.25) | (3.37) |
| intercept | 0.602*** | 0.674*** | 0.622*** |
| | (19.72) | (29.16) | (46.63) |
| Depend. var.: firm is part of JV | | | |
| any overdue payments to resolve | 0.426** | 0.694*** | 0.692*** |
| | (2.19) | (4.38) | (4.69) |
| intercept | -1.237*** | -1.774*** | -1.635*** |
| | (-10.02) | (-10.44) | (-16.57) |
| sector % sales | yes | yes | yes |
| firm size dummies | yes | yes | yes |
| time dummies | yes | yes | yes |
| region dummies | | yes | |
| country dummies | | | yes |
| $\rho$ | -0.103 | -0.207*** | -0.215*** |
| | (-1.20) | (-2.91) | (-3.37) |
| Wald test of exogeneity | 1.45 | 8.45*** | 11.36*** |
| N | 12939 | 11992 | 11992 |
| Log-likelihood | -12475 | -11233 | -10838 |

Note: Robust t-statistic in brackets, clustered by country.

Significance levels: *: 10% **: 5% ***: 1%.

external pressure to pay out early revenues.

In conclusion, to the extent that internal resource reallocation and overdue payments can serve as proxies for internal and external pressures respectively, the BEEPS data provide some supporting evidence that when either internal or external interest groups are effective, the corporate governance structure of a JV is more likely to be chosen. This is a long way from constituting a rigorous test of the model, but it provides suggestive corroborating evidence that the model's main conclusions are not evidently at odds with the data.

# 5 Conclusions

This paper investigates an unexplored rationale for organizations to enter into JVs, namely the fact that joint ownership of production projects may provide a commitment mechanism enabling more efficient levels of investment.

In our theoretical framework internal or external interest groups may pressurize owners into paying out early revenues from such investments when the autocorrelation of productivity implies they should be reinvesting them in the project. The main predictions are that in the presence of effective lobbying groups, JVs help the firm to resist their pressure.

While not claiming to provide any kind of rigorous test of this result, we have found illustrative corroborating evidence in case studies of infrastructure projects in developing countries and in a large dataset of Business Environment and Enterprise Performance Surveys. Indeed, we find that firms operating in contexts where external or internal pressure are likely to choose a JV structure more often than other firms.

# References


Abe, K. and L. Zhao (2005). Endogenous international joint ventures and the environment. *Journal of International Economics 67*, 221–40.

Bresnahan, T. F., S. Greenstein, and R. M. Henderson (2011, June). Schumpeterian Competition and Diseconomies of Scope: Illustrations from the Histories of Microsoft and IBM. In *The Rate and Direction of Inventive Activity Revisited*, NBER Chapters, pp. 203–271. National Bureau of Economic Research, Inc.

Cai, H. (2003). A theory of joint asset ownership. *The RAND Journal of Economics 34*, 63–77.

Choi, J. P. and H. Gerlach (2018). A model of patent trolls. *International Economic Review 59*(4), 2075–2106.

Crémer, J. (1995). Arms-length relationships. *Quarterly Journal of Economics 110*, 275–95.

Gibbons, R. (2005). Four formal(izable) theories of the firm? *Journal of Economic Behavior and Organization 58*, 200–45.

Grossman, S. J. and O. Hart (1986). Costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy 94*, 691–719.

Gutierrez, G. and T. Philippon (2018, June). How EU Markets Became More Competitive Than US Markets: A Study of Institutional Drift. Working Paper 24700, National Bureau of Economic Research.

Halonen, M. (2002). Reputation and the allocation of ownership. *The Economic Journal 112*, 539–58.

Hart, O. (1995). *Firms, contracts, and financial structure*. Oxford University Press.

Hart, O. and J. Moore (1990). Property rights and the nature of the firm. *Journal of Political Economy 98*, 1119–58.

Hauswald, R. and U. Hege (2003). Ownership and control in joint ventures. CEPR Discussion Paper 4056.

Hewitt, I. (2008). *Joint Ventures* (4th Edition ed.). London: Thomson , Sweet and Maxwell.

Kogut, B. (1988). Joint ventures theoretical and empirical perspective. *Strategic Management Journal 9*, 319–32.

Meyer, M., P. Milgrom, and J. Roberts (1992). Organizational prospects, influence costs and ownership changes. *Journal of Economics and Management Strategy 1*, 9–36.

Moskalev, S. and R. B. Swensen (2007). Joint ventures around the globe from 1990-2000: Forms, types, industries and ownership patterns. *Review of Financial Economics 16*, 29–67.

Neven, D., P. Papandropoulos, and P. Seabright (1998). Trawling for minnows: European competition policy and agreements between firms. Centre for Economic Policy Research.

Schmitz, P. (2008). Joint ownership and the hold-up problem under asymmetric information. *Economics Letters 99*, 577–80.

Wang, S. and T. Zhu (2005). Control allocation, revenue sharing, and joint ownership. *International Economic Review 46*(3), 895–915.

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