Controlling Shareholders and Firm Value*

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Abstract

Our model describes a market where firms are controlled by heterogeneous large shareholders. The model highlights the connection between control delegation and the wealth and managerial talent of large shareholders. We derive implications for firm value, size, capital structure, ownership concentration, and the wedge between direct and cash-flow ownership. We test the model using Chilean data from 1990-2009. We find that ownership wedges increase with control transfers, which is predicted by the model because new investors have weaker outside options. We also find a non-monotonic relationship between firm value and concentration, which is robust to controlling for size, leverage, and wedge.

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Most corporations in continental Europe, Asia, and Latin America have large controlling shareholders (Claessens, Djankov, and Lang (2000), Faccio and Lang (2002), La Porta, López-de-Silanes, and Shleifer (1999)). The value consequences of controlling shareholders are ambiguous. On the one hand, large shareholders can mitigate the agency conflict between managers and equityholders, but, on the other hand, they can also pursue interests that conflict with those of minority shareholders (Burkart, Gromb, and Panunzi (1997), Grossman and Hart (1980), Shleifer and Vishny (1986)). There is a vast empirical literature that studies the relationship between ownership concentration and firm value in the U.S., although this literature is focused on managerial ownership (see Demsetz and Villalonga (2001) for a survey). The evidence is scarcer in markets where large controlling shareholders are prevalent and where the average levels of concentration are higher (Claessens, Djankov, Fan, and Lang (2002), Cronqvist and Nilsson (2003), La Porta, López-de-Silanes, Shleifer, and Vishny (2002), Lins (2003)). Understanding the value consequences of ownership concentration is important because concentration is a key mechanism of corporate governance (Jensen and Meckling (1976), Shleifer and Vishny (1997)). At the same time, large shareholders have importance beyond the realm of corporate governance, because they control the lion's share of capital in many economies (Morck, Wolfenzon, and Yeung (2005)).

In this paper we revisit the relationship between firm value (Tobin's q), ownership concentration, and the wedge between direct ownership (i.e., shares owned) and cash-flow ownership (i.e., dividends received). We set up an equilibrium model with bargaining between large shareholders and private benefits of control. The model highlights the intimate connection between the delegation of control and the managerial talent of large shareholders, and the consequences that follow for firm value and ownership structure (concentration, wedges, etc.). We characterize the entire distribution of firms in the market, which gives us an interesting cross-section of firms to explore. We test the main predictions of the model using two decades of Chilean data (1990-2009) and find overall support for them. Chilean firms are controlled with high levels of concentration (68% on average), so they represent a natural environment to test the implications of the model. At the same time, we study the impact of changing economy-wide parameters such as investor protection.

Our baseline model combines a standard model of private benefits of control with bargaining between large shareholders. The founder of the firm meets with an outside investor, who not only provides financing, as passive shareholders do, but who can also receive full control of the firm. Control means that the shareholder is entitled to apply his managerial talent to run the assets of the firm. The founder and the investor jointly decide who gets control and the amount of capital each one invests in the firm through a bargaining process (as in Burkart, Gromb, and Panunzi (2000) or Zingales (1995)). Shareholders bargain over the surplus created by the firm, taking into account their managerial talents, outside options, and the incentive compatibility constraint of the controlling shareholder, which requires that the controlling shareholder retains a sufficiently large stake in the firm. Otherwise, the controlling shareholder is tempted to take private benefits that destroy value for the non-controlling shareholder. Controlling shareholders can also raise capital from centralized debt markets, where control cannot be transferred. Debtholders are also aware of the incentive compatibility constraint, so they restrict the supply of capital in order to keep the controlling shareholder properly incentivized. In a Modigliani-Miller world, ownership structure can be costlessly rebalanced to increase firm value, hence concentration should not be systematically related to firm value (Demsetz and Lehn (1985)). In our model ownership structure is also an endogenous variable, but it does not follow that it can be costlessly rebalanced because incentives are destroyed as a result.

In the absence of private benefits, the first-best is to allocate control to the shareholder with the highest managerial talent. However, this may not be feasible in the presence of private benefits because of the minimum investment required by the incentive compatibility constraint. As a consequence, control may end up in the hands of the less talented, although relatively wealthier, shareholder. The less talented shareholder receives control because of his scale advantage to run the firm, which is translated into a larger and more levered firm.

He has to be a lot wealthier than the more talented shareholder for the scale advantage to be dominant, which explains the overall concentration of equity in his hands. Hence, as a product of the friction in the delegation of control, we find that allocating control to the low-talent shareholder makes a firm on average larger, more levered, with a more concentrated ownership structure, and, naturally of lower value.

Understanding the mechanisms and consequences of ownership wedges is an active area of research (Adams and Ferreira (2008), Villalonga and Amit (2009)). In our model the implementation of the bargaining outcome between large shareholders can be understood as a dual-class share system. The controlling shareholder receives shares that give full control rights and a fraction of the dividends. The non-controlling shareholder receives shares that give only dividends. This structure implies that the fraction of dividends received by each shareholder (cash flow ownership) in general differs from the fraction of shares owned by each shareholder (direct ownership). Similar to Shleifer and Vishny (1986), the dividend policy of the firm is designed in relationship to the characteristics and requirements of the controlling shareholder and is not simply a by-product of other corporate decisions. In our model a large wedge is a sign of the weak outside option of the controlling shareholder. Shareholders with weaker outside options can appropriate a smaller share of the dividends so they typically own more shares than cash-flow rights, i.e., they control firms through large ownership wedges.

The bargaining position of each shareholder is a function of outside options and of what each one can do with the firm if appointed as controlling shareholder. Founders have an inherent advantage as controlling shareholders because their outside option is better than the outside option of investors: founders can choose to run the firm without investors, while investors cannot cut off founders from the firm. In a sense, founders have the upper hand because control is initially allocated to them. Therefore, founders tend to control firms with smaller wedges than outside investors because their stronger bargaining position allows them to extract more dividends. An outside investor who acquires the firm from a founder receives fewer cash-flow rights than shares because the founder, in order to give up control, is compensated with a disproportionate share of dividends. In the Chilean data we find support for this prediction. Firms that experience a change of controlling shareholder are subsequently controlled with a wedge that is 8% higher than in other firms.

As in Almeida and Wolfenzon (2006), firms in our model are controlled with large wedges because of a selection effect. The wedge is not a direct *cause* of agency problems, but rather an outcome. When control is allocated to a less talented shareholder, he typically controls with a large wedge because his weak options. Consequently, a large wedge can be associated with low firm valuation, although it is not an unequivocal sign of control misallocation or inefficiency. Talented outside investors can also control high-value firms through large wedges because of the strong bargaining position of the firm founder. This mix of firms in the large-wedge group can explain the contradicting empirical evidence about the correlation between wedges and firm value. For example, Claessens, Djankov, Fan, and Lang (2002) find a strong negative correlation between wedges and firm value, while La Porta, López-de-Silanes, Shleifer, and Vishny (2002) do not find a significant correlation. Among Chilean firms we also find a non-significant correlation between firm value and the wedge.

The model predicts a non-monotonic relationship between firm value and concentration that resembles the one found by Morck, Shleifer, and Vishny (1988) in a sample of U.S. companies. The value-concentration relationship is negative for mid levels of concentration, but it is positive for very low or very high levels of concentration. In the Chilean data we find a similar non-monotonic relationship. However, the previous literature has a hard time finding a robust relationship between firm value and concentration (Adams and Ferreira 2008). The main concerns are omitted variable bias, the regression specification, and endogeneity. Our model provides a laboratory where, given that we can characterize the true underlying functional form, we can assess the consequences of omitted variables and different regression specifications. We find that the non-monotonic relationship is mostly robust to controlling for other (endogenous) variables such as firm size, leverage, or the ownership wedge.

The level of private benefits is usually considered to have an important country-wide component related to legal investor protection. Understanding the effects of investor protection is particularly interesting given its role in the development of financial markets (La Porta, López-de-Silanes, Shleifer, and Vishny (1998), Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)). Although the precise mechanisms differ, we share some predictions with the previous theoretical literature (Almeida and Wolfenzon (2006), Burkart, Gromb, Mueller, and Panunzi (2011), Burkart and Panunzi (2006), and Shleifer and Wolfenzon (2002)). Many of the empirically-documented effects of investor protection –e.g., lower average concentration, larger firms, smaller wedges, etc.– are delivered by our model. As previous literature, we also predict a positive association between investor protection and firm value because control is allocated more efficiently. The positive effect of investor protection on firm value can be seen in La Porta, López-de-Silanes, Shleifer, and Vishny (2002) for a large cross-country sample. In terms of allocative efficiency, Wurgler (2000) and Mclean, Zhang, and Zhao (2012) show that more developed financial markets, in particular those countries with better investor protection, allocate more capital to high-value industries and firms. On the theoretical side, Burkart, Gromb, Mueller, and Panunzi (2011) show that investor protection, in interaction with the degree of competition and financial constraints, affects the efficiency of takeover outcomes.

Our model allows us to make new predictions regarding the impact of investor protection. For example, there is no clear understanding in the previous literature about changes in the value-concentration relationship as investor protection improves. We find that the basic non-monotonicity of this relationship is preserved regardless of the level of investor protection. This result helps to explain the coincidence in functional form between our paper and Morck, Shleifer, and Vishny (1988), despite the higher level of investor protection seen in the U.S. with respect to Chile.

The structure of the rest of the paper is as follows. Section 1 describes the baseline model and characterizes the equilibrium. Section 2 presents the main testable implications of the model. Section 3 shows empirical evidence with Chilean data for the 1990s and 2000s. Section 4 concludes.

1 Baseline model

1.1 Agent types, endowments, and timeline

The economy is populated by entrepreneurs (or firm founders) and outside investors. The difference between them is that entrepreneurs are exogenously endowed with ideas that allow them to open up firms, while investors are not. An idea is modeled as the access to a constant-returns-to-scale production technology:

$$Y(\theta, K) = \theta K, \tag{1}$$

where θ is the managerial talent of the agent who controls the firm and K is the total amount of capital invested in the firm.[1] In this setup θ also corresponds to Tobin's q (firm value divided by the replacement value of assets). We assume that the agent in control –whether it is the entrepreneur or an outside investor– can repudiate all financial claims and steal a fraction B of the firm's capital ($B < \theta$). In such case debtholders and non-controlling shareholders receive nothing. This form of private benefits is non-verifiable in a court of law and therefore goes unpunished.

Entrepreneurs and outside investors are heterogeneous in their managerial talent, which can be high (θ_H) or low ($\theta_L; \theta_L < \theta_H$). The level of managerial talent of each agent is public information, so nobody can conceal her type. We assume that the share of high talent agents in the economy is π_H (consequently $\pi_L = 1 - \pi_H$). All agents are endowed with capital, which is distributed on $[0, +\infty)$ according to $F_H(K)$ in the high-talent population, and $F_L(K)$ in

[1] We do not stress any particular interpretation of managerial talent, as long as it consistent with the fact that more talented agents can get a higher return on capital. The parameter θ can directly represent the agent's ability or human capital, as well as access to networks that can benefit the firm, economies of scale associated to previous businesses, etc.

the low talent population. For simplicity we assume that $F_H(K) = F_L(K) = F(K)$, so there is no correlation between talent and the distribution of capital. Both high and low talent entrepreneurs can have ideas for firms, or in other words, entrepreneurial creativity is uncorrelated with managerial talent. In particular, a share α of agents of each type are entrepreneurs.

All agents have linear preferences on consumption, do not discount the future, and are risk neutral. Thus, agents maximize utility by maximizing the value of their expected financial wealth. For simplicity we assume that there is no uncertainty in production, although given risk neutrality nothing of substance would change if we allow for risk.

There are three dates in the model, $t = 0, 1, 2$. At time $t = 0$ each entrepreneur meets with a random outside investor in a shareholders' meeting. In this meeting they decide who controls the firm and how much capital each one invests in the firm. At time $t = 1$ the firm raises debt in a centralized market. At time $t = 2$ cash flows are realized, and dividends and interest are paid.

1.2 The debt market

We focus first on the debt market at time $t = 1$. There is a centralized market where firms can take debt from perfectly competitive banks charging a gross interest rate $R > 1$ that is payable at time $t = 2$.[2] Assume for now that the firm is controlled by the entrepreneur and there is no outside investor. We assume that $\theta_H > \theta_L > R$, so even low-ability entrepreneurs can profitably run firms. Banks restrict the supply of funds given the incentives of the entrepreneur to take private benefits. An entrepreneur with talent θ_e can lever up his own capital K_e with debt $\bar{K}_{d,e}$ up to the point where he is indifferent between repaying the debt

[2] Given the risk neutrality we can also interpret the debt market as a market where the firm raises dispersed equity (see Tirole (2006), chapter 3 on this point). These non-controlling equityholders operate in perfect competition and demand an expected rate of return equal to R. Throughout the paper we use the term debt for simplicity, but it is worth noting that dispersed equity serves the same purpose as debt.

and defaulting:

$$\begin{aligned}\theta_e\left(K_e+\bar{K}_{d,e}\right)-R\bar{K}_{d,e} &= B\left(K_e+\bar{K}_{d,e}\right)\\ \bar{K}_{d,e} &= \frac{\theta_e-B}{B+R-\theta_e}K_e\equiv\delta_e K_e.\end{aligned} \tag{2}$$

The firm's scale is finite if $B+R>\theta_e$, which we assume holds for $\theta_e=\theta_H$.[3] As the (relative) incentive to steal is stronger for a low talent agent, the leverage multiplier for the low talent entrepreneur, δ_L, is lower than the multiplier for the high talent entrepreneur, δ_H.

We also assume that banks offer agents the possibility to deposit capital and receive an interest equal to R payable at $t=2$. Therefore, an agent with capital K can always get RK regardless of her managerial talent.

1.3 The shareholders' meeting

Before the debt market opens, the entrepreneur meets with a random outside investor in a decentralized market.[4] The key difference between this outside investor and debtholders is that the investor is potentially a controlling shareholder. In other words, control can be transferred in the shareholders' meeting, but not later on. The outside investor is taken from the same population as the entrepreneur, therefore the probability for a given entrepreneur of meeting with a high talent investor is π_H, and the probability of meeting with a low talent investor is $1-\pi_H$. This random matching between entrepreneurs and investors is a stylized way to describe the process of takeovers, mergers and acquisitions, and similar transactions that involve the transfer of control.

In the shareholders' meeting the entrepreneur and the outside investor decide three things.

[3] An additional assumption on parameters is that $\frac{R^2}{\theta_L}>B$. This allows us to avoid cases in which two shareholders of the same talent have simultaneous incentives to steal. Since $R>\frac{R^2}{\theta_L}$, this condition also implies that $R>B$ so nobody has incentives to steal from himself.

[4] We implicitly assume there is a matching technology, similar to the one traditionally assumed in search models (Mortensen and Pissarides (1994)). Search costs in our model are zero, so every entrepreneur decides to search, as the expected benefits are strictly positive. The matching technology and the relative sizes of both populations are such that all entrepreneurs meet an outside investor with certainty.

First, control has to be allocated to either the entrepreneur or the investor (control cannot be shared). The allocation of control is "friendly" in the sense that both agents have to agree on who has to be the controlling shareholder. If there is no agreement each agent simply walks away. As noted by Tirole (2006, chapter 1), "hostile" takeovers have largely disappeared from the market for control, and were never the majority of transactions. The choice of control determines the firm's marginal productivity of capital since the controlling shareholder applies his managerial talent θ to the firm's entire capital stock. Second, they have to decide the capital structure of the firm: the amount of capital each one commits to the firm and the amount of debt to be raised. Any agent can choose to allocate only part of his wealth to the firm and invest the rest in bank deposits. We assume that the amount of debt to be raised next period is agreed in advanced. Otherwise the unrestrained issue of a senior security (i.e., a security with a higher payment priority) such as debt can unravel the incentives set up by the entrepreneur and the investor in the shareholders' meeting. Finally, they have to decide on a payout policy, in particular, on how to distribute dividends among the shareholders.

The implementation of these different decisions can be understood as a dual-class shares system. In exchange for his investment in the firm the controlling shareholder receives shares that entitle him to all of the control rights and a fraction of the future dividends. The non-controlling shareholder, instead, receives shares that entitle him only to a fraction of the future dividends in exchange for the capital he contributes to the firm.

The entrepreneur and the outside investor bargain over the joint surplus created when meeting each other. This surplus depends on the value of the joint venture, as well as their outside options and the incentive compatibility constraint for the controlling shareholder. Each shareholder must receive at least his outside option. The outside option for the investor is to put his capital K_i in bank deposits and receive RK_i. The outside option for the entrepreneur with capital K_e and talent θ_e is to run the firm independently. The entrepreneur can take debt in the following period, so his outside option is therefore $\theta_e(1+\delta_e)K_e - R\delta_e K_e =$

$\frac{BR}{B+R-\theta_e}K_e$.

Additionally, the controlling shareholder must receive a payoff that satisfies his incentive compatibility constraint, and thus prevents stealing in equilibrium. The incentive compatibility constraint can be written in generic form stating that the controlling agent must receive at least $B\left(K_e^* + K_i^* + K_d^*\right)$, where $K_e^* \leq K_e$ and $K_i^* \leq K_i$ are the optimal capital choices of both partners, and $K_d^* \geq 0$ is the optimal amount of debt. We show below that, in equilibrium, the controlling shareholder is always fully invested in the firm (i.e., $K^* = K$), while the non-controlling shareholder is likely to invest only part of his wealth in the firm. Thus, if the entrepreneur retains control the surplus S in any given match can be written as:

$$\begin{aligned} S(\theta_e,\theta_i, K_i, K_e) &= \theta_e(K_e + K_i^* + K_d^*) - RK_d^* + R \times \max(K_i - K_i^*, 0) \\ &\quad -RK_i - \max\left[\frac{BR}{B+R-\theta_e}K_e, B\left(K_e + K_i^* + K_d^*\right)\right], \end{aligned} \tag{3}$$

and if the investor receives control:

$$\begin{aligned} S(\theta_e,\theta_i, K_i, K_e) &= \theta_i(K_e^* + K_i + K_d^*) - RK_d^* + R \times \max(K_e - K_e^*, 0) \\ &\quad -\frac{BR}{B+R-\theta_e}K_e - \max\left[RK_i, B\left(K_e^* + K_i + K_d^*\right)\right]. \end{aligned} \tag{4}$$

The first three terms in equations (3) and (4) consist of the free cash-flow associated with the joint venture. The first term is the total cash flow of the firm, from which debt payments are subtracted (second term) and to which bank deposits of the non-committed capital are added (third term). The fourth term is the outside option of the non-controlling shareholder. The investor can deposit his money in the bank and the entrepreneur can run the firm by himself. The last term is the outside option of the controlling shareholder, which is the maximum of two sub-options: his legitimate alternative use of funds, and the option to steal the firm's capital.

After bargaining each shareholder receives his outside option plus a fraction of the surplus. We assume that the surplus is split through Nash bargaining: the entrepreneur gets a fraction λ of the surplus and the outside investor gets a fraction $1-\lambda$ of the surplus. We do not impose any restrictions on λ, therefore the fraction of dividends that a shareholder receives is in general different from the fraction of shares he owns (i.e., his stake in the equity capital of the firm). We refer to the fraction of shares owned as *direct ownership* and to the fraction of dividends as *cash-flow ownership*. Direct ownership is $\frac{K_i^*}{K_i^*+K_e^*}$ and $\frac{K_e^*}{K_i^*+K_e^*}$ for the outside investor and the entrepreneur respectively. Cash-flow ownership is $\frac{D_i^*}{\theta(K_e^*+K_i^*+K_d^*)-RK_d^*}$ and $\frac{D_e^*}{\theta(K_e^*+K_i^*+K_d^*)-RK_d^*}$ for the outside investor and the entrepreneur respectively, where $D_i^*+D_e^* = \theta(K_e^*+K_i^*+K_d^*)-RK_d^*$. In line with the previous literature (Adams and Ferreira 2008), we define the *ownership wedge* as the difference between direct ownership and cash-flow ownership. By construction the wedge is zero in single-shareholder firms.

Two caveats are worth emphasizing. First, we do not allow for sales in which the entrepreneur relinquishes all participation in the firm. Instead we assume that the entrepreneur always retains an (arbitrarily small) fraction of the company. While allowing for sales changes some of our results, the main implications remain unchanged. The reasons is that sales do not eliminate private benefits and firms still face credit constraints in the centralized market. Equilibrium sales are very similar to equilibrium transfers, and only take place if they generate a positive surplus. As with transfers, sales not only reflect the marginal productivity of the agents, but their relative wealth. Rich, low-talent investors buy firms from poor, high-talent entrepreneurs if the scale advantage compensates for the loss of productivity. Second, we can allow for a secondary market of shares where the non-controlling shareholder sells his entire stake in the firm at time $t=1$ or later. In fact, the identity of the non-controlling shareholder is irrelevant after the firm is set up; he just provides capital. He can sell his stake to a group of dispersed equity investors without changing any of the main results of the paper.

1.4 Equilibrium Characterization

We define equilibrium as follows:

Definition 1 (Equilibrium): *Equilibrium is characterized by a population of firms where, conditional on the actual distribution of entrepreneurial ideas and matches between entrepreneurs and outside investors, there are no incentives to deviate in any firm:*

a) Control is allocated to maximize the joint surplus of each match.

b) Financing is incentive compatible.

c) Every agent gets at least his outside option.

We characterize the equilibrium through two main propositions. First, we show that the equilibrium size of any given firm is fully determined by the identity of the controlling shareholder. Second, we show that the control allocation in any given match is explicitly determined by the partners' relative wealth, conditional on their managerial talents. These two propositions allows us to completely characterize the equilibrium distributions of firms along multiple dimensions, a property that we exploit in the next section to derive testable empirical implications. All proofs are given in the appendix.

Proposition 1 (Controlling Shareholder and Firm Size): *There are two types of firms in equilibrium :*

a) Firms controlled by entrepreneurs: If the entrepreneur retains control the investor only substitutes for debt. Both shareholders get exactly their outside options since the match generates no surplus. Equilibrium firm size is $(1+\delta_e)K_e = \frac{R}{B+R-\theta_e}K_e$. *While the entrepreneur is fully invested in the firm, the investor invests at most* $\delta_e K_e$. *If* $K_i < \delta_e K_e$, *the investor is also fully invested, and the firm has positive debt. Otherwise, the investor is only partially invested, and the firm has no debt.*

b) Firms controlled by outside investors: Control is transferred since the transfer generates a positive surplus. Thus, both agents get more than their outside options. Equilibrium firm size is $\frac{R}{B}K_i$. *While the investor is fully invested, the entrepreneur invests at most*

$\frac{R-B}{B}K_i$. If $K_e < \frac{R-B}{B}K_i$, *the entrepreneur is also fully invested, and the firm has positive debt. Otherwise, the entrepreneur is only partially invested, and the firm has no debt.*

Since $\frac{R}{B+R-\theta_e} > \frac{R}{B}$, *the multiplier on capital is larger in firms controlled by entrepreneurs than in firms controlled by outside investors. Thus, for a given level of wealth of the controlling shareholder and irrespective of managerial talent, firms controlled by entrepreneurs are larger than firms controlled by outside investors.*

The outside investor who does not receive control becomes a passive equityholder. In this world of risk neutrality passive equityholders are equivalent to debtholders and receive the same returns as them. Therefore, the firm generates a flow that only compensates for the opportunity costs of both partners with no surplus left. The outside investor limits his investment exactly to the level of debt that the entrepreneur can get on his own. Any increase in firm capital beyond that point would imply that the firm cannot satisfy the incentive compatibility constraint of the controlling shareholder and simultaneously compensate for the investor's outside option.

In firms where control is transferred to the outside investor the entrepreneur also has an incentive to limit his investment in the firm. Once again the capital invested by the non-controlling shareholder goes exactly up to the point in which the incentive constraint and the outside option of the controlling shareholder become identical. As in the case of the entrepreneur as controlling shareholder, this implies that the size of the firm is solely determined by the capital of the controlling shareholder. Unlike the previous case, however, the outside investor is not simply substituting for debt now. By assuming control he is either changing the firm's marginal productivity, changing the firm's scale, or both. Transfers can only take place in equilibrium if they make both agents (weakly) better off, therefore the surplus associated with any firm with a control transfer is always non-negative, and typically positive.

We now show that the decision rule for control in this economy is a simple function of the shareholders' relative wealth and talent. In this model control can be allocated to a given shareholder for two, not-mutually-exclusive, reasons. First, a shareholder can have more managerial talent and therefore increase the firm's marginal productivity. Second, a shareholder can increase the firm's scale because his incentive compatibility constraint is less binding. Control is always allocated optimally from a private perspective, being handed over to the agent that, conditional on his incentive constraint, provides the best combination of wealth and talent.

Proposition 2 (Control Allocations)*: Decisions on control are determined by relative wealth and talent. In equilibrium there are three types of control transfers from the entrepreneur to the outside investor:*

a) Matches between θ_L *entrepreneurs and* θ_H *outside investors: a low-talent entrepreneur transfers control to a high-talent investor if* $K_i \geq K_i^{pi}(K_e)$*. Otherwise, the entrepreneur retains control. If a transfer takes place, it increase Tobin's q, but not necessarily the scale of the firm.*

b)Matches between θ_H *entrepreneurs and* θ_L *outside investors: a high-talent entrepreneur transfers control to a low-talent investor if* $K_i \geq K_i^{pd}(K_e)$*. Otherwise, the entrepreneur retains control. If a transfer takes place, it must increase the scale of the firm, but decrease Tobin's q.*

c) Matches between entrepreneurs and investors of the same talent: a transfers occur between an entrepreneur and an investor of the same talent if $K_i \geq K_{i,j}^{pn}(K_e)$*, where* $j = H, L$ *and* $K_{i,H}^{pn}(K_e) > K_{i,L}^{pn}(K_e)$*. Otherwise, the entrepreneur retains control. These transfers increase the scale of the firm, but do not increase Tobin's q.*

All cutoff points $K_i^{pi}(K_e), K_i^{pn}(K_e)$*, and* $K_i^{pd}(K_e)$ *are provided in the appendix. Since* $K_i^{pd}(K_e) > K_{i,H}^{pn}(K_e) > K_{i,L}^{pn}(K_e) > K_i^{pi}(K_e)$ *for any* K_e*, control transfers that increase Tobin's q are more likely, conditional on actual matches, than transfers that reduce or maintain Tobin's q.*

Conditional on the wealth of both partners, the surplus of the match is always larger when the investor has higher productivity than the entrepreneur. Thus, transfers from low-talent entrepreneurs to high-talent investors require a lower capital threshold for the investor and thus are more likely to occur than allocations that give control to a low-talent investor matched with a high-talent entrepreneur. A high-talent entrepreneur will relinquish control to a low-talent investor only if the capital of the investor is large enough to compensate for the productivity loss, therefore the capital threshold is the highest of all.

Notice also that, for matches of homogeneous talent, allocating control to the investor is more frequent among less talented agents. This result follows from the difference in the outside option between entrepreneurs and investors. While the outside option for the entrepreneur is strictly increasing in his talent –a more talented entrepreneur can open a larger, more productive firm–, it is independent of the talent of the investor, who only has access to bank deposits. Thus, for given wealth, satisfying the outside option of a talented entrepreneur is relatively harder than for a less-talented entrepreneur.

Although all control decisions are optimal in terms of maximizing the joint payoff of both partners, they need not maximize marginal productivity. For example, if a low-talent entrepreneur meets a high-talent investor, the first best in a world without private benefits is to transfer control to the investor, with both partners investing all their wealth in the firm. However, with private benefits the transfer to the more talented investor can fail to go through if the scale advantage of the entrepreneur is big enough. Simply put, the talented but poor investor is less likely to receive control even though he can increase firm productivity. And even if he receives control, the non-controlling entrepreneur can decide to reduce his capital investment in the firm and allocate some of his resources at a strictly lower marginal return.

Both propositions imply that, given the observable characteristics of both partners, we can fully characterize the resulting firm in terms of size, productivity, ownership concentration, leverage, and the control wedge. Thus, given initial distributions of agents' types, talent, and wealth, we can characterize the distributions of firms' characteristics along the dimensions mentioned above. We use this feature to derive the empirical implications of the model presented in the next section.

2 Empirical Implications

In this section we make explicit the implications of the model that can be taken directly to the data. We provide numerical examples that help illustrate these implications. Table 1 describes the baseline parameters for our numerical examples.[5]

2.1 Ownership Wedges

We first focus on disproportionate ownership, i.e., the wedge between the fraction of capital contributed to the firm by a shareholder and the fraction of dividends that he or she receives. The next proposition details the factors that are related with this wedge in equilibrium. Like the wedge itself, all of these factors are endogenous and do not have to be interpreted as having a causal effect.

Proposition 3 (Ownership Wedges)*: With respect to the difference between direct and cash-flow ownership:*

a) The wedge can be positive only in firms that experience a transfer of control to an outside investor. The wedge in an entrepreneur-controlled firm is always negative.

b) A large wedge is not necessarily associated with a low-q firm.

Closed-form expressions for all wedges are provided in the appendix.

By definition, the ownership wedge is zero in firms with only one shareholder (private firms). Concentration is 100% and the shareholder takes home all of the dividends in those

[5] We assume that capital is lognormally distributed across the population –high and low talent populations alike– with mean 10 and variance 100. We consider simulations with 100,000 agents of which 25% are entrepreneurs. Therefore there are 25,000 firms. Meetings between entrepreneurs and outside investors occur randomly. The sole difference between outside investors and entrepreneurs is that entrepreneurs have ideas for firms, but both are taken from the same population.

cases. Firms with more than one shareholder will in general deviate from this benchmark. The entrepreneur has a better outside option than the investor since he can run the firm, although a smaller one, on his own. Hence, the entrepreneur can extract a larger fraction of dividends than the fraction of equity capital he contributes to the firm. This results in a negative wedge for the entrepreneur. A negative wedge is akin to having preferred shares, which give more dividend rights than other shares. Similar to Shleifer and Vishny (1986), the dividend policy of the firm can act as a "subsidy" for the controlling shareholder so he stays in control.

In Table 2 we split firms in our numerical example into ten groups according to their wedge. As can be seen, all positive wedges correspond to transfers of control from the entrepreneur to the investor. Every time that control is transferred from an incumbent to an investor the resulting wedge is large because the incumbent has a stronger outside option than the investor. Hence, the incumbent can extract more dividends than the outside investor for a given level of equity capital. For this set of baseline parameters, no transfer of control to an outside investor implies a negative wedge.

In Table 2 we see that high-q firms and low-q firms alike can be controlled with large wedges. Many low-q firms are controlled with positive wedges in the 5%-10% range. In this case a low-talent investor receives control because of his scale advantage vis-à-vis the entrepreneur. Given his low-talent and the fact that he is an outside investor, he can extract proportionally fewer dividends than the equity capital he contributes to the firm. But high-q firms can be controlled with even larger wedges, above the 10% range in our numerical example. Notice that these firms are highly concentrated,or that the investor is contributing the lion's share of equity capital. The high-talent investor in this case can run a high-value firm and make it larger and more levered than what the entrepreneur can do, hence his incentive to invest a lot of his own capital in the firm. However, the position of the investor is weak because of his outside option if not running the firm. Consequently, he ends up contributing a much larger share of equity capital than the dividends he receives.

In Table 2 we also see that many high-q firms are controlled with negative wedges. From Proposition 1 we know that the multiplier on internal wealth is always larger for entrepreneurs than for investors of the same talent, therefore high-q firms with low wedges are larger and more levered than high-q firms with large wedges. Overall, the relationship between ownership wedges and firm value is far from obvious in the model, and large wedges are not a characteristic solely of low-q firms.

2.2 Ownership Concentration and Firm Value

We now turn our attention to the relationship between ownership concentration and firm value.

Proposition 4 (Ownership Concentration and Firm Value): *There is a direct relationship between feasible concentration levels and the identity of the controlling shareholder:*

a) There is no firm in the market with concentration below $\bar{c} \equiv \frac{B+R-\theta_H}{R}$.

b) Above $\bar{c}$*, firms enter the market in the following order as concentration increases: 1) firms controlled by* θ_H*-entrepreneurs, 2) firms controlled by* θ_L*-entrepreneurs, 3) firms controlled by* θ_H*-investors, and finally, 4) firms controlled by* θ_L*-investors.*

c) As a result, the relationship between Tobin's q (θ*) and concentration is non-monotonic.*

Firms with the lowest levels of concentration observed in the market are firms controlled by high-talent entrepreneurs. High-talent entrepreneurs can keep control with a relatively small amount of capital given their soft incentive constraints. Low-talent entrepreneurs face stronger incentive constraints, but not as binding as the constraints of outside investors. Thus, low-talent entrepreneurs need to control firms with higher concentration than the minimum required for high-talent entrepreneurs, but can control firms with lower concentration than outside investors. High-talent investors are required a higher level of concentration because their incentive constraint is more binding than the constraint of any entrepreneur.

Low-talent outside investors face the most binding constraints in the market, so their control becomes feasible only at very high levels of concentration.

This ordering of managerial talent and concentration implies that the relationship between Tobin's q and concentration is non-linear. At very low levels of concentration, the mix of firms observed in the market is composed purely of high-talent entrepreneurs. As concentration increases, the average Tobin's q for a given level of concentration falls because low-talent entrepreneurs enter the mix of firms. Average q increases again with concentration as high-talent investors enter the mix after low-talent entrepreneurs. Finally, at very high levels of concentration, average q decreases with concentration as low-talent investors are allowed to become controlling shareholders.

Figure 1 presents in a stylized way the relationship between q and concentration in the model. In the first segment only high-talent entrepreneurs ($\theta_{H,e}$) are allowed to be controlling shareholders (CS). In the second segment, low-talent entrepreneurs ($\theta_{L,e}$) are added to the potential pool of controlling shareholders. In the third segment high-talent investors ($\theta_{H,i}$) enter the mix, and so on. Inflection points ϕ_1 and ϕ_2 are complicated expressions provided in the appendix. The precise shape of the relationship and the length of each segment depend on parameter and distributional assumptions. For example, ϕ_1 and ϕ_2 can be very close together and the segment between them become indistinguishable from the previous segment. In general, the relationship is non-monotonic and with multiple inflection points.[6]

Table 3 shows the relationship between concentration and Tobin's q in our numerical example. We report the average of Tobin's q for firms in a given concentration range. Tobin's q stays flat between 0% and 40% concentration. Only high talent entrepreneurs are allowed to be controlling shareholders at such low levels of concentration, therefore there are no control transfers in that range. Tobin's q starts to decline in the 40%-50% range because firms controlled by low-talent entrepreneurs enter the mix. High-talent investors enter the mix soon afterwards since we see control transfers (43%) in the same concentration range. Above

[6]The number of inflection points would increase if we consider more than two types of managerial talent in the economy.

the 40%-50% range average q keeps falling as low-talent controlling shareholders become more prominent in the mix. There is a small uptick in q in the 80%-90% range as suggested by Figure 1, but average q remains close to the unconditional average of managerial talent in the economy (1.40).

Table 3 also shows the average of firm characteristics for the different concentration ranges. Firm size and leverage increase in tandem with concentration. This reflects the scale advantage of wealthy shareholders: control is often allocated to wealthy shareholders, even if they are not the most talented, because they can make the firm grow and take more leverage. The average wedge is also increasing in concentration. The average wedge is negative at low levels of concentration, while it is positive at high levels of concentration. The wedge is strongly related to the frequency of control transfers in each concentration range as seen in Proposition 2. There are fewer transfers of control at low levels of concentration. Entrepreneurs have an advantage as controlling shareholders at such levels of concentration because the incentive constraint that affects them is weaker than the constraint that affects outside investors. At high levels of concentration firms controlled by low-talent shareholders are relatively more frequent and therefore wedges are larger.

One way to summarize the relationship between firm value and concentration is to run OLS regressions where Tobin's q is the dependent variable.[7] These regressions are typical of the literature on the effects of managerial ownership on firm value. Some authors find a linear relationship between concentration and value, while others find a quadratic relationship, piecewise linear, or other functional forms (see Demsetz and Villalonga (2001) for a survey, in particular their Figure 1). The literature on large shareholders also studies similar regressions, with attention to the effect of ownership wedges on firm valuation (see, for example,

[7] Tobin's q is a dichotomic variable in our model, i.e., it is either high or low, so the OLS regression is basically a linear probability model. It may be more palatable to run OLS regressions with a continuous variable. One simple adjustment to our framework is to assume that the econometrician observes true q plus random measurement error. This transforms the dichotomic measure of q into a continuous measure of q. If private parties observe true q when contracting, nothing in the model will change, only the regressions. The statistics in Table 4 and the regressions themselves experience no significant change if we assume classic measurement error (i.e., iid error). R^2s fall, but none of the statistical inference changes.

Claessens, Djankov, Fan, and Lang (2002), La Porta, López-de-Silanes, Shleifer, and Vishny (2002), or Lins (2003)). We run regressions of the following type:

$$\begin{aligned} q_i &= \alpha + \boldsymbol{\beta}' f(Concentration_i) + \gamma Wedge_i \\ &\quad + \delta Log\ Assets_i + \lambda Leverage_i + \epsilon_i, \end{aligned} \tag{5}$$

where $f(Concentration_i)$ is a polynomial function of ownership concentration. Figure 1 suggests that a quadratic or a cubic polynomial can provide a good description of the relationship between concentration and Tobin's q. A quadratic polynomial can be a good approximation, although the cubic polynomial has more flexibility to capture the key inflection points in Figure 1. The first inflection point is when low-talent *entrepreneurs* enter the pool of controlling shareholders, and the second is when high-talent *investors* enter the pool.

In Table 4 we report OLS regressions for our baseline numerical example. Several results are important. First, the relationship between q and concentration is indeed non-monotonic. The linear regression (Column 1, Table 4) gives a strong negative coefficient for concentration, but the quadratic and cubic regressions (Columns 2-3, Table 4) show that the effect of concentration is more nuanced. Second, the value-concentration relationship is robust to including the ownership wedge in the regression. Third, the coefficient on the wedge is many times negative (Columns 4-10, Table 4) as in Claessens, Djankov, Fan, and Lang (2002). As shown in Proposition 3, the wedge is negatively correlated with q. However, the coefficient on wedge turns positive when we include the concentration variables and when we control for size and leverage simultaneously (Columns 11-15, Table 4). It appears that the relationship between firm value and the wedge is harder to identify than the effect of concentration itself, and crucially it depends on the particular specification that is used. One potential explanation for this problem is that concentration, size and leverage, although typically used as controls in the literature (for example, Claessens, Djankov, Fan, and Lang (2002), and Cronqvist and Nilsson (2003)), are in fact over-controlling. At the end of the day, all of these variables are related to the same contractual frictions that determine the ownership structure of the firm.

2.3 Investor Protection and Firm Characteristics

We now study the effect of improving investor protection –a reduction in the parameter of private benefits B– on the equilibrium.

Proposition 5 (Investor Protection and Firm Characteristics): *As the legal protection of investors improves (B becomes smaller):*

a) More entrepreneurs retain control, or in other words, all types of control transfers from entrepreneurs to outside investors become less frequent. Hence, the average ownership wedge in the economoy tends to decrease.

b) Productivity-reducing transfers of control become relatively less frequent among control transfers, and therefore average Tobin's q in the economy increases.

c) The average firm in the economy becomes larger, more levered, and less concentrated.

d) The relationship between concentration and Tobin's q remains non-monotonic.

A decrease in parameter B, which makes the incentive constraint of the controlling shareholder easier to satisfy for any given level of capital, has an unambiguously positive effect on overall welfare. All types of firms become larger as debtholders and non-controlling shareholders increase their exposure. More resources are allocated to firms that are more productive than bank deposits, and the economy is better off.

Why do control transfers become less frequent as investor protection improves? Proposition 1 implies that the multiplier on internal funds is larger for firms controlled by entrepreneurs than for firms controlled by investors. This multiplier is relatively more affected by changes in investor protection, which implies that, for a given level of capital, the increase in multiplier is larger for a firm under entrepreneur control than under investor control. Thus, the surplus associated with a control transfer tends to fall, and transfers become less likely. Notice that entrepreneurs retain control more often because the increase in investor protection improves their outside option (running a private firm) and not because they are necessarily more talented than outside investors.

While control transfers fall as investor protection improves, productivity-decreasing transfers fall more strongly for two reasons. First, the increase in the capital multiplier for firms under entrepreneur control is particularly pronounced for high talent entrepreneurs, thus they are in less need to transfer control. Second, the increase in the capital multiplier among investors does not depend on investor talent (see Proposition 1 again), and since low-talent investors still produce lower cash flows when controlling the firm, they are relatively less benefited from the decrease in private benefits than high-talent investors. Overall, the allocation of control in the economy becomes more efficient, despite the fact that there are fewer transfers, since the bulk of the reduction in transfers comes from control transfers that are inefficient. This is consistent with the positive effect of investor protection on firm value as documented by La Porta, López-de-Silanes, Shleifer, and Vishny (2002).

Proposition 5.b is consistent with the vast empirical evidence regarding the effect of investor protection on firm characteristics (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), La Porta, López-de-Silanes, and Shleifer (1999), and La Porta, López-de-Silanes, Shleifer, and Vishny (1998)). Table 5 illustrates these effects with our numerical example. Average firm size and leverage fall in the economy as private benefits (B) increase, while concentration increases. More control transfers occur as private benefits go up, which increases the average wedge in the economy. The wedge also increases as private benefits go up because there are more low-talent agents acting as controlling shareholders. In fact, the average q in the economy decreases from 1.453 when $B = 0.40$ to 1.431 when $B = 1.15$. The fall in q occurs despite the fact that the average talent in the economy is the same in each case by construction.

Despite the increase in investor protection, the shape of the concentration-value relationship continues to be non-monotonic since the sequence of entry points in Proposition

4.b is preserved. The entry points can become closer together, and closer to zero, as B falls, but high-talent entrepreneurs still control with lower levels of concentration than other entrepreneurs and outside investors. The exact shape varies according to parameter and distributional assumptions, but the basic non-monotonicity is still present.

Figure 2 shows, for different levels of private benefits, the fitted q from a cubic regression like the one in Column 3 of Table 4. The two inflection points in the value-concentration relationship are easily recognizable in cases with low and high levels of private benefits. In the baseline case with $B = 0.5$ the first inflection point is estimated around 15% concentration and the second inflection point is around 80% concentration. The first segment of the estimated relationship is upward sloping (and not flat as in Figure 1) because OLS tries to balance positive and negative predictive errors throughout the entire concentration spectrum. For mid levels of private benefits (e.g., $B = 0.7$), the value-concentration relationship is closer to quadratic. Low levels of ownership concentration are not feasible when private benefits are high. For example, the lowest possible concentration is above 60% when $B = 1.1$, but it is close to 0% when $B = 0.4$.

Given the narrower range of feasible levels of concentration, the shape of the concentration-value relationship looks more compressed and pronounced when private benefits are high, although the shape is similar to the one seen in the baseline case. This is important for cross-country comparisons. The precise inflection points can be different, but our model predicts certain stability in the estimated shape. For example, Morck, Shleifer, and Vishny (1988) find in a U.S. sample a similar non-monotonic shape as the one we see in our model, but with different inflection points. They find that firm value increases up to concentration levels of 5%, then decreases up to 25%, and finally increases for concentration levels above 25%.

Table 6 presents regressions like equation (5) for samples with different levels of private benefits. The regressions for $B = 0.7$ confirm that a quadratic shape is sometimes a better approximation for the value-concentration relationship as already seen in Figure 2. Although the value-concentration shape is fairly robust, it is not immune to the regression specification. For example, signs change when we include simultaneously the wedge, size, and leverage (compare, for example, Columns 13 and 14, Table 6). The coefficient on size can also flip signs depending on the regression specification. Overall, according to the simulated data, the choice of control variables is relevant for the conclusions drawn from empirical work.

3 Application to Chilean Data 1990-2009

In this section we test the main implications of the model contained in Propositions 3 and 4. These propositions give predictions across firms for a given level of investor protection. Proposition 5 is mostly about cross-country comparisons, and some of the main predictions (in particular 5.b and 5.c) are consistent with the empirical evidence already available. We test the cross-firm predictions using Chilean data for the period 1990-2009. For each listed firm we compute Tobin's q as the ratio of the market value of assets (market equity plus book value of debt) divided by the book value of assets. We compute five-year averages of q in order to smooth short-run fluctuations. Once we take averages we have at most 4 observations for each firm (1990-1994, 1995-1999, etc.). More details on the data construction are provided by Donelli, Larrain, and Urzúa (2013).

The average concentration in this market is 68%, which is in line with other markets of similar level of financial development (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)). The average wedge of 9% is relatively small, although again in line with other markets (see, for example, Table VI in La Porta, López-de-Silanes, Shleifer, and Vishny (2002)). Table 7 shows averages of firm characteristics for different concentration ranges. There are very few observations (1.5% of the sample) below 20% concentration, which is the standard cutoff in the literature to determine whether a firm is widely held or not (La Porta, López-de-Silanes, and Shleifer 1999). The shape of the value-concentration relationship is clearly non-monotonic: Tobin's q falls after 40% concentration, reaching a minimum in the 70%-80% range, and then picking up again in the upper ranges. Leverage appears to have a non-monotonic relationship with concentration similar to the one of q, although less pronounced.

In Table 8 we report correlations between the main variables. Size is negatively correlated with concentration. Size is positively correlated with leverage, as is typical in the capital structure literature (Rajan and Zingales 1995). The wedge is positively correlated with concentration. For example, none of the firms in the 0%-20% concentration range has an ownership wedge, while in the 90%-100% concentration range the average wedge is 18%. However, this correlation does not have to be over-emphasized since it is partly mechanical given that concentration is part of the definition of the wedge.

In Table 9 we explore the predictions related to ownership wedges. We report regressions with the wedge as dependent variable. We include time fixed effects for each 5-year period (1990-1994, 1995-1999, etc.). Standard errors are clustered by firm. We define a dummy for the firm-year observations after a transfer of control occurs. Only 15% of the firms experience a transfer of control in our sample period, so changes in controlling shareholder are relatively rare. As seen in the first Column of Table 9, the dummy for control transfers significantly predicts a higher wedge. The coefficient of 8% on this dummy is economically large compared to the average wedge in the sample (9%). Concentration is also positively related to the wedge. As predicted by Proposition 3, we do not find a significant coefficient on Tobin's q. The coefficient on size is positive and strongly significant (Column 3, Table 9). We do not find a significant relationship between the wedge and leverage.

In Table 10 we report regressions for Tobin's q in the style of equation (5). The results show that there is a significant non-monotonic relationship between q and concentration, regardless of control variables. Panel A in Figure 3 shows the raw data and the fitted cubic relationship that corresponds to the regression in Column 3 of Table 10. Panel B is the same figure but zoomed (not re-estimated) to see more clearly the inflection points. As suggested by Table 7, these inflection points are around 30% and 75% respectively. The inflection points are not far from the ones predicted by the model in Figure 2 for the case of $B = 0.5$.

The effect of the wedge on firm value was negative in Claessens, Djankov, Fan, and Lang (2002) and zero in La Porta, López-de-Silanes, Shleifer, and Vishny (2002). In the Chilean data we find a mostly positive, but insignificant, coefficient. We also find a strong positive coefficient on leverage as in the regressions with simulated data. The coefficient on size is strongly negative in real data. With simulated data we find a negative coefficient on size only in samples with relatively high private benefits, and depending on the regression specification (see Table 6). This is likely the result of two opposing forces. First, less-talented shareholders tend to control large firms because their scale-advantage dominates in the shareholder's meeting. This suggests a negative coefficient. On the other hand, firms controlled by high-talent shareholders also tend be large because high talent relaxes borrowing constraints. The negative effect seems to be more powerful as long as the fraction of firms with low-talent controlling shareholders is large enough as in the case with high private benefits.

The R-squared of the regressions with real data are relatively modest (18% at best), which implies that there is still a lot of unexplained variation in firm values. The R-squared of the regressions with simulated data are higher, but there is still a lot of variation to explain in particular when private benefits are low. In an environment with low private benefits, the value of firms depends more on the random matching between entrepreneurs and investors than on the capital and ownership structure of the firm. On the other hand, when private benefits are high, firm value is tightly related to capital and ownership structure because of the constraints that the contractual environment imposes on the firm. For example, the highest R-squared is 49% when $B = 0.5$ (column 15 Table 4), while the highest R-squared is 92% when $B = 1.1$ (column 14 Table 6).

4 Conclusions

In this paper we study the relationship between firm value, ownership concentration, and the wedge between direct ownership and cash-flow ownership in a market where firms are controlled by large shareholders. We set up an equilibrium model with private benefits of control and bargaining between large shareholders. The model matches the available evidence regarding the effect of investor protection on firm characteristics. In particular, the average firm becomes larger, more valuable, less concentrated, and with smaller ownership wedges as investor protection increases (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) and La Porta, López-de-Silanes, Shleifer, and Vishny (2002)). We test the cross-sectional predictions of the model using data on Chilean firms in 1990-2009. As predicted by the model, we find that ownership wedges are higher in firms that have changed controlling shareholder. We also find a non-monotonic relationship between firm value and concentration that matches the prediction of the model. The simulated data also allows us to study the effects of omitted variables, regression specification, and endogeneity in empirical work on the relationship between firm value and concentration.

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A Proofs

Proof of Proposition 1

a) As mentioned earlier, we assume that the partners agree ex ante the level of debt they take, and that the agents can choose to invest part of the wealth outside the firm.

If the entrepreneur retains control, and taking into account the chance that her incentive constraint might bind, her payoff for the controlling agent can be written as:

$$Pe = \max \left\{ \begin{array}{c} B(K_e^* + K_i^* + K_D^*); \frac{BR}{B+R-\theta_e} K_e + \\ \lambda \left[\begin{array}{c} \theta_e \left[K_e^* + K_i^* + K_D^* \right] - RK_D^* - RK_i^* + R(K_e - K_e^*) \\ -\frac{BR}{B+R-\theta_e} K_e \end{array} \right] \end{array} \right\}$$

, where $K_e^* + K_i^* + K_D^*$ are the equilibrium capital levels invested by each partner and the amount of debt the firm takes. As $\dfrac{\partial P_e}{\partial K_{ei}^*} > 0$, $K_e^* = K_e$. This is, the controlling entrepreneur maximizes her own payoff by investing as much as feasible in the firm. Thus, her wealth constraint binds, and she is fully invested in equilibrium.

The non-controlling investor has a payoff given by:

$$P_i = RK_i + \lambda \left[\begin{array}{c} \theta_e \left[K_e^* + K_i^* + K_D^* \right] - RK_D^* - RK_i^* + R(K_e - K_e^*) \\ - \max(\frac{BR}{B+R-\theta_e} K_e, B(K_e^* + K_i^* + K_D^*) \end{array} \right]$$

The investor must decide on her own investment, K_i^* taken as given K_e^* and K_d^*.

The sign on $\dfrac{\partial P_i}{\partial K_i^*}$ depends on whether the incentive or participation constraint on the manager binds. If $\frac{BR}{B+R-\theta_e} K_e > B(K_e^* + K_i^* + K_D^*)$, then $\dfrac{\partial P_i}{\partial K_i^*} = \lambda(\theta_e - R) > 0$. If $\frac{BR}{B+R-\theta_e} K_e < B(K_e^* + K_i^* + K_D^*)$, then

$$\frac{\partial P_i}{\partial K_i^*} = \lambda(\theta_e - R - B) < 0.$$

Investing capital beyond the point in which the incentive constraint becomes binding strictly decreases the payoff for the non-controlling agent, as all further increases in capital make the incentive constraint harder to satisfy, increasing the payoff to the manager in order to prevent stealing. As an increase in debt has exactly the same effect (debt and investor capital are perfect substitutes), the investor will only be willing to participate if $K_i^* + K_D^*$

are such that

$$K_i^* + K_D^* = \frac{\theta_e - B}{B + R - \theta_e} K_e$$

where the incentive and participation constraint become identical. This is, of course, exactly the same level of debt that the entrepreneur would get on his own. The entrepreneur is exactly indifferent between taking debt or a partner, and the partner gets her outside option.

It is straightforward to check that the joint surplus is zero

Firm size is then

$$K_e^* + K_i^* + K_D^* = \frac{R}{B + R - \theta_e} K_e$$

b) If the investor controls the firm, her payoff can be written as

$$P_i = \max \left\{ \begin{array}{c} B(K_e^* + K_i^* + K_D^*); RKi \\ +\lambda \left[\begin{array}{c} \theta_i \left[K_e^* + K_i^* + K_D^*\right] - RK_D^* + K_i^* + R(K_e - K_e^*) \\ -\frac{BR}{B+R-\theta_e} K_e \end{array} \right] \end{array} \right\}$$

Similarly to the previous case, the payoff to the controller is strictly increasing on her own investment, so $K_i^* = K_i$ and she will be fully invested.

For the non-controlling entrepreneur:

$$Pe = \frac{BR}{B+R-\theta_e} K_e + \lambda \left[\begin{array}{c} \theta_i \left[K_e^* + K_i^* + K_D^*\right] - RK_D^* + R(K_i - K_i^*) + R(K_e - K_e^*) \\ -\frac{BR}{B+R-\theta_e} K_e - \max(RK_i, B(K_e^* + K_i^* + K_D^*)) \end{array} \right]$$

The sign on $\dfrac{\partial P_i}{\partial K_i^*}$ depends on whether the incentive or participation constraint on the manager binds. If $RK_i > B(K_e^* + K_i^* + K_D^*)$, then $\dfrac{\partial P_i}{\partial K_e^*} = \lambda(\theta_i - R) > 0$. If $RK_i < B(K_e^* + K_i^* + K_D^*)$, then

$\dfrac{\partial P_i}{\partial K_i^*} = \lambda(\theta_e - R - B) < 0.$

As before, investing capital beyond the point in which the incentive constraint becomes binding strictly decreases the payoff for the non-controlling agent.. As an increase in debt has exactly the same effect on the manager's incentives, the non-controlling agent will only agree to $K_e^* + K_D^*$ such that

$$K_e^* + K_D^* = \frac{R-B}{B}K_i$$

where the incentive and participation constraint become identical.

Thus, the size of a firm in which control is handed to the investor is given by:

$$K_i^* + K_e^* + K_D^* = K_i + \frac{R-B}{B}K_i = \frac{R}{B}K_i$$

Proof of Proposition 2:

A transfer only occur if the surplus of any transfer is larger than zero.

The surplus associated to transferring control from an entrepreneur with capital K_e and talent θ_e to an investor with capital K_i and talent θ_i can be simplified as:

$$S(K_i, K_e, \theta_e, \theta_i) = \theta_i \frac{R}{B}K_i - RK_i - \frac{BR}{B+R-\theta_e}K_e - R(\frac{R-B}{B}K_i - K_e)$$

For there, for any given K_e the surplus is non-negative (and thus, the transfer takes place) iff

$K_i \geq K_i^{pi}(K_e) = \frac{B}{B+R-\theta_L}\frac{\theta_L-R}{\theta_H-R}K_e$ for $\theta_e = \theta_L$ and $\theta_i = \theta_H$

$K_i \geq K_{i,L}^{pn}(K_e) = \frac{B}{B+R-\theta_L}K_e$ for $\theta_e = \theta_L = \theta_i$

$K_i \geq K_{i,H}^{pn}(K_e) = \frac{B}{B+R-\theta_H}K_e$ for $\theta_e = \theta_H = \theta_i$

$K_i \geq K_i^{pd}(K_e) = \frac{B}{B+R-\theta_H}\frac{\theta_H-R}{\theta_L-R}K_e$ for $\theta_e = \theta_H$ and $\theta_i = \theta_L$.

Proof of Proposition 3

In firms controlled by entrepreneurs:

Firms generate flows

$$\frac{\theta_e R}{B+R-\theta_e}K_e - RK_D = \frac{\theta_e R}{B+R-\theta_e}K_e - R\max\left(0, \frac{R}{B+R-\theta_e}K_e - K_i\right)$$

An entrepreneur gets

$$\frac{BR}{B+R-\theta_e}K_e$$

Share is:

$$\frac{\frac{BR}{B+R-\theta_e}K_e}{\frac{\theta_e R}{B+R-\theta_e}K_e - R\max\left(0, \frac{R}{B+R-\theta_e}K_e - K_i\right)}$$

If $K_D = 0$

Share of flows is:

$$share = \frac{B}{\theta_e}$$

Concentration is:

$$conc = \frac{K_e}{K_e + \frac{\theta_e - B}{B+R-\theta_e}K_e} = \frac{B+R-\theta_e}{R}$$

Wedge:

$$wedge = \frac{B+R-\theta_e}{R} - \frac{B}{\theta_e} = \frac{(\theta_e - R)(B-\theta_e)}{R\theta_e} < 0$$

If $K_D > 0$

Share of flows is:

$$share = \frac{\frac{BR}{B+R-\theta_e}K_e}{\frac{BR}{B+R-\theta_e}K_e + RK_i}$$

Concentration is:

$$conc = \frac{K_e}{K_e + K_i}$$

Wedge:

$$wedge = \frac{K_e}{K_e + K_i} - \frac{\frac{BR}{B+R-\theta_e} K_e}{\frac{BR}{B+R-\theta_e} K_e + RK_i} < 0 \text{ as } R < \frac{BR}{B+R-\theta_e}$$

In firms controlled by investors:

Firms generate flows

$$\theta_i \frac{R}{B} K_i - RK_D = \theta_i \frac{R}{B} K_i - R \max\left(0, \frac{R-B}{B} K_i - K_e\right)$$

The investor gets

An entrepreneur gets

$$RK_i + (1-\lambda)\left[\frac{R(\theta_i - R)}{B} K_i - \frac{R(\theta_e - R)}{B+R-\theta_e} K_e\right]$$

$$= \frac{R}{B}\left[B + (1-\lambda)(\theta_i - R)\right] K_i - (1-\lambda)\left[\frac{R(\theta_e - R)}{B+R-\theta_e}\right] K_e$$

If $K_D = 0$

Share of flows is:

$$share = \frac{\frac{R}{B}\left[B + (1-\lambda)(\theta_i - R)\right] K_i - (1-\lambda)\left[\frac{R(\theta_e - R)}{B+R-\theta_e}\right] K_e}{\theta_i \frac{R}{B} K_i} = \frac{B + (1-\lambda)(\theta_i - R)}{\theta_i} - \frac{B(1-\lambda)(\theta_e - R)}{(B+R-\theta_e) K_i}$$

Concentration is:

$$conc = \frac{B}{R}$$

wedge:

$$
\begin{aligned}
wedge &= \frac{B}{R} - \left[\frac{B+(1-\lambda)(\theta_i - R)}{\theta_i} - \frac{B(1-\lambda)(\theta_e - R)K_e}{(B+R-\theta_e)\,K_i}\right] \\
&= \frac{(B+(1-\lambda)R)\,(\theta_i - R)\,(B+R-\theta_e) - RB(1-\lambda)(\theta_e - R)\frac{K_e}{K_i}}{(B+R-\theta_e)\,R\theta_i}
\end{aligned}
$$

If $K_D > 0$

Share of flows is:

$$
share = \frac{\frac{R}{B}\left[B+(1-\lambda)(\theta_i - R)\right]K_i - (1-\lambda)\left[\frac{R(\theta_e - R)}{B+R-\theta_e}\right]K_e}{\theta_i\frac{R}{B}K_i - R\left[\frac{R-B}{B}K_i - K_e\right]}
$$

concentration is:

$$
conc = \frac{K_i}{K_i + K_e}
$$

wedge:

$$
wedge = \frac{K_i}{K_i + K_e} - \frac{\frac{R}{B}\left[B+(1-\lambda)(\theta_i - R)\right]K_i - (1-\lambda)\left[\frac{R(\theta_e - R)}{B+R-\theta_e}\right]K_e}{\theta_i\frac{R}{B}K_i - R\left[\frac{R-B}{B}K_i - K_e\right]}
$$

Although in some cases the wedge decreases with an increase in the controlling shareholder's θ (Tobin's q), for example, when the entrepreneur retains control, this result is not general. For example, if the bargaining power of the entrepreneur is high ($\lambda \approx 1$) but the outside investor controls the firm, then an increase in the investor's θ implies that the investor retains a smaller share of dividends and hence the wedge is larger (ceteris paribus).

Proof of Proposition 4

a) and b) High-talent entrepreneurs that retain control run firms of size $K_e(1+\delta_H) = \frac{R}{B+R-\theta_H}K_e$. As stated in Proposition 1, if the capital of the partner exceeds $\delta_H K_e$, the firm takes no debt, and the partner restricts her investment in the firm to $K_i^* = \delta_H K_e$. As a consequence, the minimum property concentration would be

$$\frac{K_e}{K_e(1+\delta_H)} = \frac{1}{1+\delta_H} = \frac{B+R-\theta_H}{R} = C_{eH}^{\min}$$

Smaller concentration levels are not observed in equilibrium for those types of firms, as partners are never willing to increase their participation in the firm above $\delta_H/(1+\delta_H)$.

By a similar argument, the minimum concentration in firms run by low-talent entrepreneurs would be:

$$\frac{1}{1+\delta_L} = \frac{B+R-\theta_L}{R} = C_{eL}^{\min}$$

Finally, the size of a firm run by an investor is given by $\frac{R}{B}K_i$, with the non-controlling partner investing at most $\frac{R-B}{B}K_i$. Thus, concentration in an investor-run firm can never fall below

$$\frac{K_i}{\frac{R}{B}K_i} = \frac{B}{R} = C_i^{\min}$$

As $\theta_H > \theta_L > R$,$C_{eH}^{\min} < C_{eL}^{\min} < C_i^{\min}$. There are no firms with concentration below $C_{eH}^{\min} = \bar{c}$ in the economy, and firms with concentration in the range $\left\{C_{eH}^{\min}, C_{eL}^{\min}\right\}$ can only have high productivity. Firms run by low productivity entrepreneurs can operate with concentrations levels above $C_{eL}^{\min}$, suggesting that average productivity will decrease as both high and low productivity firms (all controlled by entrepreneurs) will exist in that range. Firms run by investors potentially enter the pool only at concentration levels above or equal to $C_i^{\min}$. Notice, however, that the actual concentration will also depend on the capital thresholds associated to control transfers. As θ_H investors can receive control at smaller levels of relative capital than θ_L investors, and thus can operate at smaller levels of concentration. We omit the algebra, which is quite cumbersome, but it can be shown that firms run by investors can be bounded from below in concentration at levels above $C_i^{\min}$, with minimum concentration being strictly smaller for θ_H firms. Thus, as concentration levels go to one, the pool of operating firms will sequentially incorporate θ_H investor-run firms first, and θ_L investor-run firms later. Formal derivations are available upon request.

c) Directly from a) and b) and the changes in the composition of firms at different concentration levels.

Proof of Proposition 5

a) For any given K_e, θ_e, θ_i

$$\frac{\partial K_i^*}{\partial B} = -\frac{(\theta_e - R)^2 K_e}{\theta_i - R} \frac{1}{(B + R - \theta e)^2} < 0$$

where $K_i^*(K_e, \theta_e, \theta_i)$ is such that $S_{e,i} = 0$. So, for all cases, K_i^*, the capital threshold for transfers, becomes strictly larger if B decreases.

b) Notice that the elasticity of $K_i^*()$ to B can be written as

$$\varepsilon_{K^*,B} = -\frac{\theta_e - R}{B + R - \theta e}$$

As

$$\frac{\theta_H - R}{B + R - \theta_H} > \frac{\theta_L - R}{B + R - \theta_L}$$

Then

$$\left|\varepsilon_{K^{vd},B}\right| > \left|\varepsilon_{K^{vi},B}\right|$$

so the threshold for productivity-decreasing transactions is proportionally more responsive to changes in legal protection. Thus, if legal protection becomes stronger, K^{vd} grows proportionally more than K^{vi}, so productivity-decreasing transfers become relatively less frequent.

c) We proceed by analyzing the expected characteristics of different types of firms and arguing that by law of large numbers the results will hold on average in the economy.

Notice that, for any given entrepreneur with capital K_e and ability θ_H, the expected size of the firm he forms is:

$$E_{K_e,\theta_H} = \left\{ p_H F(K_{i,H}^{pn}(K_e)) + p_L F(K_i^{pd}(K_e)) \right\} \frac{R}{B+R-\theta_H} K_e$$
$$+ \left[\begin{array}{c} p_H \left(1 - F(K_{i,H}^{pn}(K_e))\right) \int_{K_{i,H}^{pn}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_{i,H}^{pn}(K_e)) dK_i \\ +p_L \left(1 - F(K_i^{pd}(K_e))\right) \int_{K_i^{pd}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_i^{pd}(K_e)) dK_i \end{array} \right]$$

If he retains control or transfers to a θ_H investor, the expected firm size is:

$$E_{K_e}^C, \theta_H = \frac{\left[\begin{array}{c} \left\{ p_H F(K_{i,H}^{pn}(K_e)) + p_L F(K_i^{pd}(K_e)) \right\} \frac{R}{B+R-\theta_H} K_e \\ +p_H \left(1 - F(K_{i,H}^{pn}(K_e))\right) \int_{K_{i,H}^{pn}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_{i,H}^{pn}(K_e)) dK_i \end{array} \right]}{p_H F(K_{i,H}^{pn}(K_e)) + p_L F(K_i^{pd}(K_e)) + p_H \left(1 - F(K_{i,H}^{pn}(K_e))\right)}$$

If control is given a to a θ_L investor

$$E_{K_e,\theta_H}^M = \int_{K_i^{pd}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_i^{pd}(K_e)) dK_i$$

As shown in Propositions 1 and 2, it must be true that $\frac{R}{B} K_i^{pd}(K_e) > \frac{R}{B+R-\theta_H} K_e$ and $\frac{R}{B} K_i^{pd}(K_e) > \frac{R}{B} K_{i,H}^{pn}(K_e)$. Thus, $E_{K_e,\theta_H}^M > E_{K_e,\theta_H}^C$.

By a similar argument, for any given entrepreneur with capital K_e and ability θ_H, the expected size of the firm he forms is:

$$E_{K_e,\theta_L} = \left\{ p_H F(K_i^{pi}(K_e)) + p_L F(K_{i,L}^{pn}(K_e)) \right\} \frac{R}{B+R-\theta_L} K_e +$$
$$\left[\begin{array}{c} p_H \left(1 - F(K_i^{pi}(K_e))\right) \int_{K_i^{pi}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_i^{pi}(K_e)) dK_i \\ +p_L \left(1 - F(K_{i,L}^{pn}(K_e))\right) \int_{K_{i,L}^{pn}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_{i,L}^{pn}(K_e)) dK_i \end{array} \right]$$

If he meets a θ_L investor or transfers to a θ_H investor, the expected firm size is:

$$E_{K_e,\theta_L}^C = \frac{p_L F(K_{i,L}^{pn}(K_e)) \frac{R}{B+R-\theta_L} K_e + \left[\begin{array}{c} p_H \left(1 - F(K_i^{pi}(K_e))\right) \int_{K_i^{pi}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_i^{pi}(K_e)) dK_i \\ +p_L \left(1 - F(K_{i,L}^{pn}(K_e))\right) \int_{K_{i,L}^{pn}(K_e)}^{\overline{K}} \frac{R}{B} K_i f(K_i \mid K_i > K_{i,L}^{pn}(K_e)) dK_i \end{array} \right]_i}{p_L F(K_{i,L}^{pn}(K_e)) + p_H \left(1 - F(K_i^{pi}(K_e))\right) + p_L \left(1 - F(K_{i,L}^{pn}(K_e))\right)}$$

If he meets a θ_H investor and keeps control:

$$E_{K_e,\theta_L}^M = \frac{R}{B+R-\theta_L} K_e$$

As shown in Propositions 1 and 2, it must be true that $\frac{R}{B+R-\theta_L}K_e > \frac{R}{B}K_i^{pi}(K_e)$ and $\frac{R}{B+R-\theta_L}K_e > K_{i,L}^{pn}(K_e)$. Thus, $E^M_{K_e,\theta_L} > E^C_{K_e,\theta_L}$.

It is straightforward to see that the size of all types of firms is strictly decreasing in B. As a consequence, a reduction in B increases average sizes across all types of firms. Given that the economy's initial endowment of capital is given, firm sizes increase because firms take more debt or non-controlling partners allocate a larger share of their own capital. As long as at least in some firms both partners were fully invested, better legal protection will increase debt taking in those firms, increasing average leverage. As long as in some firms the non-controlling partner was not fully invested, better legal protection will increase their exposure, reducing average concentration (recall that the controlling partner is always fully invested, by Proposition 1)

d) A reduction in B reduces the minimum concentration levels for all types of firms, and keeps the absolute distance between the boundaries constant. In the model, legal protection is bounded at $B = \theta_H - R$, as otherwise the scale of θ_H-firms run by entrepreneurs is not defined. At $B = \theta_H - R + \epsilon$, with ϵ arbitrarily close to zero, $C_{eH}^{\min}$ is (almost) zero, but the other concentration thresholds remain strictly above zero. Thus, the sequential pooling of firms along the distribution of concentration persists, and the relationship between concentration and productivity is non-monotonic.

Figure 1: Concentration and Tobin's q in the model

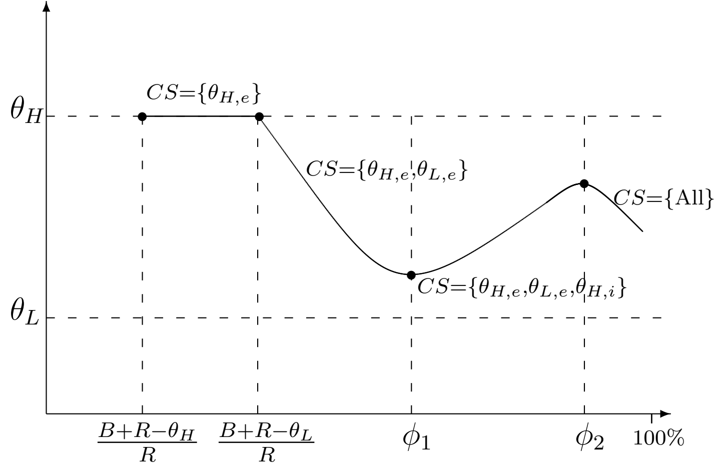

Figure 2: Concentration and Fitted Tobin's q (Cubic Regression)

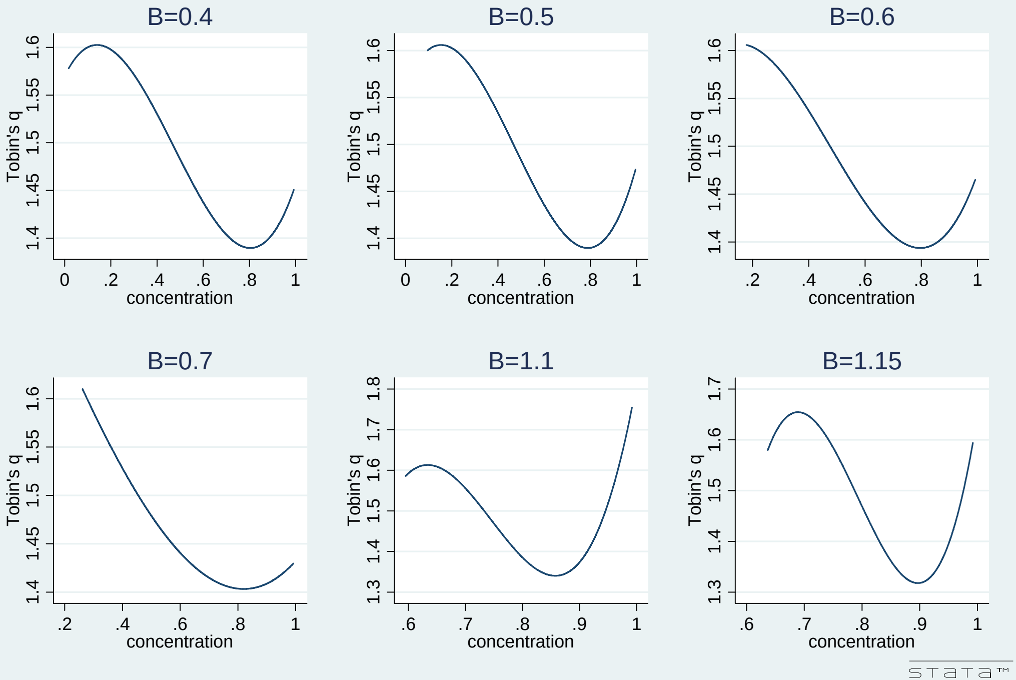

Figure 3: Concentration and Tobin's q in Chile (1990-2009)

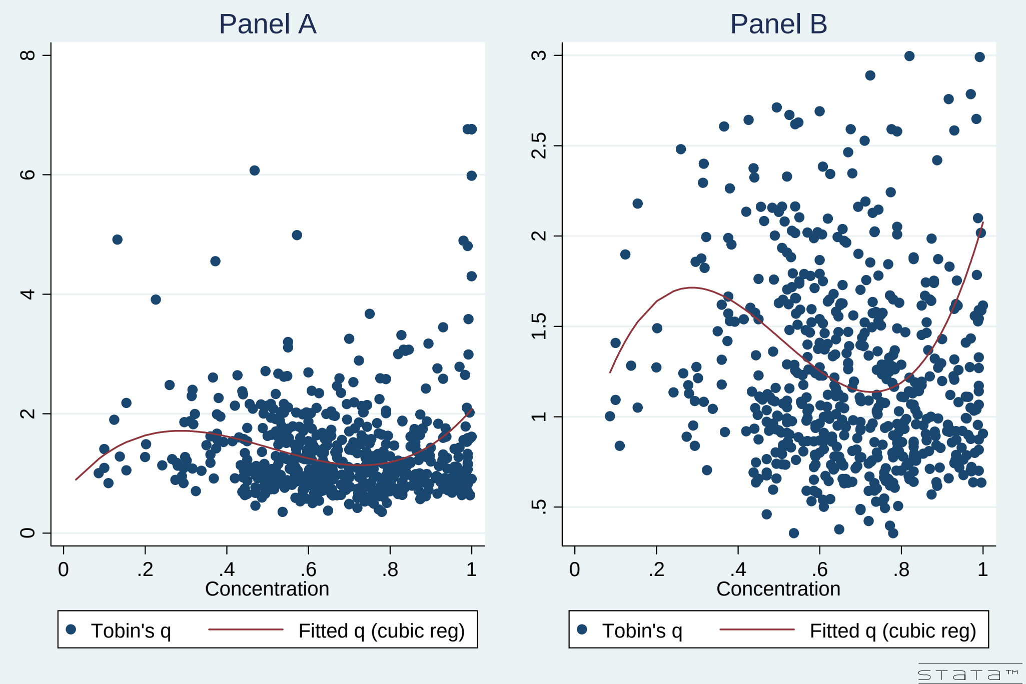

Table 1
Baseline Parameters for Simulations

Share of entrepreneurs (α)	0.25
Share of high-talent agents (π_H)	0.35
Low-talent productivity (θ_L)	1.30
Average productivity	1.40
Interest rate (R)	1.20
Private benefits (B)	0.50
Bargaining power of entrepreneur (λ)	0.50
Mean capital of agents	10
Variance of capital distribution	100

Table 2
Wedge and Average of Firm Characteristics in Simulated Data

	Average of Characteristic					
Wedge	Tobin's q	Size (log)	Leverage	Concentration	% Control Transfers	# Firms
<-.30	1.586	3.99	0.71	0.36	0%	3,940
-.30--.20	1.586	4.34	0.74	0.54	0%	2,583
-.20--.10	1.586	5.03	0.88	0.79	0%	1,379
-.10--.05	1.337	3.42	0.44	0.59	0%	3,227
-.05-0	1.305	3.79	0.58	0.79	0%	4,719
0-.05	1.586	2.69	0.07	0.45	100%	1,282
.05-.10	1.381	3.25	0.37	0.68	100%	6,411
.10-.20	1.575	3.67	0.49	0.82	100%	1,151
.20-.30	1.586	3.91	0.53	0.89	100%	251
>.30	1.586	3.53	0.49	0.82	100%	57

Table 3
Concentration and Average of Firm Characteristics in Simulated Data

	Average of Characteristic					
Concentration	Tobin's q	Size (log)	Leverage	Wedge	% Control Transfers	# Firms
0-.10	1.586	3.05	0.00	-0.22	0%	136
.10-.20	1.586	3.49	0.37	-0.29	0%	510
.20-.30	1.586	3.73	0.62	-0.34	0%	1,079
.30-.40	1.586	3.99	0.73	-0.35	0%	1,074
.40-.50	1.518	3.22	0.35	-0.10	43%	3,500
.50-.60	1.437	3.45	0.48	-0.09	35%	4,129
.60-.70	1.415	3.57	0.52	-0.05	45%	4,640
.70.-.80	1.398	3.80	0.58	-0.02	40%	4,644
.80-.90	1.412	4.09	0.62	0.02	42%	3,871
.90-1.00	1.405	4.56	0.65	0.04	43%	1,417

Table 4
Regressions of Tobin's *q* on Concentration and other Controls: Baseline Simulation Data

The basic regression is:

$$q_i = \alpha + \beta' f(Concentration_i) + \gamma\, Wedge_i + \delta\, Log\ Size_i + \lambda\, Leverage_i + \varepsilon_i$$

The dependent variable is Tobin's *q* or the managerial talent of the controlling shareholder. The function f(.) is a polynomial function of ownership concentration. We do not report the constant in the regression. Standard errors are robust. Significance: * 10%, ** 5%, *** 1%.

	Dependent Variable: Tobin's q in Simulated Data														
	Baseline Private Benefits (B = 0.5)														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Concentration	-0.291***	-0.787***	0.614***		-0.151***	-0.530***	0.690***				-1.348***	-0.611***	-1.722***	0.468***	-0.508***
	(0.003)	(0.017)	(0.049)		(0.005)	(0.016)	(0.049)				(0.010)	(0.014)	(0.020)	(0.052)	(0.069)
Concentration^2		0.427***	-2.386***			0.319***	-2.141***					0.198***	0.308***	-1.973***	-2.155***
		(0.016)	(0.105)			(0.015)	(0.107)					(0.013)	(0.012)	(0.107)	(0.126)
Concentration^3			1.688***				1.478***							1.306***	1.482***
			(0.067)				(0.068)							(0.066)	(0.072)
Ownership Wedge				-0.407***	-0.297***	-0.282***	-0.274***			-0.420***	1.502***		1.534***		1.548***
				(0.005)	(0.007)	(0.007)	(0.007)			(0.007)	(0.018)		(0.018)		(0.019)
Log Size								0.041***		0.030***	0.038***	0.032***	0.033***	0.031***	0.032***
								(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Leverage									0.167***	-0.084***	0.964***	0.158***	0.987***	0.158***	0.994***
									(0.004)	(0.006)	(0.012)	(0.005)	(0.012)	(0.005)	(0.012)
Observations	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
R-squared	0.154	0.172	0.187	0.196	0.223	0.233	0.244	0.065	0.073	0.213	0.470	0.330	0.479	0.339	0.490

Table 5
Private Benefits and Economy-Wide Averages of Firm Characteristics in Simulated Data

	Average of Characteristic					
Private Benefits (B)	Concentration	Tobin's q	Size (log)	Leverage	Wedge	% Control Transfers
0.4	0.61	1.453	4.57	0.68	-0.14	36%
0.5	0.63	1.448	3.70	0.53	-0.07	37%
0.6	0.64	1.447	3.37	0.39	-0.05	38%
0.7	0.66	1.443	3.15	0.28	-0.03	39%
0.8	0.68	1.440	2.97	0.18	-0.02	39%
1	0.76	1.435	2.70	0.06	-0.01	39%
1.1	0.82	1.432	2.59	0.03	0.00	39%
1.15	0.86	1.431	2.54	0.02	0.01	39%

Table 6

Regressions of Tobin's *q* on Concentration and other Controls: Simulations with Different Private Benefits

The basic regression is the same as in Table 3. We do not report the constant in the regression. Standard errors are robust. Significance: * 10%, ** 5%, *** 1%.

	Dependent Variable: Tobin's q in Simulated Data													
	Mid Private Benefits (B = 0.7)							High Private Benefits (B=1.1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Concentration	-0.837***	-0.685***	-2.055***	-0.926***	-3.358***	-1.224***	-3.623***	-3.527***	100.820***	-2.203***	-9.773***	-3.902***	22.512***	-3.660***
	(0.024)	(0.119)	(0.012)	(0.019)	(0.020)	(0.103)	(0.067)	(0.128)	(1.559)	(0.008)	(0.092)	(0.028)	(1.932)	(0.298)
Concentration^2	0.516***	0.246		0.369***	0.969***	0.898***	1.440***	1.357***	-134.560***		6.062***	1.172***	-35.918***	0.857**
	(0.020)	(0.220)		(0.017)	(0.010)	(0.187)	(0.105)	(0.091)	(2.043)		(0.063)	(0.024)	(2.554)	(0.398)
Concentration^3		0.149				-0.291***	-0.260***		58.129***				17.933***	0.135
		(0.125)				(0.106)	(0.056)		(0.879)				(1.111)	(0.177)
Ownership Wedge	-0.223***	-0.222***	2.676***		2.893***		2.893***	1.627***	1.739***	2.978***		2.831***		2.830***
	(0.012)	(0.012)	(0.021)		(0.023)		(0.023)	(0.025)	(0.025)	(0.016)		(0.018)		(0.018)
Log Size			0.007***	-0.003**	-0.002**	-0.002**	-0.002**			0.009***	-0.015***	0.007***	-0.017***	0.007***
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)			(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Leverage			1.425***	0.342***	1.501***	0.342***	1.501***			1.362***	0.830***	1.366***	0.760***	1.365***
			(0.008)	(0.004)	(0.009)	(0.004)	(0.009)			(0.004)	(0.008)	(0.003)	(0.008)	(0.004)
Observations	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
R-squared	0.145	0.145	0.689	0.312	0.741	0.312	0.741	0.524	0.603	0.924	0.511	0.929	0.517	0.929

Table 7
Average of Firm Characteristics and Concentration in Chilean Data (1990-2009)

	Pooled Observations 1990-2009 (5-year averages)				
	Average of Characteristic				
Concentration	Tobin's q	Size (log)	Leverage	Wedge	# Obs.
0-.20	1.74	5.08	0.44	0.00	9
.20-.30	1.48	4.41	0.40	0.04	14
.30-.40	1.75	5.14	0.42	0.04	24
.40-.50	1.35	5.21	0.39	0.07	52
.50-.60	1.40	5.16	0.37	0.08	97
.60-.70	1.24	4.61	0.34	0.09	116
.70.-.80	1.21	4.52	0.35	0.06	104
.80-.90	1.25	4.27	0.37	0.09	83
.90-1.00	1.76	3.97	0.43	0.18	80
	Full-Sample Averages				
0.68	1.38	4.62	0.37	0.09	

Table 8
Correlation Matrix in Chilean Data (1990-2009)

	Concentration	Tobin's q	Size (log)	Leverage	Wedge
Concentration	1.00				
Tobin's q	0.02	1.00			
Size (log)	-0.21	-0.23	1.00		
Leverage	0.01	0.14	0.18	1.00	
Wedge	0.17	0.03	0.08	-0.03	1.00

Table 9

Regressions of Wedge on Firm Characteristics: Pooled Chilean Data 1990-2009

The basic regression is:

$$Wedge_{it} = \alpha_t + \beta\ Control\ Transfer_{it} + \gamma\ Concentration_{it} + \delta\ Log\ Size_{it} + \lambda\ Leverage_{it} + \varphi\ Tobin's\ q_{it} + \varepsilon_{it}$$

The dependent is the wedge between direct ownership and cash-flow ownership. Control Transfer is a dummy equal variable for firm-year observations after a change of controlling shareholder. Concentration is ownership concentration in the hands of the controlling shareholder. Log Size is the log of book assets. Leverage is book debt divided by book assets. Tobin's *q* is the ratio of the market value of equity plus the book value of debt divided by the book value of total assets. For each firm we compute five-year averages (1990-1994, 1995-1999, etc.) of each variable in order to smooth short-run fluctuations. We then run a pooled regression with these 5-year averages, thus each firm has at most 4 observations. All regressions include time fixed effects (unreported). Standard errors are clustered by firm. Significance: * 10%, ** 5%, *** 1%.

	Dependent Variable: Wedge in Real Data					
	Pooled Observations 1990-2009 (5-year averages)					
	(1)	(2)	(3)	(4)	(5)	(6)
Control Transfer	0.085**					0.078**
	(0.041)					(0.039)
Concentration		0.122**				0.172**
		(0.058)				(0.066)
Tobin's q			0.006			0.013
			(0.012)			(0.011)
Log Size				0.010**		0.012**
				(0.004)		(0.006)
Leverage					-0.019	-0.068
					(0.048)	(0.052)
Observations	655	655	629	629	578	578
R-squared	0.022	0.023	0.013	0.001	0.001	0.070

Table 10

Regressions of Tobin's *q* on Concentration and other Controls: Pooled Chilean Data 1990-2009

The basic regression is:

$$q_{it} = \alpha_t + \beta' f(Concentration_{it}) + \gamma\, Wedge_{it} + \delta\, Log\ Size_{it} + \lambda\, Leverage_{it} + \varepsilon_{it}$$

The dependent is Tobin's *q* computed as the as the ratio of the market value of equity plus the book value of debt divided by the book value of total assets. The function f(.) is a polynomial function of ownership concentration. For each firm we compute five-year averages (1990-1994, 1995-1999, etc.) of each variable in order to smooth short-run fluctuations. We then run a pooled regression with these 5-year averages, thus each firm has at most 4 observations. All regressions include time fixed effects (unreported). Standard errors are clustered by firm. Significance: * 10%, ** 5%, *** 1%.

	Dependent Variable: Tobin's q in Real Data														
	Pooled Observations 1990-2009 (5-year averages)														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Concentration	0.137	-4.392***	8.453*		0.118	-4.377**	8.611*				-0.187	-3.566**	-3.472**	9.237**	9.039**
	(0.331)	(1.685)	(4.397)		(0.341)	(1.702)	(4.612)				(0.279)	(1.392)	(1.392)	(3.879)	(4.022)
Concentration^2		3.549**	-20.552**			3.533**	-20.851**					2.712**	2.601**	-21.350***	-20.935***
		(1.393)	(8.482)			(1.419)	(8.932)					(1.136)	(1.146)	(7.507)	(7.806)
Concentration^3			13.514***				13.695**							13.502***	13.236***
			(5.061)				(5.345)							(4.424)	(4.618)
Ownership Wedge				0.149	0.125	0.042	-0.104			0.295	0.339		0.259		0.117
				(0.306)	(0.315)	(0.302)	(0.320)			(0.277)	(0.288)		(0.274)		(0.281)
Log Size								-0.110***		-0.129***	-0.134***	-0.119***	-0.124***	-0.122***	-0.125***
								(0.040)		(0.042)	(0.041)	(0.037)	(0.037)	(0.035)	(0.035)
Leverage									0.716*	0.968**	0.976**	0.835**	0.860**	0.774**	0.790**
									(0.369)	(0.383)	(0.382)	(0.348)	(0.350)	(0.318)	(0.318)
Observations	579	579	579	578	578	578	578	586	586	578	578	579	578	579	578
R-squared	0.038	0.079	0.116	0.038	0.039	0.079	0.116	0.088	0.061	0.129	0.131	0.149	0.152	0.185	0.186