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Controlling Shareholders and Firm Value

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CONTROLLING SHAREHOLDERS AND FIRM VALUE

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Controlling Shareholders and Firm Value*

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December 2012

Abstract

We study the relationship between firm value and ownership concentration 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. With simulated data from the model we are able to match approximately the value-concentration relationship observed among Chilean firms in 1990-2009. The model also delivers novel predictions regarding the relationship between investor protection and: (1) the identity of the controlling shareholder (e.g., founder or outside investor), (2) the frequency of productivity-decreasing transfers of control, and (3) the separation between direct ownership and cash-flow ownership.

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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. Large shareholders can mitigate the agency conflict between managers and equityholders, but 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 on 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 consequences of ownership concentration is important because concentration is a key mechanism of corporate governance (Jensen and Meckling (1976), Shleifer and Vishny (1997)). Also, large shareholders have macroeconomic importance, beyond the realm of corporate governance, since they control the lion's share of capital in many economies (Morck, Wolfenson, and Yeung (2005)).

In this paper we provide a new look at the value-concentration relationship in markets with large shareholders. Before presenting empirical evidence, we set up a model where firm value (Tobin's q) and concentration are endogenously related. 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 non-monotonic relationship is robust to controlling for other (endogenous) variables such as firm size, leverage, or the difference between direct ownership (i.e., shares owned) and cash-flow ownership (i.e., dividends received). With simulated data from the model we approximately match the relationship between firm value and concentration observed in Chilean firms over a period of two decades (1990-2009). Chilean firms are controlled by large shareholders with

high levels of concentration (68% on average), so they represent a natural testing environment for the model.

The literature has a hard time finding a robust relationship between firm value and concentration. The main concerns are omitted variable bias, the unknown functional form or regression specification, and endogeneity (Adams and Ferreira 2008). Our regressions with simulated data help by providing a laboratory where, given that we can characterize the true underlying relationship, we can assess the consequences of omitting certain variables and of different regression specifications. Another interesting issue is the impact on firm value of the wedge between direct and cash-flow ownership. The empirical evidence in this respect is mixed. For example, Claessens, Djankov, Fan, and Lang (2002) find a strong negative effect, while La Porta, López-de-Silanes, Shleifer, and Vishny (2002) find no significant effect. The model allows us to rationalize these seemingly contradictory results and to understand what the wedge really captures. We also conduct new experiments in this laboratory. For example, there is no clear understanding in the literature on how the value-concentration relationship changes with investor protection, while in the model we can directly trace its impact.

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 equityholders do, but who can also receive full control of the firm. Through a bargaining process (as in Burkart, Gromb, and Panunzi (2000) or Zingales (1995)), the founder and the investor jointly decide who gets control and the amount of capital each one invests in the firm. They bargain over the surplus created by the firm, taking into account their managerial talent, outside options, and the incentive compatibility constraint of the controlling shareholder. The incentive compatibility constraint requires that the controlling shareholder retains a sufficiently large stake in the firm, otherwise he is tempted to take private benefits that destroy value for the non-controlling shareholder. The implementation of the bargaining outcome 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). Controlling shareholders can also raise capital from centralized debt markets, where control cannot be transferred. Banks and bondholders are aware of the incentive compatibility constraint of the controlling shareholder, so they also restrict the supply of capital in order to keep the controlling shareholder properly incentivized. In the spirit of Modigliani and Miller, Demsetz and Lehn (1985) argue that concentration should not be systematically related to firm value because it is an endogenous variable. In other words, ownership can be costlessly rebalanced to increase value in a Modigliani-Miller world. In our model concentration is also an endogenous variable, but it does not follow that it can be costlessly rebalanced because incentives are destroyed as a result.

Besides the concentration-value relationship, the model allows us to make new predictions regarding legal investor protection. Understanding the effects of investor protection is of particular interest 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)). Many of the already-documented effects of investor protection –e.g., lower average concentration, larger firms, more valuable firms, etc.– are delivered by our model. In this sense the model is similar in spirit to Almeida and Wolfenzon (2006), Burkart, Gromb, Mueller, and Panunzi (2011), Burkart and Panunzi (2006), and Shleifer and Wolfenzon (2002), although the underlying mechanisms are different.

In terms of new predictions, we first study the identity of the controlling shareholder, and in particular, whether founders or outside investors are more likely to be controlling shareholders as legal protection improves. The empirical evidence shows that founders or their families control a vast majority of firms (see La Porta, López-de-Silanes, and Shleifer (1999) or, more recently, Franks, Mayer, Volpin, and Wagner (2012) for European firms). This is somewhat surprising given that family control carries problems such as nepotism

(Pérez-González 2006) and poor management practices (Bloom and Van Reenen 2007). In fact, it is standard in the literature to assume that family management is inferior to outside management (see, for example, Burkart, Panunzi, and Shleifer (2003), and Caselli and Gennaioli (2012)). In our model 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. A superior outside option relaxes the incentive compatibility constraint of founders vis-à-vis investors of the same managerial talent and wealth. The advantage of founders as controlling shareholders becomes even more pronounced as legal protection improves and the multiplier on internal wealth becomes larger. Therefore, our model provides a rationale for the persistence of family control even in developed markets.

Second, we study the efficiency of the allocation of control between founders and outside investors. Some allocations can be inefficient in the sense that control is assigned to a less talented shareholder. The first-best is to assign control to the shareholder with the highest managerial talent, but this may not be feasible because of the minimum investment required by the incentive compatibility constraint. Thus, control may end up in the hands of the less talented, although wealthier, shareholder. Firms where control is misallocated are on average larger, more levered, with a more concentrated ownership structure, and, naturally of lower value. These characteristics are all product of the same friction in the delegation of control. The less talented shareholder receives control only because of his financing advantage to run the firm, which is translated into a larger and more levered firm. He has to be much wealthier than the more talented shareholder in order for the financing advantage to be dominant, which explains the overall concentration of ownership in his hands.

Better investor protection limits private benefits and increases the multiplier on internal wealth. The financing advantage of wealthy but less talented investors becomes weaker as the multiplier on internal wealth increases, which implies that productivity-decreasing transfers of control become less frequent as investor protection improves. Overall activity in

the market for control, i.e., number of control transfers, does not necessarily correlate with efficiency. In fact, markets with better investor protection have on average *fewer* transfers of control because firm founders are able to retain control more often as the wealth multiplier increases. The reduction of transfers caused by investor protection is tilted towards inefficient transfers so the overall efficiency of the market increases. This result is consistent with the empirical evidence on the allocative advantage of markets with better investor protection. For example, 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) also show that investor protection, in interaction with the degree of competition and financial constraints, affects the efficiency of takeover outcomes.

A third important element in our model is disproportional ownership, i.e., the wedge between direct ownership and cash-flow ownership. Understanding the mechanisms and consequences of ownership wedges is an active area of research (Adams and Ferreira (2008), Villalonga and Amit (2009)). As in Almeida and Wolfenzon (2006), our explanation for ownership wedges is that there is a selection effect, rather than the wedge directly causing agency problems. In our model a positive wedge is not an unequivocal sign of control misallocation, although in some cases it is associated with misallocation. This can potentially explain the mixed empirical evidence with respect to the effect of wedges on firm value. In our model the wedge is a function of the efficiency of control allocation, but also of the identity of the controlling shareholder. First, the wedge increases as control is misallocated because misallocation implies that a less talented agent –i.e., an agent with a weaker outside option– is given control. Less talented agents can appropriate a smaller share of the dividends so they typically own more shares than cash-flow rights, i.e., they control with large ownership wedges. Second, outside investors control, on average, with larger wedges than founders. The investor has a weaker outside option than the founder because he does not own the idea behind the firm, so *ceteris paribus*, he can also appropriate a smaller share of the dividends

than the founder. Similar to Shleifer and Vishny (1986), the dividend policy of the firm is designed in relationship to the characteristics of the controlling shareholder and is not simply a by-product of other corporate decisions.

As investor protection increases the average wedge in the economy decreases because of two effects. First, more founders become controlling shareholders, and they typically control with smaller wedges. Second, there is less misallocation of control. Similar to Almeida and Wolfenzon (2006) we predict that firms that are acquired from founders and that have low productivity are controlled with large wedges, although the mechanism in this paper is different. In our model the investor who acquires the firm receives fewer cash-flow rights than shares because the founder, in order to give up control, is compensated with a disproportionate share of dividends. On the other hand, if control is misallocated then low productivity goes hand in hand with a large wedge.

The structure of the rest of the paper is as follows. Section I describes the model and the main propositions. Section II presents the implications of the model for the concentration-value nexus with simulated data and with an application to Chilean data in the 1990s and 2000s. Section III concludes.

1 Baseline model

1.1 Agent types, endowments, and timeline

There are entrepreneurs (or firm founders) and outside investors in this economy. The difference between them is that entrepreneurs are exogenously endowed with ideas to open up firms while investors are not. An idea is modeled as the access to a constant-return-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 by both the entrepreneur and outside investors.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 of the firm –whether it is the entrepreneur or an outside investor– can repudiate all financial claims (debt or equity) 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 (θ_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 also endowed with capital, which is distributed on $[0, +\infty)$ according to $F_H(K)$ in the high-talent population, and $F_L(K)$ in 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 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

¹We do not stress any particular interpretation of managerial talent, as long as it is 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.

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 start with the debt market at time $t = 1$. There is a centralized market where firms can take debt from perfectly competitive banks charging an interest rate $R > 1$ that is payable at time $t = 2$.² Banks also 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.

Suppose 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 and defaulting:

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

The firm's scale is finite if $B + R > \theta_e$, which we assume holds for $\theta_e = \theta_H$, and therefore also for $\theta_e = \theta_L$.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 of the high talent entrepreneur, δ_H .

²Given 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.

³An 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.

1.3 The shareholders' meeting

Before the debt market opens, the entrepreneur meets with a random outside investor in a decentralized market. The key difference between this investor and debtholders is that the investor is a potential controlling shareholder. In other words, control can be transferred in the shareholders' meeting, but not in the debt market. 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 mergers and acquisitions, takeovers, venture capital financing, and similar transactions that involve the transfer of control.

The entrepreneur and the outside investor decide three things in the shareholders' meeting. 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 walks away. As noted by Tirole (2006, chapter 1), "hostile" takeovers have largely disappeared from the market for control, and were never the bulk of transactions. The choice of controlling shareholder 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 system of dual-

class shares. In exchange for his capital 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 agent. Each agent 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 agent 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 as $B(K_e^* + K_i^* + K_d^*)$, 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 amount of debt taken by the firm in equilibrium. 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 a fraction of his wealth in the firm. Thus, if the entrepreneur retains control, the surplus S in any given match can be written as:

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

and if the investor receives control:

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

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 a fraction B of the firm's capital.

After bargaining each agent gets 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 the firm's 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 received 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 the sale of ideas, 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 reason 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 results of the paper.

1.4 The allocation of control in equilibrium

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.*

As shown in the next proposition, the size of a firm is fully characterized by the identity of the controlling shareholder. 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.*

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

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 an entrepreneur as controlling shareholder, this implies that the size of the firm is solely determined by the capital of the investor who is the controlling shareholder. Unlike the previous case, however, the outside investor is not simply substituting for debt now. By receiving control the investor 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.

Corollary 1: *The return on capital for outside investors is lower in entrepreneur-controlled firms than in investor-controlled firms.*

When control is not transferred, the match generates no surplus, so each agent is only paid his outside option. Thus, the outside investor gets exactly the same return on capital as bank deposits (R). When control is transferred there is a non-negative surplus to share between the entrepreneur and the outside investor. Therefore, the return on capital for outside investors is better than R in this case. The low returns for investors in entrepreneur-controlled firms are not directly caused by agency problems, but by the substitutability between outside equity and debt. In other words, when the entrepreneur stays in control the outside investor adds little to the firm (as compared to debt) and therefore the returns he extracts are low. This is consistent with the poor returns of many family-controlled firms in several markets (see, for example, Cronqvist and Nilsson (2003), and Villalonga and Amit (2006)).

Corollary 2: *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.*

In this model control can be allocated to a given shareholder for two, non-mutually-exclusive, reasons. First, a shareholder can have more managerial talent than the rest 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. The corollary above implies that the entrepreneur always has a scale advantage compared to the outside investor if both are equally rich. This happens because private benefits are relatively less tempting

to the entrepreneur since he has a better outside option –i.e., running the firm by himself– than the investor whose alternative use of funds is only to take bank deposits. This results comes basically from comparing the last terms in equations (3) and (4).

We now show that the decision rule for control transfers in this economy is a simple function of the shareholders' relative wealth and talent. Control is always allocated optimally from a private perspective, being handed to the agent that provides the best combination of wealth and talent, conditional on his incentive constraint.

Proposition 2 (Control Transfers): *In equilibrium there are three types of control transfers from the entrepreneur to the outside investor:*

a) *Productivity-increasing (pi) transfers: a low-talent entrepreneur transfers control to a high-talent investor if $K_i \geq K_i^{pi}(K_e)$. These transfers increase Tobin's q , but not necessarily the scale of the firm.*

b) *Productivity-neutral (pn) transfers: These 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 $K_{i,H}^{pn}(K_e) > K_{i,L}^{pn}(K_e)$. These transfers increase the scale of the firm, but do not increase Tobin's q .*

c) *Productivity-decreasing (pd) transfers: a high-talent entrepreneur transfers control to a low-talent investor if $K_i \geq K_i^{pd}(K_e)$. These transfers increase the scale of the firm, but decrease Tobin's q .*

All cutoff points $K_i^{pi}(K_e)$, $K_{i,j}^{pn}(K_e)$, and $K_i^{pd}(K_e)$ are provided in the appendix.

Corollary 3: *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 , productivity-increasing transfers are more likely, conditional on actual matches, than productivity-decreasing transfers or productivity-neutral transfers.*

Conditional on the wealth of both partners, the surplus is always larger when the investor has higher productivity than the entrepreneur. Thus, productivity increasing transfers require a lower capital threshold for the investor and are more likely to occur than productivity decreasing transfers. In productivity-decreasing transfers the capital of the investor must be

large enough to compensate for the productivity loss, therefore the capital threshold is the highest of all.

Productivity-neutral transfers are more common 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 both agents are better off by transferring control, this transfer is not always in the interest of 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 high-talent investor, with both partners investing all their wealth in the firm. However, with private benefits the transfer to the more talented investor can fail if the scale advantage of the entrepreneur is big enough. Simply put, a 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 in the bank.

Definition 2 (Misallocation of Control): *Control is misallocated when the most-talented shareholder in the shareholders' meeting is not assigned control.*

We define control misallocation in comparison to the model in which there are no private benefits of control. Conditional on the existence of private benefits, control is never inefficiently assigned in our model, or in other words, shareholders never make a mistake when allocating control. In this sense the term "misallocation" can be a slight abuse of terminology, but we believe it is useful to understand the consequences of private benefits. We also restrict our definition to cases of misallocation between shareholders present in the shareholders' meeting. More talented shareholders can be available in the economy (in other

matches or unmatched), but we do not count those situations as misallocation. For example, under our definition, control is never misallocated if the entrepreneur and the outside investor have the same managerial talent, even if both have low talent. If the initial assignment of entrepreneurs and outside investors can be modified and a more talented investor can be matched to a less-talented entrepreneur, then a firm controlled by a low-talent entrepreneur could count as misallocation under an alternative definition of misallocation. We do not allow for a reassignment of investors across firms and therefore we do not count those situations as misallocation.

Proposition 3 (Misallocation of Control and Firm Characteristics):

a) *Firms where control is misallocated are on average larger, more levered, and have more concentrated ownership structures.*

b) *Large size, high leverage, and high ownership concentration are not sufficient statistics for control misallocation.*

The first part of Proposition 3 comes directly from the fact that the misallocation of control takes place only if the gain in firm scale more than compensates for the productivity loss. The less talented shareholder (entrepreneur or outside investor) who receives control needs to have a large enough capital relative to the other shareholder in order for the scale advantage to dominate. Thus, on average, they run firms that are larger and more levered. The firm can take debt since the partner has a relatively small capital and the incentive constraint on the controlling shareholder does not bind. These firms also have a more concentrated equity structure because the controlling shareholder is much richer than the other shareholder and is fully invested.

The second part of Proposition 3 follows from the fact that the first statement works only on average. While it is true that low-talent shareholders can only retain (or receive) control if they have large enough wealth, high-talent controlling shareholders can always make their firms large since they face less binding constraints. The net result of both effects –low-talent

controlling shareholders are on average richer, high-talent controlling shareholders face less binding constraints— makes size an ambiguous indicator of misallocation. There is always the possibility that a rich and high-talent shareholder controls a large, levered, and concentrated firm because he is matched with a poor shareholder. However, control is not misallocated in such cases.

Proposition 4 (Ownership Wedges): *The difference between direct and cash-flow ownership is larger in firms that are:*

- a) Controlled by outside investors,*
- b) And where control is misallocated.*

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 such 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, in the bargaining process entrepreneurs can extract a bigger share of the surplus and receive a larger fraction of dividends than the proportion of capital they contribute to the equity of the firm. This can result in a negative wedge for an entrepreneur. A negative wedge is akin to preferred shares, which give more dividend rights than other shares. Similar to Shleifer and Vishny (1986), the dividend policy of the firm is designed to fit the needs of the controlling shareholder or as a "subsidy" for the controlling shareholder so he stays in control.

At the same time, when control is misallocated it means that the controlling shareholder is less talented than other potential shareholders and therefore that he is a shareholder with relatively poor outside options. Hence, the controlling shareholder can extract a smaller share of the surplus in this case and the wedge will be positive and large.

Corollary 4: *A large ownership wedge is not a sufficient statistic for control misallocation among shareholders.*

Even if there is no misallocation we can see ownership wedges in the economy because of the different outside options of entrepreneurs and investors. Therefore, ownership wedges are not an unequivocal sign of inefficiency.

1.5 Investor protection and the allocation of control

Now we study the effect of improving investor protection, basically a reduction in the parameter of private benefits B , on the allocation of control in equilibrium.

Proposition 5 (Investor Protection and Control Allocations): *As the legal protection of non-controlling 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.*
- b) Productivity-reducing transfers of control become relatively less frequent among control transfers.*
- c) The misallocation of control is associated with firms that are increasingly larger, more levered, more concentrated, and with larger ownership wedges.*
- d) The average firm in the economy becomes larger, more levered, less concentrated, and with a smaller ownership wedge.*

A decrease in B , which makes the incentive constraint of the controlling shareholder easier to satisfy at any given level of capital, has an unambiguously positive effect on overall welfare. All types of firms become larger as banks 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? From the corollary to Proposition 1 we know that the multiplier on capital is larger in firms controlled by entrepreneurs. Moreover, this multiplier is relatively more affected by changes in investor protection. This implies that, for a given level of capital, the absolute increase in value 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.

The last part of Proposition (5) is consistent with the vast empirical evidence regarding the effect of investor protection on the average firm in the economy (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)). Although cases of misallocation are less frequent as investor protection improves, if there is misallocation then the features related to misallocation such as size, leverage, concentration or wedges are exacerbated. These features make possible the control by less talented agents: the fact that they can make the firm grow very large means that the financing advantage of these agents triumphs over the first best allocation of control. As the protection of investor increases, the financing advantage is dominant only if the wealth of the less talented shareholder is increasingly larger than the wealth of the non-controlling shareholder.

1.6 Ownership Concentration and Firm Value

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

Proposition 6 (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 concentra-

tion as high-talent investors enter the mix after the 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 ($\theta_{H,e}$) can 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 specific parameter and distributional assumptions. For example, ϕ_1 and ϕ_2 can be very close together and the segment between them can become indistinguishable from the previous segment. In general, we can say that the relationship is non-monotonic and with multiple inflection points.

Proposition 7 (Ownership Concentration, Firm Value, and Investor Protection): *Better investor protection does not eliminate the non-monotonic relationship between concentration and Tobin's q .*

Despite a change in investor protection, the shape of the concentration-value relationship continues to be non-monotonic since the sequence of entry points in Proposition 6.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 rest of Proposition 6 continues to hold. The exact shape will vary according to parameter and distributional assumptions, but the basic non-monotonicity will still be present in the concentration-value relationship.

2 Empirical Analysis

2.1 Simulated Data

Table 1 describes the baseline parameters for our simulation. 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.

Table 2 shows the relationship between concentration and Tobin’s q for simulations with different levels of private benefits. We report the average of Tobin’s q for firms in a given concentration range. We focus first on the simulation with the baseline level of private benefits ($B = 0.5$). Tobin’s q stays flat between 0% and 40% concentration. Only high talent entrepreneurs can be controlling shareholders with 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 the 40% – 50% range, average q keeps falling as low-talent controlling shareholders (entrepreneurs and investors afterwards) become more prominent in the mix. Average q remains close to the unconditional average of managerial talent in the economy (1.40).

Table 2 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

related to the frequency of control transfers in each concentration range and the misallocation of control. More transfers imply that more outside investors receive control, and we know from Proposition 4 that investors control with larger wedges than entrepreneurs. 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 we are more likely to see firms controlled by low-talent shareholders where control is misallocated and therefore where wedges are large.

Average firm size and average leverage fall in the economy as private benefits (B) increase. Average concentration, on the other hand, increases as private benefits go up. If private benefits increase significantly (for example, when $B = 1.1$), low levels of concentration even disappear from the market. More control transfers occur as private benefits go up, which increases the average wedge in the economy. Outside investors settle for a smaller share of dividends given their poor alternative use of capital, hence the relationship between more transfers and larger wedges. The wedge also increases as private benefits go up because there is more misallocation of control. This can be seen in that average q in the economy decreases from 1.448 when $B = 0.5$ to 1.432 when $B = 1.1$. The fall in q occurs despite the fact that the average talent in the economy is always the same by construction.

Next we study OLS regressions where Tobin's q is the dependent variable.⁴ 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

⁴Tobin's q is a dichotomic variable in our model, i.e., it is either high or low. 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 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 2 and the regressions themselves experience no significant change if we assume classic measurement error (i.e., iid error). Only R^2 s fall, but none of the statistical inference changes.

also studies similar regressions, with attention to the effect of ownership wedges on firm valuation (see, for example, 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:

$$q_i = \alpha + \beta' f(Concentration_i) + \gamma Wedge_i + \delta Log\ Assets_i + \lambda Leverage_i + \epsilon_i, \quad (5)$$

Where $f(Concentration_i)$ is a polynomial function of ownership concentration. Figure 1 suggests that a quadratic or a cubic polynomial can provide good descriptions 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 two 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 3 we report OLS regressions for the baseline level of private benefits. Several results are important. First, the relationship between q and concentration is indeed non-monotonic. The linear regression (column 1) gives a strong negative coefficient for concentration, but the quadratic and cubic regressions (columns 2 and 3) 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) as in Claessens, Djankov, Fan, and Lang (2002). As shown in Proposition 4, the wedge can be a sign of misallocation and therefore it can be associated with lower value. However, the coefficient on wedge turns positive when we include the ownership variables and we control for size and leverage simultaneously (columns 11-15). 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 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, both size and leverage are related to the same contractual frictions that determine the ownership structure of the firm. However, as also seen in Proposition 4, the wedge is related to the identity of the controlling shareholder and it does not have an unambiguous relationship with firm value. Therefore, we can expect some sign flipping depending on the regression specification.

Figure 2 shows, for different levels of private benefits, the fitted q from a cubic regression like the one in column 3 of Table 2. 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 at 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 space of concentration. In this first segment all errors are positive, i.e., over-predictions of firm value. For mid levels of private benefits (e.g., $B = 0.6$ or 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 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 of the value-concentration relationship. Although the precise inflection points can be different, 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 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% of concentration, and

finally increasing for concentration levels above 25%.

Table 4 presents regressions for samples with different levels of private benefits. The regressions for $B = 0.7$ confirm that a quadratic shape is 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 columns 13 and 14). The coefficient on size can also flip signs depending on the regression specification.

2.2 Application to Chilean Data 1990-2009

We are able to contrast the results for simulated data with real 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. For each firm we compute five-year averages of q in order to smooth short-run fluctuations in equity markets. Thus, 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 in Donelli, Larrain, and Urzúa (2013).

The average concentration in this market is 68%, which is in line with similar markets (see Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) for cross-country comparisons). The average wedge of 9% is relatively small. The median wedge is zero, meaning no separation between direct ownership and cash flow ownership, although there are a few cases of extreme wedges. Table 5 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 non-monotonic: Tobin's q falls after 40% concentration, reaching a minimum in the 70%-80% range, and then picking up again in the 90%-100% range.

Leverage appears to have a non-monotonic relationship with concentration similar to the

one of q , although less pronounced. In Table 6 we see that size is negatively correlated with concentration. Size is positively correlated with leverage as is typically reported 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% range have ownership wedges, while the average wedge is 18% in the 90%-100% concentration range.

In Table 7 we report regressions for Tobin's q in the style of equation (5). We include a time fixed effect for each 5-year period (1990-1994, 1995-1999, etc.). Standard errors are clustered by firm. The results show that there is a significant non-monotonic relationship between q and concentration, regardless of control variables. Figure 3 Panel A shows the raw data and the fitted cubic relationship that corresponds to the regression in column 3 of Table 7. Panel B is the same figure but zoomed (not re-estimated) for values of Tobin's q between 0 and 2. This allows us to see more clearly the inflection points in the q -concentration relationship, which as also suggested by Table 5, are around 25% and 75% respectively. These 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 found to be 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 4). This is likely the result of two opposing forces. First, as emphasized in Proposition 5, firms where control is misallocated tend to be larger which suggests a negative coefficient. On the other hand, firms controlled by high-talent individuals also tend to be larger because high talent relaxes borrowing constraints. The negative effect seems to be more powerful as long as the fraction of firms with misallocated control is large enough.

The R^2 of the regressions with real data are relatively modest (at best 18%), which implies that there is still a lot of unexplained variation in firm values. The R^2 of the regressions with simulated data are higher, but there is still a lot of variation to explain in particular when private benefits are relatively modest. 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 the capital and ownership structure because of the constraints that the contractual environment imposes on the firm. For example, the highest R^2 is 49% when $B = 0.5$ (column 15 Table 3), while the highest R^2 is 92% when $B = 1.1$ (column 14 Table 4).

3 Conclusions

In this paper we study the value consequences of controlling shareholders. In a stylized model of control allocation and firm financing we find that the relationship between ownership concentration and firm value is non-monotonic. The simulated data allows us to study the effects of omitted variables, regression specification, and endogeneity in empirical work on the relationship between firm value and concentration. We contrast the predictions of the model with data for Chilean firms in the period 1990-2009 where we find a similar non-monotonic relationship between q and concentration as the one predicted by the model. The model also delivers novel predictions regarding the identity of controlling shareholders, the efficiency of the market for control and the effects of legal investor protection, and the rationale for the separation between direct ownership and cash flow ownership.

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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:

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

, 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 $\frac{\partial P_e}{\partial K_{ei}^*} > 0$, $K_e^* = K_e$. 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:

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

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

The sign on $\frac{\partial P_i}{\partial K_i^*}$ 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 $\frac{\partial P_i}{\partial K_i^*} = \lambda(\theta_e - R) > 0$. 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

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

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:

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

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

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

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:

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

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

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

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

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

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

Proof of Proposition 3:

a) 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:

$$E_{K_e, \theta_H} = \left\{ p_H F(K_{i,H}^{pn}(K_e)) + p_L F(K_i^{pd}(K_e)) \right\} \frac{R}{B + R - \theta_H} K_e$$

$$+ \left[\begin{aligned} & p_H (1 - F(K_{i,H}^{pn}(K_e))) \int_{K_{i,H}^{pn}(K_e)}^{\bar{K}} \frac{R}{B} K_i f(K_i | K_i > K_{i,H}^{pn}(K_e)) dK_i \\ & + p_L (1 - F(K_i^{pd}(K_e))) \int_{K_i^{pd}(K_e)}^{\bar{K}} \frac{R}{B} K_i f(K_i | K_i > K_i^{pd}(K_e)) dK_i \end{aligned} \right]$$

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

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

If control is given to a θ_L investor

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

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:

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

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

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

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, $E_{K_e, \theta_L}^M > E_{K_e, \theta_L}^C$.

This is an implication of Proposition 2.

Given the results on size, the results on leverage and concentration follow directly.

b) Within any given economy, the randomness associated to the matching process implies

that firms where control is allocated to the more productive agent can be still be large, concentrated, and highly levered. Take, for instance, a firm formed by a θ_H entrepreneur with large K_i that happens to meet a θ_L investor with small K_i . Between economies, and as discussed in more detail in Proposition 5, differences in B or the distributions of endowments across firms can lead to significant differences in size, concentration, and leverage for the economy as a whole and for specific types of firms.

Proof of Proposition 4

a) Directly from the fact that the outside option per unit of capital invested in the firm is larger for entrepreneurs than for investors, as $\frac{BR}{B+R-\theta_e} > R$.

b) The outside option per unit of capital invested on the firm of non-controlling entrepreneurs is larger in firms which control is misallocated ($\frac{BR}{B+R-\theta_H}$) than the average outside option of non-controlling entrepreneurs in other firms (a combination of $\frac{BR}{B+R-\theta_H}$ and $\frac{BR}{B+R-\theta_L}$). thus, they must get a higher average return per unit of capital invested.

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 $K_i^*(\cdot)$ 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

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

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) Directly from the previous results and Propositions 3 and 4.

d) 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).

Proof of Proposition 6

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 $\{C_{eH}^{\min}, C_{eL}^{\min}\}$ 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 7:

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

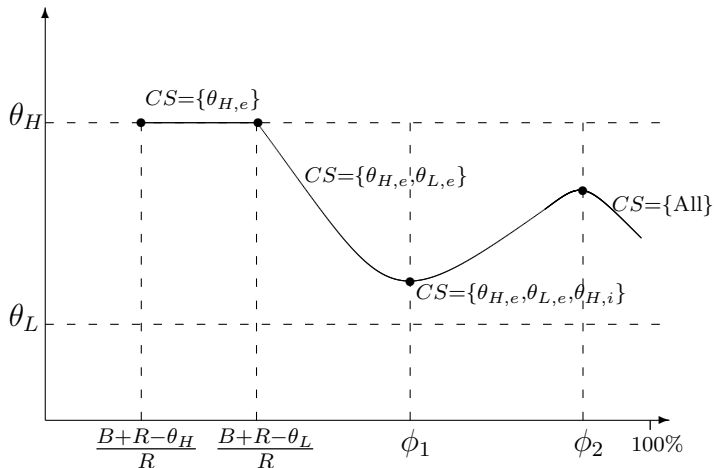


Figure 2: Concentration and Fitted Tobin's q (Cubic Regression)

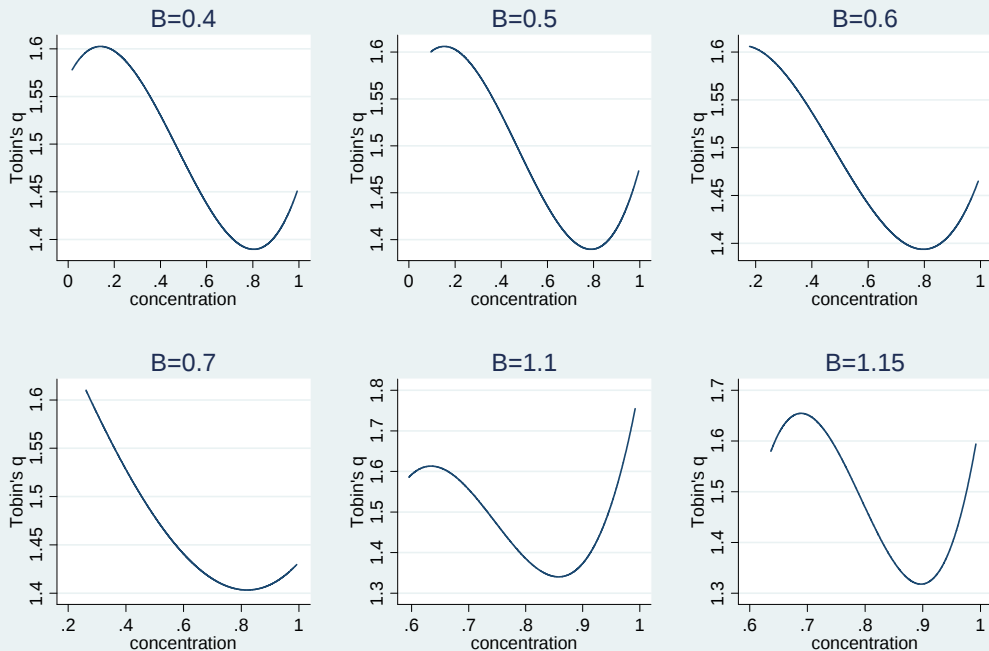


Figure 3: Concentration and Tobin's q in Chile (1990-2009)

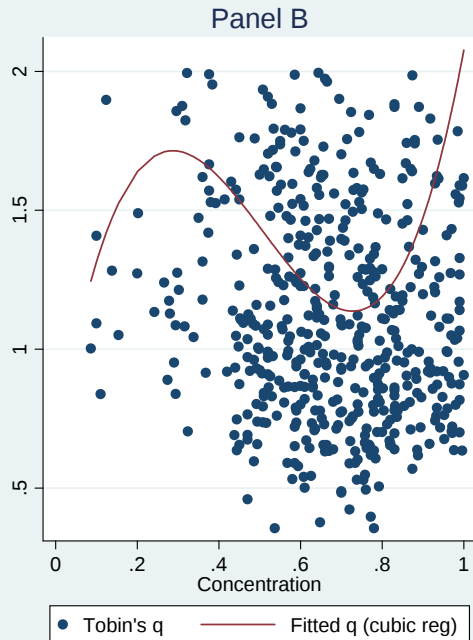
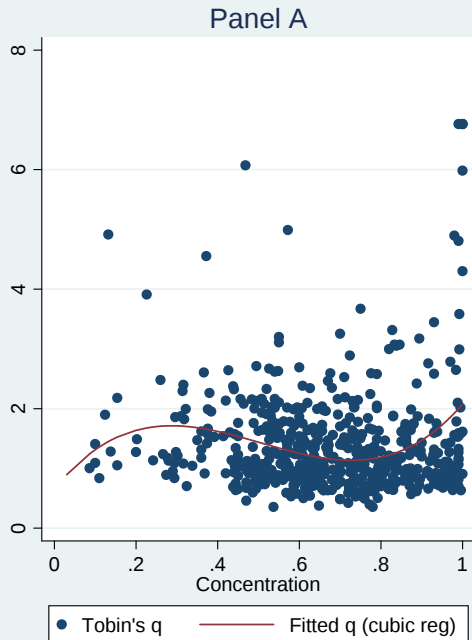


Table 1
Baseline Parameters for Simulations

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
Average of Firm Characteristics and Concentration in Simulated Data

	Baseline Private Benefits (B = 0.5)					
	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
Economy-Wide Averages						
0.63	1.448	3.70	0.53	-0.07	37%	

Table 2
Average of Firm Characteristics and Concentration in Simulated Data
(cont.)

Mid Private Benefits (B = 0.7)						
Concentration	Average of Characteristic				% Control Transfers	# Firms
	Tobin's q	Size (log)	Leverage	Wedge		
0-.10						
.10-.20						
.20-.30	1.586	2.61	0.01	-0.18	0%	1,113
.30-.40	1.586	2.95	0.25	-0.19	0%	1,132
.40-.50	1.586	3.21	0.42	-0.20	0%	1,153
.50-.60	1.445	2.75	0.13	-0.02	47%	5,921
.60-.70	1.408	3.06	0.26	-0.03	42%	5,048
.70-.80	1.413	3.26	0.34	0.00	44%	5,139
.80-.90	1.414	3.58	0.43	0.02	43%	3,988
.90-1.00	1.398	4.03	0.46	0.04	49%	1,506
Economy-Wide Averages						
0.66	1.443	3.15	0.28	-0.03	39%	
High Private Benefits (B = 1.1)						
Concentration	Average of Characteristic				% Control Transfers	# Firms
	Tobin's q	Size (log)	Leverage	Wedge		
0-.10						
.10-.20						
.20-.30						
.30-.40						
.40-.50						
.50-.60	1.586	2.29	0.00	-0.10	0%	4,184
.60-.70	1.586	2.77	0.08	-0.09	0%	1,121
.70-.80	1.586	3.04	0.21	-0.07	0%	1,022
.80-.90	1.325	2.61	0.03	-0.02	0%	8,285
.90-1.00	1.425	2.62	0.02	0.08	93%	10,388
Economy-Wide Averages						
0.82	1.432	2.59	0.03	0.00	39%	

Table 3
Regressions of Tobin's q on Concentration and other Controls: Baseline Simulation Data

The basic regression is:

$$q_i = \alpha + \beta' f(\text{Concentration}_i) + \gamma \text{Wedge}_i + \delta \text{Log Assets}_i + \lambda \text{Leverage}_i + \varepsilon_i$$

The dependent variable is Tobin's q or the managerial talent of the controlling shareholder. The function $f(\cdot)$ 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*** (0.003)	-0.787*** (0.017)	0.614*** (0.049)		-0.151*** (0.005)	-0.530*** (0.016)	0.690*** (0.049)				-1.348*** (0.010)	-0.611*** (0.014)	-1.722*** (0.020)	0.468*** (0.052)	-0.508*** (0.069)
Concentration^2		0.427*** (0.016)	-2.386*** (0.105)			0.319*** (0.015)	-2.141*** (0.107)					0.198*** (0.013)	0.308*** (0.012)	-1.973*** (0.107)	-2.155*** (0.126)
Concentration^3			1.688*** (0.067)				1.478*** (0.068)							1.306*** (0.066)	1.482*** (0.072)
Ownership Wedge				-0.407*** (0.005)	-0.297*** (0.007)	-0.282*** (0.007)	-0.274*** (0.007)			-0.420*** (0.007)	1.502*** (0.018)		1.534*** (0.018)		1.548*** (0.019)
Log Size								0.041*** (0.001)		0.030*** (0.001)	0.038*** (0.001)	0.032*** (0.001)	0.033*** (0.001)	0.031*** (0.001)	0.032*** (0.001)
Leverage									0.167*** (0.004)	-0.084*** (0.006)	0.964*** (0.012)	0.158*** (0.005)	0.987*** (0.012)	0.158*** (0.005)	0.994*** (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 4
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*** (0.024)	-0.685*** (0.119)	-2.055*** (0.012)	-0.926*** (0.019)	-3.358*** (0.020)	-1.224*** (0.103)	-3.623*** (0.067)	-3.527*** (0.128)	100.820*** (1.559)	-2.203*** (0.008)	-9.773*** (0.092)	-3.902*** (0.028)	22.512*** (1.932)	-3.660*** (0.298)
Concentration ²	0.516*** (0.020)	0.246 (0.220)		0.369*** (0.017)	0.969*** (0.010)	0.898*** (0.187)	1.440*** (0.105)	1.357*** (0.091)	-134.560*** (2.043)		6.062*** (0.063)	1.172*** (0.024)	-35.918*** (2.554)	0.857** (0.398)
Concentration ³		0.149 (0.125)				-0.291*** (0.106)	-0.260*** (0.056)		58.129*** (0.879)				17.933*** (1.111)	0.135 (0.177)
Ownership Wedge	-0.223*** (0.012)	-0.222*** (0.012)	2.676*** (0.021)		2.893*** (0.023)		2.893*** (0.023)	1.627*** (0.025)	1.739*** (0.025)	2.978*** (0.016)		2.831*** (0.018)		2.830*** (0.018)
Log Size			0.007*** (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)			0.009*** (0.000)	-0.015*** (0.001)	0.007*** (0.000)	-0.017*** (0.001)	0.007*** (0.000)
Leverage			1.425*** (0.008)	0.342*** (0.004)	1.501*** (0.009)	0.342*** (0.004)	1.501*** (0.009)			1.362*** (0.004)	0.830*** (0.008)	1.366*** (0.003)	0.760*** (0.008)	1.365*** (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 5
Average of Firm Characteristics and Concentration in Chilean Data (1990-2009)

Concentration	Pooled Observations 1990-2009 (5-year averages)				
	Average of Characteristic				# Obs.
	Tobin's q	Size (log)	Leverage	Wedge	
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 6
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

Table7

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

The basic regression is:

$$q_{it} = \alpha_t + \beta' f(\text{Concentration}_{it}) + \gamma \text{Wedge}_{it} + \delta \text{Log Assets}_{it} + \lambda \text{Leverage}_{it} + \varepsilon_{it}$$

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 $f(\cdot)$ 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 (0.331)	-4.392*** (1.685)	8.453* (4.397)		0.118 (0.341)	-4.377** (1.702)	8.611* (4.612)				-0.187 (0.279)	-3.566** (1.392)	-3.472** (1.392)	9.237** (3.879)	9.039** (4.022)
Concentration^2		3.549** (1.393)	-20.552** (8.482)			3.533** (1.419)	-20.851** (8.932)					2.712** (1.136)	2.601** (1.146)	-21.350*** (7.507)	-20.935*** (7.806)
Concentration^3			13.514*** (5.061)				13.695** (5.345)							13.502*** (4.424)	13.236*** (4.618)
Ownership Wedge				0.149 (0.306)	0.125 (0.315)	0.042 (0.302)	-0.104 (0.320)			0.295 (0.277)	0.339 (0.288)		0.259 (0.274)		0.117 (0.281)
Log Size								-0.110*** (0.040)		-0.129*** (0.042)	-0.134*** (0.041)	-0.119*** (0.037)	-0.124*** (0.037)	-0.122*** (0.035)	-0.125*** (0.035)
Leverage									0.716* (0.369)	0.968** (0.383)	0.976** (0.382)	0.835** (0.348)	0.860** (0.350)	0.774** (0.318)	0.790** (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