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Cross-shares, Board Structure and Firm Performance

in Emerging Markets

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Abstract

This study examines the relation among large shareholders, board independence and firm performance that can be found in most emerging markets, where ownership concentration is high, voting power is leveraged through business group affiliation, and there is a bias from the one-vote-one-share rule. The main working hypothesis about the effect of board independence, interlocks and turnovers on firm performance is based on the predictions of a model of collusive behavior between the largest shareholder/CEO and the remaining top blockholders that have seats on the board. The empirical analysis relies on a sample of 77 equity issuer corporations in Colombia for the 1998-2004 period (47 holding firms belonging to the two largest local conglomerates in Colombia and 30 independent firms included as a control group). Using this study case to assess the theoretical hypothesis is a proper approach since the fundamental characteristics of corporate control and ownership are reflected in our sample. The study presents for the first time measures of board governance proxies such as independence, rotation, and members' interlocking for this emerging market. Measurement results show that board independence is lower than international standards. Nonetheless, the mean for the control group is similar to levels reported for U.S. and India cases. Regarding interlocks of board members, the study finds that in a quarter of cases, boards, on average, have at least one member who is CEO of another firm. More important is the fact that there was reciprocal CEO interlocking in a fifth of the firms. Econometric results show that board interlocks, insider busy directors and women's participation on boards have a positive effect on firms' valuation when regressions are controlled by the separation between ownership and control. CEOs who sit on their own firms' boards have a negative effect on firms' performance.

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1.   Introduction

The U.K.´s Cadbury Report in 1992 initiated a worldwide quest for good corporate governance practices, and the need for stronger regulation was heightened by the subsequent East Asian and Russian financial crises. In response, many firms listed on stock exchange markets have issued voluntary codes on corporate governance practices. While some risk of fraud and company failure will always remain no matter how good the governance rules, the adoption of such codes may nevertheless help firms gain the confidence of investors by means of signaling their willingness to pursue higher transparency and better accountability standards. Several studies on U.S. board structure and firm performance for periods preceding 1992 have stressed the lack of correlation between board independence and corporate capitalization (Hermalin and Weisbach 1991, Agrawal and Knoeber 1996, Bhagat and Black 2002).   More recent studies on boards and firm value have assessed the effectiveness of corporate governance reforms during the last decade. The most representative are those by Dahya and McConnell (2007) for the U.K. and Choi et al. (2007) for Korea, both of which find strong evidence of positive effects from such reforms on firms' market capitalization. These equity law reforms implied new requirements for a minimum of independent members on boards of directors for all security issuers and listed corporations in the stock market.

Investor protection through corporate and equity law guarantees shareholders' voting rights and claims on firms' cash flow. The aim is to regulate the behavior of market participants by limiting equity issuers' ability to abuse their information advantage over outsiders and minority shareholders. Latin America does not score well on corporate governance evaluations, and according to Chong and Lopez-de-Silanes (2007), only Argentina, Brazil, Chile and Colombia have undertaken partial equity reforms in corporate and equity law since 1990. This reflects the lag in protecting private equity and fostering good corporate practice across the region.[1] La Porta et al. (2006) provide indices of specific investor protection measures related to disclosure requirements, liability standards and public enforcement and contrast IPO regulation across countries up to 2001. Latin America's score

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[1] For instance, the Sao Paulo stock exchange set the Novo Mercado in 2000, Chile imposed its IPOs Law in 2000, Argentina issued the *Ley de Transparencia* in 2001, and Colombia undertook equity issuer reform by the decreed Law 964 of 2005.

for disclosure requirements and liability is 50 percent lower than the average score in common law countries and is below 91 percent for the public enforcement index.

Despite the importance of corporate governance issues in public debate and the international agenda of multilateral institutions in promoting good corporate practices across emerging markets, there are few case studies on board structure, corporate governance and firm value in Latin America from the financial economics perspective. One can mention the studies of Garay and González (2007) for Venezuela, and Lefort and Urzúa for Chile (2007). The former considers director turnover and its effect on firm performance, while the latter finds a positive effect between an increase in the proportion of outside directors and company value. They also report that companies with more exacerbated agency conflicts tend to include professional directors on their boards in an effort to improve corporate governance.

This study contributes to the literature of governance in understanding the effects of board structure on firm value in emerging markets in several ways. First, because large public corporations are characterized by high ownership concentration and business group affiliation, there exist active controlling blockholders that contest each other to avoid rent diversion or tunneling, but there is also the possibility of their forming a sustainable coalition able to extract firms' cash flows. Thus, there is both a *private control* bias that diminishes the agency problem between a firm's management and shareholders and an increased risk of expropriation for small shareholders. Second, control contestability might be expected to arise within cross-share holdings where affiliation encourages strategic policies to gain market share in core businesses. Large shareholders in this case have a proper alignment of incentives to form a conglomerate. The effects of cross-shares on the structure of a firm's board generate unique characteristics not found in other holding structures and markets where cross-shares are forbidden by law. One can expect and observe active dual CEO/director interlocks. Busy directors (i.e., those actively involved in investment decisions and the core business) are now categorized according to their insider and outsider attributes. Moreover, director turnover can be analyzed under a different perspective, as either natural or forced. Natural turnover is associated with a member's retirement or with a career move by a professional. In the latter case, it is common to observe top executives as directors in different core business companies as time passes. Third, control contestability among large shareholders provides an alternative way of thinking about the role of independent members. Thus, an insider director can behave

as independently as an outsider one. Both must learn about the quality of an investment project to contest and avoid rent diversion. Testing the above elements implies that firm value regressions have to be controlled by ownership concentration, wedge measures between cash flow to voting rights, differences in blockholders' control rights, and blockholders' likelihood of forming a dominant coalition.

This study presents a reduced model of collusive behavior between management and boards that has direct implications for firm value. The main theoretical hypotheses are with a panel dataset of Colombian non-financial corporations for the 1998-2004 period. The sample covers the two largest business groups in the country: the *Grupo Empresarial Antioqueño* (GEA) and the *Santo Domingo* business conglomerates. The dataset also includes a set of the most important and larger non-affiliated corporations as a control group. The GEA group follows a cross-share holding structure and is the largest conglomerate in the country. Further, one of its core businesses is the manufacture of cement, lime and clinker products, leaded by *Cementos ARGOS*, which is currently the fourth largest cement producer in Latin America with investments in Panama, Haiti and the Dominican Republic. It is also the sixth largest concrete producer in the United States. The Santo Domingo group is a pyramidal group with some cross-shares, was the leading beer producer in Colombia until 2006, and remains one of the larger breweries in Latin America. Thus, this dataset provides the natural observations for testing director independence through control contestability behavior with several proxies such as director interlocks and reciprocal CEO interlocks along with ownership and control rights variables.

In section 2 we analyze the international evidence regarding the role of blockholders as ultimate owners and the separation between ownership and control in some European countries as well as in some emerging economies in East Asia and Latin America. In section 3 we present the baseline model of collusion between a firm's board and its management, and derive the implied working hypothesis concerning board independence and firm value. We describe the dataset in section 4 and the methodology used in measuring governance, board structure and other control variables. We report the empirical results in section 5, beginning with a descriptive statistical analysis of boards' structure, independence, turnovers and interlocking variables by business affiliation status. We then present the econometric analysis

regarding firm value determinants, controlling by boards, ownership and control contestability variables. Section 6 concludes.

2.   Large shareholder interactions and board structure

The role of large shareholders on firms' governance has been studied from the theoretical and empirical perspective since Shleifer and Vishny (1986) pointed out an agency problem in listed corporations that arises when large shareholders and dispersed, atomistic minority shareholders face a possible tender offer. Their model shows the conditions that minimize the free rider problem by reducing the takeover premium of the external raider and increasing the market value of the firm. Large blockholders serve as an internal control on managerial behavior when there is effective separation between ownership and control. Monitoring reduces management's perk consumption and over-investment in risky projects.

In other situations, large shareholders have an incentive to seek private benefits of control and expropriate minority shareholders (tunneling).[2] This issue has been thoroughly addressed by the surveillance authorities of publicly held firms. Minority shareholders are in a rather weak position since they are not promised any payment in return for their investment in the firm, other than the occasional dividends. Research on corporate governance has also focused on environments with multiple blockholders. Bennedsen and Wolfenzon (2000) argue that control structures with multiple shareholders may be the most efficient ownership structure in environments with poor shareholder protection because controlling coalitions can align their incentives to prevent extraction of rents. Bloch and Hege (2001) also claim that multiple blockholders can compensate for the poor legal protection of minorities. They argue that the relevant concept of control is the contestability of an incumbent shareholder's position of power and that corporate control is contestable if the incumbent cannot increase the level of control rents without losing in a control contest. In their model, the presence of two or more large blockholders acts to limit private rent extraction and attracts the votes of the minority shareholders when proposals are contested.

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[2] See, Johnson et al. (2000), Barclay and Holderness (1989) for early empirical research about private extraction of rents by large shareholders.

Empirical studies of multiple blockholders and control contestability constitute a recent research topic. The papers of Maury and Pajuste (2005) for the case of Finland, and Gutierrez and Pombo (2008) for the case of Colombia have shown a positive relation between blockholders' contestability and firm value. Contestability becomes a market mechanism inside the interactions among blockholders when they have incentives to control themselves in preventing rent extraction and when no single voting block has absolute control on boards with 51 percent voting power. The empirical evidence suggests that more equally distributed voting blocks reduce the diversion of rents predicted by the tunneling hypothesis. The existence of controlling shareholders is a stylized fact in corporations and conglomerates around the world. Ownership structure of firms in the U.K., and United States, where firms are widely held and shareholders are dispersed, is very different from that in the rest of the world, where ownership is closed and concentrated.[3] This fact has changed the way of thinking about the role of large shareholders. Issues of coalitions and control contestability within boards and among blockholders arise.

Table 1 shows the cash flow rights (the total votes implied by direct ownership) for the four largest shareholders in a sample of European, East Asian, Latin American and U.S. markets. It also presents the separation ratios, defined as the ratio of cash flow to voting rights. Voting rights are the total votes that a shareholder is entitled to on the basis of direct investment in a firm and indirect ownership. The table shows that ownership concentration is high except in the Japanese, U.S., U.K., and Korean markets. Corporate control is achieved in most countries by the top three blockholders under the one-vote-one-share rule. On average, the top three stakeholders hold 60 percent of a firm's equity. Yet, in most cases the largest blockholder does not have 51 percent of control or an absolute majority. The largest voting block, usually the controlling shareholder, has 21 percent of cash flow rights on average in East Asian markets, 42 percent in continental Europe, and 48 percent in Latin America. Ownership concentration is lower in Colombia for the largest blockholder, which has on average 39 percent of direct votes, but higher at the second, third and fourth levels, in contrast to other Latin American economies in the sample.

<div style="text-align:center"><strong style="color:blue">*** Table 1 here ***</div>

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[3] According to La Porta et al. (1998, p. 1146), "Dispersed ownership in large public companies is simply a myth.... The finance textbook model of management faced by multitudes of dispersed shareholders is an exception and not the rule."

The cash flow to voting rights ratios (a proxy for the wedge found between ownership and control) exhibit low levels in all markets on average.[4] The international evidence summarized suggests that the separation between ownership and control is 0.85, which means the largest shareholder needs 43 percent of direct votes to get a simple majority of 51 percent at a general meeting.

Country case studies on corporate ownership have shown that there exists further separation between corporate ownership and control and have identified several holdings structures in Europe as well as in emerging markets. The Korean *chaebols* and holding groups such as the Agnelli group in Italy, the Ayala group in Thailand, the Paribas-Copeba group in France and Belgium, and the Santo Domingo group in Colombia are examples of diverse holdings structures. **Table 2** shows some examples of controlling blockholders for selected business groups, firms and countries. It can be seen that wide separation is a fact in controlling holdings and firms. For instance, in 1996 the Agnelli family had 100 percent control in the Fiat Corporation with just 18 percent of cash flow rights. Paribas Financial Corporation is the controlling shareholder of the entire COPEBA holding with just 19 percent of direct ownership, and by turn becomes a larger stakeholder of the entire ERBE group in Belgium with 45 percent of voting rights. Full separation is also common. The GEA in Colombia has full control of *Colombiana de Clinker* (Colclinker), one of the largest manufacturers of clinker in South America, with no cash flow rights. The same applies for the Santo Domingo group. One of the group's investment firms – *Union de Valores* – was a larger blockholder in Sofasa-Renault, the largest domestic car assembly plant, with 25 percent of control rights and no direct investment in 2002.

<div align="center">***** Table 2 here *****</div>

Corporate board structures in emerging markets must reflect the interest of dominant investors and suggest the importance of directors' independent behavior in preventing tunneling and diversion of rents from majority coalitions. One can expect domestic conglomerates structured in a cross-share holding way to have a relatively high level of control contestability among large shareholders. Cross-shares imply aligned incentives among firms and stakeholders' association within a business group. In contrast, pyramidal groups

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[4] The separation between ownership and control is low when this indicator gets close to 1, meaning that equity holders do not get additional voting power by indirect ownership. There is a full separation when that ratio tends to zero, as in the case of a shareholder who exerts control with no direct investment.

might respond in some cases to the ultimate stakeholder-owner's interest and its portfolio structure.

One example is Colombia's GEA. Firms in several industries as well as financial companies form this business group. Its structure is the result of several alliances within a web of firms that make it a pure cross-shareholding. Its core businesses are cement, processed foods, roasted coffee, steel, tobacco, construction, textiles, investment and commercial banks, and insurance companies. The group has more than 150 affiliated firms, around 40 of which are publicly traded on the stock market, including *Banco de Colombia*, the first Colombian company to be listed on the NYSE as an issuer of ADRs (in 1996). GEA's consolidated operating income represented around 6 to 8 percent of Colombia's GDP in 2007, and some of the affiliated companies have iconic status in Colombia's industrial development, having been founded more than 80 years ago.

Table 3 depicts the two-way matrix of ownership and control rights among GEA's controlling blockholders. The data reveal two things. First, corporate control is being effectively leveraged through cross-shares association, which in turn implies that each block has at least one large blockholder under the 10 percent control threshold. Second, no block has absolute control on boards, meaning 51 percent of voting power, and each block can contest the others to prevent rent diversion, or they might in fact form a dominant coalition to extract rents. The ownership structure of these three companies measured by any of the concentration indices is relatively widely dispersed by Colombian standards. According to measurements in Gutierrez and Pombo (2008), the mean (median) of direct (integrated) ownership for the large stakeholder is 43.3 (45.5) percent for the entire sample of publicly held Colombian companies during the 2000-04 period. However, each of these three companies controls the associated group core businesses: *Cementos Argos S.A.* for cement, *Nacional de Chocolates* for processed food and *Inversiones Suramericana* for financial and insurance businesses. The data reported at the bottom of table 2 for Argos S.A. provides a representative example. In 2002, Argos S.A. had effective control of the clinker company and three cement mills, with at least 47 percent of total votes. **Figure 1** depicts the CEOs, director interlocking and the control rights within these companies. It is clear from the data that association and control go in opposite directions. Although each company is affiliated with the group, each stewards its own interest in its core businesses and investments. Thus, implicit contestability behavior might be

expected within boards. Dominant investors decide board composition by choosing competent (professional) members to exert monitoring and advisory roles without worrying about obedience and loyalty to CEO decisions.

<div align="center">*** Figure 1 and Table 3 here ***</div>

3.   Studies and models of boards of directors

The empirical literature on boards in emerging markets has focused on the effect of the recent corporate governance reforms in these economies.[5] Some case studies have posed doubts regarding the effectiveness of such reforms. Monaco (2000) notices that boards of directors in Brazil seem to have more of an advisory role rather than being instruments of control. Berkman et al. (2003) collected evidence from between 2001 and 2003 for 806 Indian firms, finding that board independence is negatively correlated with firm performance, again measured by Tobin's Q. Limpaphayon and Sukcharoensin (2003) examined evidence across 272 Thai firms for the 1997-2000 period, concluding that board independence had a positive impact on its Tobin's Q. In the same direction, the study of Lefort and Urzua (2007) for 160 non-financial listed corporations in Chile finds that outside directors have a positive effect on firm value. They note that firms with more agency conflicts tended to appoint "professional" directors on their boards. Choi et al. (2007) find a positive value for outside directors in listed Korean firms and offer a full evaluation of the corporate governance reform that took place in Korea in the aftermath of the 1997 Asian financial crisis.

The most important aspect tackled by this literature is board composition or structure. Specifically, researchers have raised the question of how to measure the degree of board independence. Two different criteria have arisen for measurement. The first is a two-way classification that distinguishes between independent and non-independent members, while the second adds another category for board members in an intermediate position of independence, as depicted in **Table 4**.[6]

Recent theoretical research has analyzed boards as an endogenous institution. Some models look at optimal board size and its composition − outsiders vs. insiders − when CEOs'

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[5] Besides the reforms already mentioned for Latin America, there are the cases of the Thai stock exchange, which issued a good governance code in 1999; the Bombay stock exchange, which issued its Clause 49 in 2001; and Korea, which issued a security trading act in 1998 conducive to ensuring that outside directors constitute at least 25 percent of boards.

[6] For more details, see Hermalin and Weisbach (1991), Berkman et al. (2003), Park and Shin (2004), Panasian et al. (2007), Garay and Gonzalez (2007), Limpaphayon and Sukcharoensin (2003), and Byrd and Hickman (1992).

private benefits are high with low monitoring costs (Raheja 2005). Under this setup, inside directors compete for the CEO succession by revealing private information to outside directors and helping boards to implement value-enhancing projects. In the same direction, Harris and Raviv (2008) propose a comprehensive setup to model several interactions between inside and outside directors. Insiders have private information and private incentives that lead them to choose projects that are not profit-maximizing. In contrast, outsiders steward shareholders' wealth and will therefore choose the best investments that increase firms' market value and equity. Other models highlight CEO-board friendships as a mechanism that eases revealing private information from the inside party and that helps outsiders to reach a consensus and provide better advice to the CEO on investment decisions (Adams and Ferreira 2007).

<div align="center">*****Table 4 here*****</div>

3.1. The baseline model of board independence behavior and firm performance

Blockholders' control contestability implies that insider as well as outsider directors might contest the largest stakeholder's usual ability to appoint the CEO. In that sense, an independent board member is a person who provides professional advice and monitors the CEO at the same time. Wagner (2007) proposes a complete model that studies independence as an optimally chosen behavior that depends on directors' competence. The model relies on an infinitely repeated game of collusion and derives the conditions that allow cooperation (loyalty) to be an equilibrium strategy that leads to a Nash equilibrium in the sense of subgame perfection. The following describes the simplified model setup, the equilibrium conditions of players' strategies, and the implied solution's comparative statics that support our working hypothesis regarding the effect of board independence, interlocks and turnover on firm value and performance.

3.1.1. Notation and payoff matrices.
The model setup relies on a two-player game that describes the interaction between a CEO (C) and a board (B), which is assumed to always act as a unified body. C always benefits from board loyalty because this implies board consent for bad projects from which C can divert funds (e.g., by overpaying a project's contractor). The player representing the board B also benefits from loyalty if there is a reward for obedience regardless of project quality. B's

competence is directly related to learning and the ability to distinguish between high quality projects (type H) and low quality ones (type L). B can benefit from good projects only if he dissents. In addition, C is unaware of project quality and needs B's advice to make good investment decisions. Let

$$G(\delta,\Omega,\infty) = \{(C,B),(S_C,S_B),(\mu_C,\mu_B),(\omega_H,\omega_L,\omega_U\} \tag{1}$$

be an infinitively repeated game defined by the set of players $N = \{B,C\}$, the strategy space for each player $\mathbf{S}_i = \{s_1, s_2,...., s_n\}$. Player actions are $S_B = \{\text{consents, dissents}\}$ and $S_C = \{\text{rewards, does not reward}\}$. Player payoff functions are defined by: $\mathbf{U}_i = \{\mu_C, \mu_B\}$; the probability space is $\mathbf{\Omega} = \{\omega_1, \omega_2, \omega_3\}$, which represent the compound probabilities of a project's quality (p) times the likelihood that B learns the project's type (θ), and δ is the market discount factor. Assume that a good quality project yields y_H with NPV >0 for the firm, and a bad quality project yields y_L with NPV< 0. The project's expected payoff is given by:

$$E(y) = py_H + (1-p)y_L \qquad \text{or} \qquad E(y) = y_L + p\Delta \ , \tag{2}$$

where: $\Delta = y_H - y_L$ and $E(y)$ can be positive or negative. Assume a situation where $E(y) < 0$; that is, the model concentrates in difficult situations where the firm is harmed if it undertakes the new investment. For instance, a merger can destroy value for the acquiring firm in the short run if it pays an extra price for the target company. The model's basic payoffs are as follows:

1. B and C receive a fixed proportional fraction of a project's profitability. B gets sy_i and C gets ay_i for every $i = H, L$. Shareholders are residual claimants of project profits, getting an amount $(1-a-s)y_i$.

2. Let $\psi > 0$ denote the private benefit for C regardless of the project's profitability. Moreover, let $\psi + ay_L > 0$; that is, C will always implement any project. In other words, C has *low-incentive schemes* that lead to non-optimal profit-maximizing outcomes.

3. Let $x > 0$ be the rewards for loyalty, with player's reservation utility set equal to zero for convenience; i.e., $\bar{U}_C = \bar{U}_B = 0$. This condition says that if B dissents, C receives zero profits, the equivalent of being fired. B´s payoffs are also zero because there is no new investment. Then the model´s payoff structure guarantees that contract participation constraints are fulfilled and thus both players accept the spot contract.

At each period there are three possible outcomes. B learns that the investment is type H, which happens with a likelihood of θp, or B learns that the investment is type L, which happens with a probability of $\theta(1-p)$, or B remains ignorant, which occurs with a probability of $1-\theta$. Given the above payoff rules and contingency states, the normal forms of this game in a given period *t* are as follows:

State High: probability = θp

	B consents	B dissents
C rewards	$ay_H + \psi - x$, $sy_H + x$	$-x, x$
C does not reward	$ay_H + \psi$, sy_H	**0,0**

State Low: probability = $\theta(1-p)$

	B consents	B dissents
C rewards	$ay_L + \psi - x$, $sy_L + x$	$-x, x$
C does not reward	$ay_L + \psi$, sy_L	**0,0**

State Unknown: probability = $(1-\theta)$

	B consents	B dissents
C rewards	$aEy+\psi-x$, $sEy+x$	$-x,x$
C does not reward	$ay_L+\psi$, sy_L	**0,0**

Before the game starts, the shareholders set the incentives *a* and *s* for C and B, respectively, and C has to announce the reward *x* for loyalty. Then, with probabilities $\{\theta p, \theta(1-p),(1-\theta)\}$, the three states *{H, L, U}* get realized. All payoff matrices are commonly observed for both players.

The solution of the simultaneous game yields the level of board competence that C prefers. It is easy to verify that the Nash equilibrium in state H is {not reward, consent}; meanwhile, in states L and U it is {not reward, dissents}, with zero payoff if and only if there is a difficult situation; that is, $E(y)<0$. Therefore, C's expected utility for the one-shot game is given by:

$$EU_C = \theta p(ay_H+\psi) \tag{3}$$

since in the other scenarios C's payoffs are zero because the project is not approved. B's expected utility is:

$$EU_B = \theta p(sy_H). \tag{4}$$

Maximizing expected utility for C (or B) implies

$$\underset{\theta}{\text{Max}}\, EU_C = \arg\max\ \{\theta p(ay_H+\psi),0\} \rightarrow \theta^* = 1. \tag{5}$$

Hence, C will always choose the more competent board by maximizing the likelihood that B learns that a project is of good quality. The result of the static game implies that C always

receives the maximum payoff only with good projects. A cooperative solution is convenient for C, given that he gets a private benefit from any investment regardless of its quality by offering a reward x to secure loyalty. This setting implies an incomplete contract. The only way to achieve a collusive solution that makes loyalty an equilibrium strategy for B is through repeated interactions. The solution of the model is to find an optimal reward x^* such that always it induces cooperation from B.

3.1.2. Collusive and trigger strategies.

The subgame perfect Nash equilibrium of the model is supported by trigger strategies; that is, those in which each party promises rewards with loyalty. On the basis of the normal form payoffs structure, the expected utility of C in period t is:

$$EU_C(ND) = \theta p \ ay_H + \psi - x \ + \theta(1-p) \ ay_L + \psi - x \ + (1-\theta) \ aEy + \psi - x \ , \qquad (6)$$

where ND means non-deviating strategy. The total payoff for C is the net present value (NPV) of his income flows, given a bad project, and is, by equation (6), equal to

$$ay_L + \psi - x \ + \frac{\delta}{1-\delta} \begin{bmatrix} \theta p \ ay_H + \psi - x \ + \theta(1-p) \ ay_L + \psi - x \\ + \ (1-\theta) \ aEy + \psi - x \end{bmatrix} . \qquad (7)$$

C's trigger strategy estimates the expected utility for choosing the cooperative path. If C does not reward B at time t, given that in t-1 the board has agreed to a bad project, C gets $ay_L + \psi$ in the deviating period, but afterward C gets only the NPV of the payoffs derived from high quality projects; that is,

$$ay_L + \psi + \frac{\delta}{1-\delta} \ \theta p(ay_H + \psi) \ . \qquad (8)$$

C will always reward B if and only if the NPV of his expected utility from cooperating is greater than that from deviating, $EU_C(ND) > EU_C(D)$. It follows from equations (7) and (8) that the optimal reward is:

$$x_C^* \leq \delta\left[\psi + aEy\right] - \delta\theta p\left[ay_H + \psi\right].$$ (9)

This is the maximum reward that C is willing to pay for B's consent to every new investment.[7]

From B's perspective, allegiance is preferred to exerting full control if the NPV expected utility of non-deviating is greater than the expected utility of deviating. Restricting this condition to states L and U, B's expected payoff when consenting knowing that the project is type L or without knowing the true investment quality is:

$$sy_L + x + \frac{\delta}{1-\delta}\Big[\theta p\left(sy_L + x\right) + \theta(1-p)\left(sy_L + x\right) + (1-\theta)\left(sEy + x\right)\Big]$$ (10)

and B's expected payoff from dissent is:

$$x + \frac{\delta}{1-\delta}\Big[\theta p\left(sy_H\right)\Big].$$ (11)

Setting $EU_B(ND) > EU_B(D)$, it follows that the optimal award that B needs for not contesting C's decisions is:

$$x_B^* \geq -\frac{sy_L}{\delta} - sp\left[y_H\left(1-\theta\right) - y_L\right] > 0$$ (12)

since $y_L < 0$ and the discount factor is low enough to warrant a positive reward for loyalty.

3.2. Comparative statics and working hypotheses

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[7] Note that if $\partial x^*/\partial\theta < 0$, indicating that B behaves more professionally, then C can offer a smaller reward to board members.

Equations (9) and (12) are the fundamental results of the model, since they describe the conditions under which each player will choose the collusive strategy as his equilibrium strategy; that is, his best response to the other player's actions. The optimal reward x_B^* for B is positive to changes in B's competence because, as long as θ increases, B has a better forecast of the bad state, and can demand more for approving bad projects. These equilibrium equations define the optimal level of a board's competence. Setting $x_C^* = x_B^*$, solving θ and simplifying terms yields

$$\theta^* = \frac{\left[\, \psi + aEy + sp\ \Delta/\delta \,\right] + sy_L}{\delta^2 p\left[\, ay_H + \psi + s\ y_H /\delta \,\right]}, \tag{13}$$

where $\Delta = y_H - y_L > 0$.

Clearly, this optimal level by definition must be less than 1, and the model predicts that when $\theta^* \rightarrow 1$ there is no cooperative solution in a repeated game. That is, loyalty from fully competent boards is infeasible. Thus, if C wants private benefits, he must choose less competent boards to obtain loyalty. From equation (12), let

$$\tilde{x}_B(0) = -\frac{sy_L}{\delta} - sp\ y_H\ 1-0\ - y_L\ = -s\left(\frac{y_L}{\delta} + p\Delta\right) \tag{14}$$

be the payment for incompetent boards. Therefore, C will prefer B's loyalty over full expertise if and only if the expected payoff for loyalty is greater than that from the spot interaction. In that sense the following inequality must hold:

$$\Gamma = EU_C^U - EU_C^H > 0 \ \text{ then}$$
$$aEy + \psi\ - \tilde{x}(0) > p(\psi + ay_H) \tag{15}$$

The left-hand side of this inequality is the payoff that C gets under the unknown state when he is offering an equilibrium reward for incompetent boards, given that B approves all

investments. The right-hand side is the result of the static game given by equation (5) when the high state is always realized. Simplifying and rearranging terms, inequality (15) becomes

$$\Gamma = (1-p)\ ay_L + \psi\ + s\left[\frac{y_L}{\delta} + p\Delta\right] > 0 . \tag{16}$$

The following comparative statics are derived from the above inequality:

1. $\quad \dfrac{\partial \Gamma}{\partial \psi} = (1-p) > 0$.

If C gets more private benefits from undertaking any new investment, he is more likely to induce loyalty from the board. Therefore, firm value decreases because the firm's directors behave less independently.

2. $\quad \dfrac{\partial \Gamma}{\partial s} = \dfrac{y_L}{\delta} + p\Delta < 0$ since $y_L < 0$ and $\left|y_L / \delta\right| > \left|p\Delta\right|$.

When the board has a greater stake in firm performance, directors behave more independently regarding CEO investment decisions. Therefore, there is more control on the quality of investment projects, which improves firm value.

The above results support theoretically the following working hypotheses.

Hypothesis 1 (H1): The more independent behavior by the board of directors, the better is firm value and performance.

Hypothesis 2 (H2): The more a board interlocks across firms affiliated with a given business group, the higher is firm capitalization.

Mizruchi (1996) highlights that boards observed in large firms follow a structure of one group of insiders (such as the firm's CEO and other top executives, retired officers, and stockholding

family members) and a group of independents, most of them investment bankers or insurance company executives. Members of the board are appointed to be in charge of key decisions such as the implementation of new market strategies, changes in the organizational structure, the removal of highly visible executives, and the approval of mergers and acquisitions. It follows that independent directors are more suited to put the firm's interests above the interests of controlling shareholders or managers when dealing with decisions regarding takeovers, successions, and managerial compensations. Nonetheless, insiders can be important too, since they bring along some firm-specific knowledge, business understanding and experience. Clearly these empirical features agree with the model predictions.[8] Fich and White (2005) examined board interlocks across 576 large U.S. firms in 1991. They define a reciprocal CEO interlock as the case when the CEO of firm i serves as a director of firm j, and the CEO of firm j serves as a director of firm i. They suggest that this strategic strengthening of their linkages has a direct effect on firms and can yield opportunities for mutual support.[9]

3. $\quad \dfrac{\partial \Gamma}{\partial \delta} = -\dfrac{s y_L}{\delta^2} > 0 \ $ since $y_L < 0, s > 0, \delta > 0$.

A decreasing discount factor makes collusion less feasible and spot interaction more likely, which implies competent boards, low director turnover and better firm performance.

Thus, the following working hypothesis is that:

Hypothesis 3 (H3): The better the firm performance, the lower the rate of director turnover.

Gilson (1990, p. 373) found that approximately 46 percent of board members in the United States retain their seats at year +4 after a default event. Board members may be removed as a result of external pressures or poor performance, at the urging of creditors who end up taking possession of the firm, or because they are unable to fight against a powerful CEO, so that

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[8] Hypothesis 1 is best tackled within panel data regression. As stressed by Hermalin and Weisbach (1991, p. 103), cross-section regressions for firms replacing their directors because of chronic poor performance produce negative and thereby misleading coefficient signs between board independence and performance.

[9] Regarding director interlocks, Mizruchi (1996) also highlights that the phenomenon may facilitate communication between competitors (collusion mechanisms), allow monitoring of subsidiary firms (mechanisms of monitoring), or facilitate inter-firm political unity (social cohesion).

their resignation is viewed as a protest against the current administration. Garay and Gonzalez (2007) report that in Venezuela, the poorer the firm performance, the greater the probability of director turnover.

4. Data and methodology

We used a sample of 77 Colombian non-financial firms, and gathered their data for the 1998-2004 period. Financial firms were excluded since their performance measures are not comparable, given the specific regulation affecting their activities. Listed firms registered on the Colombian Stock Exchange (Bolsa de Valores de Colombia, BVC) were targeted because they are the only ones forced to disclose both their directors' names and some of their qualitative data. This information has been available since 1995, but because of gaps in the data between 1995 and 1997, we chose 1998 as the starting year. Firms belonging to the two largest business groups in Colombia (the Santo Domingo group and the GEA) were pre-selected, together with a control group of 30 firms with no business group affiliation. The main sources of the assembled data for boards of directors came from the National Equity Registry Forms (Registro Nacional de Valores e Intermediarios, RNVIs) filed by Colombia's Financial Superintendence (SFIN). Despite the fact that all listed firms are required to complete RNVIs, in practice we discovered that some in fact did not, so we turned to other sources to supplement and/or clean the dataset.[10] Firms' financial and ownership data were borrowed from Gutierrez and Pombo (2008), whose raw data was in turn taken from Colombia's Superintendence for Commercial Societies (SSOC), and the SFIN.[11]

Table 5 shows the sample coverage and dataset span measured by firm-year observations. The working sample covers up to 23.2 percent of the Santo Domingo group and 34 percent of the GEA group. Despite the low percentages, both these business groups are known to have over 200 affiliated firms as a whole, so the working sample is fairly

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[10] Approximately 150 firms should have filled in the Registry Forms (Table 3 - Panel A) but, oddly, not all did so in a proper way. We realize that our sample selection was influenced by this data restriction, since firms had to have at least one year of complete data in order to be included in the final sample. The alternative sources were: the annual minutes of the general shareholders' meetings, recorded by the Financial Superintendence; the Annual Reports to the Board of Directors from the Colombian Stock Exchange; firms' mercantile registry certificate from the Chamber of Commerce; and DIRNAFAX LTDA – the dataset of information on top executives that covers around 10,000 private firms and state institutions.

[11] Firms' information from SFIN is publicly available. Information on companies' ownership, board of directors, CEOs, auditors, and the notes to financial statements from SSOC is under statistical reserve. Financial statements are publicly available for both sources.

representative. These conglomerates have been the two largest business groups in Colombia since the 1950s. Their largest and most representative enterprises are indeed listed and publicly held, and our sample includes their main holding companies, whose boards of directors are the focus of this study. All in all, the working sample gathers data from approximately 40 percent of all non-financial listed firms in Colombia, including the most traditional of the Santo Domingo group corporations.

According to the data there were 60 firms in the dataset in 1998. That number dropped to 39 in 2004, and 29 firms out of 77 non-financial, publicly held firms remained listed for the entire period under study. This result is a direct consequence of the delisting trend that has been observed in Colombia as well as across Latin American exchange markets despite the gain in market capitalization after 2002. For instance, a summation of data for Argentina, Brazil, and Mexico shows that there were 877 listed companies on the stock exchange in 1995. That number had fallen to 633, a 30 percent decrease, by 2005.

** Table 5 here **

4.1. An overview of governance and performance variables

Governance indicators are related mainly to board composition variables. They are: board independence, size, interlocks, gender participation and director turnover. Director independence is a difficult concept to narrow. The data of directories did not identify given members as independent because, before Colombia's Law 964 of 2005, it was not mandatory to disclose such information. Thus, the identification of a director as independent relied on crossing different criteria either stipulated in the international legislation on equity law or used by multilateral institutions. In particular, an independent director is a person who: 1) never has had employment with the firm other than being on the board of directors, 2) was never employed with any related firm as far as the scope of the sample allows to tell, 3) does not sit on any of the boards of related firms as far as the scope of the sample allows to tell, 4) does not have the same last name as the CEO, and 5) is not a shareholder with ownership rights greater than 1 percent or a member of a specific voting block.

Board interlocks are equal to the sum of external directorships, divided by board size.[12] These can be seen as links between two firms that agree to share the services of the same individuals. Interlocks are also reciprocal among CEOs. This structure is relevant for groups with cross-shares. At the same time interlocks can be understood as family interlocks. The proxy used for that variable was the matching of directors' last names with those of CEOs. This variable is more relevant for pyramidal or family groups. Board turnover is an indicator of director mobility, which may be related to form performance, or not, since one must disentangle forced versus natural rotation. Director turnover ratios measure the number of members at year t who are not appointed at year $t+1$ relative to board size at year t.

Corporate governance variables are associated with measures of ownership and control. These variables are related, as explained in section 2, to cash flow and the voting rights of large blockholders. Thus, ownership concentration is measured by the usual CR1 and CR4 entropy indices. The equity-to-voting ratios capture the wedge or separation between blockholders' ownership and control. It is noted that CR1 is higher than the 10 percent cutoff when there is at least one large blockholder and CR4 higher than 50 percent, which implies effective control under the one-vote-one-share rule. Contestability variables were constructed by following Maury and Pajuste (2005), who used four proxies. The first is the Herfindal concentration index (*HI_concentration*) that captures the effect of voting block power. A second variable is the differences in the Herfindal indices (*HI_differences*), defined as the sum of the squares of the differences between the first and second largest voting stakes, the second and the third largest voting stakes and the third and fourth largest voting stakes. These variables capture the actual contestability that the largest blockholder faces when unable to control the company directly.[13] Their expected relation with firm value is negative because, as voting power among the four largest shareholders becomes more egalitarian, there is more control contestability and so greater firm values. A third contestability variable is the Shapley value, which is the solution concept for coalitional games. In this case, it will measure the probability that individual blockholders (or groups of shareholders) form part of a winning coalition. Thus, if the probability of forming a sustainable coalition with the largest

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[12] Most studies do not normalize this indicator, but we considered it pertinent to do so since, for example, locating ten external directorships associated with six directors is not the same as twenty directorships associated with six directors.
[13] Both measures are transformed into logarithms to control for distribution skewness.

blockholder increases, there is a diversion of cash flows, which therefore lowers firm value and performance.[14]

Performance variables relied on Tobin's Q as a proxy for firm value, following the definition proposed by Black et al. (2006). However, since not every firm actually traded their stocks during the sample period, some other accounting performance measures were used, such as return on assets (ROA) and return on equity (ROE).[15]

5.   Empirical results

5. 1. Demographic characteristics and interlocks

This section summarizes the measurement results regarding board demographics and interlocks. **Table 6** summarizes the statistics concerning demographic characteristics. First, board size is between 6 and 20 directors, with a mean (median) of 9.85 (10) directors. Women comprise around 8.8 percent of boards, and this number is similar to that observed in Europe in 2004. Moreover, Norway has been explicit in considering women's participation on boards as a best corporate practice. The mean (median) of foreign directors in the sample of 77 firms was 8 (17.1) percent. This result is explained by the inclusion of multinationals' subsidiaries within the sample of non-affiliated firms. However, it also reflects the direct foreign investment across the largest corporations in the country. This trend has sharply increased, especially since 2005.[16]

Regarding board interlocks, several indicators were constructed. The percentage of firms who had the CEO on their board of directors was cut by half. In 1999 this percentage was 30

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[14] Calculation of Shapley values is somewhat problematic since most shareholders' stakes are unknown, but since they are often very low, we can assume they do not affect main voting coalitions. Prior to estimating this Shapley value for the main blockholder in a coalition of four agents, we rescaled the sum of the four largest shareholders to 100 percent. If the largest blockholder held more than 50 percent of the votes, the Shapley value was set equal to 1; that is, the voting power of the largest stakeholder is treated as a winning coalition able to exert full control. If this blockholder could not hold a majority of voting rights, then its contestability power increased with lower Shapley values. For more details about control contestability and firm performance, see Gutiérrez and Pombo (2008).

[15] Table A.1 in the appendix lists and defines the above indicators as well as the other performance and financial variables included in the econometric estimations.

[16] This fact was particularly important in the Santo Domingo group, which has sold or merged its most representative firms since 2005. Some examples are: Carrefour group took control of Grandes Superficies, Colombia's second largest wholesale retailer; Avianca the oldest and main passenger air company, was sold to the Synergy group of Brazil in December 2004; and the crown jewel Bavaria was merged with the South African beer conglomerate SAB-Miller in August 2005. In the GEA, the Casino group of France took control of Almacenes Exito, the largest wholesale retailer in Colombia in 2007 with 53 percent of direct shares.

percent; by 2004 that number had dropped to 15 percent. However, the number of directors who were at the same time CEOs of other companies remained steady during the period at 25 percent. The fraction of board members who were relatives of the CEO was 5 percent. These outcomes highlight changes in corporate best practices even though structural ownership relations (equity concentration, cross-shares and pyramidal voting leverage) remain binding. The voluntary issuance of good corporate practices in several companies, triggered after Resolution 275 of 2001, implied a separation of CEO duties those of boards.[17] Panel C of table 6 summarizes board interlock statistics. This indicator is normalized by the size of the board, and its interpretation is as follows: a board of ten directors with a value of 1 indicates that its directors as a whole hold exactly ten external directorships as well. Our findings suggest that there are, on average, 11.9 external directorships for every 10 directors (the higher that indicator, the higher the number of connections the board has with other firms). A mean of 3.2 indicates the maximum number of directorships held by any one director of the firm; in other words, the best-connected director has 3.2 external directorships.

Reciprocal CEO interlocks with at least two members were observed in 20 percent of the sample. That is, the CEOs of firms i and j simultaneously serve on the others company board. The largest number of reciprocal CEOs found was four members. Those types of interlocks were found, as expected, in the GEA group, which follows a cross-share holding structure. **Table 7** shows the number of external directorships by affiliation status. Multiple board appointments have dropped, particularly for the case of five or more appointments. For instance, within the GEA group, 60 percent of their companies' directors were on the boards of at least five additional firms in 1998. This number had dropped to 41 percent by 2004. For the Santo Doming group as well as for non-affiliated firms, the average number of external directorships has decreased in all categories during the 1998-2004 period. Moreover, board members without external seats rose from 6.6 percent in 1998 to 23 percent by 2004. A similar pattern is observed for the non-affiliated firms. The number of directors without external seats doubled from year 1998 to year 2004, and this reduction in the number of busy directors

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[17] By mid-2003, 23 non-financial firms had issued a code of good practices. This number had risen to 60 in 2005. The variable for CEOs' family-related members is just a proxy since we mapped only the first last name, lacking information on extended or in-law relations. Resolution 275 of the former Superintence of Securities established explicitly that "For an equity issuer to be able to take portfolio investments from pension funds, the company must have issued a voluntary code of best practices in which it is specified how managers and directors are assessed" (our own translation).

reflects better corporate practices.[18] In sum, the relative frequency distribution of directorships shows that the number of single directorships (i.e., one seat) rose from 67 percent in 1998 to 83 percent by 2004, and the number multiple directorships with two or more seats dropped significantly during the same time span (Figure 2).

<div align="center">***** Tables 6 and 7, Figure 2 here *****</div>

5.2. Independence and turnovers

As previously noted, the measurement of board independence is difficult when there are no official records to indicate independent members. Measurement of independent directors in Latin American corporations has usually relied on mandatory disclosure, required by domestic exchange commissions or the Superintendence for equity issuers, or has used the information recorded on the SEC' s 20-F form for companies that are cross-listed through the issuance of ADRs. Neither case applies for this working sample.[19]

Table 8 displays the board independence measurements defined as the ratio of independent members to board size. The mean (median) of board independence was 47.2 (50) percent. Thus, a typical board with ten directors (five primary and five alternate members) has five independent directors on average. Regarding business groups, it can be noted that the board independence mean (median) for the non-affiliated firms is 58.7 (63.1) percent; for Santo Domingo firms it is 48.9 (50) percent and for the GEA group it is 38.5 (30) percent. These numbers show that the percentage of outside directors' density is different across groups. Clearly, the density for GEA is right-skewed, signaling less independence, while for non-affiliated firms the density is left-skewed, meaning more board independence. To test differences in means, panel B in table 9 shows that differences in board independence between affiliated and non-affiliated firms is statistically significant at the 5 percent level.

<div align="center">***** Table 8 here *****</div>

These results accord with what has been reported in other studies of board independence. Hermalin and Weisbach (1991) estimated the mean of board independence at

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[18] Article 202 of Colombia's Commercial Code penalizes those directors holding six or more seats n boards in incorporated firms. In addition, Resolution 400 of 1995 made mandatory higher disclosure of information for equity issuers, causing top executives in Colombia to be more cautious about accepting multiple directorships.

[19] The mandatory disclosure of independent members started after the issuance of Law 964 of 2005, which was first implemented in 2007. Cross-listing is still not implemented by Colombian corporations. Until 2006 the only company listed on the NYSE was Banco de Colombia. Almacenes Exito issued ADRs in 2007, and the Empresa Colombiana de Petroleos (Ecopetrol, the former state oil company) made its first IPO targeted to minor shareholders in 2007 and is expected to get cross-listed by 2009.

53.9 percent for the United States in 1983. For Venezuela, Garay and Gonzalez (2007) report a mean value of 54 percent for board independence in 2002. For the case of Chile, Lefort and Urzúa (2007) estimate that the fraction of outside directors is 34 percent for the largest companies (5th quintile) where ownership is less concentrated. Berkman et al. (2003) show board independence ratios of around 55 percent in India for 2001-03. The highest ratio of board independence was found in Canada by Park and Shin (2004), who estimated it at 68 percent for 1991-97, although Panasian et al. (2007), also working with Canadian firms, calculated it as 60.3 percent for the years 1993-97. Hence, despite the potential misidentification of our measurements attributable to the indirect approach of crossing information to classify outside directors, Colombia still follows Chile in having the lowest board independence ratios according to the data depicted in **table 9**. Another test is given by the fraction of firms below the 25 percent mandatory cutoff for outside directors. According to panel B of table 9, this number has ranged from 32.1 to 38.5 percent, and there is no evidence of a decreasing trend, which means that there is too much room for low compliance.

Table 10 summarizes the statistics of director turnover. Turnover is low, and there is no difference between affiliated and non-affiliated firms. The average mean (median) is 18 (10) percent for the 1998-2003 period. The asymmetry of the frequency distribution of this variable, which is right-skewed, makes the median an accurate indicator of central tendency. The interpretation of a median of 10 percent would be that in a typical firm of ten directors, one leaves each year. This number suggests that the implicit directorate tenure is ten years. Figure 3 displays the histogram of director turnover and shows that in 45 percent of the firm-year observations, the turnover ratio is at most ten years (10 percent). For the fraction of 20 percent, the turnover rate is between five and ten years (10-20 percent). The higher rates occurred in 1999, when turnover ratios increased by two or three times with respect to the previous year and the following ones. That year the Colombian economy was in the bottom of an economic recession, with a negative GDP growth of minus 10 percent. One would expect lower turnover rates in affiliated firms because of entrenchment by insiders appointed on behalf of conglomerates, a problem not faced by independent firms. However, the non-affiliated firms had a median turnover rate of 9 percent in this sample. The turnover ratios for the GEA and Santo Domingo groups are 10 and 12 percent, respectively, for the whole period, although such differences turned out statistically insignificant.

Another issue is the association of turnovers with firm performance. One could expect higher director turnovers with lower firm performance. The partial correlations between the turnover ratios with firm value were 0.08 with Tobin´s Q or 0.02 with the market-to-book-value ratio (MTBR). The correlation was negative for ROE (-0.09) suggesting a weak association between director turnover and firm performance. On the other hand, there are other variables affecting turnovers that are missing in this analysis. The data do not tell whether turnovers are forced or natural. The former might be related to bad performance, but the latter implies a director's retirement, a professional move for career purposes, or ordinary internal rotation within holding companies or business groups. For holdings with cross-shares, internal director turnover is explained by contestability factors, and board members are therefore motivated to behave more professionally, with positive effects on firm performance.[20]

<p style="text-align:center;color:blue;">***Table 9, Table 10 and Figure 3 here***</p>

5.2. Econometric results

This section considers the relationship between firm performance and corporate governance variables as proxied by board structure, ownership and control contestability variables. Firm financial indicators and idiosyncratic characteristics complete the set of independent variables. **Table 11** displays the summary of statistics by firm-year observations for the 1998-2004 period. To measure firm performance and valuation, five indicators were used: ROA, ROE, Tobin's Q, the MTBR, and market to sales ratio (MTSR). The maximum number of firm-year observations is 372 distributed among 74 firms that had complete information for each category of the above variables. Some performance variables and financial indicators were adjusted by deleting extreme outliers.[21]

The econometric specification follows a general two-way error component model with a matrix dimension of $i \times t$:

$$Y_{it} = \alpha_0 + \alpha_k \mathbf{CG}_{it} + \varphi_k \mathbf{X}_{it} + IND_j + (\alpha_i + \lambda_t + \varepsilon_{it}), \tag{17}$$

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[20] Table A.2 in the appendix presents the partial correlation matrix between the performance and the corporate governance variables.

[21] For instance, for the case of Tobin's Q this implied dropping only three observations.

where Y_{it} is the valuation/performance variable, such as Tobin's Q, MTSR, MTBR, ROA and ROE; **CG** is the vector with the corporate governance variables, which includes board of directors, ownership and control contestability variables; **X** is the vector with the standard controls mentioned above. The estimation of equation (17) is also controlled by industry and time dummies.

<div align="center">*****Table 11 here *****</div>

The results of firm value regressions are summarized in **Table 12**. Several comments are worth mentioning. First, equation 1 in the table estimates firm value with just the board structure variables. Outside directors defined by the independence ratio are negatively related to firm value, which is the opposite of the theoretical hypothesis. This correlation is reversed when valuation is controlled by ownership and control variables, but the coefficients are not statistically significant at the 10 percent level. Second, four board variables have a positive effect on Tobin's Q: women's participation, board size, family and the dummy for busy inside directors. In particular, if participation by women increases by 10 percent, firm value will increase between 2.5 and 4.1 percent. CEOs' relatives and busy insiders reflect one aspect of director interlocking, and it is common to find relatives with multiple appointments. This is more severe when members are relatives of the controlling blockholder. In our sample, this fact was important in the Santo Domingo group, which is a pyramidal and family-controlled group. Busy insider directors are common in the GEA group, which has a cross-share structure. Most of these are high-ranking executives who have a professional role in controlling and advising investment decisions. Regression coefficients suggest that the existence of busy inside directors increases Tobin's Q by 15 percent, on average, and if the number of family members rises by 10 percent, firm valuation rises by 0.45 percent (regressions 2 and 3). These variables are statistically significant at the 1 and 5 percent level, respectively.

Third, there is evidence of a negative effect on corporate capitalization when the CEO is also a board director. The pooled estimations suggest that, on average, a CEO-director duality implies a negative impact of 0.8 percent on firm value. This result highlights an important aspect of the theoretical model. Potential collusive behavior eases when there is no split between a firm's management and effective control and accountability of a CEO's actions.

Fourth, board interlocking can affect firm value in different ways. According to regression equation 3, within-group interlocks have a positive effect on Tobin's Q, but too many external directorships can have the opposite effect. In particular, if internal interlocks rise by 10 percent, firm value increases by 0.09 percent; however, if a director's external appointments rise by 10 percent, Tobin's Q will drop by 0.03 percent. This result validates hypothesis 2. Internal reciprocal interlocking is a proxy for control contestability that seeks to prevent rent extraction by any of a firm's blockholders. Nonetheless, a director who sits on too many boards might fail to develop the necessary skills for controlling the quality of investment projects. This fact can be more problematic when there are multiple appointments in firms unaffiliated with the business group or different from the group's core business.

Fifth, ownership and control variables are important to firm value. This is a strong result that validates the hypothesis of private corporate control and direct monitoring exerted by large shareholders on managements. Regressions in 2 and 3 show that the Herfindal concentration index (HI) of the top four shareholders is positively related to firm value. For instance, if HI increases by 10 percent, Tobin's Q rises between 3.6 and 3.8 percent. In contrast, separation between ownership and control is negative for firm value, which offsets the positive effect of direct monitoring by blockholders. In particular, if the separation between ownership and voting rights (the equity to voting ratio) of the largest stakeholder rises by 10 percent, firm value decreases an average of 2.5 percent. This result is important and confirms the hypothesis of tunneling for the largest blockholder whose voting power can be effectively leveraged by business group affiliation or the issuance of non-voting shares. Hence, greater separation implies additional monitoring costs between managers and stakeholders. The wedge proxy is significant at 1 percent in the model.

Another corporate control variable that turned out to be a robust regressor was the interaction between the concentration index of the top four stakeholders times the board independence ratio (CR4 × independence ratio), which is negatively related to Tobin's Q. Thus, the marginal effect of increasing independent members is positive if and only if the CR4 index is less than 30 percent. This condition is fulfilled only in 3.4 percent of the firm-year observations in the working sample. Hence, board independence does not have a significant positive effect on firm value, given the current ownership structure. This result does not contradict hypothesis 1. Further, it corroborates the nature of boards as endogenous

institutions within complex business groups and high ownership concentration structures. Recall that the theoretical model stresses independent behavior rather than independent appointments. In that sense one can have insider-dominated boards with high control contestability through reciprocal inside directors' interlocking, as the variable of board interlocks suggests (table 12, regression 3). Sixth, all regressions are controlled by firm characteristic variables such as firm size, leverage and log of operating income. These turned out to improve overall regression robustness.[22]

<div align="center">***Table 12 here ***</div>

5.3. Robustness test

Firm valuation regressions in general can suffer from endogeneity problems between ownership, governance and firm market capitalization. Ownership structure affects governance and by turn firm performance and firm market value has an effect on ownership and governance structures. Thus, the issue of robustness is common in the governance literature. A standard approach to this problem is to relay on instrumental variables regressions, which treat ownership concentration as an endogenous variable. The main instrument included is the lag of equity concentration, given either by the Herfindal concentration index or the lag of the equity concentration index for the top four blockholders (CR4) interacted by the board independence ratio.

Table 13 displays the instrumental variables (IV) regressions. Equations 1-3 in the table display the two-stage-least-square regressions on Tobin's Q. The main outcome is that board structure variables keep the expected sign and robustness in most cases, compared with the original OLS−pooled regressions, when the estimating equation is also controlled by ownership and control contestability variables. In particular, the relations among board size, participation by women, CEO board dummy, and family and board interlocks keep, in every case, the coefficient's size and its expected sign. For instance, when the CEO is at the same time a board member, firm value drops by 8.5 percent while this effect is 8 percent when equity concentration is instrumented (equation 1). A rise of 10 percent in board interlocks across firms affiliated with a conglomerate will raise firm value by 0.1 percent, whereas this effect is around 0.08 percent unless instrumental variables are performed. Moreover, IV

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[22] Fixed effects regressions are displayed in the last two columns of table 12. These estimations were not conclusive, in contrast to the pooled OLS regressions. The main reason for this outcome is the reliance of the baseline estimating equation on several dummies that are proxies for board characteristics. Hence, the model loses robustness if all time-invariant variables are excluded in the estimates.

regressions show a 15 percent increase in firm value when inside members are busy directors and behave more professionally. This effect is the same in the original OLS regressions (equations 2 and 3).

In contrast, the coefficient of board independence ratio is negative to Tobin's Q according to the IV regressions, which is contrary to the expected relation. However, this variable turned out to be significant in only one regression. This result called for performing alternative estimates to verify robustness. One approach is to check structural changes and to rely on alternative performance-accounting measures such as the ROE ratio. Several arguments support the inclusion of ROE regressions in the robustness analysis. ROE regressions allow working with the whole sample, including bond issuers who are excluded in the value regressions and information on firms that were delisted during the period. The core results are summarized in the last three columns of the table. These estimations are less robust than the value regressions, mainly because there are fewer independent corporate governance variables that were statistically significant. However, those independent variables that were included in the value regressions keep the same sign and marginal effect on a firm's profitability.

These estimates first control for board variables (equation 4). Two controls show a positive impact on a firm's ROE. Board interlocks raise a firm's ROE by 1 percent if conglomerate interlocks rise by 10 percent. The director-CEO duality to board size ratio is also associated with a positive effect on ROE. This last proxy measures the number of directors who are CEOs of other firms within or outside the business group. Firm profitability is boosted by 1.5 percent when that ratio increases by 10 percent. In other words, ROE increases by 1.5 percent when an average board of ten members has one vacant seat filled by another firm's CEO.

Equations 5 and 6 expand the estimating equation by including ownership and control contestability variables first and the financial indicators thereafter. There is again evidence of rent diversion by the largest stakeholder. If separation between equity to control rights increases by 10 percent, then ROE drops by 3.9 percent (equation 6). However, rent diversion is partially offset when the lag of Herfindal ownership concentration is included. Recall that for Colombia the largest stakeholder has on average 39 percent of cash flow rights. The second largest blockholder can contest the largest blockholder with his equity share. This

contestability behavior is reinforced by the negative sign of the high contestability dummy. This variable captures the control that the fourth largest blockholder has over the top three voting blocks. Thus, if the number of firms having the top three blockholders account for absolute control decreases, then firm profits rise because there is less rent diversion.

The ROE regressions included three new exogenous variables. The first is a dummy for year 1999. That year recorded the worst recession experienced by the Colombian economy in 50 years, with a GDP growth of minus 10 percent. The second new variable is listing experience, which shows the expected sign (positive). The third is the liquidity dummy, which takes the value of 1 if the stock is ranked as having median liquidity by the Financial Superintendence index, and zero otherwise. The coefficient sign is negative, the opposite of what was expected. Nonetheless, recall that the sample in these estimates include some firms that are not publicly held. Those firms do not have a measure of stock liquidity and yet are still very profitable.[23]

*** Table 13 here ***

6.   Conclusions

This work has presented two types of results. It provides, for the first time, measures of corporate governance variables associated with boards of directors for the main listed corporations in Colombia. In addition, it has tested the main hypothesis regarding independent board behavior and firm value by using a theoretical model based on a board-CEO collusive game. The econometric exercise presents positive evidence regarding firms' market capitalization and women's participation, within-group CEO interlocks, busy insider directors and family-related members on boards. High ownership concentration of the top four blockholders also has a positive effect on firms' valuation. This cash flow effect is partially offset by the potential diversion of funds by the largest blockholder when the separation between ownership and control increases. And when the CEO is also a firm director or when a

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[23] See Gutierrez and Pombo (2008) for more econometric results regarding the testing of control contestability across blockholders for the case of Colombia. The goodness of fit (R2) for the ROE regression statistics indicates that the model is explaining 30% of the ROE ratios on average. Despite this, regression equations consistently reject the null hypothesis that all joint regression coefficients are zero by the F-test. The above test is complemented by the mean of the variance inflation factor (VIG), which records low levels. It indicates that there is no severe multicollinearity across the set of independent variables. Tests on the regression's residuals indicate either that standard errors were corrected by the consistent White-Hubert residual variance-covariance matrix or the null hypothesis of residual constant variance is not rejected. The RESET test still indicates the persistence of an omitted variable problem, which is not present in the value regression estimates. Lastly, regression residuals are still not normally distributed according to the Shapiro-Wilk test. The problem in those estimates is explained more by an excess of kurtosis rather than non-normal skewness.

busy director has too many appointments, especially outside the business group, their supervisory roles are negatively affected, which can decrease firm value. Outside directors who do not have a business relation within the corporation, seem to be unimportant to firm value under a cross-share business structure. The expected positive relation is observed but is not robust enough in the econometric model. The policy implications are straightforward for capital market regulation. The evidence supports the likelihood that blockholder contestability behavior will take place when there is no limitation on cross-shares, which indeed is a market mechanism inside corporations. If tunneling is limited in this way, small shareholders will benefit.

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Table 1

Corporate ownership: Cash flow rights (direct ownership) and separation ratios
for the largest stakeholders in non-financial listed firms for selected countries

Country	year	N	CR1	CR2	CR3	CR4	Cash Flow / Voting Rights
Austria	1996	95	47.16	57.76	60.66		0.8510
Belgium	1999	120	35.14	45.44	49.94	50.64	0.7790
France	1996	674	46.68	55.68	60.68	63.18	0.9300
Germany	1996	372	49.60	52.50	53.10		0.8420
Italy	1996	204	38.33	46.03	49.53	50.38	0.7430
Spain	1995	193	32.13	40.08	47.06	49.96	0.9410
UK	1992	207	14.44	21.74	27.74	33.00	1.0000
USA-NYSE	1996	1309	8.50	12.20	14.00	14.15	0.9596
Hong-Kong	1996	330	24.30	-	-	-	0.8820
Indonesia	1996	178	25.61	-	-	-	0.7850
Japan	1996	1117	6.90	-	-	-	0.6020
Korea	1996	211	13.96	-	-	-	0.8580
Malasya	1996	238	23.89	-	-	-	0.8530
Philipines	1996	99	21.34	-	-	-	0.9080
Singapore	1996	211	20.19	-	-	-	0.7940
Tawian	1996	92	15.98	-	-	-	0.8320
Thailand	1996	135	32.84	-	-	-	0.9410
Argentina	2005	36	40.38	-	-	-	0.9650
Brazil	1998	240	47.00	-	59.00	-	0.6812
Chile	1998	195	46.00	-	55.00	-	0.8070
Colombia	1998	146	38.68	55.32	64.49	70.51	0.9514
Mexico	2005	52	42.22	-	-	-	0.8225
Average Continental Europe			41.51	49.58	53.50	53.54	0.85
Average East-Asia			20.56				0.83
Average Latin America			42.86		59.50		0.85

This table presents the cash flow rights (direct ownership) and concentration ratios for the four largest stakeholders and the separation between ownership and control proxied by the ratio of cash flow to voting rights. Continental Europe: CR1 refers to the ultimate controlling blockholder's cash flow rights according to Faccio and Lang (2002); CR2 to CR4 adds the direct votes for the second to the fourth largest voting blocks reported in Barca and Becht (2001). Separation ratios are at the controlling blockholder's level reported in Faccio and Lang (2002). USA and UK: Refers to direct cash flow rights of main blockholders according to Barca and Becht (2001). Separation ratios are from La Porta et al. (1999). East Asia: CR1 is the cash flow rights of controlling blockholders. Separation ratios are at controlling blockholder level; data from Claessens et al. (2000). Argentina: CR1 refers to direct votes from direct equity ownership (cash flow rights) for the largest shareholder; data from Roiters and separation ratio from Bebzuck (2007) Chile: CR1 refers to direct equity of the controlling blockholder. Separation ratios derived from total voting rights at controlling shareholder's level; data from Leffort and Walker (2007); CR3 is the total voting rights of the three largest blockholders for Chile. Mexico: CR1 refers to direct votes from direct equity ownership (cash flow rights) for the largest shareholders; data from Roiters and separation ratio from La Porta el al. (1998 and 1999). Brazil and Colombia: Refers to direct votes from direct equity ownership (cash flow rights) for the larger shareholders. Separation ratios estimated from total voting rights measured by total direct plus indirect ownership. Data for Brazil is from Leal and Carvalhal-da-Silva (2007); the estimates for Colombia are our own.

Table 2

Ownership and control separation by selected business groups, firms and countries

Group	Year	Country	Type	Controlling Blockholder	Controlled Firms	Control Rights	Ownership Rights	Separation Ratio
Agnelli Group	1996	Italy	Pyramid	G.Agnelli&C S.a.p.a	IFI	0.825	0.825	1.00
					IFIL	0.500	0.410	0.82
					FIAT	0.220	0.180	0.82
					FIAT Auto	1.000	0.182	0.18
Ayala Group	1998	Philippines	Pyramid Cross-shares	Ayala Family	Mermac Inc	1.000	1.000	1.00
					Ayala Corp	0.580	0.580	1.00
					Pure Foods	0.840	0.487	0.58
					Globe Telecom	0.400	0.232	0.58
					Bank of Philippines	0.340	0.278	0.82
Li Ka-shing Conglomerate	1998	Hong-Kong	Pyramid	Li Ka-shing Family	Cheung Kong	0.350	0.350	1.00
					Hong Kong Electric	0.340	0.024	0.07
					Start TV	0.538	0.500	0.93
					Husky Oil	0.460	0.360	0.78
Paribas-Copeba	1995 1996	France Belgium	Piramidal Cascades	Co. Financiere Paribas	S.G.C.F	1.000	1.000	1.00
					Bank Paribas	1.000	0.700	0.70
					Bank Paribas Suisse	0.400	0.000	0.00
					Copeba	0.600	0.186	0.31
					Erbe Group	0.455	0.000	0.00
					Compagnie National a Portefeuille	0.142	0.000	0.00
Santo Domingo	2002	Colombia	Pyramid Cross-shares	Union de Valores	Bavaria	0.41459	0.415	1.00
					Grandes Superficies	0.480	0.054	0.11
					Malterias de Colombia	0.49382	0.000	0.00
					Avianca S.A	0.03467	0.000	0.00
					Sofasa S.A	0.24513	0.000	0.00
Grupo Empresarial Antioqueño	2002	Colombia	Web Cross-shares	Argos S.A	Colclinker	0.54957	0.000	0.00
					Cementos Caribe	0.66561	0.653	0.98
					Fabricato	0.08972	0.007	0.08
					Cementos Cairo	0.47284	0.287	0.61
					Cementos Nare	0.74453	0.129	0.17

Sources

Italy: Bianchi et al. (2001);Philippines and Hong Kong: Claesssens et al. (2000); France and Belgium: Renneboog (1997), Chapelle and Szafarz (2002), Becht et al. (2002);Colombia: Our own estimates based on SFIN and SSOC assembled datasets and Gutierrez et al. (2008)

Table 3

Reciprocal ownership and control rights matrix among controlling blockholders in Colombia's *Grupo Empresarial Antioqueño* (GEA)

Bolckholder	Onwership Rights			Control Rights		
	year 2006			year 2006		
	Suramericana de Inversiones	Argos S.A	Nacional Chocolates	Suramericana de Inversiones	Argos S.A	Nacional Chocolates
Suramericana de Inversiones	.	0.1441	0.2188	.	0.3429	0.3347
Argos S.A	0.0757	.	0.0720	0.1464	.	0.1301
Nacional Chocolates	0.0526	0.0596	.	0.2456	0.1151	.
	year 2000			year 2000		
Suramericana de Inversiones	.	0.1854	0.1478	.	0.2941	0.2261
Argos S.A	0.0652	.	0.0369	0.1261	.	0.0667
Nacional Chocolates	0.0774	0.0505	.	0.2780	0.0975	.

Source: Our own estimations based on an expanded dataset from SFIN, SSOC, BVC official records of boards and shareholders.

Table 4
Equivalent classifications on boards' structure

Non-independent	Intermediate	Independent
Inside Director	Affiliated Outside Director	Independent Outside Director
Related Director	Grey Director	Unrelated Director
Executive Director		Non-executive Director
Insider Director		Outsider Director

Source: Our own synthesis.

Table 5
Sample coverage and dataset span

PANEL A : Coverage by business group

Number of firms	Santo Domingo	Grupo Empresarial Antioqueño
Sample	13	34
Total (non financial)	56	100
Coverage	0.23	0.34

PANEL B: Coverage by year

Year	Sample	Total (non financial)	Coverage
1998	60	169	0.36
1999	59	140	0.42
2000	58	119	0.49
2001	57	120	0.48
2002	56	117	0.48
2003	51	111	0.46
2004	39	107	0.36

Panel C: Dataset span

Years listed	Sample	Total firm-year observations
7	29	203
6	10	60
5	10	50
4	4	16
3	9	27
2	9	18
1	6	6
Total		**380**

Source: Our own estimations.

Table 6
Boards demographic characteristics

PANEL A: Statistics 1998-2004

	Mean	Median	Std	Max	Min
Board size	9.8579	10.0000	2.2859	20.0000	6.0000
Female participation	0.0880	0.0833	0.0966	0.5000	0.0000
Percentage of director-CEOs	0.2941	0.2143	0.2694	1.0000	0.0000
Family	0.0537	0.0000	0.1082	0.6667	0.0000
Percentage of foreing directors	0.0803	0.0000	0.1716	1.0000	0.0000

PANEL B: Averages per year

	1998	1999	2000	2001	2002	2003	2004
Board size	10.2000	10.2373	9.8276	9.8596	9.5357	9.5294	9.6923
Female participation	0.0881	0.0828	0.0841	0.0917	0.0955	0.0898	0.0828
Percentage of director-CEOs	0.3474	0.2813	0.3075	0.2791	0.2761	0.3190	0.2269
Family	0.0627	0.0705	0.0456	0.0461	0.0624	0.0484	0.0321
Percentage of firms that had a CEO-director duality	0.2333	0.3051	0.1552	0.1754	0.1786	0.1569	0.1538
Percentage of foreing directors	0.0591	0.0831	0.0798	0.0768	0.0858	0.0874	0.0976

PANEL C: Board interlockings - Statistics 1998 - 2004

	Mean	Median	Std	Min	Max
Board Interlocks	1.1964	0.6000	1.4397	0	6.25
Reciprocal CEO interlocks	0.2105	0.0000	0.5838	0	4
Maximum number of external directorships held by one director in a firm	3.2947	3.0000	3.1037	0	11

Source: Our own estimations based on an expanded dataset from SFIN, SSOC, BVC official records of boards and shareholders and the DIRNAFAX LTDA database of top executives.

Table 7
Number of external directorships by selected years and business group affiliation

Number of external directorships	*Grupo Empresarial Antioqueño*			*Santo Domingo*			*Non-Affiliatted firms*		
	1998 N =30	**2001** N = 28	**2004** N = 22	**1998** N = 9	**2001** N = 10	**2004** N = 4	**1998** N =21	**2001** N = 19	**2004** N = 13
0	2 (6.67%)	3 (10.71%)	5 (22.73%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	6 (20.00%)	10 (35.71%)	10 (45.45%)
1	1 (3.33%)	2 (7.14%)	4 (18.18%)	3 (10.00%)	1 (3.57%)	0 (0.00%)	8 (26.67%)	3 (10.71%)	1 (4.55%)
2	4 (13.33%)	1 (3.57%)	3 (13.64%)	1 (3.33%)	3 (10.71%)	2 (9.09%)	1 (3.33%)	2 (7.14%)	1 (4.55%)
3	3 (10.00%)	6 (21.43%)	1 (4.55%)	0 (0.00%)	0 (0.00%)	1 (4.55%)	1 (3.33%)	0 (0.00%)	0 (0.00%)
4	2 (6.67%)	1 (3.57%)	0 (0.00%)	0 (0.00%)	1 (3.57%)	1 (4.55%)	0 (0.00%)	1 (3.57%)	0 (0.00%)
5 or more	18 (60.00%)	15 (53.57%)	9 (40.91%)	5 (16.67%)	5 (17.86%)	0 (0.00%)	5 (16.67%)	3 (10.71%)	1 (4.55%)

Source: Our own estimations based on an expanded dataset from SFIN, SSOC, and BVC official records of boards and shareholders and the DIRNAFAX LTDA database of top executives.

Table 8
Board independence statistics

PANEL A: Fraction of outside directors by business group

Group	Statistic	1998	1999	2000	2001	2002	2003	2004	1998-2004 Avg
Non-Affiliatted	N	21	21	20	19	21	19	13	19.1
	Mean	0.5471	0.5720	0.5428	0.5929	0.6183	0.6671	0.5656	0.5865
	p50	0.6154	0.6000	0.5857	0.7000	0.7143	0.7143	0.6667	0.6566
	p75	0.8125	0.9000	0.8377	0.9000	0.9000	0.9565	0.8000	0.8724
	p25	0.2857	0.3000	0.2500	0.3000	0.3636	0.5000	0.3333	0.3332
Grupo Empresarial Antioqueño	N	30	27	28	28	26	25	22	26.6
	Mean	0.3002	0.4440	0.3940	0.4051	0.4013	0.3801	0.3809	0.3865
	p50	0.2929	0.4286	0.3000	0.3000	0.2750	0.2500	0.2500	0.2995
	p75	0.5000	0.7000	0.6667	0.6833	0.7059	0.6429	0.6667	0.6522
	p25	0.0000	0.1667	0.1633	0.1667	0.1000	0.1000	0.2000	0.1281
Santo Domingo	N	9	11	10	10	9	7	4	8.6
	Mean	0.4921	0.4636	0.4696	0.4864	0.5553	0.4718	0.5006	0.4913
	p50	0.4000	0.5000	0.4314	0.5000	0.5333	0.5000	0.4500	0.4735
	p75	0.9000	0.7000	0.8333	0.7143	0.6250	0.6250	0.6346	0.7189
	p25	0.3000	0.2000	0.2000	0.2000	0.5000	0.2727	0.3667	0.2913

PANEL B: Mean differences test

		N	Mean
Affiliated firms	[1]	246.0000	0.4109
Non affiliated firms	[2]	134.0000	0.5868
Total		380.0000	0.4729

PANEL C: Z-statistic for differences in means

Test: [1] vs. [2]	-5.1166**

Source: Our own estimations based on an expanded dataset from SFIN, SSOC, and BVC official records of boards and shareholders and the DIRNAFAX LTDA database of top executives.

Table 9
Outside directors

PANEL A: International Comparisons

Country	Mean Independence	Study	Period
Canada	68.0%	Park & Shin (2004)	1991-1997
Chile	34.0%	Lefort & Urzúa (2007)	2000-2003
India	55.0%	Berkman et al. (2003)	2001-2003
Venezuela	54.0%	Garay & González (2005)	2002
United States	53.9%	Hermalin & Weisbach (1991)	1983
Colombia	47.2%		1998-2004

PANEL B: Colombia - Firms below 25 percent outside directors cutoff

Year	1998	1999	2000	2001	2002	2003	2004
Percentage	0.35	0.31	0.34	0.35	0.32	0.33	0.38

Source: Our own synthesis and estimations based on an expanded dataset from SFIN, SSOC, and BVC official records of boards and shareholders and the DIRNAFAX LTDA database of top executives.

Table 10

Director Turnover

		year						1998-2003
Group	**Statistic**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**Avg**
Non- Affiliatted	N	18	19	19	16	17	14	17.2
	Mean	0.1616	0.2864	0.1585	0.1374	0.1663	0.1170	0.1712
	p50	0.0955	0.2000	0.1000	0.1000	0.0000	0.0455	0.0902
	p75	0.3000	0.5000	0.2500	0.2000	0.2000	0.1538	0.2673
	p25	0.0000	0.0909	0.0000	0.0000	0.0000	0.0000	0.0152
Grupo Empresarial Antioqueño	N	27	24	27	28	20	13	23.2
	Mean	0.2156	0.1961	0.1856	0.2067	0.1498	0.1412	0.1825
	p50	0.1000	0.1833	0.1000	0.1603	0.0871	0.0000	0.1051
	p75	0.3000	0.3000	0.2857	0.3000	0.1458	0.2857	0.2695
	p25	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Santo Domingo	N	6	8	7	9	9	6	7.5
	Mean	0.0970	0.2018	0.1682	0.2116	0.2049	0.1703	0.1756
	p50	0.0500	0.1500	0.2000	0.1000	0.1429	0.0917	0.1224
	p75	0.1818	0.3571	0.2727	0.3333	0.4000	0.1429	0.2813
	p25	0.0000	0.0000	0.0000	0.0714	0.0000	0.0000	0.0119

Source: Our own synthesis and estimations based on an expanded dataset from SFIN, SSOC, and BVC official records of boards and shareholders.

Table 11

Summary of statistics – valuation, ownership, contestability and firm characteristics variables
(Pooled data, 1998-2004)

Variable	Obs	Mean	Std. dev	Median	Min	Max
Value and performance*						
Tobin's q	269	0.7627	0.3047	0.7110	0.0710	1.9710
ROA	193	0.0289	0.0757	0.0360	-0.4630	0.2000
ROE	367	0.0266	0.2470	0.0610	-1.8560	1.6160
MTBR	268	0.6331	0.4436	0.5910	-0.0730	3.1460
MTSR	263	1.4401	1.9670	0.7030	0.0110	11.9960
Ownership and separation ratios						
Equity 1	372	0.3928	0.2349	0.3252	0.0754	0.9500
Equity 2	372	0.1587	0.1034	0.1335	0.0000	0.5000
Equity 3	372	0.0781	0.0495	0.0735	0.0000	0.2450
CR4	372	0.6832	0.2304	0.6892	0.2154	1.0000
Equity-voting ratio1	372	0.9211	0.1484	1.0000	0.3249	1.0000
Equity-voting ratio2	372	0.8126	0.2764	1.0000	0.0000	1.0001
Equity-voting ratio3	372	0.7760	0.3023	0.9883	0.0000	1.0000
Equity-voting ratio4	372	0.7486	0.3230	0.9911	0.0000	1.0000
Control contestability						
Herfindal index-concrentation	372	0.3261	0.2693	0.2365	0.0158	0.9671
Herfindal-index-differences	372	0.1290	0.1783	0.0444	0.0001	0.8324
Shapley value	370	0.7238	0.2717	0.5000	0.3330	1.0000
Firm characteristics						
Log - operating income	366	11.1833	1.6800	11.2415	-1.2920	14.70
Firm size	370	11.9384	1.6687	12.0865	6.3190	15.79
Asset tangibility	370	0.2120	0.1933	0.1595	0.0000	0.9020
Debt ratio*	369	0.3739	0.2327	0.3350	0.0030	1.3080
Leverage	370	0.1529	0.1610	0.1015	0.0000	0.7730
Growth - sales (t-3)	357	0.1128	1.0512	0.0320	-0.8710	19.17
PPE/operating income*	365	0.8525	6.8283	0.2580	0.0000	130.26
Liquidity	265	4.8249	2.9776	4.5200	0.0000	10.00
Year listed	372	22.7231	19.8679	16.0000	1.0000	75.00

Notes: *:/ corrected by outliers

Source: Our own estimations based on an assembled dataset from Financial Superintendence Forms, companies' financial statements and
stock prices.

Table 12 Firm value regressions –
Tobin's Q determinants

Variable	OLS-Pooled			Fixed- Effects 1/	
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5
Independence Ratio	-0.2703	0.1538	0.1558		-0.0976
	(0.061)*	(0.1113)	(0.1132)		(0.1019)
Board Size	0.0135	0.01743	0.0167	-0.0195	-0.0131
	(0.0053)*	(0.0051)*	(0.0054)*	(0.0075)*	(0.0073)***
Female participation	0.4112	0.2570			
	(0.1534)*	(0.1411)***			
External directorships			-0.0036		
			(0.0016)**		
external directorships / board size	-0.0319			-0.2752	-0.0332
	(0.0122)*			(0.0133)**	(0.0146)**
Board Interlocks within business group			0.0089		
			(0.0044)**		
CEO_board dummy	-0.0687	-0.0868	-0.0827		
	(0.0447)	(0.0417)**	(0.0419)**		
Busy board dummy - Insiders	0.1126	0.1508	0.1507		
	(0.0616)***	(0.0561)*	(0.0560)*		
Family	0.0296	0.0462	0.0450	0.0504	
	(0.0154)**	(0.0150)*	(0.0153)*	(0.0343)	
turnover / board size				0.1018	
				(0.0547)***	
maximum number of employee-directorships				-0.0139	
				(0.0083)***	
HI_concentration		0.3937	0.3688		
		(0.7490)*	(0.0767)*		
CR4 * Independence_Ratio		-0.5202	-0.5012		
		(0.1467)*	(0.1485)*		
Equity-voting ratio largest stakeholder		-0.2771	-0.2306		
		(0.0931)*	(0.0971)**		
Equity second largest stakeholder					0.6413
					(0.2769)**
Log - operational income		0.0551	0.0566		-0.0770
		(0.1465)*	(0.0150)*		(0.0515)
Firm size		-0.0654	-0.0739		
		(0.0158)*	(0.0164)*		
Leverage		0.4440	0.3978		0.5375
		(0.0924)*	(0.0950)*		(0.1609)*
Dummy for outliers	yes	yes	yes	no	no
Constant		0.8503	0.1692	0.9616	1.6873

Table 12 (Cont.)
Firm value regressions – Tobin's Q determinants

Variable	OLS-Pooled			Fixed- Effects 1/	
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5
Regression statistics					
Obs	268	268	268	269	268
Number of groups				54	54
R2	0.39	0.53	0.53	0.07	0.13
F-test	20.80	21.78	20.46	3.76	4.49
	[0.000]	[0.000]	[0.000]	[0.0028]	[0.0003]
Test residuals					
Breuch-Pagan Heteroskedasticity	0.0500	0.0001	0.1600		
	[0.8307]	[0.9971]	[0.6872]		
ramsey-RESET omitted variables	1.52	0.20	0.61		
	[0.2110]	[0.8949]	[0.6096]		
Shapiro-Wilk normality	3.96	3.86	4.89		
	[0.0001]	[0.0001]	[0.0001]		
Hausman specification test				27.48	28.56
				[0.0001]	[0.0001]

Standard errors in parenthesis, p-values in brackets. * = significant at 1%,** = significant at 5%, *** = significant at 10%.
1/: FE regressions with robust standard errors.
Source: Our own estimations based on an assembled dataset from Financial Superintendence Forms, companies' financial
statements and stock prices.

Table 13
Firm value instrumental variables and performance regressions

Variable	Tobin' Q 2SLS-Pooled			ROE OLS-Pooled		
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5	Eq 6
Independence Ratio	0.1511 (0.1264)	-0.0379 (0.1307)	-0.1793 (0.0778)**		0.0423 (0.0290)	0.0858 (0.0472)***
Board Size	0.1574 (0.0058)*	0.0108 (0.0063)*	0.0131 (0.0061)**			
Female participation	0.0837 (0.1563)					
Total external directorships		-0.0056 (0.0018)*	-0.0033 (0.0018)***			
External directorships / board size				-0.0503 (0.0176)*	-0.0486 (0.0179)*	
Board Interlocks within business group		0.0105 (0.0048)*	0.0067 (0.004)***	0.0112 (0.0038)*	0.0110 (0.0042)*	
CEO_board dummy	-0.0804 (0.0482)***	0.0029 (0.0490)	-0.0546 (0.0489)			
Director-CEO duality / board size				0.1150 (0.0405)*	0.1241 (0.0432)*	
Foreign directors / board size						-0.2312 (0.0931)**
Busy board dummy - Insiders	0.1552 (0.0574)*	0.1246 (0.0593)*	0.1401 (0.0577)**			
Family	0.0489 (0.0175)*	0.0214 (0.0184)	0.0407 (0.0181)**	-0.0126 (0.0087)		
HI_concentration	0.4217 (0.0934)*		0.2107 (0.0686)*			
Lag HI_concentration						0.0945 (0.0497)**
CR4 * Independence_Ratio	-0.5249 (0.1699)*	-0.2856 (0.1868)				
Equity-voting ratio largest stakeholder	-0.2977 (0.1010)*	-0.2785 (0.1102)*	-0.2859 (0.1067)*		-0.0752 (0.0342)**	-0.3933 (0.0839)*
High contestability dummy					-0.1029 (0.0349)*	
Log - operational income	0.0710 (0.0166)*	0.0812 (0.0175)*	0.0827 (0.0166)*			0.0985 (0.0136)*
Firm size	0.0759 (0.0173)*	-0.0932 (0.0184)*	-0.0868 (0.0180)*			-0.0556 (0.0139)*
Leverage	0.4384 (0.1007)*	0.3218 (0.1082)*	0.3131 (0.1030)*			
Assets tangibility						-0.1263 (0.0701)***

Table 13 (Cont.)
Firm value instrumental variables and performance regressions

| Variable	Tobin' Q 2SLS-Pooled			ROE OLS-Pooled		
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5	Eq 6
Listing experience						0.0011
						(0.0006)***
Dummy year 1999				-0.1045	-0.0947	-0.0647
				(0.0278)*	(0.0263)*	(0.0299)**
Dummy Liquidity						-0.0835
						(0.0292)*
Dummy for outliers	yes	yes	yes	yes	yes	yes
Intrumented variable	HI-con	CR4 * Ind	HI-con			
Constant	0.8296	1.1349	0.9377	0.0449	0.0905	-0.0196
Regression statistics						
Obs	217	217	217	367	365	205
R2	0.4791	0.4312	0.4660	0.2704	0.3028	0.3475
Mean VIF (Multicollinearity)				1.33	1.43	1.65
F-test	14.35	12.39	13.73	7.46	8.74	9.34
	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Test residuals						
Breuch-Pagan Heteroskedasticity				Robust SE	Robust SE	0.22
						[0.6359]
Ramsey-RESET omitted variables				20.85	36.63	17.58
				[0.0000]	[0.0000]	[0.0000]
Shapiro-Wilk normality				9.78	9.26	8.34
				[0.0000]	[0.0000]	[0.0000]

Instruments:

Eq 1: HI concentration = Lag HI concentration + Z
Eq 2: CR4* Independence = Lag CR4 * Independence + Z**;**
Eq 3: HI concentration = Lag HI concentration + Z

Notes:
Z = other exogenous variables included in the equation; Robust SE = White Hubert robust standart errors; Standard error in parenthesis, p-values in brackets: * = significant at 1%,** = significant at 5%, *** = significant at 10%.
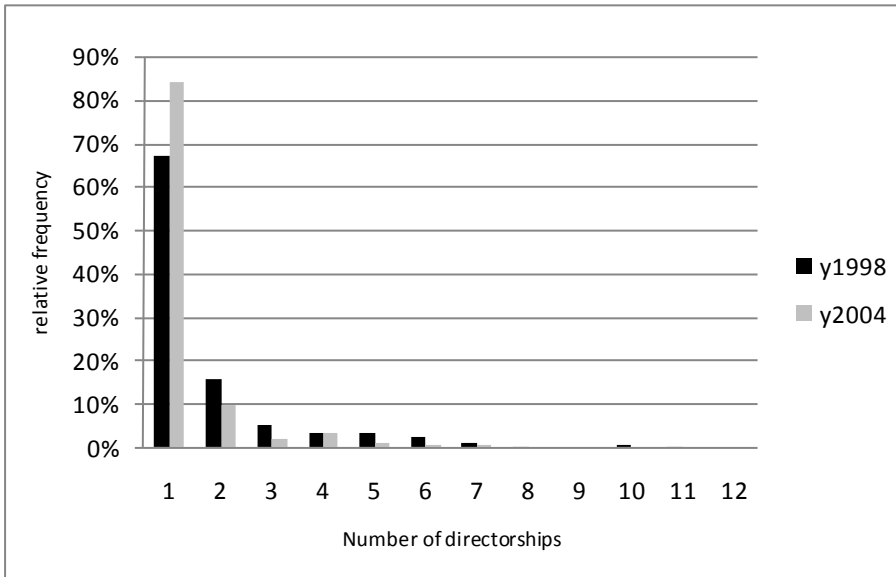**Source:** Our own estimations based on an assembled dataset from Financial Superintendence Forms, companies' financial statements and stock prices.

Figure 1- Main Blockholders
Reciprocal CEO and Director Interlocking
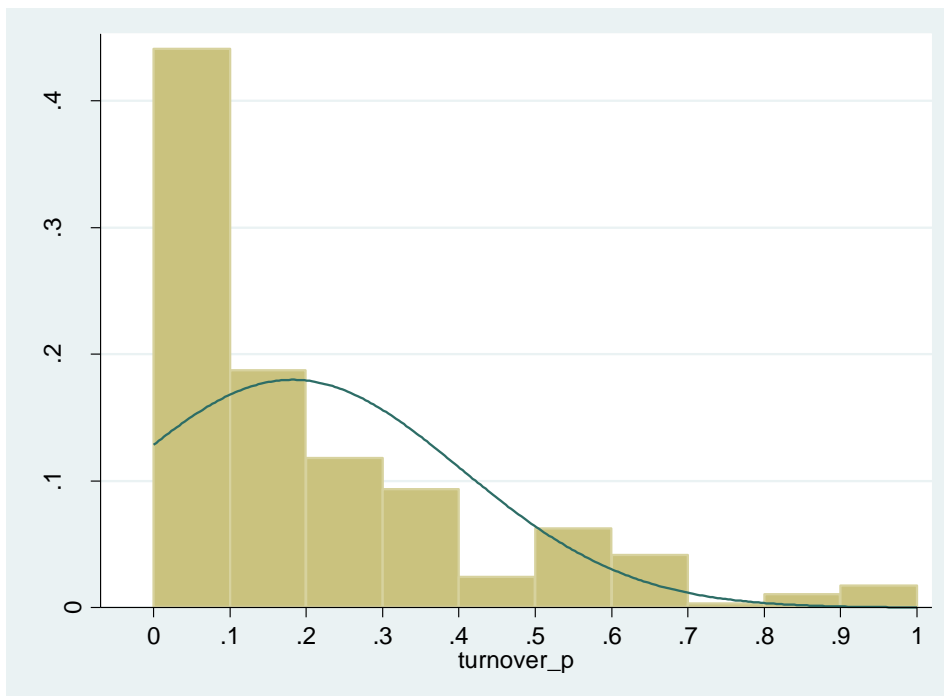*Grupo Empresarial Antioqueño (GEA), 2004*
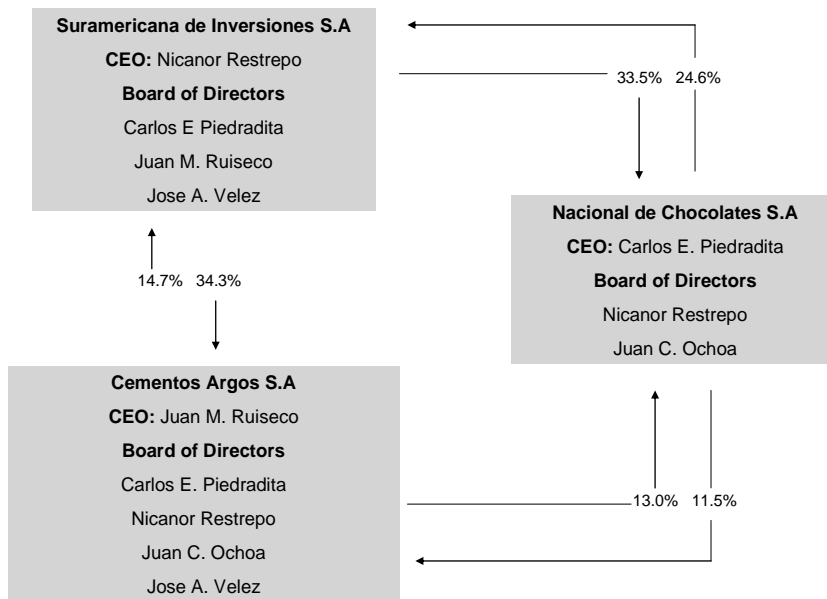
Notes: Numbers between arrows are the control (voting) rights in 2006 across companies.
Source: Our own estimates based on SFIN and SSOC assembled dataset.

Figure 2
Number of Directorships

Source: Our own estimates based on SFIN and SSOC assembled dataset.

Figure 3
Director Turnover Histogram

Source: Our own estimates based on SFIN and SSOC assembled dataset.

APPENDIX

Table A.1- Definition of variables

Value and Performance Variables	
Tobin's Q	The ratio between the market value of assets and their corresponding book value. Market value of assets was estimated as the sum of the book value of debt plus book value of preferred stocks plus market value of common stock (product of the average market price times the number of common stocks).
MTBR	*Market to Book Ratio:* $MTBR=\dfrac{\text{Common stock}}{\text{Total Assets}-\text{Total Liabilities}-\text{Preferred stocks}}$
MTSR	*Market to Sales Ratio:* $MTSR=\dfrac{\text{Common stocks}}{\text{Sales}}$
ROA	*Return On Assets:* The ratio of net profits after taxes to total assets
ROE	*Return on Equity:* The ratio of net profits after taxes to equity
Ownership and Contestability Variables	
CR1	Percentage of cash-flow rights of the largest voting block
CR4	Percentage of cash-flow rights of the four largest voting blocks
HI -Concentration	Herfindal concentration index. The sum of the squares of the four largest voting stakes. $[(\text{votes 1})^2 + (\text{votes 2})^2 + (\text{votes 3})^2 + (\text{votes 4})^2]$
HI-differences	The sum of the squares of the differences between the first and the secon votin stakes and the third and fourth largest voting stakes: $[\text{Votes 1} – \text{Votes 2}]^2 + [\text{Votes 2} – \text{Votes 3}]^2 + [\text{Votes 3} – \text{Votes 4}]^2$
Shapley Value	The Shapley value solution for the largest shareholder in a four voting game.
Equity 1-4	The fraction of cash flow rights held by the first, second, third, and fourth larger blockholder respectively
Equity-voting ratio 1 -4	The cash flow rights divided by voting rights for the first, second, third and fourth larger blockholder respectively
High contestability dummy	Dummy variable equals to 1 if the sum of the voting rights held by the three largest shareholders dos no exceed 50 percent an there is at least one more blockholder with at least 10 percent of the votes, and 0 otherwise
Board Variables	
Independence	*Independence ratio:* Number of independent directors / board size
Turnover	- *Turnover ratio*: Number of directors of year n that are no longer on the board at year $n+1$ / board size of year n.
Board interlocking	- *Reciprocal CEO interlocks:* For a firm i, the number of times that its CEO sits in the board of a firm whose CEO is reciprocally seated on the board of firm i - *External directorships held*: Maximum number of external directorships held by a single individual on the board of directors - *Board Interlocks within business group*: Number of external directorships held by a board member within firms affiliated to the conglomerate. Restricted only to firms in the sample. - *Director-CEO duality:* number of directors that are CEO of other firms
Board size	Total number of directors
Family	Fraction of the board of directors occupied by individuals with the same last name as the CEO
Female	Fraction of board seats occupied by women
Director-CEO duality / board	Fraction of board seats occupied by CEOs from other firms
CEO-board dummy	Dummy variable equals to 1 if a firm's CEO seats at the board, and 0 otherwise.
Busy board dummy insiders	Dummy variable equals to 1 if 50 percent of inside members are busy directors, and 0 otherwise.
Financial and firm characteristics variables	
Log- operating income	The logarithm of real operating income in pesos at 1999 prices
Firm size	The logarithm of total assets values in pesos at 1999 prices
Asset tangibility	The ratio of total property, plants and equipments to total assets
Leverage	The ratio of total liabilities to total assets
Growth - sales	The moving average of the rates of growth of sales; uses the three rates prior to year n
Listing experience	Number of years listed at the stock exchange
Dummy liquidity	Dummy variable equals to 1 if a firm's security is ranked as liquid by the FS, and 0 otherwise.

Table A.2
Spearman partial correlations
Boards' structure and firm performance measures, 1998-2004

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	Independence ratio	1										
(2)	Family	-0.1443	1									
(3)	Board size	0.3636	0.0185	1								
(4)	Reciprocal CEO interlocks	-0.3179	0.0765	-0.0547	1							
(5)	CEO-board dummy	-0.1153	0.6856	-0.0281	0.0755	1						
(6)	Female participation	0.0274	-0.0769	0.1205	0.0105	-0.1082	1					
(7)	External directorships /board size	-0.4880	-0.1700	-0.2047	0.4137	-0.1131	-0.1434	1				
(8)	Turnover ratio	0.0586	0.0552	0.1787	-0.0661	0.0086	0.0343	0.0099	1			
(9)	Tobin's Q	-0.1339	0.0614	0.0210	-0.0010	-0.0346	0.1759	-0.0745	0.0805	1		
(10)	ROE	-0.0623	-0.0814	-0.0086	0.0891	-0.0318	0.0804	0.0476	-0.0996	0.2524	1	
(11)	MTBR	-0.1283	0.1058	0.0581	0.0849	0.0005	0.1508	-0.0081	0.0287	0.8650	0.3461	1

Source: Our own estimates based on SFIN and SSOC assembled dataset.