

## **Pyramids: Empirical Evidence on the Costs and Benefits of Family Business Groups**

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## **Pyramids: Empirical Evidence on the Costs and Benefits of Family Business Groups**

**Abstract:** We analyze whether family-controlled business groups, which are often structured as pyramids, are a means to facilitate better access to capital or to expropriate minority shareholders. At the country level, we find that, access to outside funding, taxation and regulatory factors are more important than the strength of the corporate governance environment in explaining the prevalence of business groups. At the individual firm level, group-affiliated firms tend to be larger, less risky, and more highly levered, and pay more dividends than non-group firms. Consistent with some previous findings, group-affiliated firms on average have lower Tobin's Q than unaffiliated firms. However, after controlling for endogeneity in group membership choice, we find that a group structure helps improve firm value. Within groups, we find that Q increases down the pyramidal chain and decreases with the ultimate owner's cash flow rights, and that the direct shareholding of the group in a firm is an important (positive) determinant of Q. These firm-level results are contrary to previous findings that emphasize agency problems and expropriation of minority shareholders in business groups. Our evidence indicates that such expropriation risk is outweighed by the funding and corporate control benefits provided by a group, similar to a venture capitalist in a developed market. Overall, both the country- and firm-level analyses point to a consistent implication that business groups exist and persist because of their critical roles in assisting projects that might not be otherwise funded by external investments, especially in underdeveloped capital markets.

## Introduction

The ownership structure of publicly listed firms differs markedly across the world. Concentrated ownership in the hands of wealthy families or individuals, while relatively infrequent in developed markets, is commonplace in smaller markets and emerging economies (La Porta et al, 1999 and Claessens, Djankov and Lang, 2000). A popular way in which wealthy families can control multiple independent firms is through a family business group, where member firms are connected together through inter-corporate shareholdings and common ownership ties to a controlling family in the form of a pyramid or a cross-shareholding structure.

Existing research on business groups (family controlled and otherwise) points to both important costs and benefits (see Khanna and Yafeh (2007) for a review). Studies such as Bertrand, Mehta and Mullainathan (2002), Bae, Kang and Kim (2002), Joh (2003) and Baek, Kang, and Lee (2006) suggest that pyramidal groups can facilitate expropriation of minority shareholders through various tunnelling activities.<sup>1</sup> Almeida and Wolfenzon (2006a) point to social welfare costs brought about by inefficient internal capital allocation of family groups. Fogel (2006), Morck, Strangeland and Yeung (2000) and Morck, Wolfenzon and Yeung (2005), argue that family groups become so dominant that they acquire enough political influence to entrench their position at the expense of economic and institutional development. Stulz (2005) in fact argues that these family firms can actively oppose capital market reforms, since they broaden external capital access and encourage market entry by potential competitors.

On the other hand, studies such as Khanna and Rivkin (2001) and Khanna and Palepu (2000) find that group affiliation in emerging markets is associated with better performance. The basic premise underlying these findings is that group reputation substitutes for underdeveloped legal and regulatory mechanisms that leave outside investors vulnerable to exportation risks and information asymmetries in the market, and thus reluctant to invest. In the absence of adequate protection mechanisms, access to capital markets is seriously restricted. Fisman and Khanna (2004) suggest that business groups promote economic development in this risky environment, because they are able to overcome such problems and expand into underdeveloped regions, where these problems are most severe. Khanna and Palepu (1997) argue that business groups can also substitute for weak educational institutions, because they have a greater incentive to invest in management training programs compared with unaffiliated firms. Gopalan, Nanda and Seru (2007) find that business

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<sup>1</sup> Johnson et al, (2000) also provides examples of how tunnelling can take place.

groups often lend financial support to financially distressed member firms. Finally, Khanna and Yafeh (2005) examine the idea that business groups facilitate risk sharing which provides mutual insurance to group firms that shield them from capital market shocks, that can be particularly pronounced in emerging economies.

In this study we seek to understand the factors that contribute to the existence and prevalence of family-controlled business groups based on two levels of analysis. First, at the country-level, using a sample of 45 countries we examine the factors that explain cross-country variations in the prevalence of family controlled-business groups. While groups may emerge for different reasons in different markets, (Khanna and Yafeh, 2007), we focus on several quantifiable country-level characteristics, common to all our sample countries, whose variation may explain why family controlled business group are more popular in some countries than others. Our country-level factors are broadly categorised as those that facilitate private benefits of control (e.g. corruption, weak investor protections etc), those related to economic development (poor access to capital, poor education), and the tax system and other regulatory factors. In general, we find private benefits of control have little ability in explaining business groups. Country-level measures of access to capital seem to be more important in explaining the prevalence of family groups, reflecting their ability to utilise internal capital in markets when capital is scarce in external markets (Almeida and Wolfenzon, 2006b).<sup>2</sup> This is not to say that corporate governance factors are unimportant. Rather we conjecture that corporate governance factors can influence the prevalence of family business groups through two channels; directly by facilitating the extraction of private benefits of control and indirectly by restricting the amount (or increasing the cost) of capital, outside investors are willing to provide to firms. To this end, we suggest that role of corporate governance is more important in terms of its access to capital implications, rather than its effect on the extraction of private benefits. Among our other country-level explanatory factors, we find that tax and merger and acquisition rules also play an important in explaining the cross-country prevalence of family business groups.

We also attempt to distinguish between reputation and private benefits explanations for the existence of business groups as both effects can explain why groups are more popular in markets where private benefits are large and sources of capital are scarce. Our empirical analysis suggests that business group reputation acts to curb the extraction of private benefits of control, rather than acting as a vehicle to facilitate private benefits of control, making it attractive for minority

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<sup>2</sup> Almeida and Wolfenzon (2006b), refer to this advantage as a Financing Advantage.

shareholders to invest through a business group structure when private benefits are large. Our results are robust to endogeneity biases, and possible reverse causality explanations for family-controlled group effects on corporate governance standards and the availability of capital.

The second level of our analysis aims to understand the motivations behind family business groups by first comparing them with non-group firms and second, by examining the relationship between the positioning of each firm in the group and various characteristics of these firms, and in particular, firm performance. From a total sample of 22,486 firms we are able to identify 640 family controlled groups, comprising of a total of 1841 firms. For each group we map out its exact structure in terms of the number of pyramidal layers in the group and the position of each member firm in the chain of control. We also calculate the cash flow and control rights that belong to the ultimate owner (the controlling family/individual at the apex of the pyramid) for each firm. First, we focus on the relationship group and non-group firms. Our univariate analysis confirms that group-affiliated firms tend to have lower Tobin's Q than unaffiliated firms. Group firms also tend to be larger, less volatile, pay more dividends and have higher capital expenditures. Second, our within-group comparisons reveal that Tobin's Q actually rises down the pyramidal chain. This is contrary to some theories of pyramidal groups that emphasize agency problems and risk of minority shareholder expropriation, which is predicted to be a function of the cash flow and control rights of the ultimate controlling shareholder.

Next, we re-examine our univariate findings in multivariate regression framework. In our tests comparing group and non-group firms, we employ several econometric techniques to control for selection biases (e.g. the possibility that firms with certain characteristics are selected into family business groups). We find that our univariate results of lower Tobin's Q in group-affiliated firms is reversed. This finding indicates that endogeneity has an important impact on our results that is more consistent with an internal capital market explanation, rather than an expropriation explanation for family groups. It appears that while firms in business groups on average have a lower market value than non-group firms, this may simply reflect that most high-value projects can overcome information asymmetries themselves to obtain external funding and do not require the support of a business group's internal funds or reputation. In contrast, projects with lower value may find it impossible to be independently funded in less developed capital markets and may need to be supported through a group structure. However, having accounted for this endogenous selection (treatment effect), we find that the group structure helps to enhance firm value. This positive relation

indicates that for those firms that choose to be in a group, the benefits of obtaining cheaper funding (relative to the cost of capital from external markets) and certification of quality by the group help improve their market valuation.

We also re-examine our within-group univariate results controlling for group and non-group selection, within group selection effects, and potential endogeneity between Tobin's Q and pyramidal placement using Heckman two-stage regressions. Consistent with our univariate results, and in contrast with a number of previous studies, we find that that Tobin's Q rises down the pyramidal chain, where the ultimate owner's cash flow rights also decrease. This evidence is not consistent with suggestions that firms at the bottom of a pyramid group (and those having the low cash flow rights) are the most likely to be expropriated. More importantly, we find that the direct shareholding of the immediate parent in the pyramid firm is significantly positively related to Tobin's Q. We interpret this finding as indicating that the upper echelons of the shareholding chain connecting each firm in the pyramid to the ultimate owner are previously chosen in an optimal manner, so that any deviations can adversely affect the rest of the group. Therefore, it is a group's direct ownership stake in a newly formed or acquired firm at the bottom of the pyramid (the final link in the chain of control), rather than the ultimate cash-flow rights at the apex of the pyramid, that provides the most appropriate channel to examine the ultimate owner's motivations and strategies for expanding a business group. We argue that this is the most important link because it generally defines a group's level of control (i.e., voting power) as well as cash flow rights and amount invested in a junior firm in the pyramid. The positive relation between this direct ownership link and firm value indicates that to minority shareholders, the funding, certification of quality and corporate control/monitoring benefits provided by the group appear to outweigh the cost of potential expropriation.

Moreover, our results show firms at the bottom of the pyramid tend to have not only higher Tobin's Q, but also higher capital expenditures, indicating they have high demand for external capital. They also tend to have high risk (stock return variance), which offers a good reason for limiting the ultimate owner's cash flow rights in these firms. At the same time, the substantial external funding requirements of the junior firms in capital markets with limited investor protections presents serious challenges, given the limited amount of external funding available in such high moral hazard situations. This makes the immediate parent firm an attractive source of direct funding to meet the junior firm's investment needs. Such funding also offers a strong reason for the

immediate parent to hold significant control rights in these firms so as to offset the potentially large moral hazard problem associated with being an outside investor with limited minority shareholder protections. This is the same rationale for giving superior control rights to venture capitalists.

While a number of related research papers examine the motivations behind business groups in general, we choose to focus specifically on family-controlled business groups. This choice is motivated by the fact that business groups controlled by widely held firms, or those made up of cross-held firms with no dominant shareholder, do not possess the same incentives to maintain reputation as family controlled groups. For example, Korean chaebols or Japanese keiretsus have often been criticised as being “headless bodies” because there is no accountable shareholder who bears responsibility for the actions of the group. Instead such groups allow member firms to mutually insure themselves against adverse market movements and protect themselves from hostile takeover bids.

Overall, our findings are consistent with the importance of internal capital market benefits that family-control business groups facilitate, in that the positioning and size of the stake taken in new group firms help strengthen their value. These findings are in line with Gopalan, Nanda and Seru (2008), who find that dividend payments amongst group firms in Asia and Europe, are a means of distributing funds in an internal capital market. Similarly, we find support for Almeida and Wolfenzon’s (2006b) theoretical proposition that beyond simply enhancing control, arranging firms in a pyramidal structure provides a *financing advantage*, because groups can tap into a larger pool of retained earnings. Our results also support the findings of Gomes (2000) and Gopalan, Nanda and Seru (2007) who show that reputation is key element in attracting funding in the presence of weak investor protection.

The rest of the paper is structured as follows. Section I describes our ownership data and business group construction procedures. Section II identifies potential country-level determinants of the prevalence of family business groups and presents the results of our country level empirical analysis. Section III presents our firm-level empirical analysis of the relationship between group membership and various firm-level characteristics. Finally, section IV summarizes our conclusions.

## I. Ownership Data and Group Construction

To construct business groups we begin by collecting ownership data for each of our sample firms across the 45 sample countries. Despite the availability of a number of databases that provide international ownership information for listed firms, the coverage provided by any given single databases is not complete. Thus we use multiple data sources to ensure maximum coverage. Our primary sources of data are the *Osiris* database from *Bureau Van Dijk*, the *Worldscope* database from *Thomson Financial* and various information providers in *LexisNexis*.<sup>3</sup> Despite the use of multiple databases we find that ownership information is missing for a significant number of firms. In these cases we resort to a manual search of individual firms to identify their owners. The manual search process begins by searching for firms individually in two online databases, the *Who Own's Whom* database by *Dunn and Bradstreet* and the *OneSource* database. For the remaining firms without ownership we refer to their annual reports, obtained from the *Mergent Online* or company websites. This constituted a significant portion of ownership information for firms in Mexico, Malaysia, Pakistan, Sri Lanka, Singapore, Thailand and Israel. In other markets such as India and Chile, ownership data on listed firms is made available on the stock exchange websites. In total we obtain ownership data for 22,486 firms.

Based on the ownership data we collect, the first stage of the group construction process is to distinguish between widely-held (independent) firms and those that are controlled. As a starting point, we define control at the 20 percent threshold and identify firms with a single shareholder at or above this threshold. Ideally, firms that did not satisfy this criterion could be ruled out as being independent firms. However, this is not necessarily the case. In many emerging markets, where groups are most prevalent, controlling shareholders do not report their total beneficial holdings in a firm. The shareholdings of the controller are often spread out and held in the name of a number of other entities such as private holding companies, by other family members, or in the case of firms belonging to business groups, in the name of other group entities (listed and unlisted). Moreover even when information on beneficial shareholdings is available, it is often disclosed only in notes to company annual reports or through stock exchange websites, but not in the ownership databases listed above.

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<sup>3</sup>We find that these data sources are somewhat complementary, in that a firm available in one database is often not available in another and vice-versa. Multiple data sources also allow us to cross-check outlying observations.



Thus, to determine whether such firms are ultimately controlled, we individually examine the shareholder data of firms with a large number of scattered shareholdings to identify if any of the above ownership patterns exist.<sup>4</sup> We limit this manual search to markets where beneficial ownership is not disclosed in our primary ownership databases. As a first step, we refer to the company's annual report and/or stock exchange websites, to confirm whether the fragmented shareholdings are vehicles used by controlling shareholders. When such information is not available, our second step is to identify the largest shareholding vehicles in the shareholder lists, and search for them in the shareholder lists of other firms. Through an examination of their annual reports, we can observe the holdings of these entities in other firms which often allows us to establish which controlling shareholder they are all connected to.<sup>5</sup>

While the above procedures allow us to confirm the ultimate controlling shareholder for a majority of firms, in some cases there still remains doubt over the control status of a firm (i.e. firms where we can not establish that that a set of affiliated shareholders hold in total over 20 percent of their shares). Thus in the final step, we focus on the doubtful cases and on firms where the above steps have not been able to establish any likely controlling shareholder. For these firms, we search media resources (via *Factiva* and the *Google* search engine) for articles which confirm that the firm in question is controlled by a particular group, individual or family. If we can confirm that this is the case, we assume that all of the unidentified private companies are vehicles used by the controlling investor or family.

The next stage of our group construction process establishes the type of entity that is in control of each of our sample firms. While the above procedure has established whether a firm is controlled by an ultimate owner, we want to distinguish family from non-family control.<sup>6</sup> We do this by establishing a unique identity for a controlling family, so that firms controlled by the same family can be grouped together, and then eliminating firms that are controlled by government, other widely held firms, and banks or other widely held financial institutions.<sup>7</sup> Controlling shareholders in the

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<sup>4</sup> In many cases the procedure is straightforward as individual shareholders have the same last name, or can be quickly identifies as the spouse of the controller.

<sup>5</sup> Finding common shareholders also helps us identify whether two firms are in the same group, which is used in the next stage of the group identification process.

<sup>6</sup> Throughout each of the above steps, the group affiliation of the firm in question is revealed.

<sup>7</sup> This is done by searching for controlling shareholders whose name contains the word "government", "province", "state" or their equivalents in foreign languages. We also identify government controlled investment agencies such as Singapore's Temasek. To identify controlling shareholders that are financial institutions, we obtain a master list of financial institutions around the world compiled by Li et al. (2006).

remaining firms are recorded either in the name of individuals or families, or in the name of other public or private companies. In some cases we find that an allied group of individuals ultimately owns a firm (such as the GEA Group of Colombia and the Shrem Fudim Group of Israel).<sup>8</sup>

We also find cases where a coalition of families, sometimes joined through marriage, are in control (such as the Boel, Solvay & Janssen families in Belgium). In both cases, we classify the firms as being family controlled. When a public company is the controlling shareholder, we then investigate its largest shareholders until we can identify the ultimate owner at the top of the chain of control.<sup>9</sup> When a private company is the controlling shareholder, we investigate who is the ultimate owner in control of this entity, similar to the process described above.<sup>10</sup> This is primarily done through company websites, annual reports and through media articles accessed via the Google search engine or Factiva.<sup>11</sup> In some cases where we can not identify the individuals behind a private company, but the company controls multiple firms, we assume that it is controlled by a family and assign it a unique family identifier.<sup>12</sup>

The above process allows us to assign to each of our family controlled firms a unique identifier based on the specific identity of the family in control. In the next step we make use of these identifiers to group together firms with a common controlling family. When two or more firms in the same market are linked together by one common controlling family, we define this as a family-controlled business group. We allow a controlling family to be foreign-based provided they hold two or more firms in the same market. We find that a number of groups, although comprising of many listed firms, control only one firm in a particular national market. In this case, we classify the firm as not being group affiliated in the market in question.

Once our family-controlled firms have been identified and grouped together, the next stage in our process is to ensure that the family-controlled groups are constructed as accurately as possible. To do this we re-examine the ownership of each firm belonging to each group to identify if any cross-holdings exist between member firms. Furthermore, once a group has been identified, we also search through a number of web resources and media databases to cross-check if our list of member

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<sup>8</sup> Both groups are controlled by a group of businessmen.

<sup>9</sup> This also allows us to establish if the firm is held in a pyramid structure.

<sup>10</sup> Where possible we identify the cash flow rights held in the private company (for example, we occasionally find that the controlling family has 50/50 partnership in a private company which subsequently controls a public company.)

<sup>11</sup> The identification of the controlling family is made easier by examining the boards of directors of these firms, because the CEO or Chairman is often a member the controlling family. This narrows our list of suspected families which makes their control much easier to confirm.

<sup>12</sup> This is limited to very few cases mainly in Indonesia

firms for each group is complete.<sup>13</sup> This allows us to catch any additional group firms that were overlooked in our initial classification procedure. In total our group construction procedure identifies 640 family controlled groups, comprising of 1841 firms from 45 countries. Our coverage of firms is far greater than other studies that examine business groups. For example Khanna and Yafeh (2005), look at only 15 countries, in which our coverage of sample firms is significantly higher for most countries.

To our knowledge this is the first paper to document the prevalence of family controlled business groups across a large number of countries. Claessens, Djankov and Lang (2000) and Faccio and Lang (2002) document the extent of pyramid control as a means of separating cash flow and control rights among 9 East Asian and 13 Western European economies respectively. Similarly, La Porta, Lopez, Shliefer and Vishny (1999) document the popularity of control pyramids and cross-shareholdings based on the largest 20 listed firms across the 27 richest economies. However, apart from a number of illustrative examples they do not attempt to understand the pervasiveness of family business groups, nor the dynamics of group structure and by construction they exclude less developed markets where groups are especially persuasive. Faccio, Lang and Young (2001) identify business groups in 14 Western European and East Asian countries, while Khanna and Yafeh (2005) do the same for 14 emerging countries mainly from Asia and South America. However they only identify whether a firm is group affiliated or not, without regard to the structuring of the group and to their sample firms' exact position in the group structure.

### **A. Constructing Cash Flow and Control Rights for Group Firms**

The above process allows us to establish the identity of the immediate parent, the identity of the ultimate parent and shareholdings of the immediate parent and other group entities in each group affiliated firm. This information allows us to map out the structure of each group and calculate the ownership and control rights for every group firm as well as its position within the group. We construct several measures of the controlling family's ownership and control rights as well as measures for each firm's position in the group.

The first measure is the *direct* percentage ownership a group holds in the member firm. For example, A (the controlling family) can hold shares in Firm D, through two shareholding chains. A could own 40% of Firm B and 30% of Firm C. Firms B and C in turn hold 20% and 40% of Firm D,

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<sup>13</sup> We search the Forbes Billionaires list to ensure that billionaires, who are often behind these groups, are accounted for.

respectively. In this situation the direct percentage ownership of Firm D attributable to the group is  $30\% + 40\% = 70\%$ .

The second measure is the ultimate cash flow rights of the controlling family in each group firm, defined as the former's total claim on each dollar of earnings generated by the latter. This is calculated by summing the cash flow rights across all of the chains of shareholdings through which the controlling shareholder establishes its interest in the group firm. For each chain, the cash flow rights are the product of all observed percentage shareholdings connecting various firms along the chain. In the above example, the ultimate cash flow rights of A in Firm D is:  $0.4 \times 0.2 + 0.3 \times 0.4 = 0.20$  or 20%.

The third measure is the control rights that the controlling shareholder can exert in each group firm. For each chain, the control rights are the smallest percentage voting interests (the weakest link) observed along the chain. Where multiple control chains exist we sum the control rights across all of the chains to arrive at the total control rights. In the above example, if all group firms issue shares with equal voting rights, the ultimate the control rights are equal to: 20% (weakest link along the first chain) + 30% (weakest link along the second chain) = 50%. If, for example, C issued a certain number of shares with superior voting rights to A, so that A actually controls 50% of its votes, then the ultimate control rights are equal to: 20% (weakest link along the first chain) + 40% (weakest link along the second chain) = 60%.<sup>14</sup> This weakest-link definition reflects the risk that the ultimate owner may lose control of a shareholding chain, where its voting rights is lowest.

The final measure is the position of each firm in the group. In particular, we count how many layers of listed firms exist above each group firm along each shareholding chain and take the minimum of this figure across all of the chains. In the above example, this position measure would be equal to one for D and zero for B and C. In other words, B and C are directly controlled while D is indirectly controlled through one layer of firms.

One issue that complicates the calculation of these measures arises when group firms own shares in each other (i.e., cross-shareholding). For example, A owns 40% of Firm B, B in turns owns 30% of Firm C and 20% of Firm D. In addition, C and D each own 20% in each other, creating a cross-shareholding layer. In such a case, the cross-shareholding between two firms means that each

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<sup>14</sup> We obtain information on percentage ownership of voting rights from Worldscope. In cases where this information is not available, but we know that the firm issues multiple classes of shares with different rights (i.e. from the Datastream or Mergent Online database), we assume that all of the superior voting shares belong to the controlling shareholder / parent.

effectively owns some shares in itself. For every one dollar of earnings generated by Firm C in the above example, C itself has an interest in  $0.2 \times 0.2 = 0.04$  or 4 cents of its own earnings. This is similar to the situation where a company has just conducted a share buyback or owns treasury stock, and thus means that each shareholder has  $1/(1-0.04)$  share of cash flow rights more than the level implied by his or her nominal percentage shareholding. In summary, the four ownership and control measures (as discussed above) for Firm C can be calculated as follows: (1) the direct ownership percentage of Firm C attributable to the group is  $(0.2+0.2)/(1-0.04)=0.41667$  or 41.67%; (2) the ultimate cash flow rights of A in C is  $0.2/(1-0.04)*0.3*0.4 + 0.2/(1-0.04)*0.2*0.4 = 0.0417$  or 4.17%; (3) the weakest-link control right of A in C is  $20+20 = 40\%$ ; and (4) the minimum number of firms between C and A is one.

## **B. Descriptive Statistics and Country-level Measures of Family Business Groups**

Our construction of family business groups allows us to calculate several country-level measures of the prevalence of these groups. The first measure is calculated as the percentage of all listed firm in the market that belong to a family business group, and is labelled *% Group*. We are also interested in the use of pyramid structures as a means of arranging a business group, as the prevalence of such structures has been heavily scrutinized in the literature. A pyramid is defined as a group in which there is at least one firm not directly held by the ultimate controlling shareholder (i.e. there are at least two layers of firms). We measure the use of such structures by calculating the percentage of all listed firms in the market that are pyramid-controlled group firms (*% Pyramid*). While this measure allows us to ascertain the frequency of the use of pyramid structures in family business groups, it does not indicate the extensiveness (or depth) of the pyramids. Thus, for each country we calculate an *Average Pyramid Score* variable. In the same manner as the group position variable described above, we assigning a number to each firm in a family business group corresponding to the number of listed firms that separate it from the ultimate owner.<sup>15</sup> We then sum the pyramid score of every firm in each market and divide by the total number of listed firms to obtain the country-level *Average Pyramid Score*. This measure can also be interpreted as the country-level average separation of cash-flow and control rights achieved through pyramiding. All of the above measures are subsequently used as dependent variables in our country level regression analysis to follow.

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<sup>15</sup> In cases where the apex of the group is made up of two cross-held firms are given a pyramid score of 1.

We also construct *% Group* and *% Pyramid* variables, which are based on the percentage of total market capitalization that is due to family business groups and pyramid controlled firms respectively. We label these variables *% Group MC* and *% Pyramid MC*.<sup>16</sup> Finally, we calculate two additional statistics that measure the concentration (or power) of family business group in each of our sample countries. The first is the number of groups divided by the number of total firms in the market, (*Group Conc*). The second is the market capitalisation held by the largest group in the market (*% Largest Group*). Table II presents all our country-level business group measures, along with the identity of the largest family business group in each country based on both the percentage market capitalization under their control and the number of firms in the group.

Not surprisingly, our country-level measures in Table II reveal that the prevalence of family business groups is concentrated in emerging markets. For instance, the proportion of listed firms belonging to family business groups (*% Group*) is at least 30% in Colombia, Israel, Sri Lanka and Turkey, with Sri Lanka being the largest at 41%. The trend is similar for group firms that are controlled through pyramids (*% Pyramid*). There are however, some important differences in these two statistics, indicating that pyramid structures are less popular in some markets than others. In India for example, 28.8% of listed firms belong to a family business group, while only 8.13% are controlled through a pyramid. Similar patterns exist in Turkey and the Philippines. In contrast, the proportion of business group firms structured as pyramids compared to all business groups is much larger in Colombia and Sri Lanka (28.57% out of 35.71% and 31.62% out of 41.03% respectively). While family business groups may only control a few firms in a market, they can often be very large firms that play a key role in the nation's economy. Our market capitalization measures (*% Group MC* and *% Pyramid MC*) attempt to capture these dimensions of the economic environment. Most notably, the South-East Asian Markets, such as Singapore, Malaysia and Indonesia display a significant difference between the number of firms controlled and the value of firms controlled. For example only 12.65% of listed firms in Singapore belong to family business groups, but these groups represent 31.52% of equity market capitalization.

The country level measures examined thus far focus on the prevalence of family business groups. In contrast, the *Average Pyramid Score* provides insight into how these groups are structured and specifically the extent (or depth) of pyramiding. The highest pyramid score is achieved by

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<sup>16</sup> We are unable to obtain market capitalisation information for approximately 7 percent of our group firms or 143 out of 1841 firms in our sample.

Colombia, indicating that on average, Colombian groups have the most pyramidal layers in their family groups. It also suggests that the average separation between cash-flow and control rights is greatest among Colombian family groups. It is also noteworthy that group firms controlled through pyramids make up approximately 15% of market capitalization for Chile, Colombia, Malaysia, Sri Lanka and Turkey. However, *Average Pyramid Score* differs markedly across these four countries (25, 64.29, 9.54, 38.46 and 19.51 respectively).

Finally, our group concentration measures indicate that the degree to which a small number of business groups dominate a local stock market varies significantly across our sample countries. Chile's Angelini family, Colombia's GEA Group, Israel's Shrem, Zimmerman & Fudim Group, the Phillipine's de Ayala family, and Singapore's Leng Seng Wee, all control more than 10% of their respective country's market capitalization. In contrast, in more developed markets such as the US, UK and Japan, the largest family controlled business group owns less than 1% of stock market capitalization.<sup>17</sup> The *Largest Group by No. of Firms* produces two stand-out family business groups, namely the Tata group in India comprised of 24 listed firms and the Dankner Group in Israel comprised of 26 listed firms in our sample. Although both business groups control the largest number of listed firms in their respective markets, they are not the largest business groups by market capitalization.

## **II. Country-level Determinants of Family Business Groups.**

The business group literature suggests that a number of country-level factors contribute to the prevalence of business groups around the world. However, Morck, Wolfenzon and Yeung (2005) states that “*much additional theoretical and empirical work is needed to solidify hypotheses in this area and to distinguish presumptions from facts*”. Our paper is a first attempt to provide empirical evidence on the reasons for cross-country variations in the existence of family business groups. Using past theoretical and descriptive studies, we identify possible country-level determinants of these groups, and utilize several variables to proxy for them. We next describe these factors and explain how they are measured for the purposes of our empirical analysis.

### ***A. Private Benefits of Control***

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<sup>17</sup> While Japan and Korea both have a substantial amount of business groups (Keiretsus and Chaebols) these are almost always controlled by a widely held firm and thus we do not include them in our sample.

Perhaps the most cited reason explaining the prevalence of family controlled firms is that they facilitate the extraction of private benefits of control. Private benefits available to families who control numerous firms through business groups may be magnified in comparison with families in control of a single firm. For example large family business groups can often wield significant political power (Morck, Wolfenzon and Yeung, 2005), which can be used to entrench or strengthen their control over corporate assets or to solicit political favors. Transfer pricing and other intra-group resource shifting mechanisms allow the distribution of profits to the group firms where they are most valuable to a controlling family. Moreover, structuring business groups as pyramids, creates a divergence between cash-flow and control- rights, which increases the incentives of controlling families to tunnel profits out of lower tier firms at the expense of minority shareholders. When such opportunities to capture the private benefits of control exist, then there is a greater incentive for controlling families to retain and magnify their control of corporate assets through a group structure.

We measure a controlling family's ability to capture private benefits of control by using the country-level average block premium estimated by Dyck and Zingales (2004). The block premium is derived based on the average difference between the negotiated price for a controlling block of shares and the prevailing market price. It allows us to analyse how country-level differences in the estimated value of private benefits of control influence the prevalence of family groups. However, the average block premium is only available for 33 of our 45 sample countries.<sup>18</sup> Therefore we also test the individual country-level factors, classified by Dyck and Zingales (2004) as either legal or extra-legal mechanisms, which curb the extraction of private benefits of control.

Legal mechanisms that discourage the consumption of private benefits of control involve the ability of minority shareholders to limit the appropriation of value by controlling shareholders. The enforcement of a greater number of protective rights and a greater ability to exert influence on corporate decision making should lead to smaller private benefits of control. We utilize a number of variables that measure the protection minority shareholders rights. First, the *Anti-director Rights* index constructed by LaPorta et al (1997) and updated in Pagano and Volpin (2004) quantifies the presence of six important provisions related to shareholder rights in a country's corporate laws and commercial code. Second, while minority rights may be well protected under the law, their effect can be weakened if they are not effectively enforced. To measure the degree of enforcement, we

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<sup>18</sup> In some countries such as Austria and Portugal the *Block Premium* is only calculated based on two transactions, which also leads rely more on our other private benefits measures.



employ quantitative assessments of the rule of law (the extent to which agents have confidence in and abide by the rules of society), regulatory quality (the ability of government to formulate and implement effective policies for the regulation of businesses and markets), and the control of corruption that come from Kaufmann, Kraay, and Mastruzzi (2003). Third, country-level disclosure standards dictate the ability of non-controlling shareholders to monitor corporate decision making and limit any potential self-dealing by insiders. To measure disclosure standards we use survey data from the World Economic Forum's Global Competitiveness Report. We use responses to the question: "Access to reliable and timely information on company financial performance is: 1 = often insufficient, delayed and difficult to obtain, 7 = regular and easy," and label this variable *WEF Disclosure*. Finally, as a summary measure, we construct a *Governance Index* by aggregating all of the above factors together using weights based on a principle components analysis.<sup>19</sup>

Extra-legal mechanisms place constraints on the extraction of private benefits by imposing external discipline on controlling families. Dyck and Zingales (2004) suggest that product market competition disciplines a family wishing to use transfer pricing to tunnel resources out of a controlled firm because prices are more objective and verifiable when markets are competitive. Furthermore, the inefficient allocation of resources brought about by the consumption of private benefits will threaten the survival of a family-controlled firm in a competitive market. Similarly, increased competitiveness brought about by openness to the world economy may also threaten group controlled firms. We measure the country-level extent of product market competition using a survey variable from the World Economic Forum's Global Competitiveness Report. We use responses to the question. "Competition in the local market is (1 = limited in most industries and price-cutting is rare, 7 = intense in most industries as market leadership changes over time)" and label it *Competition*.

Another relevant extra-legal factor that can play a particularly important role in understanding family-business groups is the role of reputation. The consumption of private benefits by a controlling family comes at the expense of a damaged group reputation. For families that intend on controlling only a single firm, the value extracted from consuming private benefits may outweigh the reputation cost. Families that intend on creating or expanding their business groups, however, will bear significant reputation cost, which may outweigh the value of the private benefits consumed. The reputation cost of consuming private benefits of control depends on whether information

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<sup>19</sup> We also use the Anti-self Dealing Index from Djankov et al (2008) as alternative measure of the protection of minority investors from expropriation by controlling shareholders and find the results to be qualitatively similar.

relating to improper behaviour by controlling shareholder can be widely disseminated. We measure this by the average circulation (or copies printed) of daily newspapers per 1000 inhabitants as measured in 2000, for each of our sample countries.<sup>20</sup> We obtain this variable from the *World Association of Newspapers* and label it *Newspaper*.

At this point it is important to note that there are two possibilities regarding the role of reputation in explaining the prevalence of family business groups. First, the desire to protect reputation curbs private benefits, and renders control less valuable, leading to less incentive to establish business groups. Second, while reputation may curb private benefits, it also creates a competitive advantage for family business groups who can use their reputation as a substitute for strong legal protections of minority shareholders, thus giving business groups a competitive advantage in weak legal protection environments. Indeed, all of our measures of private benefits of control (investor protection, newspaper circulation, competition etc.) can be interpreted in a similar manner. In our empirical results to follow, we attempt to distinguish between these two effects by using the proportion of all controlled firms (group and non-group) belonging to a family group as our dependant variable. Since this dependant variable is based on a sample of controlled firms only, we can assume that the effects of private benefits of control are constant. This allows us to consider the effect of the above variables on the prevalence of business groups, without needing to control for their ability to increase or decrease private benefits of control.

The final extra-legal mechanism we examine is government monitoring of firms through the tax system. An important way groups can generate private benefits of control is through shifting profits, assets, and liabilities within a group to minimize its overall tax liabilities. The government has an incentive to monitor within-group transfers in order to limit profit-shifting and maximize its tax revenue. Thus, the degree to which the government prescribes and enforces a strict inter-corporate tax rules will influence the ability of controlling families to tunnel resources out of firms less important to the family to those that are more important. We measure the effect of inter-corporate tax rules and enforcement using a tax transparency measure from the *Deloitte International Taxation Guide*. For each country, this measure is a sum of four indicators for: (1) whether there is a specific regulation that limits transfer pricing so that intra-group transactions must be conducted on an arm's length basis, (2) whether there is a specific rule against setting up a thinly

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<sup>20</sup> For 9 of our sample countries this figure was only available at some point before 2000, with the earliest being 1995 for Greece.

capitalized firms (low equity) so that income is redistributed as interest rather than dividend to minimize taxes, (3) whether there is a specific rule against setting up a controlling or holding company in a low-tax jurisdiction, (4) whether there is a specific requirement to disclose corporate transactions and structures that are related to the three requirements above for the purpose of strengthening the monitoring ability of the tax authority. We label this variable *Tax Transparency*.

### ***B. Access to Capital***

Another reason why family business groups are more popular in emerging markets is the difficulty in accessing capital. Khanna and Palepu (1997) argue that in most emerging markets, investors are generally wary of putting capital into unfamiliar ventures because mechanisms that curb private benefits are either absent or very weak. For example, in many such countries enforcement of insider trading laws is often nonexistent and securities law disclosure requirements are frequently lax. Thus, business groups can benefit if they are able to substitute for these deficient mechanisms using their greater visibility and reputation. Aside from expropriation risks, emerging markets are also characterized by lower GDP per capita, low savings rates and an underdeveloped investment management industry. These factors also serve to reduce the domestic pool of funds available for corporate investment.

Almeida and Wolfenzon (2006b) develop a theoretical model that illustrates how family pyramidal business groups can alleviate such capital constraints. They propose that a pyramidal business structure allows the controlling investor of the apex firm to access the retained earnings of all the group firms to help finance a new firm. Furthermore the family can then access the retained earnings of both the new firm and existing firms to finance a third new firm and so on.

We argue that when external capital is scarce, there are greater incentives for controlling families to organise firms into groups. Under such circumstances, the use of the group's internal capital becomes very valuable because of the high cost of external financing.<sup>21</sup> The use of a higher percentage of internal capital allows families to finance new risky ventures that otherwise could not be funded due to high information asymmetry and a prohibitive cost of capital. Moreover, expropriation risk faced by minority investors can be alleviated through the implicit protection provided by the family's reputation. In this sense, the group's role is much like that of a venture capitalist. These unique advantages in accessing capital and funding new firms make it attractive for

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<sup>21</sup> Almeida and Wolfenzon (2006b) point out that this is an extension of the pecking order theory.

both families and minority investors to invest through the group structures. This argument suggests that new high risk firms are likely to be financed in this manner. Group reputation can be especially valuable in economic downturns or periods of high market volatility and when firms face financial distress, which are all circumstances when outside equity investors and unaffiliated lenders are especially risk averse due to the severe moral hazard and adverse selection problems investors face in these markets.

In contrast, an independent entrepreneur will not have access to an internal capital market, creating a heavy reliance on expensive external capital. Even if these entrepreneurs can finance a large proportion of the new firm with their own personal wealth, they remain unable to sell equity to outside investors since they cannot offset their country's poor investor protection by relying on their own reputation in the capital market. The increased risk these outside investors face will force them to discount the value of the securities they receive to provide financing. As a result, an entrepreneur able to obtain external financing will be forced to hand over a larger proportion of ownership to outside investors. This further increases the cost of capital, as insiders are unable to signal their commitment to the firm by retaining a sufficiently large ownership stake.

We use a number of variables to measure the access to capital at the country level. First, we use the amount of savings scaled by GDP (*Savings to GDP*). Second, we attempt to capture the funds available from institutional investors, using the total equity invested (both locally and internationally) by domestic banks, insurance companies, pension funds, and mutual funds scaled by the domestic stock market's capitalization (*Institutional Funds*), obtained from Li et. al (2006).

### ***C. Lack of Managerial Talent***

In many emerging economies, the supply of well trained managers is severely restricted by a lack of quality business schools. Groups are able to substitute for weak educational institutions by investing in their own internal management development programs, which focus on identifying and developing talent within the business group (Khanna and Palepu, 1997). Family groups have the incentive to invest in such programs as they are able to utilize and deploy talented managers across their multiple member firms, maximizing the return on their investment in their employees' human capital. In contrast, the fixed costs of such training programs for small independent firms are generally too high to allow them to benefit from this activity. Thus, the prevalence of family business groups should be negatively related to the capacity of a country's education system to train

professional managers. We measure the quality and capacity of a country's business education system by employing a survey variable from the World Economic Forum's Global Competitiveness Report. We use responses to the question: "Management or business schools in your country are 1 = limited or of poor quality, 7 = the best in the world" and label it *Manager*.

#### ***D. Taxation Factors***

Morck (2005) points out that the double-taxation of inter-corporate dividends, introduced by the U.S. government in the 1930s, was explicitly aimed at addressing corporate governance problems created by business groups. Since inter-corporate dividends are a means to tunnel resources out of group firms, a tax on such dividends is argued to have repressed the dominance of family business groups in the U.S. relative to other countries. We collect information on the tax treatment of inter-company dividends across our sample countries from *Deloitte International Taxation Guide*, in order to test its effect on the frequency of family groups. However, we find that only three countries, Colombia, the U.S. and Pakistan, have some form of double taxation of inter-corporate dividends. Since there is insufficient cross country variation in this variable, we decide to exclude it from our empirical analysis.

Another element of a country's tax system, which can affect the extent of family business groups, is its tax consolidation rules. These rules govern how a parent can treat its subsidiaries for taxation purposes. In some countries, tax consolidation allows a family business group to be treated as one entity for tax purposes. This arrangement permits the parent to disregard intra-group transfers for income tax purposes and also allows tax-free movements of assets within the group. Tax regimes in different countries will have differing ownership thresholds at which they allow the parent firm to consolidate their subsidiaries. We distinguish between two tax consolidation regimes based on consolidation threshold levels. First, regimes where a parent firm is allowed to consolidated a subsidiary in which it has an ownership stake of less than 90% and second, regimes where consolidation is either not allowed or can only take place if the parent owns more than 90% of its subsidiaries. We construct a dummy variable equal to 1 if the sample country has the first regime and 0 otherwise. We label this variable *Accounting Consolidation*.

#### ***E. Merger and Acquisition Rules***

If a business group can create an internal capital market or leverage the reputation capital of a family or entrepreneur, then one important way to capitalize on such competitive advantages is to

expand the business group through acquisitions of large blocks of shares. Such transactions allow a group to avoid having to gather a large amount of capital, as required by a complete merger or takeover, while still being able to control the same assets. However, in some markets, gaining a controlling ownership stake can be difficult due to takeover regulations that favor minority shareholders. In particular, if a country's takeover law specifies a very low ownership threshold that triggers a takeover offer (any shareholder crossing this threshold is required to formally bid for all shares on issue), then any acquirer would find it difficult to seek only a proportion of the ownership interest for the purpose of creating a controlling stake. In such countries, groups may be created for reasons completely unrelated to those discussed above, simply because it is difficult and costly for a firm to completely takeover another firm.

To account for the extent to which block holdings can be easily created through mergers and acquisitions, we employ the index of takeover regulations (labelled *Takeover Index*) constructed by Nenova (2006) for 50 countries around the world. This index measures the level of protection of minority shareholders, the extent of fair and equitable treatment of all shareholders in the takeover process and the transparency of the process. The higher the value of the index, the harder it is for an acquirer to create a controlling, but less than full ownership position, that we describe earlier to be the critical link between group firms. Thus, we hypothesize that stringent takeover regulations can lead to fewer instances of business groups.

#### ***F. Country-Level Results***

In this section we examine the determinants of family business groups in a multivariate OLS regression framework. Using country-level measures of family business groups as our dependant variables, we analyse the strength of our proposed determinants in explaining cross country variations in family business groups. We use four measures of business group dominance in an economy, namely % *Group* and % *Pyramid*, to account for the proportion of listed firms in business groups and pyramids respectively and % *Group MC* and % *Pyramid MC* to account for the dominance in terms of market capitalization of business groups and pyramids respectively. Our explanatory variables can be broadly categorized into four areas; factors that facilitate the private benefits of control, factors characteristic of poorer or emerging countries (poor access to capital and underdeveloped human capital) and tax and regulatory factors.

Table IV reports the results of various model specifications for the four dependant variables described above. Model (1) represents our first test of the importance of the four determinants of business group importance in an economy for both *% Group* and *% Pyramid*. We use *Block Premium* to proxy for private benefits of control, *Log GDP per Capita* to proxy for economic development (good or poor access to capital and human capital), *Accounting Consolidation* to capture tax features affecting groups and a *Takeover Index* to account for the effects of regulation on the difficulty of making acquisitions. For both dependant variables, we find that *Log GDP per Capita* clearly dominates *Block Premium* in explaining family business groups, suggesting that the prevalence of groups is driven by a “poor-country” effect, rather than by a desire of large investors to extract private benefits of control. In unreported tests, we also substitute the *Governance Index* for the *Block Premium* and also remove the *Takeover Index* from our model, because it is correlated with the *Governance Index*. However, our main result remains qualitatively unchanged.<sup>22</sup>

In models (2) - (4), for both *% Group* and *% Pyramid* regressions, we replace our summary measures of private benefits of control (*Block Premium*) and economic development (*Log GDP per Capita*) with more specific factors that explain the importance of business groups. However, we can not include *Competition* and *Governance Index* in the same regression since they are highly correlated (correlation of -0.822). Therefore, we use these variables alternately in Models (2) and (3). Of the factors related to the private benefits of control, *Tax Transparency* appears to be the strongest and also seems to subsume the *Accounting Consolidation* variable in all our regression models. This suggests that if taxation is not transparent, then the tax regime in place is not particularly relevant. From a private benefits perspective, the lack of government monitoring of inter-corporate transfers allows families to appropriate value through transfer pricing more easily and this appears to increase the prevalence of family business groups. The *Governance Index* does not appear to have any effect on the prevalence of business groups other than in model (1) for *% Pyramid MC*, where it has a counter-intuitive positive sign, though it is only weakly significant. One possible explanation for the positive relationship is that investor protections are strong in countries with more groups, because while groups play an important role in providing capital, regulations respond to ensure such groups are not used to expropriate minority shareholders. This endogeneity explanation is tested below using an instrumental variable (IV) regression approach. Consistent with

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<sup>22</sup> While it is conceivable that either private benefits of control are determined by factors that are also related economic underdevelopment, or that private benefits of control can lead to economic underdevelopment, we do not believe that this drives our results since Table II indicates a correlation of only -0.354 between *Block Premium* and *Log GDP per Capita*.

our expectations, *Newspaper* circulation has a negative relationship with business groups, although it is insignificant in all the models.<sup>23</sup> The role of *Competition* is also not significant in any of our specifications, and so we only report it in Model (2).

The most notable result from Table IV is the ability of our access to capital variables to explain the prevalence of business groups. *Institutional Funds* is significant across all specifications and almost always at the 1 percent level. Moreover, *Savings to GDP* is also significant at the 1 percent level in both the % *Group* and % *Pyramid* regressions. In an unreported regression, we also utilize a country-level average *Cost of Capital* measure from Hail and Leuz (2006), as a second alternative measure for the availability of capital, which gives similar results. In interpreting these results we recognize that *Institutional Funds* and *Cost of Capital* are themselves partially determined by aggregate corporate governance factors. For example, Khoranna, Servaes and Tufano (2005) find that higher quality national legal systems and greater corporate transparency promote equity investments by mutual funds.

Thus, corporate governance factors can be seen to influence the prevalence of family business groups through two channels; directly by facilitating extraction of private benefits of control and indirectly by restricting the amount (or increasing the cost) of capital, outside investors are willing to provide. To this end, our interpretation of the access to capital variables in our models is twofold i) the impact of corporate governance standards on the prevalence of family business groups is more important in terms of its access to capital implications, rather than its private benefits effects ii) the availability of capital is an important determinant of the extent of family business groups because when capital is scarce, the groups ability utilize its internal capital becomes a more valuable competitive advantage.

Among the remaining explanatory variables, the *Takeover Index* appears to be the most important factor in explaining business groups. When acquirers are not required to make an offer to buy all the outstanding shares in a takeover, then families are able to control a target firm's assets with only a partial ownership stake. Finally, *Manager* does not seem to have an impact in any of our models, suggesting that while a lack of management talent may be one motivation behind the creation of business groups in some markets, it does not explain any cross-country variation in the prevalence of business groups.

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<sup>23</sup> We also include the effect of press freedom in an alternative variable to measure information circulation and find that it is highly significant.



A further concern with the interpretation of our results is that the direction of causality between corporate governance related factors and family business groups is opposite to what our models suggest. For example large family business groups can often wield significant political power (Morck et al 2005), which can be used to lobby against any governance reforms that would diminish their power or threaten their existence. Alternatively, as suggested in the above results, regulations could respond to the threats that business groups present for minority shareholders to ensure that existing business group structures can not be not used to expropriate minorities.

To address this reverse causality concern, we use an instrumental variable (IV) regression, and employ the legal origins of each of our sample countries as an instrument. Several studies suggest that the legal origin of a country is a suitable instrument because it is historically predetermined and highly correlated with current governance environments (La Porta et al., 1999, 2006, Dyck and Zingales, 2004). Following these studies, we use a dummy variable for common law origin as the instrument because it is associated with greater shareholder rights and transparency (La Porta et al. 1998). Given that the explanatory variables, *Institutional Funds* and *Cost of Capital*, can also be influenced by the overall corporate governance environment, they could also be subject to a reverse causality explanation. Thus, we use *Savings to GDP* to instrument for *Institutional Funds*, as it is strongly correlated with *Institutional Funds*, but theoretically unrelated to the prevalence of family business groups. The IV regressions show that the governance index changes sign from positive to negative, although it remains statistically insignificant. These untabulated results suggest that endogeneity biases are responsible for the positive coefficient observed in Table IV. The remaining results are consistent with the results in Table IV, suggesting that endogeneity biases are unlikely to be responsible for our main findings.

Thus far, the relationship between private benefits of control and the importance of family business groups has been open to two interpretations. First, since groups can facilitate the extraction of private benefits, they should be more prevalent in markets where private benefits are larger. Second, groups are more prevalent in markets where private benefits are large because they substitute for mechanisms that could curb private benefit consumption. While both interpretations explain the negative relationship between *Newspaper* and *Tax Avoidance* and the Table IV dependant variables, they represent very different motivations for the existence family groups.

We attempt to determine which of the above two interpretations is more consistent with our data by using two separate approaches. The first approach is to re-estimate the regression models in

Table IV using two alternative dependant variables. First, we use the percentage of all firms in a market controlled by an ultimate owner that belong to a family business group (*Group Firms / Controlled Firms*). Second, we use the percentage of all family controlled firms that belong to a family business group (*Group Firms/ Family Controlled Firms*). Since these dependant variables are based on a sample of controlled firms only, we can assume that the effects of private benefits of control are constant. This allows us to consider the effect of the *Governance Index*, *Newspaper* and *Tax Avoidance* variables on the prevalence of business groups, without needing to control for their ability to increase or decrease private benefits of control. The second approach is to control for the private benefits of control using an additional explanatory variable, rather than modifying the dependant variable. To do this, re-estimate the % *Group* and % *Pyramid* regressions in Table IV, adding *Block Premium* as an additional independent variable to control for the private benefits of control. Results from these two approaches are reported in Table V.

All of the specifications for the modified dependant variables in Table V indicate that the *Governance Index* has a similar effect in explaining the proportion of family controlled firms that belong to groups. For the *Block Premium* regressions, the *Governance Index* is positive and significant in two regressions, possibly due to the reverse causality explanation discussed earlier. However, the access to capital variables, *Institutional Funds* and *Savings to GDP*, continue to have strong explanatory power for the prevalence of family groups across countries. This implies that, after controlling for the general attractiveness of ‘control’, the indirect role of investor protection through its influence on access to capital is the primary mechanism that renders family business groups more attractive. The *Tax Transparency* variable remains significant at the 1 percent level across all models, confirming the role that tax benefits play in the incentive to form business groups. Controlling for the private benefits of control in these regressions, however, suggests profit shifting within group firms to avoid taxes is another motive for business groups that is also be valuable to minority investors, since a reduced overall tax burden for the business group can benefit the controlling shareholder and minority investors alike. The remaining variables in our models are qualitatively similar to the results in Table IV.

Finally, the regression results in Table V are subject to endogeneity biases in the same manner as our models in Table IV. Thus, we repeat our IV regressions using legal origins and *Savings to GDP* as instruments for the *Governance Index* and *Institutional Funds*, respectively. Although unreported, our results reveal that the sign of the *Governance Index* reverses and ceases to

be significant in the models. The remaining results are largely consistent with those reported in Table IV.

Overall country-level results suggest that corporate governance factors can explain cross-country variations in the prevalence family business groups across countries and their effects are through access to capital, rather than through their impact on private benefits of control. Family business groups appear to be a powerful channel for raising external capital because their reputation substitutes for the absence of effective legal protections for minority investors. This is analogous to Khanna and Palepu's (1997) argument relating to the power of brand names in product markets of underdeveloped economies. In such circumstance brands with an established reputation for quality carry with them tremendous market power. Thus, in these circumstances trusted and established families can utilise their brand-like status to raise capital to expand their business, even into areas that can be completely unrelated to their existing operations. This makes co-investment by minority investors with controlling families more attractive.

### **III. Firm-Level Analysis**

To further examine the motivation behind the prevalence of business groups, we next conduct several firm-level analyses that delve into the characteristics of each group firm and their relation to firm performance. First, we compare firm attributes of group versus non-group firms and among different layers of firms in a group. Second, we examine whether group membership is related to firm value, controlling for the endogeneity of group membership choice. Finally, we investigate whether within-group ownership and control linkages also influence firm performance. These tests aim to provide empirical evidence on whether group structures exist more as a means for the controlling shareholder (or family) to leverage monetary (and human) capital or as a mechanism to expropriate minority shareholders and/or to capture private benefits of control.

#### ***A. Univariate Comparisons***

In Table VI we compares the median values of selected firm-level variables across group and non-group firms (*Group vs. Non Group Tests*) and between firms at different layers in same pyramidal business group (*Within-Group Tests*). The descriptions of these variables are summarized in Table I. For the *Group vs. Non-Group Tests*, we compare group firms with industry matched peers

in the same market based on 2-digit SIC codes.<sup>24</sup> The statistics reported in the table are the differences between group and non-group median values. For the *Within-Group Tests* we exclude groups that do not employ a pyramid structure (i.e. groups where member firms are directly connected to the controlling family). We then compare median values at each layer of the group, with median values at the layer above. If there is only one firm at any particular layer, then the median is equal to the firm observation. We control for country and group-effects by only comparing firms that belong to the same family business group. We use the Wilcoxon Rank-Sum test of medians to assess whether differences are significant.

Panel A of Table VI presents the results for all 45 sample countries. For the *Group vs. Non-Group Tests*, Q is significantly lower for group firms. This is consistent with the findings of Claessens, Djankov, Fan and Lang (2002), who find that separation of cash flow and control rights, (in this case achieved through pyramiding) reduces firm value.<sup>25</sup> Group firms also tend to be larger based on both total assets and market capitalization, reflecting their superior ability to grow through leveraging their reputation to expand into multiple business lines (Khanna and Palepu, 1997). Panels B and C also show that the yearly average asset growth rate measured over the 1997-2001 period (labeled *Asset Growth*) is significantly higher for group firms.

Another reason that group firms are capable of greater growth is a superior ability to raise capital both internally and externally. For example, the comparison of the total liabilities over total assets ratio (labeled *Leverage*) shows that group firms, particularly those in the first layer (i.e. those near the top) of a pyramid rely significantly less on debt. Moreover, firms in the first layer of a pyramid pay higher dividends than comparable non-group firms. This is in contrast with the implications from the country-level study of dividends by La Porta et al (2000), who show that in the presence of weak investor protection, firms pay less dividends. While this may be true for a broad sample firms, it does not apply to group-affiliated firms. Rather, our results appear more in line with those of Faccio, Lang and Young (2001), who show that “tight” group affiliation leads to higher dividends. Our explanation for the higher rate of dividends, however, centers on a reputation argument. Groups pay out returns to shareholders to allay expropriation fears in order to protect their valuable reputation. Finally as expected group firms are also significantly less volatile, particularly

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<sup>24</sup> In smaller markets, we find that finding a non-group match is not possible at the 2 digit SIC code level, in these cases we resort to matching based on the 1-digit SIC code level.

<sup>25</sup> Masulis, Wang and Xie (2008) find a similar result when cash flow and control rights are separated through the use of dual class shares.

those in layer 1 and at the apex, since they tend to control diversified subsidiaries, and group firms also tend to be in multiple lines of business.

Our within-group comparison in Table VI reveals some surprising results. Tobin's Q rises significantly down the ownership chain. Panel A shows that the difference in Tobin's Q between layer 2 and layer 0 (0.118) is larger than the difference between layer 1 and layer 0, (0.087). Similarly, the level of capital expenditures scaled by total assets (labeled *CAPEX/TA*) also rises significantly down the pyramidal chain with the layer 1 difference being 0.008 and layer 2 being 0.049. This is consistent with family business groups placing higher growth firms at lower layers of the pyramid. The differences in standard deviation of monthly returns measured over the 1997-2001 period (labeled *Stock Volatility*) also indicate the firms at the bottom of the pyramid are generally riskier. These findings provide evidence that groups are structured in order to exploit risky, but potentially profitable investment opportunities (in a similar way that venture capitalists do in developed markets). Risky high growth firms have difficulty in raising capital, particularly in environments when capital is scarce and investor protection is weak. Family groups are in a position to fund such firms at the bottom of their pyramidal group, because it is precisely at this point where groups can leverage the most internal capital relative to their own invested capital (i.e. the point where the discrepancy between the family's cash and control rights is the largest). This means that such firms need to rely less on expensive external capital and are backed by the implicit protection provided by the group's reputation, reducing the cost of the residual funding required.<sup>26</sup> Furthermore, from a risk sharing point of view, because such firms are riskier, the ultimate owner is able to limit their risk exposure to such firms by placing them at lower layers of the pyramid.

Among the other within-pyramid comparisons, *Leverage* appears to decrease down the pyramidal chain, reflecting the fact that high growth firms do not have the capacity to support debt. Borrowings seem to be conducted by the stable, established firms at (or close to) the top of the pyramid. These funds can then be used to finance their bottom-layer subsidiaries, consistent with the internal capital market argument. Both the *Log Assets* and *Log Market Cap* measures show that group firms lower down in the pyramid tend to be significantly smaller than those above them. This again reflects the growth potential of firms lower down in the pyramid compared with their parents.

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<sup>26</sup> Evidence in Gopalan, Nanda and Seru (2007) on Indian family groups also supports the proposition that group firms benefit from the financial strength of the group and can receive additional capital when they are in financial distress.

## ***B. Regression Analysis of Family-Group Affiliation and Firm Value***

It has been well documented that most listed firms around the world are controlled by an individual or a family. Even in the US, about 37% of Fortune 500 firms are family-controlled (Villalonga and Amit, 2006). However, empirical findings regarding the effect of a controlling shareholder on firm value have been mixed (Holderness and Sheehan, 1988; Anderson and Reeb, 2003, Villalonga and Amit, 2006; Classens et al. 2002, La Porta et al 2002, Lemmon and Lins, 2003). Within this line of enquiry, there is further uncertainty as to whether family firms, controlled in conjunction with a number of other firms in a group structure, possess a value premium compared with similar independent family-controlled firms.

We investigate this issue for a large sample of firms around the world by estimating a multivariate regression of Tobin's Q on family-group membership. Due to the lack of information on replacement cost of assets, Q is simply calculated as the market value of equity plus book value of liabilities, divided by the book value of assets. The market value of equity is obtained from *Datastream*, and aggregates the market values of different classes of a firm's tradable stocks as of the end of 2002.<sup>27</sup>

Our main explanatory variable is an indicator variable which equals one if a firm belongs to a family group, and zero otherwise (labelled *Group Dummy*). As documented by the univariate results, family-group firms differ significantly from other firms in size, historical asset growth rate, leverage, dividend yield, and investment intensity (as measured by the ratio of capital expenditure to total assets), all of which can influence Q. Therefore, we control for these and other firm characteristics (*Log Size, Beta, Asset Growth, Leverage, CAPEX/TA, and Dividend Yield*) in the Q regressions, which also include country and industry fixed effects (the latter is constructed using 9 broad sectors based on the Standard Industry Classification system). The control variables are described in Table I.

One issue that arises from a simple OLS estimation of the Q regression is the potential endogeneity of the family-group indicator variable (*Group Dummy*). If group-affiliation provides a mechanism to access otherwise expensive external capital and reduce the information asymmetries associated with high-growth projects, then the choice of whether a firm should be placed in a group may be dependent on its growth prospect, which is correlated with Q. Alternatively, a maturing

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<sup>27</sup> At this current stage of the paper, we are still devising ways to take into account non-tradable shares and to compute market value of equity at the closing balance date rather at the end of 2002.

(low-Q) group firm may be spun off from the group if its role in generating capital or its need to be supported by the group's reputation is no longer necessary.

We employ two alternative methods to address this endogenous selection problem in comparing the performance between family-group versus non-family-group firms. The first approach is two-stage IV estimation, in which we assume endogeneity for *Group Dummy* and instrument for it using firm idiosyncratic risk. The latter is measured as the standard error from estimating a one-factor market model on each firm's monthly stock returns from the beginning of 1997 to the end of 2001 using each country's MSCI index for the market returns. Idiosyncratic risk has been frequently employed as an instrument in previous studies on the impact of ownership on Tobin's Q (Himmelberg, et al. 1999; Villalonga and Amit, 2006) since Q (as a reflection of cost of capital) should be related to market risk, rather than firm-specific risk. In the context of our study, idiosyncratic risk is likely to explain whether a firm is created as part of a business group, because the group structure diversifies the controlling family's investments, therefore providing them with a competitive advantage in owning and control high-risk firms. In addition, as *Group Dummy* is an indicator variable, we do not use idiosyncratic risk as the instrument directly, but instead the fitted values of the probit regression of *Group Dummy* on idiosyncratic risk along with all of the other explanatory variables in the Q regression.

Alternatively, we employ a treatment effect model in which we estimate the Q regression simultaneously with the treatment regression using maximum likelihood estimation. The treatment regression accounts for the self-selection issue by explaining the differences between group and non-group firms using all of the explanatory variables in the Q regression and adding idiosyncratic risk as an identifying instrument.

Another important issue to consider is that the impact of family-group affiliation on firm value can be a result of the benefits (or costs) of the concentrated ownership structure or the entrepreneurial skills (and/or commitment) of the family. To avoid the possibility that our results may be driven by systematic differences between family-controlled and other non-family firms or widely held firms, we conduct further robustness checks by applying the same regression models on two sub-samples of firms. First, we use a sample of all firms that have a controlling shareholder (family or non-family) and second we use a sample of firms that are all controlled by a family or an individual (group and non-group firms).

Table VII first reports the baseline OLS estimation of the Q regression. Similar to the univariate comparison, we find that Q is significantly lower for family-group firms than for other firms, after controlling for other important determinants of Q. The same result is observed even when we restrict the sample to just controlled firms or family-controlled firms. Similar to the evidence in Claessens et al, (2002) and Lemmon and Lins (2003), it appears that control through a family business group has a negative effect on firm value. Without taking into account the potential endogeneity in group-affiliation choice, group firms appear to suffer a valuation discount that may reflect expropriation of minorities or consumption of private benefits by controlling families.

However, after accounting for endogeneity, using idiosyncratic risk as an instrumental variable, we find that the coefficient of *Group Dummy* reverses sign and becomes significantly positive when using either the two-stage procedure or the treatment effect model. This finding remains consistent in the sub-samples of only controlled firms or only family-controlled firms. We also find that there are strong statistical reasons not to assume the group-affiliation choice is entirely exogenous. With the two stage procedure, the choice of instrument appears to be validated by the Stock and Yogo (2005) test statistic that is much higher than the conventional critical value of the test. In addition, we report the Wald test, which rejects the null hypothesis that the correlation between the errors of the two equations in the treatment effect model is zero. This test result indicates that the *Group Dummy* variable is indeed endogenous. The treatment effect model also indicates that idiosyncratic risk has a positive and significant impact on group-affiliation choice, confirming our earlier conjecture that the group structure helps reduce a family exposure to idiosyncratic risk.

The positive and significant coefficient of *Group Dummy* in models that account for endogeneity has an important implication that is more consistent with an internal capital markets explanation, rather than an expropriation interpretation for the existence of family controlled business groups. It appears that while all group firms on average have lower firm value than non-group firms, this may simply reflect the fact that high-value projects can overcome information asymmetries themselves to obtain external funding and do not need the support of a group's internal funds or reputation. In contrast, projects with lower value may find it impossible to be independently funded by the market and may need to be supported through a group structure. However, having accounted for this endogenous selection (treatment effect), we find that the group structure helps to enhance firm value.



### ***C. Within-Group Ownership Characteristics and Firm Value***

We next examine whether variations in firm value can be explained by within-group differences in ownership and control structures. La Porta et al (2002) find that the ultimate cash flow rights of the controlling shareholder is positively related to firm value for a sample of large firms around the world. Claessens et al (2002) document similar results for a sample of East Asian firms, finding that the control rights of the controlling shareholder are negatively related to firm value. These results imply that the deviation of cash flow rights from control rights can create an incentive for the controlling owner to expropriate minority interests. However, these results are based on samples of both group and non-group firms, and hence may reflect their systematic differences and endogeneity in group-affiliation choice.

To reduce the confounding effect of such systematic differences, our next analysis focuses only on the sample of group firms. In particular, we estimate the regression of Q on various ownership and control measures, including the direct ownership of the group in a firm, the ultimate cash flow and control rights of the family, and the layer position of a firm in its group. These explanatory variables are described in section I.A. Other standard control variables for Q again include *Log Size*, *Beta*, *Asset Growth*, *Leverage*, *CAPEX/TA*, and *Dividend Yield*. To control for group-level differences (e.g. the reputation and/or entrepreneurial skills of the controlling family/individual), we include group fixed effects in the regression model. Finally, to deal with the possibility that the variations in Q may be due to intra-group corporate transfers (and tunnelling), hence causing regression standard errors to differ systematically across groups, we test our regression estimates using clustered-robust standard errors, calculated by treating each business group as a cluster.

Using simple OLS estimations in our baseline model, Table VIII documents that the ultimate cash-flow rights and the weakest-link control rights of the family individually have no significant influence on Q. When combined together in one regression, Q is negatively related to the cash-flow rights measure and positively related the control rights measure. Both of their coefficients are statistically significant. These results are in contrast to Claessens et al (2002), whose findings imply that weak cash flow rights and strong control rights create an incentive for expropriation.

Our results favor a different interpretation of group structure dynamics. The negative correlation between the ultimate cash flow rights and Q indicates that high-growth firms are often

placed or established at the bottom layer of a group. In fact, there is a positive and significant relation between firm value and the layer position of a firm in the business group. We also find evidence that Q is significantly and positively related to the direct ownership measure. This relation is much stronger than that between Q and the ultimate cash flow rights measure. This indicates that the ultimate cash flow rights held at the apex of a pyramid controlled firm is not an active ownership decision variable from the perspective of the controlling family. When a new firm is added to a group, the chain of ownership connecting the family to the immediate parent of the firm is often already well established and optimized, and thus, the ownership decision is focused on the last chain of ownership connecting the group to the new firm. Our results indicate that Q increases with the size of the direct ownership link. This direct ownership link and the position of a firm in the pyramid appear to be the most important determinants of firm value.

The systematic differences between group versus non-group firms can still create a selection bias that influences the coefficients of the ownership and control variables tested in Table VIII. To address this, we also employ the Heckman two-stage procedure to correct for selection bias. In the first stage, we run a probit selection model of group affiliation choice using the same specification as the treatment equation in Table VII. The fitted values of this model are used to calculate the inverse Mill's ratio, which is then included in the regressions of Q on the ownership and control variables. Essentially, we find very similar results to the OLS regression. As a robustness check, we repeat the first-stage of the Heckman correction on the sub-samples of only controlled firms and that of only family-controlled firms. Again, we obtain very similar results.

The significant relation between Q and the direct ownership measure of the group (and the layer position measure) may be confounded by potential endogeneity of these explanatory variables. In particular, a high growth (i.e. high Q) firm may be placed at the bottom of the group for ease-of-funding purposes. The group may also decide to retain a large direct ownership in high-value firms. We deal with this endogeneity by using two instruments, firm idiosyncratic risk and an indicator variable for whether a firm and its immediate parent belong to the same industry. The first instrument is used because the ownership and firm placement decisions can be influenced by the ultimate controlling shareholder's concern about under-diversification. In particular, exposure to firms with high idiosyncratic risk can be reduced by establishing these firms at the bottom of the pyramid and by selling more of their shares to outside investors who do not face diversification constraints. As mentioned earlier, idiosyncratic risk is likely to be exogenous with respect to Q

because the latter is a function of systematic risk (Villalonga and Amit, 2006). The second instrument is used because it determines the extent to which the group can capture potential synergy between two firms by creating (or acquiring) a new group firm below an established group firm of the same industry and connecting them through a large ownership stake. This means that the same-industry indicator is likely to be correlated with the position of a group firm in the pyramid and the direct ownership level. However, for each group firm, there is no reason to expect that this indicator, which describes the relationship between the firm and its parent, to be related to the (subsidiary) firm's value; whereas any potential synergy is likely to be captured by the parent, rather than the subsidiary firm.

The instrumental-variable regression results are reported in Table IX. One econometric issue that arises is that our instruments are not strong enough to identify regressions that include multiple within-group ownership variables, especially since these variables are often correlated with each other. Therefore, we only test each variable one by one. In addition, we again incorporate the Heckman two-step correction for selection bias as a robustness check (with the first-stage selection equation estimated on the full sample or alternatively, on the sample of controlled firms or family firms).

The results of the Heckman correction are generally consistent with the OLS regression results. We find that the ultimate cash flow rights of the controlling family are again negatively related to firm value. Therefore, even after controlling for potential endogeneity, we do not find evidence consistent with the expropriation argument that group firms with high cash flow rights attributable to the controlling shareholder have a higher market value as they are less susceptible to potential expropriation. Instead, the negative relation between the cash flow rights measure and Q is likely to arise simply due to the correlation between the former and the layer positioning of a group firm. We find that establishing a group firm at the bottom of the pyramid tends to increase firm value, indicating that this is the best position for a new firm to receive relatively low-cost financing so as to capitalize on its growth opportunities. The group's direct ownership in a firm also influences its Q measure, indicating that the group's ownership interests do provide an incentive to strengthen the firm's performance, or that such interests signal a strong commitment on behalf of the group in the new firm, thereby reducing information asymmetries and improving the market value of the firm. Overall, our evidence is more consistent with the internal capital market explanation of group formation. Our within-group analysis implies that the group benefits associated with its strong

reputation and access to capital seem to outweigh the potential risk of expropriation in the eyes of minority shareholders.

#### **IV. Conclusion**

This paper aims to examine the motivation behind the existence of family controlled business groups based on two levels of analysis. First, at the country level we find that family controlled business groups are more prevalent in countries where access to capital restricted, tax regimes are not transparent, and merger and acquisition rules constrain the ability of controlling families to build pyramids through acquisitions of share block holdings. While investor protection is an important factor that influences the availability of external capital, it does not appear to provide any explanatory power in our country level analysis in its own right. Our country-level results suggest that a group's ability to raise capital both internally, and as a function of its reputation, externally, renders the group structure beneficial in markets where external capital access is limited.

At the firm level we find that after controlling for selection effects, group firms have higher Tobin's Q than non-group firms. It appears that lower average value of group firms relative to non-group firms reflects the fact that firms with high-value projects can overcome information asymmetries themselves to obtain external funding and do not need the support of a group's internal funds or reputation. In contrast, projects with lower value may find it impossible to be independently funded by the market and may need to be supported through a group structure. However, having accounted for this endogenous selection, we find that business group structures help to enhance firm value. Similarly, within-groups we find that high value firms are placed at the bottom of the pyramidal chain. Family groups fund such firms at the bottom of their pyramidal group, because it is precisely at this point where groups can leverage the most internal capital relative to their own invested capital (i.e. the point where the discrepancy between the family's cash and control rights in the largest). This means that such firm need to rely less on expensive external capital, while still being backed by the group's reputation. This result differs from existing research that emphasizes the risk of minority shareholder expropriation when cash flow and control rights diverge, which is predicted to result in lower value due to increased expropriation incentives.

Overall, our findings are consistent with the importance of the internal capital market benefits that pyramids facilitate, in that the size of the stake taken in new pyramidal firms is determined by risk and return characteristics. Thus, our evidence indicates that expropriation of

minority interests is not the primary motive for the establishment and growth of pyramidal business groups.

An important implication of our analysis is that any country-level improvements in the ability to access to capital should weaken the benefits of family business groups. In particular, in emerging markets, openness to foreign investment can reduce the importance of the role played by family business groups because experienced foreign investors can take on the role of funding new high growth firms. To the extent that foreign providers of capital can bring greater skills and experience in owning such firms, the competitive advantage of family business groups in this area can be diminished, and the value assigned to group controlled firms can be significantly reduced.

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**Table I – Description of Main Variables**

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<b>Country-Level Measures of Prevalence of Family Business Groups</b>	
<i>% Group</i>	The percentage of all listed firms in the market that belong to a family business group.
<i>% Pyramid</i>	The percentage of all listed firms in the market that belong to a family business group and are controlled through a pyramid structure.
<i>% Group MC</i>	The percentage of total market capitalization due to firms that belong to family business groups.
<i>% Pyramid MC</i>	The percentage of total market capitalization due to firms that belong to family business groups and are controlled through a pyramid structure.
<i>Group Firms / Controlled Firms</i>	The percentage of all firms in the market controlled by an ultimate owner that belong to a family business group.
<i>Group Firms /Family Controlled Firms</i>	The percentage of all family controlled firms that belong to a family business group
<b>Country-Level Variables explaining the Prevalence of Family Business Groups</b>	
<i>Block Premium</i>	Calculated based on the average difference between the negotiated price for a controlling block of shares and the prevailing market price across 33 countries. Source: Dyck and Zingales (2004)
<i>Governance Index</i>	A principal components aggregation of i) minority shareholder rights (Anti-director rights), from La Porta (1997) and update by Volpin and Rossi (2004), ii) the strength of the rule of law, regulatory quality and control of corruption from Kaufmann, Kraay, and Mastruzzi (2003), and iii) a survey variable measuring disclosure standards from the World Economic Forum's <i>Global Competitiveness Report 2003</i> .
<i>Competition</i>	A survey variable measuring the extent of product market competition. Source: World Economic Forum's <i>Global Competitiveness Report 2003</i> .
<i>Newspaper</i>	The total average circulation (or copies printed) of daily newspapers per 1000 inhabitants as measured in the year 2000 Source: <i>World Association of Newspapers</i>
<i>Tax Transparency</i>	A measure of the stringency of a country's tax law related to intra-corporate transactions, equal to the sum of four indicator variables. The first three indicates if the law addresses and controls three intra-group tax minimization practices, including (i) transfer-pricing, (ii) the use of thin-capitalization companies, and (iii) the registering of holding companies in tax havens. The last variable indicates if there is explicit reporting requirement for companies engaging in the above transactions. Source: <i>Deloitte International Taxation Guide</i> .
<i>Log GDP</i>	The natural logarithm of a country's gross domestic product as of 2001. Source: World Bank.
<i>Log GDP Capita</i>	The natural logarithm of a country's gross domestic product scaled by total population as of 2001. Source: World Bank.
<i>Institutional Funds</i>	Total equity investments of banks, insurance companies, pension and mutual funds in a country scaled by domestic stock market's capitalization, collected at various points during 2001-2002. Sources: OECD publications, websites of national regulators and international associations (EFRP, FEFSI and FIAP).
<i>Savings to GDP</i>	Total domestic savings scaled by a country's gross domestic product as of 2001. Source: World Bank.
<i>Accounting Consolidation</i>	A dummy variable equal to 1 if a parent firm is allowed to consolidated a subsidiary in which it has an ownership stake of less than 90%, and equal to 0 if where consolidation is either not allowed or can only take place if the parent owns more than 90% of its subsidiaries. Price Waterhouse Coopers (1998). <i>Corporate Taxes: A Worldwide Summary</i>
<i>Manager</i>	A survey variable based on responses to the question: "Management or business schools in your country are 1 = limited or of poor quality, 7 = the best in the world" Source: World Economic Forum's <i>Global Competitiveness Report 2003</i> .
<i>Takeover Index</i>	An index measuring the level of protection of minority shareholders and the extent of fair and equitable treatment of all shareholders in the takeover process and the

transparency of the process. Source: Nenova (2006)

### ***Firm-Level Variables***

<i>Tobin's Q</i>	The market value of equity plus book value of liabilities, divided by the book value of assets as of 2002. Sources: <i>Osiris</i> , <i>Worldscope</i> , company annual reports, and <i>Datastream</i>
<i>Asset Growth</i>	Average growth of total assets based on the five years previous to 2002. Sources: <i>Osiris</i> , <i>Worldscope</i> .
<i>Market Capitalization</i>	Total no. shares outstanding multiplied by the share price as at the end of 2001. Sources: <i>Datastream</i> , <i>Osiris</i> , and <i>Worldscope</i> .
<i>Log Size</i>	The log of US dollar market capitalization measured at the end of 2001. Sources: <i>Datastream</i> , <i>Osiris</i> , and <i>Worldscope</i> .
<i>Cash</i>	Total cash or cash equivalents divided by total assets as at the end of 2001. Sources: <i>Osiris</i> , <i>Worldscope</i> and company annual reports
<i>Leverage</i>	Total liabilities divided by total assets as at the end 2001. Sources: <i>Osiris</i> , <i>Worldscope</i> and company annual reports
<i>Dividend Yield</i>	Total dividends paid divided by price per share averaged over the five years previous to 2002. Sources: <i>Datastream</i>
<i>CAPEX/TA</i>	Total capital expenditures divided by total assets averaged over the five years previous to 2002. Sources: <i>Osiris</i> , <i>Worldscope</i> and company annual reports
<i>Stock Volatility</i>	The standard deviation of monthly stock returns calculated based on a 60-month window in the 5 years previous to 2002. Source: <i>Datastream</i>
<i>Earnings Volatility</i>	The standard deviation of the percentage change in earnings based on the 5 years previous to 2002. Sources: <i>Osiris</i> , <i>Worldscope</i> and company annual reports
<i>Beta</i>	The systematic risk of the company estimated through a market model based each firm's monthly stock returns in the 5 years prior to 2002. Source: <i>Datastream</i>
<i>Idiosyncratic Risk</i>	The standard error from estimating the market model on each firm's monthly stock returns in the 5 years prior to 2002. Source: <i>Datastream</i>

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**Table II – Country Descriptive Statistics on Family Business Groups**

The table reports various statistics on family business groups for 45 sample countries. *No of Groups* is the number of families or individuals that control two or more listed in the same market. *% Group* is the percentage of listed firm in the market that belong to a family business group. *% Pyramid* is the percentage of listed firm that belong to a family business group and are controlled through a pyramid structure. *% Group MC* and *%Pyramid MC* are the percentage of market capitalization held by group-controlled firms and pyramid-controlled group firms respectively. *Average Pyramid Score* measures the average depth of pyramiding by family business groups. The last five columns comprise of measures of country-level group concentration. *Group Conc.* is calculated as the number of groups divided by the number of firms multiplied by 100. *Largest Group by Market Cap* and *% Mkt. Cap* reveal the identity of the family business group with the largest share of market capitalization and the share of market capitalization under their control. *Largest Group by No. of Firms* and *No. of Firms* reveals the identity of the family business group comprising of the largest number of firms and the number of firms under their control.

Country	N	No. of Groups	% Group	% Pyramid	% Group MC	% Pyramid MC	Average Pyramid Score	Group Conc.	Largest Group by Mkt. Cap	% Mkt. Cap	Largest Group by No. of Firms	No. of Firms
Argentina	57	1	5.26	1.75	6.12	0.78	1.75	1.75	Perez	6.12	Perez	3
Australia	877	18	5.25	2.51	5.60	0.38	2.85	2.05	Murdoch	3.62	Millner	8
Austria	95	3	6.32	4.21	6.68	6.59	6.32	3.16	Mautner Markhof	4.88	Mautner Markhof	3
Belgium	146	10	19.18	9.59	12.20	7.78	14.38	6.85	Boel, Solvay & Janssen	4.23	Boel, Solvay & Janssen	5
Brazil	292	13	15.07	9.59	9.69	7.83	13.01	4.45	Jaeger (SSJ)	4.22	Egydio de Souza Aranha (ITAU)	7
Canada	810	11	3.21	1.23	3.99	2.02	1.23	1.36	Desmarais	2.39	Desmarais	3
Chile	164	10	25.61	16.46	26.12	15.97	25.00	6.10	Angelini	12.35	Luksic	12
Colombia	56	4	35.71	28.57	30.17	14.39	64.29	7.14	Bojanini, Piedrahita, Velez & Londoño (Grupo Empresarial Antioqueño, GEA)	11.70	Bojanini, Piedrahita, Velez & Londoño (Grupo Empresarial Antioqueño, GEA)	11
Czech	73	4	10.96	6.85	1.15	0.48	6.85	5.48	Bakala (RPJ)	0.66	Kozeny	2
Denmark	142	5	7.75	2.11	2.65	0.72	2.11	3.52	Duer	0.70	Kjaer	3
Finland	137	3	6.57	4.38	0.78	0.42	5.11	2.19	Erkko	0.34	Erkko	4
France	767	25	9.39	5.35	8.66	2.71	9.00	3.26	Arnault	2.24	Bollore	9
Germany	724	23	7.18	3.31	4.13	0.21	4.01	3.18	Plattner	2.34	Quandt	4
Greece	231	13	15.15	8.66	10.44	2.65	9.09	5.63	Leventis	3.91	Stassinopoulos	7
Hong Kong	442	22	14.71	7.47	21.18	8.69	11.09	4.98	Li Ka-Shing	9.92	Chan Kwok Keung	8
Hungary	41	2	9.76	4.88	1.42	0.05	4.88	4.88	Schreier (CP Holdings)	1.37	Schreier (CP Holdings)	2
India	603	55	28.86	8.13	19.23	1.31	8.13	9.12	Ambani	8.78	Tata	24
Indonesia	259	20	22.78	12.36	33.85	13.20	19.31	7.72	Sampoerna	8.13	Mochtar Riady	7
Ireland	62	2	6.45	1.61	1.34	0.00	1.61	3.23	O'Reilly	1.33	O'Reilly	2

Israel	226	17	36.73	24.34	40.56	32.29	47.35	7.52	Shrem, Zimmerman & Fudim	17.42	Dankner	26
Italy	222	15	18.47	7.66	17.29	11.26	14.86	6.76	Tronchetti Provera	9.28	Tronchetti Provera	7
Japan	2819	32	2.55	1.06	1.25	0.32	1.10	1.14	Uehera Shoji	0.22	Masayoshi Son	3
Korea	1335	59	11.61	4.27	5.37	1.84	4.72	4.42	Shin Kyuk-Ho (Lotte)	1.09	Kim Jung-Gi (Dongbu)	9
Malaysia	702	36	16.10	7.98	28.28	13.53	9.54	5.13	Lim Kok Thay (Genting) <sup>a</sup>	4.54	Vincent Tan (Berjaya) <sup>a</sup>	11
Mexico	122	8	19.67	9.02	12.15	3.54	11.48	6.56	Slim	8.39	Slim	8
Netherlands	183	5	5.46	2.19	4.62	3.36	2.73	2.73	de Carvalho-Heineken	4.52	de Carvalho-Heineken	2
New Zealand	85	2	5.88	5.88	7.59	7.59	14.12	2.35	Murdoch <sup>b</sup>	7.03	Quek Leng Chan <sup>c</sup>	3
Norway	133	5	9.02	3.76	3.87	0.60	4.51	3.76	Nagell-Erichsen <sup>d</sup>	1.18	Nagell-Erichsen <sup>d</sup>	3
Pakistan	221	13	14.03	2.71	6.60	2.24	3.17	5.88	Dawood	2.65	Dawood	5
Peru	143	7	12.59	2.10	3.27	0.24	2.10	4.90	Brescia	1.85	Brescia	6
Philippines	179	18	29.61	11.73	19.15	5.77	13.97	10.06	de Ayala	10.85	de Ayala	6
Poland	104	5	10.58	3.85	3.18	0.33	4.81	4.81	Krauze (Softbank)	1.96	Kulikowski (Rolmex)	3
Portugal	78	5	19.23	8.97	9.74	6.46	8.97	6.41	de Azevedo (Sonae)	7.89	de Azevedo (Sonae)	6
Singapore	340	14	12.65	7.65	31.52	9.21	8.53	4.12	Lee Seng Wee <sup>e</sup> (Overseas Chinese Banking Corp)	11.66	Wee Cho Yaw <sup>e</sup> (United Oversease Bank)	8
South Africa	251	7	6.77	3.19	1.23	0.97	3.98	2.79	Kebble (Consolidated African Mines)	0.46	Kebble (Consolidated African Mines)	5
Spain	160	4	6.25	3.13	2.15	0.61	3.75	2.50	Koplowitz	0.86	Koplowitz	3
Sri Lanka	117	13	41.03	31.62	26.35	15.06	38.46	11.11	Jayasundera (Hayleys)	6.70	Jayasundera (Hayleys)	9
Sweden	215	8	11.16	6.51	7.63	4.09	6.51	3.72	Wallenberg (Investor AB)	3.01	Wallenberg (Investor AB)	6
Switzerland	232	6	4.74	2.16	2.57	0.64	3.02	2.59	Schmidheiny	1.29	Buhrle	3
Taiwan	356	7	5.06	3.09	8.87	3.67	3.93	1.97	Y.C. Wang (Formosa Corp)	4.21	Y.C. Wang (Formosa Corp)	4
Thailand	348	20	14.08	7.47	21.98	11.59	7.76	5.75	Shinawatra (Shin Corp)	9.46	Chokwatana (Saha Pathana)	5
Turkey	205	20	37.07	17.56	37.97	17.77	19.51	9.76	Sabancı	13.86	Koc	13
UK	1412	8	1.13	0.57	0.98	0.88	0.57	0.57	Murdoch <sup>f</sup>	0.88	Chambers	3
USA	6288	61	2.39	0.68	0.00	0.00	0.72	0.97	Buffet	0.00	Magness (Liberty Media)	10

Venezuela	32	1	6.25	3.13	0.11	0.00	3.13	3.13	Levy	0.11	Levy	2
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<sup>a</sup> Quek Leng Chan is in control of the largest group belonging to a Malaysian family, however his group comprises of listed firms in Singapore Malaysia, New Zealand, Thailand, Philippines and the UK. Thus it is not the biggest group made up of purely Malaysian firms.

<sup>b</sup> Rupert Murdoch controls New Zealand's Sky Network and Independent Newspapers Ltd.

<sup>c</sup> Quek Leng Chan controls CDL Hotels and other smaller listed firms in New Zealand.

<sup>d</sup> This could have been superseded by the Hagen family with the acquisition of Steen & Strom in 2004.

<sup>e</sup> Ng Teng Fong, another Singaporean businessman, is most likely in control of a larger group, however, this group comprises of firms listed mainly in Hong Kong.

<sup>f</sup> Rupert Murdoch controls BSkyB and NDS Group PLC.

**Table III Correlation Matrix for Country Level Variables**

The table displays the correlations amongst the country-level variables used to explain the prevalence of family-controlled business groups. *Block Premium* is calculated based on the average difference between the negotiated price for a controlling block of shares and the prevailing market price. *Governance Index*, is an index based on principle components weights of anti-director rights, an enforcement index and corporate disclosure. *Competition* is a survey variable measuring the degree of product market competition. *Log GDP per Capita* is the natural logarithm of GDP scaled by total population. *Log GDP* is the natural logarithm of GDP. *Institutional Funds* is total institutional equity investments scaled by stock market capitalization. *Savings to GDP* is total domestic savings scaled GDP. *Manager* is a survey variable measuring the quality of business schools. *Accounting Consolidation* indicates the ownership threshold at which subsidiaries can be consolidated into the parent for taxation purposes. *Takeover Index* measures the measuring the level of protection of minority shareholders and the extent of fair and equitable treatment of all shareholders in the takeover process and the transparency of the process

	<i>Log GDP Per Capita</i>	<i>Accounting Conso- lidation</i>	<i>Savings to GDP</i>	<i>Institu- tional Funds</i>	<i>Compet- ition</i>	<i>Manager</i>	<i>Newspaper</i>	<i>Takeover Index</i>	<i>Cost of Capital</i>	<i>Tax Trans- parency</i>	<i>Log GDP</i>	<i>Govern- ance Index</i>	<i>Block Premium</i>
<i>Log GDP Per Capita</i>	1.000												
<i>Accounting Consolidation</i>	0.490	1.000											
<i>Savings to GDP</i>	0.307	-0.127	1.000										
<i>Institutional Funds</i>	0.541	0.402	0.171	1.000									
<i>Competition</i>	0.523	0.253	0.044	0.355	1.000								
<i>Manager</i>	0.590	0.470	0.035	0.523	0.651	1.000							
<i>Newspaper</i>	0.779	0.362	0.320	0.301	0.506	0.387	1.000						
<i>Takeover Index</i>	0.576	0.222	0.395	0.412	0.668	0.525	0.533	1.000					
<i>Cost of Capital</i>	-0.489	-0.168	-0.068	-0.125	-0.277	-0.209	-0.521	-0.218	1.000				
<i>Tax Transparency</i>	0.350	0.235	-0.325	0.087	0.270	0.269	0.179	0.171	-0.254	1.000			
<i>Log GDP</i>	0.490	0.350	-0.135	0.304	0.442	0.410	0.369	0.263	-0.349	0.520	1.000		
<i>Governance Index</i>	0.726	0.423	0.184	0.526	0.836	0.737	0.587	0.747	-0.288	0.289	0.355	1.000	
<i>Block Premium</i>	-0.354	-0.072	-0.226	-0.129	-0.380	-0.378	-0.272	-0.435	0.250	-0.306	-0.196	-0.520	1.000

**Table IV Multivariate Regression Analysis of Cross-Country Variations in Family Business Groups**

The table reports OLS regression results for a sample of 44 countries. *Block Premium* is calculated based on the average difference between the negotiated price for a controlling block of shares and the prevailing market price. *Governance Index*, is an index based on principle components weights of anti-director rights, an enforcement index and corporate disclosure. *Competition* is a survey variable measuring the degree of product market competition. *Newspaper* is the average newspaper circulation per 1000 inhabitants. *Tax transparency* measures the stringency of tax laws related to intra-corporate transactions. *Log GDP* per Capita is the natural logarithm of GDP scaled by total population. *Log GDP* is the natural logarithm of GDP. *Institutional Funds* is total institutional equity investments scaled by stock market capitalization. *Savings to GDP* is total domestic savings scaled GDP. *Manager* is a survey variable measuring the quality of business schools. *Accounting Consolidation* indicates the ownership threshold at which subsidiaries can be consolidated into the parent for taxation purposes. *Takeover Index* measures the level of protection of minority shareholders and the extent of fair and equitable treatment of all shareholders in the takeover process and the transparency of the process. Heteroskedasticity-consistent standard errors are reported in parentheses.

<i>Dependent Variables</i>	<i>% Group</i>		<i>% Group MC</i>		<i>% Pyramid</i>		<i>% Pyramid MC</i>						
	(1)	(2)	(3)	(4)	(1)	(2)	(1)	(2)	(3)	(4)	(1)	(2)	
<i>Intercept</i>	49.712 <sup>a</sup> (9.849)	16.727 (17.397)	47.951 <sup>a</sup> (17.036)	56.582 <sup>a</sup> (15.289)	39.928 <sup>b</sup> (17.162)	44.115 <sup>b</sup> (18.059)	24.892 <sup>a</sup> (6.688)	8.793 (12.067)	32.060 <sup>b</sup> (14.100)	38.251 <sup>a</sup> (13.176)	24.955 <sup>b</sup> (11.080)	28.992 <sup>a</sup> (10.998)	
<i>Block Premium</i>	0.086 (0.077)						0.073 (0.046)						
<i>Governance Index</i>			1.552 (2.017)	0.282 (1.712)	2.598 (1.826)	1.166 (2.130)			1.671 (1.417)	0.810 (1.265)	2.085 <sup>c</sup> (1.124)	1.344 (1.283)	
<i>Competition</i>		7.647 (4.986)						4.615 (3.454)					
<i>Newspaper</i>		-2.854 <sup>b</sup> (1.360)	-2.466 (1.564)	-0.407 (1.763)	-2.078 (2.118)	-0.810 (2.916)			-1.482 (1.050)	-1.542 (1.256)	-0.081 (1.297)	-0.735 (1.350)	0.277 (1.855)
<i>Tax Transparency</i>		-2.947 <sup>a</sup> (0.863)	-3.117 <sup>a</sup> (0.916)	-3.909 <sup>a</sup> (0.950)	-4.756 <sup>a</sup> (1.140)	-4.494 <sup>a</sup> (1.254)			-1.788 <sup>a</sup> (0.630)	-1.975 <sup>a</sup> (0.644)	-2.582 <sup>a</sup> (0.708)	-1.827 <sup>a</sup> (0.648)	-2.081 <sup>a</sup> (0.635)
<i>Log GDP Per Capita</i>	-3.236 <sup>a</sup> (1.126)												
<i>Log GDP</i>		-1.264 (1.098)	-0.656 (1.076)	-1.368 (1.011)	0.351 (1.416)	-0.399 (1.671)			-1.374 (0.864)	-0.942 (0.805)	-1.428 <sup>c</sup> (0.739)	-0.684 (1.011)	-1.090 (1.140)
<i>Institutional Funds</i>		-7.984 <sup>a</sup> (2.317)	-9.288 <sup>a</sup> (2.543)		-14.126 <sup>a</sup> (4.427)				-5.041 <sup>a</sup> (1.624)	-6.083 <sup>a</sup> (1.752)		-6.085 <sup>b</sup> (3.052)	
<i>Savings to GDP</i>				-0.624 <sup>a</sup> (0.216)		-0.248 (0.357)					-0.451 <sup>a</sup> (0.158)		-0.282 (0.236)
<i>Manager</i>		0.043 (1.963)	0.799 (2.656)	-0.244 (2.303)	0.866 (2.639)	-0.445 (2.738)			0.365 (1.477)	0.363 (1.659)	-0.337 (1.535)	-0.153 (1.940)	-0.786 (1.892)
<i>Accounting Consolidation</i>	0.829 (2.350)	2.332 (2.364)	1.171 (2.076)	-1.683 (1.912)	-0.960 (2.522)	-3.518 (2.615)	0.532 (1.626)	2.034 (1.537)	1.300 (1.343)	-0.677 (1.245)	1.263 (1.939)	-0.285 (1.626)	
<i>Takeover Index</i>	-14.474 <sup>b</sup> (6.999)	-21.523 <sup>a</sup> (6.279)	-19.964 <sup>a</sup> (5.843)	-12.306 <sup>b</sup> (5.593)	-11.770 (7.693)	-10.325 (8.743)	-7.477 (6.463)	-12.174 <sup>b</sup> (5.347)	-12.677 <sup>b</sup> (5.848)	-7.048 (5.831)	-9.034 <sup>c</sup> (5.209)	-5.863 (4.831)	
<i>Adjusted R<sup>2</sup></i>	0.387	0.479	0.451	0.510	0.313	0.181	0.247	0.342	0.335	0.417	0.111	0.097	
<i>N</i>	37	44	44	44	44	44	37	44	44	44	44	44	

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at the 1, 5 and 10 percent levels, respectively.



**Table V. Multivariate Regression Analysis of Family Business Groups Controlling for Private Benefits of Control**

The table reports OLS regression results for a sample of 44 countries. Block Premium is calculated based on the average difference between the negotiated price for a controlling block of shares and the prevailing market price. *Governance Index*, is an index based on principle components weights of anti-director rights, an enforcement index and corporate disclosure. *Competition* is a survey variable measuring the degree of product market competition. *Newspaper* is the average newspaper circulation per 1000 inhabitants. *Tax transparency* measures the stringency of tax laws related to intra-corporate transactions. *Log GDP* per Capita is the natural logarithm of GDP scaled by total population. *Log GDP* is the natural logarithm of GDP. *Institutional Funds* is total institutional equity investments scaled by stock market capitalization. *Savings to GDP* is total domestic savings scaled GDP. *Manager* is a survey variable measuring the quality of business schools. *Accounting Consolidation* indicates the ownership threshold at which subsidiaries can be consolidated into the parent for taxation purposes. *Takeover Index* measures the level of protection of minority shareholders and the extent of fair and equitable treatment of all shareholders in the takeover process and the transparency of the process. Heteroskedasticity-consistent standard errors are reported in parentheses.

	<i>Group Firm/Controlled Firms</i>		<i>Group Firms/Family Controlled Firms</i>		<i>% Group</i>		<i>% Pyramid</i>	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
<i>Intercept</i>	0.594 <sup>a</sup> (0.196)	0.675 <sup>a</sup> (0.179)	0.662 <sup>a</sup> (0.254)	0.756 <sup>a</sup> (0.236)	51.168 <sup>a</sup> (16.286)	66.047 <sup>a</sup> (14.255)	29.524 <sup>b</sup> (12.824)	40.173 <sup>a</sup> (11.432)
<i>Block Premium</i>					0.136 (0.095)	0.029 (0.076)	0.117 <sup>c</sup> (0.061)	0.041 (0.043)
<i>Governance Index</i>	0.024 (0.023)	0.013 (0.021)	0.005 (0.032)	-0.007 (0.027)	3.672 <sup>c</sup> (2.158)	1.706 (1.687)	3.193 <sup>b</sup> (1.427)	1.816 (1.161)
<i>Newspaper</i>	-0.026 (0.019)	-0.007 (0.022)	-0.023 (0.021)	-0.001 (0.022)	-1.815 (1.524)	-0.274 (1.893)	-1.402 (1.179)	-0.275 (1.299)
<i>Tax Transparency</i>	-0.045 <sup>a</sup> (0.012)	-0.053 <sup>a</sup> (0.012)	-0.051 <sup>a</sup> (0.014)	-0.062 <sup>a</sup> (0.015)	-1.863 (1.149)	-3.299 <sup>a</sup> (1.017)	-1.404 <sup>c</sup> (0.809)	
<i>Log GDP</i>	-0.010 (0.013)	-0.016 (0.013)	-0.026 <sup>c</sup> (0.015)	-0.033 <sup>b</sup> (0.013)	-0.699 (1.010)	-1.530 (1.031)	-0.500 (0.717)	-1.085 (0.723)
<i>Institutional Funds</i>	-0.076 <sup>b</sup> (0.037)		-0.077 <sup>c</sup> (0.044)		-11.569 <sup>a</sup> (3.638)		-7.953 <sup>a</sup> (2.619)	
<i>Savings to GDP</i>		-0.006 <sup>b</sup> (0.003)		-0.007 <sup>b</sup> (0.003)		-0.545 <sup>b</sup> (0.245)		-0.399 <sup>b</sup> (0.165)
<i>Cost of Capital</i>								
<i>Manager</i>	0.010 (0.031)	0.001 (0.027)	0.028 (0.039)	0.019 (0.035)	-0.980 (2.589)	-2.434 (2.234)	0.062 (1.585)	-0.944 (1.391)
<i>Accounting Consolidation</i>	0.030 (0.025)	0.004 (0.022)	0.031 (0.027)	0.003 (0.027)	0.624 (1.808)	-1.328 (2.147)	0.207 (1.170)	-1.229 (1.378)
<i>Takeover Index</i>	-0.235 <sup>a</sup> (0.075)	-0.161 <sup>b</sup> (0.070)	-0.225 <sup>b</sup> (0.093)	-0.135 (0.086)	-23.679 <sup>a</sup> (6.995)	-16.334 <sup>a</sup> (6.280)	-15.192 <sup>b</sup> (6.495)	-9.919 <sup>c</sup> (5.865)
<i>Adjusted R<sup>2</sup></i>	0.409	0.466	0.462	0.523	0.462	0.466	0.405	0.427
<i>N</i>	44	44	44	44	37	37	37	37

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at the 1, 5 and 10 percent levels, respectively.

**Table VI Non-Parametric Tests of Differences between Group and Non-Group Firms and between Firms within the Same Group**

The Table compares the median values of selected firm-level variables across group and non-groups firms as well as between firms at different layers in the same pyramidal business group. Group vs. non-group comparisons are made between group firms and their matched industry peers. Within-group tests compare median unadjusted firm variables across pyramidal layers in the same business groups. Statistical significance of differences is tested using a Wilcoxon Rank-Sum test of medians. Panel A examines all firms in our sample. Panel B examines only countries whose Governance Index is below the sample median and Panel C examines countries whose GDP Per Capita is below the sample median. Variables are described in Table I.

	<i>Q</i>	<i>Asset Growth</i>	<i>Log Assets</i>	<i>Log Market Cap</i>	<i>Cash</i>	<i>Leverage</i>	<i>Dividend Yield</i>	<i>Capex</i>	<i>Stock Volatility</i>	<i>Earnings Volatility</i>
<b>Panel A: All Sample Countries</b>										
<b>Group vs. Non-Group Tests</b>										
Groups minus Non-Group Firms	-0.079 <sup>a</sup>	0.000	0.856 <sup>a</sup>	0.634 <sup>a</sup>	-0.034 <sup>b</sup>	0.349	0.000 <sup>a</sup>	0.001	-0.011 <sup>a</sup>	-0.003
Pyramid Layer 1 minus Non-Group Firms	-0.081 <sup>a</sup>	-0.006	0.709 <sup>a</sup>	0.597 <sup>a</sup>	-0.084	-1.203 <sup>b</sup>	0.137 <sup>a</sup>	0.005 <sup>b</sup>	-0.013 <sup>a</sup>	-0.004
Pyramid Layer $\geq 2$ minus Non-Group Firms	-0.033	-0.010	0.585 <sup>a</sup>	0.765 <sup>a</sup>	0.332	-2.433	0.000 <sup>b</sup>	0.001	-0.011	-0.001
<b>Within-Group Tests</b>										
Layer 1 minus Direct Control	0.087 <sup>a</sup>	-0.011 <sup>b</sup>	-1.036 <sup>a</sup>	-0.618 <sup>a</sup>	0.000	-2.648 <sup>b</sup>	0.000	0.008 <sup>b</sup>	0.006 <sup>a</sup>	0.005 <sup>b</sup>
Layer $\geq 2$ minus Direct Control	0.118 <sup>a</sup>	-0.068 <sup>a</sup>	-1.678 <sup>a</sup>	-1.148 <sup>a</sup>	1.025 <sup>b</sup>	-9.839	0.208	0.049 <sup>a</sup>	0.007 <sup>b</sup>	0.015
Layer $\geq 2$ minus Layer 1	0.082 <sup>b</sup>	-0.040	-1.164 <sup>a</sup>	-0.375 <sup>a</sup>	0.281	-3.542	-0.066	0.003	0.003	-0.001
<b>Panel B: Weak Governance Countries</b>										
<b>Group vs. Non-Group Tests</b>										
Groups minus Non-Group Firms	-0.076 <sup>a</sup>	0.007 <sup>b</sup>	0.836 <sup>a</sup>	0.629 <sup>a</sup>	0.016 <sup>a</sup>	-0.632	0.069 <sup>a</sup>	0.003 <sup>a</sup>	-0.012 <sup>a</sup>	-0.003
Pyramid Layer 1 minus Non-Group Firms	-0.065 <sup>a</sup>	0.011	0.826 <sup>a</sup>	0.663 <sup>a</sup>	-0.049	-2.857 <sup>b</sup>	0.128 <sup>a</sup>	0.003	-0.014 <sup>c</sup>	-0.004
Pyramid Layer $\geq 2$ minus Non-Group Firms	-0.049	-0.038	0.806 <sup>a</sup>	0.776 <sup>a</sup>	0.973 <sup>a</sup>	-2.939	0.038 <sup>c</sup>	0.010	-0.006	0.001
<b>Within-Group Tests</b>										
Layer 1 minus Direct Control	0.056 <sup>a</sup>	-0.023 <sup>b</sup>	-0.954 <sup>a</sup>	-0.535 <sup>a</sup>	-0.113	-2.597 <sup>c</sup>	0.000	0.003	0.006 <sup>b</sup>	0.004
Layer $\geq 2$ minus Direct Control	-0.031	-0.111 <sup>a</sup>	-1.589 <sup>a</sup>	-1.031 <sup>b</sup>	1.139	-9.839	1.222	0.041	0.003	0.007
Layer $\geq 2$ minus Layer 1	0.025	-0.049 <sup>c</sup>	-1.012 <sup>a</sup>	-0.275 <sup>b</sup>	1.024	-4.373	0.114	0.037 <sup>b</sup>	-0.011	-0.004
<b>Panel C: Low GDP Per Capita Countries</b>										
<b>Group vs. Non-Group Tests</b>										
Groups minus Non-Group Firms	-0.083 <sup>a</sup>	0.006 <sup>b</sup>	0.816 <sup>a</sup>	0.554 <sup>a</sup>	0.008 <sup>a</sup>	-0.843	0.055 <sup>a</sup>	0.003 <sup>b</sup>	-0.012 <sup>a</sup>	-0.004
Pyramid Layer 1 minus Non-Group Firms	-0.061 <sup>a</sup>	0.009	0.789 <sup>a</sup>	0.582 <sup>a</sup>	-0.002 <sup>c</sup>	-2.857 <sup>b</sup>	0.131 <sup>a</sup>	0.003	-0.015 <sup>b</sup>	-0.005
Pyramid Layer $\geq 2$ minus Non-Group Firms	-0.054	-0.028	0.491 <sup>a</sup>	0.600 <sup>b</sup>	0.777 <sup>a</sup>	-3.296	0.000	-0.038	-0.003	0.002 <sup>c</sup>
<b>Within-Group Tests</b>										
Layer 1 minus Direct Control	0.071 <sup>a</sup>	-0.021 <sup>b</sup>	-0.987 <sup>a</sup>	-0.472 <sup>a</sup>	-0.024	-2.597 <sup>c</sup>	0.000	0.001	0.008 <sup>c</sup>	0.003
Layer $\geq 2$ minus Direct Control	0.017	-0.149 <sup>a</sup>	-1.634 <sup>a</sup>	-1.249 <sup>a</sup>	0.690	-12.654 <sup>b</sup>	0.614	0.038	0.008 <sup>c</sup>	0.018 <sup>c</sup>
Layer $\geq 2$ minus Layer 1	0.029	-0.073 <sup>b</sup>	-1.057 <sup>a</sup>	-0.641 <sup>b</sup>	0.483	-5.582 <sup>c</sup>	0.000	0.018	-0.020	-0.004

<sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance at the 1, 5 and 10 percent levels, respectively.

**Table VII. Family Group Membership and Firm Performance**

This analysis is based on the sample of 13,910 firms from 45 selected countries. The dependent variable is the ratio of market value of assets over book value of assets, used as a proxy for Tobin's Q. In the Q regression, *Group Dummy* is an indicator variable that equals one if a firm belongs to a family-controlled group and zero otherwise. *Log Size* is the log of US-dollar market capitalization measured at the end of 2001. *Beta* is the estimate of beta for each firm obtained from running a market model on the firm's monthly stock returns over the 1997-2001 period. *Asset Growth* is the average annual growth rate in asset size over the 1997-2001 period. *Leverage* is the ratio of total liabilities to total assets. *CAPEX* is the ratio of capital expenditure over total assets. *Dividend Yield* is the average of the ratio of dividend-per-share over share price over the 1997-2001 period. To address potential endogeneity of *Group Dummy*, two alternative models are used, both employing *Idiosyncratic Risk*, which is the standard error from the same market model used to estimate of *Beta*, as the identifying instrument. In the two-stage instrument-variable (IV) models, *Group Dummy* is first regressed on *Idiosyncratic Risk* and other explanatory variables in the Q regression using a probit estimation. The fitted values from this first stage is used as the instrument for *Group Dummy* in the second stage (the Q regression). In the treatment effect models, the Q regression equation is estimated jointly with the treatment equation, in which *Group Dummy* is explained by *Idiosyncratic Risk* and the other explanatory variables in the Q regression, using the maximum likelihood procedure. To save space, the estimates of the first-stage regressions are not reported, except for the coefficients of *Idiosyncratic Risk*. The treatment-effect models report the Wald test for cross-equation correlation of the error terms, which indicates evidence of endogenous selection. The two-stage IV models report the Stock and Yogo (2005) test for weak instruments. All regression models include dummy variables for industry sectors (based on their first SIC digit) and country fixed effects. Each of the specifications is estimated first on the full sample, then on the sample of firms with a controlling shareholder (controlled firms), and finally on the sample of family-controlled firms. The robust standard errors are reported in parentheses below the coefficients.

	Full sample			Endogenous Selection Regression Models					
	Controlled-Firm Sample	Family-Firm Sample		Full sample		Controlled-Firm Sample		Family-Firm Sample	
	OLS regression	OLS regression	OLS regression	Two-stage IV reg.	Treatment-Effect reg.	Two-stage IV reg.	Treatment-Effect reg.	Two-stage IV reg.	Treatment-Effect reg.
<i>Group Dummy</i>	-0.160 <sup>a</sup> (0.041)	-0.205 <sup>a</sup> (0.036)	-0.227 <sup>a</sup> (0.042)	3.843 <sup>a</sup> (0.709)	1.741 <sup>a</sup> (0.253)	1.863 <sup>b</sup> (0.747)	1.700 <sup>a</sup> (0.267)	0.993 <sup>c</sup> (0.544)	1.697 <sup>a</sup> (0.304)
<i>Log Size</i>	0.061 <sup>a</sup> (0.012)	0.099 <sup>a</sup> (0.013)	0.109 <sup>a</sup> (0.012)	0.031 <sup>a</sup> (0.008)	0.047 <sup>a</sup> (0.006)	0.100 <sup>a</sup> (0.008)	0.059 <sup>a</sup> (0.009)	0.077 <sup>a</sup> (0.017)	0.059 <sup>a</sup> (0.010)
<i>Beta</i>	0.060 <sup>b</sup> (0.024)	0.038 (0.03)	0.024 (0.029)	0.063 <sup>c</sup> (0.032)	0.061 <sup>b</sup> (0.031)	0.04 (0.041)	0.030 (0.042)	0.036 (0.046)	0.031 (0.045)
<i>Asset growth</i>	0.055 <sup>b</sup> (0.021)	0.080 <sup>b</sup> (0.038)	0.088 <sup>b</sup> (0.041)	0.065 <sup>a</sup> (0.017)	0.060 <sup>a</sup> (0.016)	0.078 <sup>a</sup> (0.027)	0.090 <sup>a</sup> (0.027)	0.093 <sup>a</sup> (0.030)	0.098 <sup>a</sup> (0.029)
<i>Leverage</i>	0.014 <sup>a</sup> (0.003)	0.013 <sup>a</sup> (0.003)	0.014 <sup>a</sup> (0.003)	0.014 <sup>a</sup> (0.001)	0.014 <sup>a</sup> (0.001)	0.013 <sup>a</sup> (0.001)	0.013 <sup>a</sup> (0.001)	0.013 <sup>a</sup> (0.001)	0.013 <sup>a</sup> (0.001)
<i>CAPEX/TA</i>	1.097 <sup>a</sup> (0.184)	1.018 <sup>a</sup> (0.277)	0.839 <sup>a</sup> (0.241)	1.300 <sup>a</sup> (0.202)	1.193 <sup>a</sup> (0.186)	0.997 <sup>a</sup> (0.238)	1.229 <sup>a</sup> (0.249)	1.115 <sup>a</sup> (0.280)	1.214 <sup>a</sup> (0.267)
<i>Dividend Yield</i>	-0.019 <sup>c</sup> (0.010)	-0.007 (0.008)	-0.007 (0.008)	-0.014 <sup>b</sup> (0.006)	-0.017 <sup>a</sup> (0.004)	-0.007 <sup>b</sup> (0.003)	-0.004 (0.004)	-0.005 (0.004)	-0.003 (0.005)

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<i>Idiosyncratic Risk</i> (from first stage)	0.101 (0.125)	0.599 <sup>a</sup> (0.117)	0.157 (0.149)	0.597 <sup>a</sup> (0.124)	0.233 <sup>c</sup> (0.133)	0.575 <sup>a</sup> (0.122)
Wald test (H0: Rho=0 or no endogenous selection)		317.89 <sup>a</sup>		254.23 <sup>a</sup>		156.45 <sup>a</sup>
Stock-Yogo test (H0: weak instrument)	71.852 (16.38)		46.436 (16.38)		81.836 (16.38)	
R-squared	17.75	16.86	16.62			
No of obs	13911	6091	7985	13911	7985	6091

<sup>a</sup>, <sup>b</sup>, and <sup>c</sup> denote significance at the 1, 5, and 10 percent levels.

**Table VIII. OLS regression of within-group differences and firm performance**

This analysis focuses on the sample of 1259 family-group firms from 45 selected countries. The dependent variable is the ratio of market value of assets over book value of assets, used as a proxy for Tobin's Q. The main explanatory variables of interest are different measures of within-group control and ownership measures. *Direct Ownership* is the percentage of issued shares of a group firm held directly by its parent firm(s) in the same group. *Weakest Control Link* is the sum of the weakest ownership links in various chains of ownership connecting the firm to its ultimate controlling shareholder. *Ultimate CF Rights* is the sum of cash-flow rights of a group firm attributable to the ultimate controlling shareholder. *Pyramid layer* is an integer variable that counts the number of layers of listed firms that exist between a group firm and its ultimate controlling shareholder. Other control variables for Q are also included. *Log Size* is the log of US-dollar market capitalization measured at the end of 2001. *Beta* is the estimate of beta for each firm obtained from running a market model on the firm's monthly stock returns over the 1997-2001 period. *Asset Growth* is the average annual growth rate in asset size over the 1997-2001 period. *Leverage* is the ratio of total liabilities to total assets. *CAPEX* is the ratio of capital expenditure over total assets. *Dividend Yield* is the average of the ratio of dividend-per-share over share price over the 1991-2001 period. All Q regressions include group-specific fixed effects. To address potential selection bias as a result of investigating only group firms, the Heckman two-stage procedure is used. The first stage is a probit regression that explains group-affiliation status using all of the standard control variables mentioned above, country and industry dummies, and *Idiosyncratic Risk*, which is the standard error from the same market model used to estimate of *Beta*, as the identifying instrument. The *Lambda* measure (inverse Mill's ratio) is calculated from this first stage and included in the Q regression as an additional control. For robustness, the first-stage of Heckman selection bias correction is estimated first on the full sample, then on the sample of controlled firms and finally on the sample of family-controlled firms. The standard errors are reported in parentheses, and are corrected for cluster-specific heteroskedasticity, with a cluster being defined as a group in the sample.

					Heckman Selection Bias Correction					
					1 <sup>st</sup> stage: full sample	1 <sup>st</sup> stage: ctrl. firms	1 <sup>st</sup> stage: family firms			
OLS Regression Models										
<i>Direct Ownership</i>				0.271 <sup>b</sup> (0.126)	0.396 <sup>a</sup> (0.112)	0.201 <sup>c</sup> (0.120)	0.241 <sup>c</sup> (0.136)	0.244 <sup>c</sup> (0.136)	0.234 <sup>c</sup> (0.135)	
<i>Weakest Control Link</i>	0.254 (0.194)	0.812 <sup>b</sup> (0.368)								
<i>Ultimate CF Rights</i>		-0.625 <sup>b</sup> (0.291)	-0.149 (0.161)		-0.331 <sup>b</sup> (0.151)					
<i>Pyramid Layer</i>						0.113 <sup>a</sup> (0.026)	0.104 <sup>a</sup> (0.027)	0.060 <sup>b</sup> (0.028)	0.063 <sup>b</sup> (0.029)	0.064 <sup>b</sup> (0.028)
<i>Log Size</i>	0.064 <sup>a</sup> (0.013)	0.069 <sup>a</sup> (0.015)	0.066 <sup>a</sup> (0.014)	0.070 <sup>a</sup> (0.013)	0.075 <sup>a</sup> (0.014)	0.076 <sup>a</sup> (0.014)	0.079 <sup>a</sup> (0.014)	0.077 <sup>a</sup> (0.018)	0.056 <sup>b</sup> (0.021)	0.052 <sup>a</sup> (0.020)
<i>Beta</i>	-0.053 (0.056)	-0.056 (0.056)	-0.056 (0.056)	-0.049 <sup>b</sup> (0.056)	-0.049 (0.055)	-0.050 (0.055)	-0.046 <sup>b</sup> (0.055)	-0.060 (0.060)	-0.070 (0.058)	-0.075 (0.056)
<i>Asset growth</i>	0.002 (0.052)	0.008 (0.051)	0.005 (0.053)	-0.001 (0.051)	0.000 (0.051)	0.009 (0.052)	0.005 (0.051)	0.000 (0.051)	0.038 (0.049)	0.040 (0.050)
<i>Leverage</i>	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)	0.005 <sup>a</sup> (0.001)

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<i>CAPEX/TA</i>	0.724 <sup>a</sup>	0.703 <sup>a</sup>	0.708 <sup>a</sup>	0.708 <sup>a</sup>	0.684 <sup>a</sup>	0.633 <sup>a</sup>	0.633 <sup>a</sup>	0.532	0.732	0.701
	(0.173)	(0.172)	(0.173)	(0.175)	(0.175)	(0.175)	(0.174)	(0.184)	(0.202)	(0.192)
<i>Dividend Yield</i>	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
<i>Lambda</i> (inverse Mills)								-0.030	-0.43 <sup>c</sup>	-0.452 <sup>b</sup>
								(0.255)	(0.234)	(0.224)
<b>R-squared</b>	<b>53.95</b>	<b>54.57</b>	<b>53.88</b>	<b>54.12</b>	<b>54.40</b>	<b>54.64</b>	<b>54.78</b>	<b>54.98</b>	<b>55.67</b>	<b>55.76</b>

<sup>a</sup>, <sup>b</sup>, and <sup>c</sup> denote significance at the 1, 5, and 10 percent levels.

**Table IX. Regression of within-group differences and firm performance under endogeneity assumption**

This analysis focuses on the sample of 1259 family-group firms from 45 selected countries. The dependent variable is the ratio of market value of assets over book value of assets, used as a proxy for Tobin's Q. The main explanatory variables of interest are different measures of within-group control and ownership measures. *Direct Ownership* is the percentage of issued shares of a group firm held directly by its parent firm(s) in the same group. *Ultimate CF Rights* is the sum of cash-flow rights of a group firm attributable to the ultimate controlling shareholder. *Pyramid layer* is an integer variable that counts the number of layers of listed firms that exist between a group firm and its ultimate controlling shareholder. Other control variables for Q are also included. *Log Size* is the log of US-dollar market capitalization measured at the end of 2001. *Beta* is the estimate of beta for each firm obtained from running a market model on the firm's monthly stock returns over the 1997-2001 period. *Asset Growth* is the average annual growth rate in asset size over the 1997-2001 period. *Leverage* is the ratio of total liabilities to total assets. *CAPEX/TA* is the ratio of capital expenditure over total assets. *Dividend Yield* is the average of the ratio of dividend-per-share over share price over the 1997-2001 period. All Q regressions include group-specific fixed effects. To address potential endogeneity, the two-stage instrumental-variable procedure is used. The first stage regression regresses one of the within-group ownership variable of interests (*Ultimate CF Rights*, *Direct Ownership*, *Pyramid Layer*) on the standard control variables mentioned above and two additional instruments, *Idiosyncratic Risk*, which is the standard error from the same market model used to estimate of *Beta*, and *Same Industry Dummy*, which equals one if a group firm's and its immediate parent's SIC-code share the same first digit. In addition, to address potential selection bias as a result of investigating only group firms, the Heckman two-stage procedure is used. The first stage is a probit regression that explains group-affiliation status using all of the standard control variables mentioned above, country and industry dummies, and, *Idiosyncratic Risk* as the identifying instrument. The *Lambda* measure (inverse Mill's ratio) is calculated from this first stage and included in the Q regression as an additional control. For robustness, the first-stage of Heckman selection bias correction is estimated first on the full sample, then on the sample of controlled firms and finally on the sample of family-controlled firms. The standard errors are reported in parentheses, and are corrected for cluster-specific heteroskedasticity, with a cluster being defined as a group in the sample.

	Two-stage IV regressions						With Heckman Selection Bias Correction					
	1 <sup>st</sup> Stage	2 <sup>nd</sup> Stage	1 <sup>st</sup> Stage	2 <sup>nd</sup> Stage	1 <sup>st</sup> Stage	2 <sup>nd</sup> Stage	Heckman 1 <sup>st</sup> stage inc.: Full Sample	Heckman 1 <sup>st</sup> stage inc.: Ctrl. Firms	Heckman 1 <sup>st</sup> stage inc.: Family Firms			
<i>Ultimate CF Rights</i>		-0.764 <sup>c</sup> (0.398)										
<i>Direct Ownership</i>				0.768 <sup>c</sup> (0.460)			0.882 <sup>b</sup> (0.450)	0.878 <sup>b</sup> (0.438)		0.777 <sup>b</sup> (0.407)		
<i>Pyramid Layer</i>						0.122 <sup>b</sup> (0.056)	0.135 <sup>b</sup> (0.055)	0.128 <sup>b</sup> (0.055)		0.128 <sup>b</sup> (0.055)		
<i>Same Industry Dummy</i>	-0.114 <sup>a</sup> (0.013)		0.106 <sup>a</sup> (0.016)		0.789 <sup>a</sup> (0.039)							
<i>Idiosyncratic Risk</i>	-0.039 (0.074)		0.054 (0.094)		0.963 <sup>b</sup> (0.399)							
<i>Log Size</i>	0.000 (0.004)	0.073 <sup>a</sup> (0.018)	-0.018 <sup>a</sup> (0.004)	0.087 <sup>a</sup> (0.015)	-0.02 (0.022)	0.076 <sup>a</sup> (0.015)	0.080 <sup>a</sup> (0.016)	0.079 <sup>a</sup> (0.016)	0.054 <sup>a</sup> (0.021)	0.06 <sup>a</sup> (0.021)	0.049 <sup>b</sup> (0.019)	0.056 <sup>a</sup> (0.020)
<i>Beta</i>	-0.007 (0.011)	-0.075 (0.054)	-0.021 (0.015)	-0.054 (0.061)	-0.09 (0.057)	-0.061 (0.059)	-0.059 (0.065)	-0.071 (0.062)	-0.071 (0.063)	-0.079 (0.06)	-0.073 (0.063)	-0.081 (0.061)

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<i>Asset growth</i>	0.011 (0.016)	0.004 (0.055)	0.017 (0.019)	-0.016 (0.045)	-0.079 (0.053)	0.008 (0.049)	0.002 (0.049)	0.017 (0.051)	0.025 (0.048)	0.033 (0.051)	0.04 (0.05)	0.044 (0.053)
<i>Leverage</i>	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.006 (0.001)	(0.002) (0.001)	0.005 (0.001)	0.006 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)	0.006 <sup>a</sup> (0.001)
<i>CAPEX/TA</i>	-0.034 (0.05)	0.543 <sup>a</sup> (0.165)	0.037 (0.056)	0.538 <sup>a</sup> (0.166)	0.563 <sup>a</sup> (0.206)	0.499 <sup>a</sup> (0.170)	0.606 <sup>a</sup> (0.182)	0.536 <sup>a</sup> (0.194)	0.743 <sup>a</sup> (0.185)	0.637 <sup>a</sup> (0.207)	0.783 <sup>a</sup> (0.180)	0.667 <sup>a</sup> (0.209)
<i>Dividend Yield</i>	0.001 (0.001)	-0.001 (0.005)	0.000 (0.001)	-0.002 (0.003)	-0.006 (0.004)	-0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)	0.000 (0.003)	0.000 (0.004)	0.001 (0.003)	0.001 (0.003)
<i>Lambda (inverse Mills)</i>							-0.166 (0.266)	-0.166 (0.266)	-0.546 <sup>b</sup> (0.258)	-0.377 (0.274)	-0.571 <sup>a</sup> (0.207)	-0.402 <sup>c</sup> (0.233)
Stock-Yogo test (H0: weak instrument)	37.920 19.93		17.825 19.93		205.972 19.93		18.280 19.93	188.69 19.93	19.183 19.93	182.48 19.93	19.650 19.93	177.78 19.93
No of obs	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126

<sup>a</sup>, <sup>b</sup>, and <sup>c</sup> denote significance at the 1, 5, and 10 percent levels.