Internal Capital Market and Dividend Policies: Evidence From Business Groups

Radhakrishnan Gopalan
Olin Business School, Washington University in St. Louis

Vikram Nanda
Ernest Scheller Jr. College of Business, Georgia Institute of Technology

Amit Seru
Booth School of Business, University of Chicago and NBER

We argue that internal capital market imperatives of business groups i.e., reallocation of capital across group firms, influences an affiliated firm's dividend policy. Intuition is developed in a model in which business group insiders distribute dividends from cash-rich firms and use their share of payout to invest in other affiliated firms. Employing multi-country panel-data, we find support for this channel: Dividends by a group firm are positively related with equity-financed investments by its affiliated firms. Results are corroborated by exploiting variation in a firm's investment opportunity generated by changes in import tariff policy: a shock to investment opportunity of an affiliated firm is propagated to dividend policies of other firms in its group. (*JEL* G30, J33)

The increased efficiency of financial markets in the United States has diminished the benefits of allocating capital through internal versus external markets, bringing into question the economic rationale for the diversified conglomerate (Matsusaka 2001). In economies with less developed financial markets, however, raising external financing remains burdensome and firms rely heavily on internal sources of capital (Stein 2003). Firms in these economies typically have access to an internal capital market (ICM) as members of business groups:

We thank Michael Weisbach (the editor), anonymous referees, Heitor Almeida, Vladimir Atanasov, Meghana Ayyagari, Arnoud Boot, Amy Dittmar, Mara Faccio, Todd Gormley, Kose John, Raghuram Rajan, Robert Kennedy, Avner Kalay, E. Han Kim, Joel Slemrod, Daniel Wolfenzon, and the seminar participants at the Corporate Governance Conference at Seoul Korea, American Finance Association meetings, Summer Research Conference at Indian School of Business, University of Michigan (Ross), and the William Davidson Institute at the University of Michigan for helpful comments and suggestions. The authors acknowledge Mitsui Finance Center, Center for International Business Education and the William Davidson Institute, all at the University of Michigan for financial support and for acquiring the Prowess data set. We also thank Mara Faccio, Stijn Claessens, Simeon Djankov and Larry Lang for graciously providing us part of the data. We thank Shu Zhang and Ram Chivukula for outstanding research assistance. Seru thanks Kauffman and Gould Foundation for financial assistance. Please address correspondence to Radhakrishnan Gopalan, Olin Business School, Washington University in St. Louis, Campus Box 1133, 1 Brookings Drive, St. Louis, MO 63130-4899; telephone: (314) 935-9196; fax: (314) 935-6359. Email: gopalan@wustl.edu. This is a substantially revised version of the paper that was previously circulated earlier as "Do Business Groups use Dividends to Fund Investments?"

doi:10.1093/rfs/hhu004 Advance Access publication February 16, 2014

firms in different industries, often controlled by a family and their associates. We exploit information on the financing and investment patterns in these firms to highlight a novel aspect of the ICM and provide a different perspective into the costs and benefits of allocating capital internally. Employing an extensive data set across several countries, we provide empirical evidence that links the organization of an ICM to the dividend policies of its member firms. The connection follows from our model that shows that insiders may sometimes operate an ICM where they use dividends from existing firms to invest directly in the equity of affiliated firms with profitable investments.

Business groups are the dominant organizational form for large firms outside the U.S (Almeida and Wolfenzon 2006a). Two observations about these firms provide motivation for our study. First, group firms pay significant amounts of dividends despite the well documented agency problems in these firms and the weak legal and regulatory environments in which they operate (e.g., Almeida and Wolfenzon 2006a; Gopalan, Nanda, and Seru 2007). For instance, in our cross-country sample of group firms, we observe positive dividends in more than 46% of the firm-years and find that dividends are on average 1.8% of firms' sales.[1] Second, group insiders have significant direct ownership stake in member firms (La Porta et al. 1999) and continue to invest substantial amounts when new equity capital is raised. For example, the promoters of Tata Motors, a firm belonging to the Tata group in India, launched the small car "Nano" and invested almost $48 million in a recent rights issue.[2]

We argue that both these observations are linked: group insiders use their share of dividend flows from member firms — which tends to be significant — to take a direct stake in profitable investment opportunities of other group firms. This motive suggests that group firms may, in fact, distribute significant amounts of dividends if affiliated firms have attractive investment opportunities that require financing. We formalize this intuition in a simple model that highlights situations in which such a mechanism might operate.

We model a business group with two firms controlled by a wealth-constrained insider. The legal regime is assumed to be weak, thereby allowing the insider to divert firm resources for his private benefit. The insider's incentive to divert is, however, moderated by a high equity stake. In the scenario we consider, one group firm has surplus cash, and the other has an investment opportunity that requires financing. Internal finance from within the group is advantageous because it helps maintain the insider's equity stake, resulting in less diversion and a lower cost of external finance.

---

[1] To put this in perspective, over a similar time frame, US firms with financial data in Compustat paid dividends in about 33% of firm-years, and the US dividends averaged 1.9% of sales.

[2] See"Non-promoter shareholders cool towards Tata Motors rights issue" *Business Line* November 4, 2008. Similarly, the market value of Samsung Electronics' main promoter, Lee Kun-hee, has a stake of approximately $4.9 billion, while the stake of Azim Premji, the main promoter of Wipro, an Indian software firm, is approximately $8 billion.

The insider can potentially employ two alternative channels to transfer resources across the group firms – the dividend channel and the intra-group investment channel. In the dividend channel, the cash rich firm pays dividends and the insider uses his share of dividends to invest in the firm with the investment opportunity. There may, however, be costs associated with the distribution and reinvestment of the dividends (such as taxes). The intra-group investment channel involves the cash rich firm directly investing in the firm with the investment opportunity. Given the opaque nature of this channel and the ease with which it might be manipulated, outside investors may force the insider to bear dissipative auditing costs.[3] Exploring the tradeoff between the dividend channel and the dissipative auditing costs in the intra-group investment channel provides us with a rich set of testable predictions about the dividend policy of group firms and its relation to group investments.

In our empirical analysis, we examine if *within* a group, dividend payments from a firm are positively associated with investments and equity-financed investments in other member firms that occur fairly close in time relative to when dividends are paid out. We test this prediction using a panel data of more than 92,000 firm-year observations from 22 countries spanning Asia and Europe. This data consists of both stand-alone and group affiliated firms. We start by exploring the basic patterns of dividend payment by these firms and find that, on average, group firms pay 20% more dividends than stand alone firms. Moreover, the higher dividend payment by group firms is predominantly in groups that are investing. While they are only suggestive, the patterns are consistent with our model where investment opportunities in member firms provides a group firm with an additional motive to pay dividends.

Consistent with our model, we find that *within* affiliated firms, dividend payments from a group firm are positively associated with investments and equity-financed investments in other firms in the group. The results also suggest that group firm dividends may be an economically large source of finance for insider equity investments in member firms. In particular, a one standard deviation increase in equity-financed investments in other group firms is preceded by a 10.01% increase in group firm dividends in the previous year. The dividend increase is large and insider's share of the payout accounts for more than 20% of their average equity investment in a member firm. This evidence is supported by several anecdotes in the press about affiliated firms in our sample. For instance, in March 2001, Rhône-Poulenc (India) a member firm of Piramal Group announced a large special dividend of nearly the same size as the regular dividend. Coincident with this dividend increase, the investments

[3] The auditing costs with the indirect route may arise from covenants in loan contracts that require auditing of the pricing of inter-corporate investments. These are routinely found in loan contracts in India (see Gopalan, Nanda, and Seru 2007). See Almeida and Wolfenzon (2006b) for a model that highlights another cost of the intra-group investment channel.

in other firms in the subsequent two years increased by around 60% relative to the average investments in these firms in years before the announcement.[4]

We also provide direct evidence for our mechanism by exploiting specific instances when affiliated firms raise outside equity. Specifically, we use extensive news searches to identify instances of large rights and preferential equity issues with insider participation for affiliated firms in our sample. We then conduct an event study around these events and find that equity issue by an affiliated firm is associated with a significant increase in the dividend payout of other firms in its group – both in the year before and in the year of the issue. This analysis offers strong and direct evidence of insiders operating internal capital markets using dividends from cash-rich firms to invest in equity of other affiliated firms.

There are several alternative explanations that may account for the positive correlation between dividends and investments among group firms that we find. First, some firm level factor such as investment opportunity and/or a country level factor such as legal regime may explain both the propensity of a firm to pay dividends (see La Porta et al. 2000) and for other group firms to invest. To account for these factors, we use a rich specification that includes all the firm specific variables that prior research has shown to affect firm dividend policies in an international setting (Faccio, Lang, and Young 2001). In addition, to account for macro policies and conditions that may affect investment opportunities and in turn a firm's dividend policy, we also include within country-time fixed effects in our regressions. Finally, we only exploit within industry variation in each country by including within country-industry fixed effects in our specifications. Despite using a very flexible specification, our results remain.

Second, we need to consider that group firms may pay dividends in response to better *group-level* investment opportunities as a way to bolster the group's reputation for paying dividends and improving access to capital markets in the future. While it would be difficult to completely rule out the reputation channel, we design several tests to argue that our findings are not entirely due to reputation effects. In particular, we include firm fixed effects to account for slow moving group and firm-level reputation effects. To the extent reputation (at group or firm level) is not time varying, this specification should remove any effects of reputation. In addition, we exploit the cross-sectional implications of our model and show that, consistent with its predictions, the correlation between dividend payments by an affiliated firm and investments in member firms is larger in countries with weak legal regimes, for more profitable and smaller investments. Furthermore, in all these tests the flow of dividends from an affiliate firm and investments in member firms tend to occur fairly close in

[4] Similarly, a special dividend payment (about one and half times the regular dividend) by Vivendi SA in 2004 in France was followed by about 56% increase in investments in the member firms in its group over the next two years, relative to the investments in these firms in years before the announcement.

time – an implication that is consistent with our model and does not directly follow from a reputation argument.

A final alternative we need to consider is that there may be some correlation between the investment opportunities of the dividend paying affiliated firm and the investments of the member firms that the plethora of industry-level controls in our empirical specification do not capture. We follow two broad empirical strategies to ensure that our conclusions are robust to any such omitted factor. First, we exploit the fact that a firm's industry is a primary driver of its investment opportunities to design a placebo test that directly tackles this issue. For each group in our sample, we construct a 'pseudo-group' that consists of a portfolio of median unaffiliated firms in the same industry as the member firms of the group. We then repeat our tests among the members of the 'psuedo-group' and reassuringly, find no positive association between dividends of one firm and investments by other member firms.

We further address the issue of an omitted factor by exploiting a quasi-experiment in India that involves changes in import tariff policy in different industries over the sample period. These changes (both increases and decreases) not only had a direct effect on the investment opportunities of the firms in the industries with duty changes — but also had an indirect effect on the investment opportunities of firms that were users of products from these industries. Our analysis uses changes in import tariffs to generate variation in industry investment opportunities and shows that dividend payments by an affiliated firm responds to changes in investments of member firms following the tariff shocks. Again, these patterns do not show up in the 'pseudo-groups'. Overall, our findings suggest that the organization of internal capital market influences an affiliated firm's dividend policy.

Our paper is related to research on ICMs which largely studies their functioning in the context of US conglomerates — highlighting both the benefits and costs of ICMs (see Stein 2003). For instance, among papers examining the bright side, Maksimovic and Phillips (2002) show that investments within conglomerate firms responds to relative productivity and demand shocks across its segments.[5] Similarly, several papers argue that agency conflicts inside conglomerates also distort investments inside ICMs (e.g., Rajan, Servaes, and Zingales 2000; Scharfstein and Stein 2000; Ozbas and Scharfstein 2010; Seru 2014).

A related strand of the literature studies the functioning of ICMs in emerging economies among business groups. This literature primarily highlights the dark side of business groups, focusing on their complex ownership structure and its role in aggravating the agency problems between insiders and outside shareholders (Claessens et al. 2002 and Friedman, Johnson, and Mitton 2003).

[5] On a similar note, Maksimovic and Philips (2008) demonstrate that conglomerates alleviate financial constraints in acquisitions and plant openings in growth industries. Gopalan and Xie (2011) show that conglomeration makes firms more resilient to adverse shocks.

There are some papers that examine the benefits of this corporate form. In particular, Khanna and Yafeh (2005) argue that ICMs in business groups allow for efficient risk sharing, while Gopalan, Nanda, and Seru (2007) show that affiliated firms have reputation at stake which makes them support each other in times of distress via intra-group loans. Similarly, Bena and Ortiz-Molina (2013) show that new firms affiliated with a group are larger, use more capital and are able to withstand losses for longer.[6] Almeida and Wolfenzon (2006b) use several of these insights and develop a theory to explain how pyramidal groups arise. While our model has similarities with theirs, our objective is to understand and empirically test the relation between investment flows and dividends in affiliated firms. In doing so, we contribute to research in this area by showing that the organization of the ICM can influence an affiliated firm's dividend policy.

Our paper is also related to the enormous literature that emphasizes the agency aspects of dividends (e.g., Easterbrook 1984; Jensen 1986; Hart and Moore 1994; Fluck 1999; Gomes 2000). Of specific relevance are papers that investigate the role of the legal system in various countries and its effect on various corporate policies. In an influential study of the dividend policies of firms around the world, La Porta et al. (2000) contrast a reputation-based theory of dividends with a legal regime-based theory. Faccio, Lang, and Young (2001) contrast the dividend policies of firms belonging to business groups in East Asia and Western Europe and show that group firm dividend policies are related to the position of the firm in the group pyramid.[7] We extend this literature by offering and empirically testing a novel, ICM motive for business group firms to pay dividends in environments where the legal regime does not sufficiently protect minority shareholders. By doing so we also contribute to the literature on the effect of firm boundaries on the allocation of resources (Coase 1937; Mullainathan and Scharfstein 2001).

The rest of the paper is organized as follows: In Section 1, we present our model, in Section 2 we formalize our main predictions, outline the empirical specification and discuss the identification issues. In Section 3, we describe our sample construction and provide the summary statistics. All the empirical results are in Section 4 and we conclude in Section 5. All proofs are in Appendix A.

1. The Model

In this section, we develop a simple model of an ICM in which business groups use the cash from one group firm to finance new investments in another.

[6] In similar vein, Lins and Servaes (1999) document that in contrast to diversified firms in the U.S., those outside have a value premium associated with diversification.

[7] Masulis, Pham, and Zein (2011), find that within a pyramid, internal equity funding, investment rates, and firm value increase down the ownership chain.

The model allows us to develop several testable predictions about the dividend policies of affiliated firms.

1.1 Model set-up

We analyze a business group that consists of two all-equity financed firms, A and B, managed by a common insider. The insider directly owns $\alpha \geq 0$ and $\beta \geq 0$ fractions of the equity of firms A and B respectively. In addition, firm A owns a fraction $\gamma \geq 0$ of firm B's equity.[8] The remaining equity of both firms is held by atomistic outside investors. We normalize the total number of shares outstanding in each firm to be one. All agents are taken to be risk neutral, and there is no time discounting. There are two relevant dates — the start date 0 and the terminal date 1.

At date 0, firm A has cash $S > 0$ and no positive NPV investments. Firm B, on the other hand, has no cash but has a positive NPV project that requires an investment of $I > 0$ at date 0 and which produces a cash flow of $X > I$ at date 1. Firm B is also assumed to have ongoing projects that generate a cash flow of $V > 0$ at date 1. The new project is specific to firm B and cannot, for instance, be transferred to firm A. Hence, to finance the project, firm B has to arrange for I dollars in external financing, part of which may come from firm A. The flow of resources from firm A to B represents a type of ICM. We assume that the insider does not have funds available for investing in B's equity, other than his share of any dividends paid out from firm A.

We make some important assumptions about the legal and regulatory environment. The first assumption is that the legal protection for outside shareholders from expropriation is weak. This is a natural assumption to make in the context of emerging markets, where governance mechanisms such as hostile takeovers or activist shareholders are underdeveloped and do not offer a credible threat to control by insiders. The weakness of the legal regime also allows insiders to divert some resources from firm B for their private benefit. We do, however, put some limits on insider diversion. Specifically, depending on the nature of the legal regime, insiders can divert up to a fraction $\mu < 1$ of the cash from firm B for private consumption. This diversion takes place at date 1 and comes with a dissipative cost. For simplicity, we assume a proportional cost of diversion. That is, δ represents the dissipative cost of diverting a dollar from the firm. Thus, for every dollar diverted, the insider receives only $1-\delta$. Any cash not diverted at date 1 is paid out as dividends.

The parameters δ and μ characterize the difficulty of diversion or the stringency of the legal and regulatory regime in the country. In countries with lax regulations, where diversion is easier, δ (μ) is likely to be low (high); whereas in countries with tighter regulations, the opposite is likely to be true.

[8] The assumption that A owns shares in B – and not vice-versa – is without loss of generality.

1.2 Insider stake and diversion

We first consider the insider's diversion problem in firm B. The insider's effective holding in firm B is the sum of his direct holding, β, and his indirect holding through firm A, $\gamma\alpha$. Thus, the insider gets $\beta+\gamma\alpha$ of every dollar of dividends from firm B, while he receives $1-\delta$ if he diverts the dollar. The insider will strictly prefer to not divert from firm B iff $\beta+\gamma\alpha>1-\delta$. In keeping with our intuition that insiders have an incentive to maintain a relatively high ownership stake to moderate outsiders' concern about diversion, we make the following assumption about the insider's holding in firm B.

Assumption 1. $\beta+\gamma\alpha>1-\delta$.

If there is no new project, the payoff to the insider from firms A and B and his total payoff, U_{NP}, can be characterized as follows:

Lemma 1. In the absence of a new project in firm B, the insider does not divert any money from firm B. The insider's payoffs from A and B are:

$$U_A^*=\alpha S,\quad U_B^*=[\beta+\gamma\alpha]V \quad\text{and,}\quad U_{NP}^*=U_A^*+U_B^*=\alpha S+[\beta+\gamma\alpha]V. \qquad (1)$$

We now extend the analysis by considering the project in firm B. We first consider the case in which B funds its project by selling equity to the insider and outside investors. This is then compared to the case in which the insider maintains his stake in B indirectly by having firm A invest in firm B's equity.

1.3 Dividend payout and investment by the insider

Before we analyze the two firms together, we consider firm B in isolation and analyze the insider's decision to purchase shares. Let firm B raise I through an equity offering, and let the insider invest $W\in[0,I)$ in the issue. Let P_B denote the price of B's shares. The number of shares sold in the equity offering are $\frac{I}{P_B}$, of which the insider receives $\frac{W}{P_B}$. The insider's shareholding in firm B prior to the equity sale is $\beta+\gamma\alpha$. The insider's fractional holding in firm B after the equity sale is hence $[\beta+\gamma\alpha][1-\frac{I}{P_B}]+\frac{W}{P_B}$. With fair pricing, P_B depends on the anticipated level of insider diversion from firm B.[9] If the insider does not divert, then the total firm value and B's share price will be $P_B=V+X$. On the other hand, if the insider is expected to divert, then the share price – reflecting the value of the shares to outside investors – will be $P_B=[1-\mu][V+X]$. As we have discussed, the insider will refrain from diverting from firm B only if his effective holding is greater than or equal to $1-\delta$.

[9] The assumption that the equity is sold at a fair price is not unreasonable and can be justified as follows. The issue will not be underpriced unless the insider can preferentially allocate the underpriced shares to himself. In many countries this is discouraged by requiring that equity sales be first offered to existing shareholders in the form of a rights offer. On the other hand, an overpriced offering will result in outside investors not participating.

We now state:

Lemma 2. If firm B raises outside equity financing, the insider's ownership in firm B will be sufficient so as to avoid diversion only if $W \geq W_{min} \equiv \max\{0, [\beta + \gamma\alpha]I - [\beta + \gamma\alpha - \{1-\delta\}][V+X]\}$.

An equity issue with less than proportional insider participation dilutes the insider's holding in firm B. The above lemma identifies the minimum amount the insider needs to invest in the equity offering so as to ensure an effective holding of at least $1-\delta$.

Lemma 3. Subject to availability of sufficient funds, the insider will want to invest $W \geq W_{min}$ in firm B's equity issue.

Since the equity issue is fairly priced, the dissipative costs of diversion, if any, are borne by the existing shareholders of firm B. Note that the dissipative cost of diverting a fraction μ of the final cash flows, $V+X$, is $\delta\mu[V+X]$. The insider bears a fraction $\beta+\gamma\alpha$ of this cost. Assumption 1 ensures that the insider's fraction of the dissipative cost is greater than his benefit from diverting the cash flows of firm B. Hence the insider will wish to avoid these costs and will seek to invest to the extent of W_{min} in the equity issue.

We now extend the analysis and consider firm A along with firm B. If, as we assume, the insider has no other funds available, he can pay dividends from firm A and reinvest his share of dividends in firm B. We allow for some dissipative costs associated with the payment of dividends from firm A at date 0, so that the insider receives only $\eta < 1$ per dividend dollar paid. The costs may be relatively small and could reflect, for instance, the cost of not deferring the dividends and associated taxes and/or losing the option of paying the dividends at a tax advantaged time. These dividend related costs are taken to always be smaller than the benefits from maintaining the insider's stake in firm B above $1-\delta$ and precluding the dissipative cost of diversion.[10] To invest W_{min} in firm B, the minimum dividend to be paid by firm A at date 0 is, $D_{min} = \frac{W_{min}}{\alpha\eta} = \frac{W_{min}}{\alpha'}$, where $\alpha' = \alpha\eta$. As long as $S \geq D_{min}$, it is always possible for the insider to maintain a stake that is high enough to inhibit subsequent diversion.

It is worth pointing out that any tax disadvantage from financing investments through the dividend channel, rather than by a direct investment by firm A in B is likely to be small. This is despite the fact that individual taxes on dividends in some countries (e.g., India) tend to be higher than taxes on inter-corporate dividend flows. The reason is that the insider's investment in group firms is likely to be done through holding firms or other investment vehicles. The dividends that are received by these investment vehicles (and

[10] The sufficient condition for this to be the case is $S(\frac{\alpha}{\alpha'} - 1) < (\beta+\gamma\alpha)(\delta\mu[V+X])$. Here the LHS is the cost of paying out all of A's cash flow of S as dividends, while the RHS is the insider's share of the dissipative costs from diversion in firm B.

then reinvested) are likely to be treated as inter-corporate dividends and taxed accordingly.[11]

If firm A pays a dividend of $\frac{W_{min}}{\alpha'}$, the insider's total payoff from firm A is

$$U_A^* = \alpha\left[S - \frac{W_{min}}{\alpha'}\right] + W_{min} = \alpha S - W_{min}\left[\frac{\alpha}{\alpha'} - 1\right].$$

The first term captures the date 1 payoff to the insider from firm A and the second term captures the insider's share of date 0 dividends from firm A. The insider's date 1 payoff from firm B is

$$U_B^* = [\beta + \gamma\alpha][V + X - I].$$

Since the equity issue of firm B is fairly priced, the existing shareholders of firm B retain the full NPV of the new project. Thus the insider's payoff from firm B is the sum of the value of the existing project V, and the NPV of the new project $X - I$, times his initial shareholding $\beta + \gamma\alpha$. The insider's total payoff if firm B raises financing through an outside equity issue (OE) can be obtained by summing his payoff from firms A & B as

$$U_{OE}^* = U_A^* + U_B^*, = \alpha S - W_{min}\left[\frac{\alpha}{\alpha'} - 1\right] + [\beta + \gamma\alpha][V + X - I]. \quad (2)$$

Comparing (2) with (1), we see that apart from the insider's share of the NPV of the new project, given by $[\beta + \gamma\alpha][X - I]$, U_{NP}^* and U_{OE}^* differ by the term $W_{min}[\frac{\alpha}{\alpha'} - 1]$. This term represents the cost to the insider of paying dividends from firm A at date 0. The cost ensures that the insider will always want to pay the minimum dividends at date 0 required to ensure an effective stake in firm B at or above $1 - \delta$.

1.4 Investment modes: Intra-group vs. dividend channel

We now consider the case in which firm B raises financing by placing shares with firm A i.e., maintaining the insider's stake by increasing the cross-holdings rather than by paying dividends accompanied by a public sale of equity. Since the route involves private dealings between affiliated firms, it will lack the transparency of the dividend channel. For simplicity, we consider only the polar case of raising all financing through intra-group investments.[12]

When a firm sells equity to another group firm, it presents a potential opportunity for the insider to tunnel by mispricing the shares, especially if his

[11] For example, all the investments of the promoters of the Tata group in India are routed through investment firms Tata Sons, Tata Investment Corporation and Tata Capital Limited. As a result, even though insiders almost fully own and control these investment vehicles, the dividends received by these vehicles are not taxed at individual tax rates. Hence, one would not expect the dividend channel to be significantly tax disadvantaged relative to direct investment between firms.

[12] We focus on intra-group equity as the primary mode of transferring cash across member firms because prior literature shows that intra-group debt is primarily used by business groups to transfer resources to prop up member firms in financial distress and not to finance investment opportunities (Gopalan, Nanda, and Seru 2007). Nevertheless, our empirical analysis deals with this issue in Section 4.4.

holding is different across the two firms. To prevent such stealing, banks and institutional investors usually require intra-group equity sales to be appraised and audited. For example, loan contracts often specify auditing requirements for inter-corporate investments. Furthermore, insiders may also have incentives to signal their good intentions and strengthen reputation by providing information and establishing mechanisms to verify transfers between the firms. We assume that such auditing is costly and represent the costs by M.[13]

A few words on the auditing costs are in order. Although intra-group investments (through debt or equity) are disclosed in the financial statements and, hence, are observable by the outsiders, it is likely to be difficult to detect if the terms are equitable and adhered to going forward – which can be contrasted with the relatively greater transparency associated with the payout of cash through dividends. In other words, it is relatively easier for outsiders to detect preferential dividends than to infer mispriced loans or equity shares. This assumption is confirmed in several studies that provide evidence of opacity associated with intra-group investments (Almeida et al. 2011).[14] In addition, while direct investments by insiders in affiliated firms can also be manipulated to the insider's benefit, the *incremental* monitoring intensity is likely to be higher for intra-group investments because the outside shareholders and lenders of *both* firms may want to ensure that the investments are fairly priced. In contrast, direct investment by insiders may prompt auditing only by shareholders and lenders of one firm.

In the intra-group investment channel, firm A invests I in firm B's equity. The insider's share of this investment is αI. We assume that $W_{min} < \alpha I$, so that with intra-group investment, the insider maintains, in effect, shareholding greater than $1-\delta$ in firm B. The insider's total payoff from the intra-group investment channel (IG) can be given as

$$U^*_{IG} = U^*_A + U^*_B = \alpha S + [\beta + \gamma\alpha][V + X - I] - M. \tag{3}$$

The first term represents the insider's payoff from firm A, the second term his payoff from firm B and the last term represents the auditing costs. The following proposition characterizes the insider's choice between the dividend channel and intra-group investment channel.

Proposition 1. The choice between the dividend channel, with the insider investing in B's equity, versus the intra-group investment channel with firm A

[13] While we take M to be fixed for simplicity, assuming that M is larger in stronger legal environments would imply a greater reliance on the dividend channel in such regimes. Overall, though, as discussed in our empirical implications, the effect of the legal regime on the use of the dividend channel is likely to be non-monotonic.

[14] Gopalan, Nanda, and Seru 2007 point out that, even though Indian accounting standard requires firms to disclose loans made to other group firms, finding the exact terms of these loans is quite difficult and requires a labor intensive search of notes to the annual report. Even after the terms are known, verifying that the loans are fairly priced is not straightforward. The situation is also complicated by the fact that firms may choose not to enforce loan terms if it is beneficial for the insider. Similarly, Almeida et al. (2011) show that Korean chaebols that have intra-group investments in other member firms trade at a heavy discount relative to other firms.

investing in B's equity, can be characterized as follows. Ceteris paribus, the use of the dividend channel will be:

1. Favored for smaller values of I, the project investment level,
2. Favored for larger values of project cash flow X, and
3. Non-monotonic in the cost of diversion, δ.

With the dividend channel, the insider faces dissipative costs $W_{min}[\frac{\alpha}{\alpha'}-1]$, while he incurs the additional auditing costs M with the intra-group investment channel. The insider will choose the channel that imposes the least cost. Since $W_{min}[\frac{\alpha}{\alpha'}-1]$ is increasing in I, the size of the investment, ceteris paribus, an increase in I, makes the dividend channel less attractive. By an analogous argument, since the dissipative costs of dividends is decreasing in the profitability of the new project X, ceteris paribus an increase in X makes the dividend channel more attractive.

The effect of δ on the use of the dividend channel can be non-monotonic. The reason is that an increase in δ, indicating a stronger legal system, reduces W_{min} and, hence, the cost of using the dividend channel. It is, therefore, possible that for high values of δ, when the legal system is strong, the dividend channel is favored; while for lower values of δ the intra-group investment channel is favored. Note, however, that as δ increases, the quantity of dividends, given by $\frac{W_{min}}{\alpha'}$, decreases as well. For a large enough value of δ, the legal system is sufficiently strong so that $W_{min}=0$ and funds required for investment in firm B can be raised externally, with neither the dividend nor the intra-group channel being employed.

Almeida and Wolfenzon (2006b) (AW) offer a model that has similarities with our approach, though their focus is on group structure rather than on dividends. They develop a theory of business groups that highlights the situations in which groups will employ the vertical or the horizontal structure. The dividend and intra-group investment channels of our model are analogous to the horizontal and vertical business group structure in AW. However, the two models differ in the initial structure of the group, availability of investment opportunities and in the insider diversion possibilities. Despite the differences, both models predict that less profitable investment opportunities and smaller investments will be financed through intra-group (vertical in AW) investments. This shows that the conclusions of both the papers are robust to alternative modeling assumptions. Having said that, while AW's objective is to highlight how pyramidal groups arise, our focus is on the relation between dividends and investment flows among affiliated firms.

1.5 Alternative financing methods

We did not consider alternative modes of financing in the model to keep it tractable and short. In a more general set-up one can consider alternative modes of financing such as inside and outside debt and outside equity with

non-voting shares. Here we briefly discuss the costs and benefits of these alternative financing modes and outline scenarios when we expect to observe them.

If firm B uses outside debt to finance the investment, it will avoid diluting the insider's cash flow rights and can prevent inefficient diversion. The ability of firm B to access outside debt will depend on the pledgeability of the cash flows from the project. Cash flows of projects with more tangible and liquid assets are likely to be pledgeable. Hence such projects are more likely to be financed with outside debt. Of course, an important consideration with outside debt is the cost of financial distress. Thus, projects in industries with lower costs of financial distress are more likely to be financed with outside debt.

Pledgeability of cash flows is unlikely to be an issue with inside debt. To the extent the group controls both firm A and firm B, the insider can ensure that the borrowing firm honors its obligations. However, the insider's incentives to enforce the debt contract will depend on her relative share-holding in firm A and firm B. Thus inside debt is prone to the same problem as intra-group investment by firm A in firm B. As a result, outside stakeholders in firm A and firm B are likely to insist on auditing and monitoring the terms of inside debt, and thus will also be subject to auditing costs. Consequently, the choice between inside debt and the dividend channel is equivalent to the choice between intra-group investment and the dividend channel.

Finally, the insider can also raise outside equity by employing non-voting shares. While such an equity issue will avoid diluting the insider's control rights, it will dilute the insider's cash flow rights and this in turn will lead to costly diversion. Thus, employing non-voting outside equity is not a viable solution in the context of our model. Based on this discussion, we summarize in Appendix B, the situations in which the group is likely to use these alternative financing methods. To keep our empirical analysis focussed, we do not test these predictions in this paper. A fruitful avenue for future research would be to test these predictions.

It is worth noting that our analysis also has implications for the organization of firms in the form of business groups. When firms in our setup use intra-group channel to finance investments, the result is a 'pyramidal' organization where firms higher up the in the structure own equity in firms that are lower down in the chain. This organizational form is similar in spirit to a structure in which assets in place are combined with growth opportunities as in say, a conglomerate.[15] Thus, Proposition 1 also sheds light on the choice between a pyramidal structure and a horizontal group structure (i.e., a structure where insiders have direct equity stake in member firms). The legal protection for outside investors in a country will affect the cost of diversion, δ. From Proposition 1 we see that business group makeup will have a non-monotonic relationship with a country's

[15] In case of a conglomerate, the auditing costs associated with intra-group channel would represent the potential discount that outside investors apply when valuing such complex firms.

legal protection. Both in countries with very weak and very strong legal protection, groups will have a pyramidal or conglomerate structure whereas in countries with intermediate levels of legal protection, groups are likely to have a horizontal business group structure. Furthermore, to the extent η represents the costs of paying dividends (including taxes), an increase in η will make the dividend channel less attractive. This indicates that in countries with high dividend taxes, we are likely to observe pyramidal structure for business groups.

2. Empirical Predictions, Specification and Identification

The central implication of the model that we test is that affiliated firms pay dividends, in part, to provide insiders with the resources to reinvest in the equity of other member firms that need to finance their investments. It is worth noting that, in our model, the insider uses her share of dividends to invest in group firm's equity. However, dividends can also be used to finance investments if the group firm making the investment has a large equity stake in the firm paying dividends. In that situation, the investing firm can directly use its share of dividends to finance investments. Thus, our main prediction does not necessarily require the funds to pass through the insider. To formally test our main prediction we conduct tests on two margins.

2.1 Extensive margin: Dividends in affiliated vs. unaffiliated firms

We begin our empirical analysis by examining the extensive margin (i.e., between affiliated and unaffiliated firms). In our model, while an unaffiliated firm A will not pay dividends at date 0, an affiliated firm A will pay dividends at date 0 whenever the group insider employs the dividend channel to fund investments in firm B. Hence we expect affiliated firms to pay more dividends than unaffiliated firms (control firms). Note that this result is contingent on the unaffiliated firms not having other motives to pay dividends. Because of this assumption, we treat the results of this test as only suggestive and rely on tests on the intensive margin — which we presently explain — to test the main predictions. To conduct these tests we use specifications that are variants of the following form:

$$y_{it} = \beta_0 + \beta_1 \text{Group}_i + \gamma \text{X}_{it} + \delta \text{X}_{igt} + \mu_t + \mu_c \text{ or } (\mu_c \times \mu_t) + \mu_j \text{ or } (\mu_c \times \mu_j), \tag{4}$$

where the i indicates the firm, j and c indicate respectively, the industry and the country to which firm i belongs, and the t subscript refers to time in years. *Group* is a dummy variable that takes a value one if the firm is affiliated to a group and is zero otherwise. Following La Porta et al. (2000), the dependent variable y in most of our analysis is $\frac{Dividend}{Asset}$, a measure of dividend payout. All variables are described in Appendix C. We also employ other variants of dividend payout such as $\frac{Dividend}{EBITDA}$ and $\frac{Dividend}{Sales}$ for robustness. The coefficient of interest is β_1, with our prediction being that $\beta_1 > 0$.

Firms may have different levels of ability and motives to pay dividends. Hence, in our empirical analysis we condition on a host of firm level observables that are likely to be correlated with both ability and motive. In particular, we include *Size* to proxy for both the resources available with the firm and its access to external capital markets. Moreover, we include leverage of the firm ($\frac{Debt}{Asset}$) to proxy for financial constraints faced by the firm. In addition, we also use *Sales Growth* and $\frac{Investment}{Asset}$ as measures of firm growth and investment levels to proxy for the potential resources needed by a firm for investment purposes and its need to maintain access to external capital markets. Industry fixed effects (μ_j) are included to capture any time invariant unobserved industry factors that may drive a firm's propensity to pay dividends. We do not include firm fixed effects since we are interested in the coefficient on a group level time invariant variable (β_1).

La Porta et al. (2000) argue that the country level legal regime is an important determinant of dividend payment. To account for this explicitly, we include country fixed effects (μ_c). Moreover, to account for the fact that industries may differ across countries, we include within country industry fixed effects ($\mu_c \times \mu_j$) in some of the tests. In addition, macro policies and conditions may affect investment opportunities and, in turn, a firm's dividend policies. We account for this aspect by including time fixed effects (μ_t) and also allow for these macro effects to vary across countries by including within country time fixed effects ($\mu_c \times \mu_t$). Despite the exhaustive controls that we employ, we acknowledge that some unobserved differences between group and stand alone firms could bias our estimates. Hence we interpret the results from the extensive margin as suggestive and rely more on our tests on the intensive margin, where we estimate the effect of exogenous shocks to group firm investments on dividends paid by other member firms.

Besides testing if the propensity of affiliated firms to pay dividends differs from that of unaffiliated firms, we conduct a more direct test to examine if the difference can be explained largely by investments undertaken by member firms of the affiliated firm. To establish this, we augment the specification and include contemporaneous and future values of *Group investment* (X_{igt}) which represents, for any group firm, the aggregate investments made by the other firms in the group.[16] The expectation is that this variable will soak up the explanatory power of *Group* in earlier specifications. Note that in the data *Group* and *Group investment* are highly correlated (62%). However, to the extent that these variables are not perfectly correlated, we are interested in

[16] Note that we do not have information on insider investment in incremental equity issues. However, we can estimate the amount of investments financed through external equity financing. If insider investment in group firm's equity is correlated with the incremental outside equity capital raised by group firms, we would expect a positive association between dividend payments by group firms with the investments financed through external equity capital in the group. To examine this in some specifications we use *Group equity* as a measure of the aggregate investment by the other firms in the group financed through new equity capital. It is calculated in a manner similar to *Group investment*: by aggregating investments across the rest of the group less the sum of the increase in total debt and retained earnings for the year.

understanding whether both the factors can explain firm dividends. According to our theory, the higher dividends paid by group firms should be driven by groups that also invest more. Thus, *Group investment* instead of *Group* should be a better predictor of firm dividends.

2.2 Intensive margin: Dividends and investments within groups

The second and primary prediction we test concerns the intensive margin: i.e., that the time-series changes in dividends *among affiliated firms* should be explained by investments undertaken by other member firms in the group. In particular, we expect the dividends paid by an affiliated firm to be positively associated with investments by the other member firms in the group. To test this prediction we estimate regressions of the following form:

$$y_{it} = \beta_0 + \sum_{l=0}^{k} \beta_{(l+1)} \text{Group investment}_{it+l} + \gamma \mathrm{X}_{it} + \delta \mathrm{X}_{gt} + \mu_t + \mu_i, \qquad (5)$$

This specification differs from (4) in that we also account for firm level time invariant factors by including firm fixed effects (μ_i). The dependent variables are measures of dividend payout as discussed earlier. The coefficients of interest for our purpose are $\sum_{l=0}^{k} \beta_{l+1}$ which measure the sum of coefficients on investments made by the other firms in the group either contemporaneously (t) or in the future ($t+k$). The reason for including investments from time t up to time $t+k$ is because we cannot be certain about the timing of the dividend payments and investments. For one, as indicated in the data section, we observe investments and dividends annually. While the investments for a year occur sometime during the fiscal year, the dividends are sometimes paid quarterly, while in other cases might be declared during a year but paid out fully only after the end of the year.[17] Our specification is flexible enough to allow for such differences in timing between dividends and investments, with the expectation from our tests being that $\sum_{0}^{k} \beta_{l+1} > 0$.

We also use variants of specification (5) to investigate cross-sectional implications that follow from Proposition 1. In particular, we investigate how the association between dividend payments by an affiliated firm and investments by member firms varies with the governance of the country such as the strength of its legal regime, the size of the investment and its profitability.

2.3 Identification

In our empirical tests, we interpret the positive correlation between group firm dividends and other member firm investments as evidence consistent with our theory. We now elaborate on some competing arguments that may generate a similar association and the empirical strategies we employ to achieve identification.

[17] The total dividend for the year is usually finalized during the annual meeting which occurs after the financial results for the fiscal year are finalized and audited.

First, as mentioned earlier, country level factors such as the legal regime (La Porta et al. 2000) and macro economic conditions could affect both dividends and investments. In our specifications we employ within country-year fixed effects to ensure that country and macro factors do not affect our estimates.

Second, group firms may pay dividends in response to better group-level investment opportunities as a way to bolster the group's reputation for paying dividends and improving the group's access to external capital markets in the future. These arguments are usually about the *level* of dividend payout over time, rather than about short-term changes in dividend payout, right before corresponding changes in the investments undertaken by other firms in the group. To account for such time invariant or slow moving group- and firm-level reputation effects, we include firm fixed effects in our specification. This ensures that the variation we exploit is unlikely to be slow moving. Our results show that the flow of dividends from an affiliate firm and investments by other member firms tends to occur fairly closely in time – which, as we have noted, is not easily explained on the basis of reputation arguments.

Third, our results may be biased if investment opportunities are correlated across firms in the group and our controls do not adequately capture the underlying factors of such opportunities. We follow several empirical strategies to ensure that our results are robust to such omitted factors. In particular, we rely on a plethora of industry- and firm-level controls to capture the investment opportunities of the firm paying dividends. In addition, we exploit the fact that a firm's industry is a primary driver of its investment opportunities to design a placebo test. For each group in our sample, we construct a 'pseudo-group' that consists of a portfolio of median unaffiliated firms in the same industry as the affiliated firms. We then repeat our tests among the members of the 'pseudo group'. If our results are due to an unobserved correlation between investment opportunities across industries then they should hold in the 'pseudo-group' as well.

Finally, since we do not directly observe the investment event we cannot be fully certain that our mechanism is in fact at play. To alleviate this concern we exploit a natural experiment in India involving changes in import tariffs in different industries over the sample period. These changes (both increases and decreases) not only had a direct effect on the investment opportunities of the firms in the industries with import duty changes but also had an indirect effect on the firms in the user industries. We use these changes as shocks to investment opportunities of firms in certain industries and test if these shocks are propagated through the internal capital market via payment of dividends by member firms.

3. Sample Construction and Summary Statistics

In this section we describe our sample construction and provide descriptive statistics.

3.1 Sample construction

We test our predictions with data from several sources on group and stand alone firms from 22 countries in Asia and Europe. The data for Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Thailand, and Taiwan, are from the database of group firms provided by Claessens, Djankov, and Lang (2000), found at the web site of the *Journal of Financial Economics*. This is a database of the largest firms in these countries and identifies the specific business group to which the firms belong, the identity of the controlling insider and the insiders' effective cash flow and control rights in individual firms. We are constrained in our choice of the sample since this is the only publicly available data source on Asian firms that identifies the specific group to which firms belong, as well as the extent of insider holding. We complement the Claessens et al.'s data with detailed financial information from Thompson Analytics' Worldscope database, using the SEDOL identifier to match firms. To augment our sample, we also match manually by company names. For identifying industry affiliation, we adopt Claessens et al.'s classification of firms (15 industries). Note that the industry affiliation may not be strictly comparable across the different sub-samples in our data. Hence, in the regressions where we require industry controls, we use country-specific industry classification. Our sample of Asian firms spans the period 1996-2005 and includes over 21,300 firm-year observations.

For the Indian sample, we obtain firm financials, stock prices, group and industry affiliation, and insider holding data from Prowess, a database maintained by Centre for Monitoring the Indian Economy. Prowess provides annual financial statements of public and private Indian firms including balance sheet, profit and loss statements, and cash flow statements starting from 1989. For identifying group affiliation, we adopt Prowess's classification. This group affiliation has been previously used by Bertrand, Mehta, and Mullainathan (2002) and Gopalan, Nanda, and Seru (2007). For identifying industry affiliation, we adopt Prowess' classification of firms into industries based on their principal line of activity. We code the industry classification at a level equivalent to the 4-digit SIC. We have data on firms from 95 such industries. For our analysis, we consider all non-government and non-foreign firms. Although Prowess has data starting from 1989, to be comparable to the data for the other countries, we limit the sample to firms that have positive sales during any of the years from 1996 to 2005. The sample of Indian firms, with over 57,000 firm-year observations, is the largest of any country in our data.

The sample of firms for Austria, Belgium, Finland, France, Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, and Switzerland are from data graciously provided by Mara Faccio. This database, used in Faccio, Lang, and Young (2001), also identifies the specific group to which firms belong as well as the identity of the controlling insider and the insiders' effective cash flow rights. We complement this data with detailed financial information from the Thompson Analytics' Worldscope database, using the SEDOL identifier to

match firms. To augment our sample, we also match manually by company names. For identifying industry affiliation, we adopt the Faccio, Lang, and Young (2001) classification of firms. The European sample also spans the period 1996-2005 and includes over 13,600 firm years.

3.2 Summary statistics

In Panel A of Table 1 we provide the distribution of our sample by country. There are about 92,000 firm year observations spanning firms in 22 countries, consisting of about 40,000 affiliated firm years and 52,000 unaffiliated firm years. More than 60% (57,000 out of 92,000) of our sample is from India. To ensure that our results are not unduly influenced by the Indian sample, we re-estimate all our regressions without the Indian data. For Indian firms, we use the percentage shareholding of promoters given in Prowess to measure *Insider holding*, while for the Asian and European firms we use the insider cash flow rights provided in Claessens, Djankov, and Lang (2000) and Faccio, Lang, and Young (2001) respectively. The average insider holding among the sample firms is 37.1% and firms pay dividends in more than 46% of the firm-years in the sample. The average *Dividend/Sales* ratio in our sample is comparable to those in La Porta et al. (2000) and Faccio, Lang, and Young (2001).

Panel B of Table 1 provides additional statistics to highlight the importance of outside equity as a financing source for firms in our sample countries. We

Table 1
Sample distribution

Panel A: Sample Distribution

	All Firms[1]	Group Firms[1]	% Insider Holding	% Dividend Payers	% $\frac{Dividend}{Asset}$	% $\frac{Dividend}{Sales}$
Austria	627	311	44.284	77.671	1.121	3.004
Belgium	542	229	29.787	83.579	1.771	8.670
Finland	799	238	30.074	83.354	2.678	3.087
France	2905	1333	44.887	74.182	1.282	2.727
Germany	3298	1597	43.621	66.980	1.438	2.475
Ireland	338	181	19.061	76.627	1.115	1.957
Italy	1139	722	40.701	79.017	1.149	3.215
Norway	783	418	19.572	63.346	1.399	3.863
Portugal	394	148	37.166	69.114	1.118	2.737
Spain	1004	525	26.673	68.626	1.404	4.070
Sweden	1127	617	20.021	75.776	1.973	2.977
Switzerland	696	227	32.875	77.874	1.172	2.737
Hong Kong	2214	991	27.302	72.809	1.853	6.276
Indonesia	1104	750	28.460	54.529	1.184	2.003
Japan	9760	5973	7.116	82.018	0.473	0.718
Malaysia	1795	769	26.874	71.532	1.306	3.634
Philippines	893	609	24.655	40.985	0.779	2.482
Singapore	1403	217	23.347	80.114	1.383	4.668
South Korea	2042	1045	18.261	65.965	0.423	0.715
Taiwan	1099	147	19.995	45.405	0.974	1.729
Thailand	1053	409	35.866	55.176	1.736	3.769
India	57050	22530	48.050	31.513	0.702	1.412
Total	92065	39986	37.119	46.161	0.846	1.826

(*Continued*)

Table 1
Continued

Panel B: Equity and market capitalization across countries

	Total equity issues ($ Million)	Market capitalization ($ Billion)	Equity Issue / Market capitalization
Austria	1041.92	50.36	2.27%
Belgium	1650.08	189.86	0.94%
Finland	1792.96	182.68	0.92%
France	14110.06	1199.42	1.18%
Germany	15755.69	1055.03	1.44%
Hong Kong	3982.13	531.77	0.73%
India	1438.10	215.04	0.50%
Indonesia	3056.24	49.55	7.25%
Ireland-Rep	973.45	83.28	1.28%
Italy	14620.23	587.98	2.64%
Japan	37709.07	3133.88	1.19%
Malaysia	2425.36	154.52	1.65%
Norway	1780.46	86.30	2.23%
Philippines	507.46	38.87	1.20%
Portugal	2449.41	53.84	5.04%
Singapore	1678.38	174.45	1.05%
South Korea	11281.48	297.84	4.21%
Spain	6747.72	543.14	1.50%
Sweden	3186.15	298.67	1.12%
Switzerland	4118.00	682.19	0.59%
Taiwan	3244.87		
Thailand	1788.79	69.14	2.77%
Mean (Sample)	6199.58	467.30	1.98%
Median (Sample)	2337.27	184.77	1.15%
United Kingdom	28894.22	2398.42	1.26%
United States	131953.40	13700.00	1.01%

Panel A of this table provides the sample distribution (firm years). Variables are described in Appendix C. All information on Indian firms is from Prowess database; information on insider holding and group affiliation for firms from Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan is from Claessens, Djankov, and Lang (2000), which is available at the website of the *Journal of Financial Economics*; information on insider holding and group affiliation for firms from other countries was provided by Mara Faccio. Financial data on firms from countries other than India is from Worldscope database. Panel B provides data on aggregate public equity issues and equity market capitalization for the sample, along with information for the U.K. and U.S. We obtain data on the public equity issues from SDC Platinum and information on equity market capitalization from the World Bank's World Development Indicators. Data for all countries is for 1996 to 2005.

provide data on aggregate public equity issues and equity market capitalization for the countries in our sample along with information for the United Kingdom and the United States for comparison [also see Kim and Weisbach (2008)]. We obtain data on the public equity issues from SDC Platinum and information on equity market capitalization from the World Bank's World Development Indicators. The data covers the period 1996-2005. In Column (1) we provide the mean value of the aggregate annual public equity issued by firms. On average, firms from in our sample raise $6199.58 million in public equity every year. There is wide variation in the amount of equity raised ranging from a high of $37,709.07 million for Japan and a low of $507.46 million for the Philippines. In Column (2) we provide the average equity market capitalization of our sample countries, while in Column (3) we provide the ratio of aggregate equity issues to market capitalization. This provides a rough measure of the importance of

Table 2
Summary statistics and correlations

Panel A: Sample Means (affiliated and unaffiliated firms)

	All Firms			Group Firms			Stand Alone Firms		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
Dividend/Asset	98342	0.008	0	39986	0.009***	0.002	52079	0.006	0
Size	98342	2.341	2.909	39986	2.555***	3.092	52079	1.820	2.630
Debt/Asset	98336	0.301	0.267	39982	0.329***	0.300	52077	0.286	0.243
Sales Growth	84639	0.181	0.066	35045	0.16***	0.064	44011	0.190	0.064
Investment/Asset	87720	0.042	0.039	36111	0.039***	0.043	45843	0.042	0.031
EBITDA/Asset	97396	0.069	0.061	39512	0.070***	0.062	51633	0.063	0.056
Insider Holding (%)	74902	37.11	35.01	30710	33.68***	30.97	41519	37.85	36
Group investment[1]				28333	0.110	0.09			

Panel B: Correlations between Key Variables (Only affiliated Firms)

	$\frac{Dividend}{Asset}$	Group investments	Size	$\frac{Debt}{Asset}$	Sales Growth	$\frac{Investment}{Asset}$	$\frac{EBITDA}{Asset}$	Insider Holding
Dividend/Asset	1							
Group investments	0.089	1						
Size	0.032	0.262	1					
Debt/Asset	−0.313	−0.004	0.143	1				
Sales Growth	0.026	0.318	0.094	0.002	1			
Investment/Asset	0.092	0.495	0.291	−0.049	0.524	1		
EBITDA/Asset	0.493	0.221	0.362	−0.126	0.139	0.293	1	
Insider Holding	0.144	0.178	0.328	0.027	0.133	0.192	0.324	1

[1] Only for Family Owned Group Firms

This table reports the summary statistics of the key variables for firms in our sample. In Panel A, *** indicates significant difference from the mean values for stand alone firms at less than 1% level. Panel B reports the correlation coefficient between the key variables for the group firms in our sample. Variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005.

public equity as a financing source for firms in our sample countries. We find that the mean (median) $\frac{Equity\ Issue}{Market\ Capitalization}$ for the countries in our sample is 1.98% (1.15%). As can be observed, this ratio is very comparable to that for firms in the U.S. and U.K. This suggests that outside equity is as important a source of finance for firms in the countries in our sample as it is for firms in the U.S. and U.K.

Table 2 provides the summary statistics and correlations for the key variables. We convert all the firm financials into US dollars to make uniform comparisons across countries. As is reported in Panel A, the average dividend to asset ratio of around 0.8% and debt to total assets ratio of 30% in our sample is comparable with other studies that use similar data. Group firms pay more dividends than stand alone firms, which is consistent with our first prediction.[18] Consistent with the evidence in Gopalan, Nanda, and Seru (2007) and elsewhere, we find that group firms are larger, have more leverage, and are more profitable than unaffiliated firms. A large proportion of observations have no dividend payment by firms as can be observed from median dividend payout. To ensure that this

[18] Results are robust to using other definitions of dividend payout such as $\frac{Dividend}{Sales}$ or $\frac{Dividend}{EBITDA}$. This is not surprising since the raw correlation between these measures is in excess of 70%.

truncation does not affect our inferences with an OLS model, we employ a Tobit model for robustness.

Panel B of Table 2 provides the correlations between the key variables for the group firms in our sample. Consistent with our main prediction, we find that $\frac{Dividend}{Asset}$ is positively correlated with *Group investments*. Moreover, as might be expected, firms with higher insider holding, larger size, lower leverage and larger profits pay more dividends. Since these are univariate correlations, we now turn to formal tests of our predictions.

4. Empirical Results

With the data and empirical strategy in hand, we now proceed to test our predictions.

4.1 Dividend rates of affiliated and unaffiliated firms

To compare the dividend rates of group firms and stand alone firms (the extensive margin) we estimate Equation (4) and report the results in Panel A of Table 3. The first four columns of the table use an OLS specification, while the last three use a Tobit specification for robustness.

In the first two columns we use $\frac{Dividend}{Asset}$ as the measure of dividend payout. Consistent with our model, the results in Columns (1) and (2) show that group firms pay significantly more dividends than stand alone firms. From the control variables we find that as one might expect, dividends are found to increase with firm size and profitability. On the other hand, dividends tend to decrease with sales growth and firm leverage, suggesting the need for preserving cash in firms that face more investment opportunities or are highly levered. Insider holdings are positively related to dividend payout in this specification. In Columns (3) and (4), we repeat the regressions using $\frac{Dividend}{EBITDA}$ and $\frac{Dividend}{Sales}$ as measures of dividend payout. As indicated, the results are similar irrespective of the measure of divided payout.

To address the concern that a significant number of observations have zero dividends, we next use a Tobit specification with heteroscedastic consistent standard errors. The results, reported in Columns (5) to (7), are similar to the other regression results and confirm that group firms pay more dividends. Our results are economically significant. In particular, the results in Column (2) indicate that a group firm with mean sample characteristics has a 20% higher dividend payout as measured by $\frac{Dividend}{Asset}$ $(\frac{0.0012}{0.006})$, in comparison to a similarly situated stand alone firm. The estimates from other specifications and measures are quantitatively higher in magnitude.

In Panel B, we assess whether the higher dividend payout rates of group firms can be explained in part by investments in the member firms, as suggested by our model. To investigate this, we re-estimate Equation 4 after including $Group\ investment_{-it}$ and $Group\ investment_{-it+1}$ i.e., investments by all the other firms in the group in the years concurrent with and subsequent to the

Table 3
Comparing dividend rates of affiliated and unaffiliated firms

Panel A: Baseline regressions

	OLS				Tobit		
	$\frac{Dividend}{Asset}$		$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group	0.0012***	0.0012***	0.0085***	0.0021***	0.0026***	0.0246***	0.0064***
	(0.0002)	(0.0002)	(0.0020)	(0.0005)	(0.0001)	(0.0020)	(0.0004)
Insider Holding		0.003***	0.0221***	0.004***	0.0066***	.0702***	.0132***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0048)	(0.0001)
Sales Growth	−0.0006***	−0.0006***	−0.0077***	−0.0018***	−0.0024***	−0.0329***	−0.0055***
	(0.0001)	(0.0001)	(0.0008)	(0.0002)	(0.0002)	(0.0019)	(0.0004)
Size	0.0006***	0.0006***	0.0071***	0.0016***	0.0015***	0.0225***	0.0047***
	(0.0001)	(0.0001)	(0.0005)	(0.0001)	(0.0001)	(0.0005)	(0.0001)
$\frac{Debt}{Asset}$	−0.0108***	−0.0108***	−0.117***	−0.0169***	−0.0236***	−0.269***	−0.0478***
	(0.0004)	(0.0004)	(0.0037)	(0.0009)	(0.0003)	(0.0047)	(0.0009)
$\frac{Investment}{Asset}$	0.0008***	0.0008***	0.0148***	0.0028***	0.0062***	0.112***	0.0192***
	(0.0002)	(0.0002)	(0.0029)	(0.0007)	(0.0004)	(0.0056)	(0.0011)
$\frac{EBITDA}{Asset}$	0.0557***	0.0550***	0.248***	0.0703***	0.138***	1.120***	0.220***
	(0.0012)	(0.0012)	(0.0084)	(0.0023)	(0.0010)	(0.0136)	(0.0026)
Observations	62822	62822	62822	62822	62822	62822	62822
R^2	0.401	0.402	0.321	0.365			
Time fixed effects (FE)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Industry FE	Yes	Yes	Yes	Yes	No	No	No
Country FE					Yes	Yes	Yes

Panel B: Effect of *Group investment* on baseline regressions

	OLS			Tobit		
	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$
	(1)	(2)	(3)	(4)	(5)	(6)
Group	0.0003	0.0004	0.0003	0.0014***	0.0134***	0.0051***
	(0.0003)	(0.0038)	(0.0008)	(0.0002)	(0.0036)	(0.0007)
Group investment$_{-it}$	0.0055***	0.0239	0.0075**	0.0043**	0.0049	−0.0011
	(0.0012)	(0.0150)	(0.0032)	(0.0017)	(0.0233)	(0.0045)
Group investment$_{-it+1}$	0.0071***	0.0533***	0.0166***	0.0097***	0.1860***	0.0259***
	(0.0012)	(0.0151)	(0.0031)	(0.0009)	(0.0118)	(0.0023)
Observations	52700	52700	52700	52700	52700	52700
R^2	0.416	0.314	0.382			
Time fixed effects (FE)	Yes	Yes	Yes	Yes	Yes	Yes
Country × Industry FE	Yes	Yes	Yes	No	No	No
Country FE				Yes	Yes	Yes
Other Controls (Panel A)	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the results of regressions relating the dividend payments by group and non-group firms to firm characteristics. Variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005. The standard errors are robust and clustered at the individual firm level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

year of dividend payout. The reason for using contemporaneous and future investments in member firms follows from the discussion in Section 2.2. For stand alone firms, *Group investment* is set equal to zero.

Comparing the results of Panel A with Panel B, we find that not only are *Group investment*$_{-it}$ and *Group investment*$_{-it+1}$ significantly positively related to firm dividends, but that their inclusion makes the coefficient on *Group* either

lose its significance (Columns (1) to (3)) or reduce in magnitude by 20% to 50% (Columns (4) to (6)). This is a striking result since it suggests that the higher dividend rates of group firms can, in large part, be explained by its correlation with investments undertaken by other member firms. In unreported tests we also repeat our regressions with *Group equity* in place of *Group investment* and find similar results (see footnote 16 for discussion on *Group equity* measure). We note that in this specification both *Group investment* and *Group* take a value zero for stand-alone firms. As a result there is a significant positive correlation between these variables (around 60%). Consequently, these results should be interpreted with caution and only taken as being suggestive of the dividend channel we outlined in our model. As noted, we will rely on tests related to intensive margin to form more definitive conclusions.

Overall, the results in Table 3 show that affiliated firms indeed pay more dividends than unaffiliated firms and the difference can be explained in large part by the correlation between a group firm's dividends and investments undertaken by other member firms. These results are robust to alternative measures of dividend payments and to different specifications.

4.2 Dividends of an affiliated firm and investments by other member firms

In Table 4, we use Equation (5) to test if *among group firms*, dividend payments by a group firm are positively associated with investments by other member firms in the group (the intensive margin).

There is, however, one specification issue to resolve before we present our results. As indicated earlier, group dividends may be related to both

Table 4
Dividends of an affiliated firm and investments by other member firms

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$
Group investment$_{-it}$	0.0049***	0.0097	0.0051*			
	(0.0010)	(0.0119)	(0.0026)			
Group investment$_{-it+1}$	0.0057***	0.0279**	0.0105***			
	(0.0010)	(0.0106)	(0.0023)			
Group equity$_{-it}$				0.0032**	−0.0177	0.0036
				(0.0013)	(0.0160)	(0.0032)
Group equity$_{-it+1}$				0.0022	0.0320**	0.0071**
				(0.0013)	(0.0154)	(0.0031)
Observations	25253	25100	25100	25253	25100	25100
R^2	0.781	0.567	0.776	0.733	0.590	0.727
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls as Table 3	Yes	Yes	Yes	Yes	Yes	Yes
$\sum_0^1 \beta_l$	0.0106***	0.0539***	0.0156***	0.0054**	0.0143*	0.0107*

This table reports the results of regressions relating the dividend payments by a group firm to investments by other member firms in the group. Variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005. The standard errors are robust and clustered at the individual firm level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

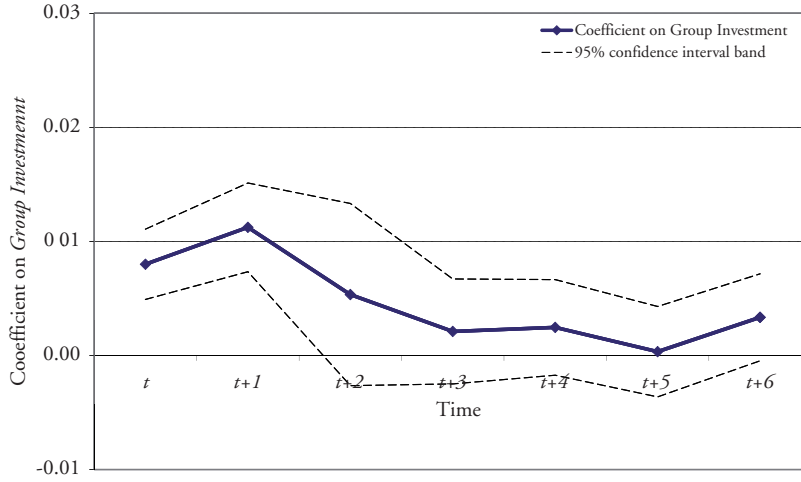

Figure 1
Coefficients on *Group investment*$_{t+k}$
Figure 1 depicts the coefficients on *Group investment* using specification in Equation (5). The coefficients on *Group investment*$_t$ and *Group investment*$_{t+1}$ are statistically significant at the 1% level. The coefficients on *Group investment*$_{t+2}$ to *Group investment*$_{t+6}$ are statistically insignificant at the 10% level. 95% confidence interval bands are also reported.

contemporaneous (*Group investment*$_t$) and future group investments (*Group investment*$_{t+k}$). Relying on the data to guide us, we experiment with our specification by allowing k to be as high as six, beyond which we lose many observations. Figure 1 provides a plot of the coefficients on *Group investment*$_t$ to *Group investment*$_{t+k}$ and shows that dividends are strongly correlated with only contemporaneous and one year ahead investments by the member firms (the rest of the terms are statistically insignificant). Consequently, for the rest of the paper, we use specifications that include only *Group investment*$_t$ and *Group investment*$_{t+1}$. For brevity we suppress coefficients on other controls and only report β_1 and β_2 for the various specifications.

The results in Column (1) indicate that $\beta_1+\beta_2$ is positive and significant, offering strong support for our model. In Columns (2) and (3) we repeat the regressions with alternative measures of payout and find similar results. In Columns (4) to (6) we re-estimate the regressions replacing *Group investment* in equation (5) with equity-financed investments *Group equity*. The results again indicate that $\beta_1+\beta_2$ is significant for all the specifications. Note that these regressions are estimated with time and firm fixed effects. Therefore, as stressed earlier, the variation exploited in this estimation comes from transient changes in dividend payout of an affiliated firm and transient changes in the investment by other member firms in the group. This ensures that the estimates are not likely to be driven by slow moving variables such as firm or group reputation.

The results are not only statistically significant but also economically meaningful. For instance, the coefficient estimates in Column (1) indicate that group firm dividend payouts as measured by $\frac{Dividend}{Asset}$ are 10.01% higher when there is a one standard deviation increase in the investments by the other member firms in the following year. The dividend increase is large and accounts for more than 20% of the insiders' equity investment in member firms.[19] We get similar results when we use other measures of dividend payout or use group equity-financed investments instead of group investments. Overall, the results provide evidence that is consistent with our model.

It is instructive to note that several anecdotes in the media about affiliated firms are quite consistent with our results. For instance, in 2004, SK Telecom (South Korea) announced a special dividend that was about 50% of its regular dividend. This was followed by the investments in other firms in the group increasing by about 25% for two years, relative to their average annual investment prior to the announcement. Similarly, in 2001, Pirelli (Italy) reported a large dividend increase of about two times the regular dividend. For two years following this announcement, other member firms in the group saw an increase in investments of around 90%, relative to their average investment level prior to the announcement.[20]

4.2.1 Evidence from equity issues . A legitimate concern with our analysis thus far is that both *Group investment* and *Group equity* are not direct measures of insider's investment in affiliated firm's equity. We next turn to providing direct evidence for our mechanism by exploiting specific instances when affiliated firms raise outside equity. The idea behind this test is to identify instances when a group firm raises significant outside equity – with at least some part coming from insiders – and assess how the dividend payout behavior of the other firms in its group changes around these events.

We use extensive media searches to identify instances of large rights and preferential equity issues with insider participation for affiliated firms in our sample. We identify these issues by searching media reports through Factiva and Lexis Nexis for articles that mention both the firm name and any of the following key words: private placement of equity, private placement of shares, preferential allotment of equity, preferential allotment of shares and rights issue. Our search is conducted for all the group firms in our sample between 1996 and

[19] The details of the calculation are as follows. A 1 standard deviation increase in investments of member firms (0.085) will increase dividend payment of an affiliated firm by (0.0106*0.085). Given the sample mean value of $\frac{Dividend}{Asset}$ of 0.009, this implies that the dividends of the affiliated firm will increase by around 10.01%. Also, insider's share of the increase in payout aggregated across group firms corresponds to about 20-25% of their average equity investment in a member firm.

[20] A similar example is Mitsubishi Corp. in Japan. In 2003, the firm raised its dividends by about 30% relative to its regular dividend. This was followed in the next two years by an increase in investments in the other affiliated firms by around 20%, relative to the average investment in years before the announcement.

2005. This search identifies 294 instances of large rights or preferential equity issues.[21]

In Figure 2, we examine the dividend payout behavior of other affiliated firms in a group around the equity issue by a member firm. In particular, we examine changes in $\frac{Dividend}{Asset}$ and $Log(Dividends)$ of the member firms around the event date. For ease of comparison we compute these changes relative to the value of these variables three years before the event. As can be seen, the rights or preferential equity issues of an affiliated firm are associated with significant increases in the dividend payout of other firms in its group – both in the year before and in the year of the equity issue by the affiliated firm. The magnitudes are large and of the order of 5-6% relative to three years before the event. For instance, in dollar terms this percentage change amounts to roughly an additional $30-40 million in dividends by member firms in the vicinity of the equity issue.

We test whether these patterns are robust to including standard controls in Table 5. In particular, we employ either $\frac{Dividend}{Asset}$ or $Log(Dividends)$ of member firms as the dependent variable. The main explanatory variable is *Before* – a dummy variable that takes a value one in the year before and in the year of the equity issue and 0 otherwise. Our results in Column (1) show a positive and significant coefficient on *Before*. This is consistent with $\frac{Dividend}{Asset}$ significantly increasing both in the year before and in the year of the equity issue. In Column (2) we repeat our tests after including country fixed effects and in Column (3) we confine the sample to the three years before and the three years after the equity issue. In both these specifications the coefficient on *Before* remains positive and significant. In Columns (4)-(6) we repeat our analysis with $Log(Dividends)$ as the dependent variable and obtain similar results. The magnitudes in these regressions are also qualitatively similar to those reported in the figures.

A caveat is in order. Our media searches are likely to capture large rights or preferential equity issues — i.e., those that are newsworthy. It is likely that there were other rights and preferential equity issues conducted by other group firms but the size of these issues was not large enough to make it newsworthy. This possibility implies that the magnitudes documented in this section might be larger than what one might expect for rights or preferential equity issue for an average affiliated firm in the sample. In other words, caution needs to be applied to external validity of these magnitudes. Regardless, the analysis in this section does provide strong and direct evidence of insiders using dividends from cash-rich firms to invest in equity of other affiliated firms.

4.2.2 Evidence from industry-adjustment and 'pseudo-groups'. We now provide evidence that our results are not driven by some industry level correlation between investment opportunities of group firms that we have

[21] Each of these instances involves large rights or preferential equity issues. For example, one of the instances concerns a group firm Sonera (Finland) that did a billion-euro rights issue in 2001.

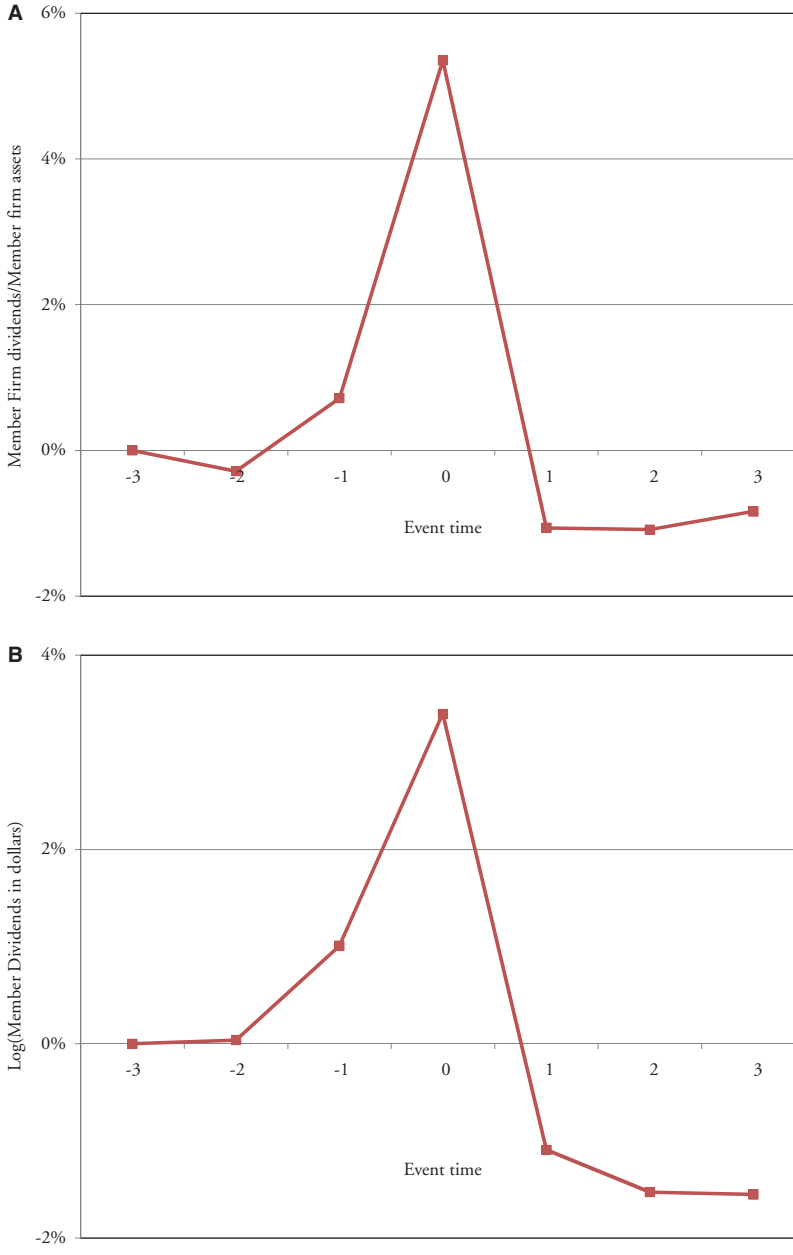

Figure 2
Dividends of member firms around equity issue by an affiliated firm
Figure 2 depicts the percent change in dividends of member firms around the rights or preferential equity issue by an affiliated firm (*t=0*). For ease of representation, the changes are normalized using values at period t=−3. In Panel A, the variable used is total member firm dividends normalized by total assets of member firms. In Panel B the variable used is dollar dividends of member firms. There is a significant increase in the dividend payout of other member firms in its group – both in the year before and in the year of the equity issue by an affiliated firm.

Table 5
Evidence from dividend payout of member firms around equity issue by an affiliated firm

	(1)	(2)	(3)	(4)	(5)	(6)
	Member Firms Dividends/ Member Firm Assets			Log(Member Firms Dividends ($))		
Before	0.0014***	0.0012***	0.0010**	0.673***	0.401***	0.283*
	(0.0003)	(0.0003)	(0.0004)	(0.122)	(0.114)	(0.144)
Observations	2205	2188	1355	2205	2188	1355
R^2	0.060	0.221	0.312	0.042	0.401	0.431
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	Yes	No	Yes	Yes
Sample period	All	All	[−3, +3]	All	All	[−3,+3]

This table reports the results of the regressions that examine the change in dividend payments by member firms around the large rights or preferential equity issue by an affiliated firm. We identify these issues by searching news reports between 1996 and 2005 on Factiva and LexisNexis for articles that mention both the firm name and any of the following key words: 'private placement of equity,' 'private placement of shares,' 'preferential allotment of equity,' 'preferential allotment of shares,' and 'rights issue'. The sample period for regressions is 1996-2005 for all the tests except in columns (3) and (6) where we restrict the data to be within three years around the event date. *Before* is a dummy variable that takes a value one in the year before and in the year of the equity issue and 0 otherwise. The data sources are listed in Table I. The standard errors are robust and clustered at year level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

inadequately controlled for in our specifications. We start by re-estimating the main specification after industry adjusting dividends and group investments. This methodology has been used extensively in the literature on conglomerates to account for correlations between investment opportunities of affiliated segments (e.g., Berger and Ofek 1995). As is reported in Column (1) of Table 6, our results are qualitatively unaffected when we make this change ($\beta_1 + \beta_2 > 0$ and is significant).

In Column (2), instead of industry adjusting the group investments, we include the investments of a portfolio of unaffiliated firms operating in the same industry and country and closest in terms of size to the member firms of a dividend paying affiliated firm. As can be observed, while the coefficient estimates on contemporaneous and future *Group investment* are positive and significant, the estimates on the matched portfolio of unaffiliated firms (*Industry Investment*^{matched}) are *negative* and significant. This provides additional evidence that our results are unlikely to be driven by mere investment opportunity correlations across industries in group firms.

In Column (3), we pursue an alternative approach. We construct a counterfactual for our main test by conducting a placebo test on a set of 'pseudo-group' firms. In particular, for each group in our data, we form a 'pseudo-group' of unaffiliated firms. The unaffiliated firms chosen are median sized firms operating in the same industry and country as the group firms. We then re-estimate our main regression on the sample of 'pseudo-group' firms. If our results are driven largely by industry level correlations, the estimates from these regressions should mirror closely our estimates in Table 4. Strikingly, we find that for the 'pseudo-groups' the sum of coefficients on investments by member firms of the pseudo affiliated firm ($\beta_1 + \beta_2$) is negative and significant.

Table 6
Evidence from industry adjustment and 'pseudo-groups'

	(1)	(2)	(3)	(4)	(5)
		$\frac{Dividend}{Asset}$		$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$
Group investment$^{ind-adj}_{-it}$	0.0028**				
	(0.0014)				
Group investment$^{ind-adj}_{-it+1}$	0.0015				
	(0.0014)				
Group investment$_{-it}$		0.0056***			
		(0.0011)			
Group investment$_{-it+1}$		0.0061***			
		(0.0010)			
Industry investment$^{matched}_{-it}$		−0.0104***			
		(0.0040)			
Industry investment$^{matched}_{-it+1}$		−0.0082*			
		(0.0044)			
Group investment$^{pseudo-grp}_{-it}$			−0.0020*	−0.0171	−0.0090***
			(0.0013)	(0.0127)	(0.0021)
Group investment$^{pseudo-grp}_{-it+1}$			−0.0031***	−0.0680***	−0.0040*
			(0.0009)	(0.0120)	(0.0020)
Observations	25253	24253	23427	23423	23417
R^2	0.724	0.782	0.725	0.833	0.629
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Other Controls as Table 3	Yes	Yes	Yes	Yes	Yes
$\sum_0^1 \beta_l$ (Group investment or Group investment$^{ind-adj}$)	0.0043**	0.0117***			
$\sum_0^1 \beta_l$ (Industry investment^{matched} or Group investment$^{pseudo-grp}$)		−0.0187***	−0.0051***	−0.0851***	−0.0130***

This table reports the results of regressions that relate the dividend payments by a group firm to investments by other member firms in the group, accounting for potential industry-level correlation between investment opportunities of affiliated firms. All variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005. The standard errors are robust and clustered at the individual firm level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

This result is robust to employing alternative measures of dividend payout as can be observed from Columns (4) and (5). Overall, the tests in this section provide further evidence in support of model's predictions.

4.2.3 Evidence from import duty shocks in India. In this section we provide additional evidence in support of the model's predictions. As per our model, an exogenous shock to the investment opportunities of some affiliated firms should be propagated to the dividend policies of unaffected member firms through the ICM. Accordingly, this section makes use of several import duty changes across industries in India to design such a test.

The tests in this section also help corroborate that the positive association between group firm dividends and investments we have documented so far is not due to spurious correlation between the two variables induced by (unobservable) financial situation of the affiliated firm that receives dividends. In particular, an increase in dividends by a group firm will increase the cash holdings of firms that hold an equity stake in the dividend paying firm. If the

dividend receiver is financially constrained, then its investments may respond to the availability of internal cash (e.g., Fazzari, Hubbard, and Petersen 1988). Under this alternative, *any* dividend policy of a group firm could show spurious correlation with investments made by affiliated firms in the group. By testing if dividends of a group firm respond to *investment opportunities* of affiliated firms, we will be able to rule out this alternative explanation.

The import duty changes are likely to affect the profitability and investment opportunities of not only the firms in the industries where the duties changed, but also of firms in the user industries. A tariff decrease is likely to increase competition from imports and, hence, act as a negative (positive) shock to the profitability and investments of firms making (using) the product. On the other hand, a tariff increase is likely to reduce competition from imports and, hence, act as a positive (negative) shock to the profitability and investments of firms making (using) the product. Our test examines if dividend payments of affiliated firms respond to the investments of its member firms that experience tariff shocks.

To identify the changes in import tariffs we obtain data on these tariffs from the Comprehensive tariff data from the World Trade Organization website.[22] The database provides both the bound tariffs agreed to by member countries and the actual tariffs charged on imports, the 'applied rates'. We obtain data at the 6-digit Harmonized System (HS) code level and use publicly available correspondence tables to convert the 6-digit harmonized codes to four digit NIC codes. When multiple 6-digit HS codes map into one NIC code, we take the average tariff to compute the tariff for the NIC. The tariffs are available for the years 1996, 2000, 2002 and 2006. We replace missing data with the most recent available tariff in the past years. We identify events when tariffs change in an industry based on this time series. Finally, we link shocks in the primary producer industry to user industries by identifying user industries for specific products using the 1998-99 input-output matrix for India.[23]

The main specification examines if there is a relationship between dividend payments of a group firm and investments of affiliated firms that are induced by tariff shocks.[24]

$$y_{it} = \left\{ \beta_0 + \beta_1 \text{Group } \widehat{\text{investment}}_{it} + \beta_2 \text{Group } \widehat{\text{investment}}_{it+1} + \gamma \text{X}_{it} + \delta \text{X}_{gt} + \mu_t + \mu_j \right\}. \tag{6}$$

[22] The data can be accessed at www.wto.org.

[23] In particular, for every industry in our sample, we sort industries consuming its output in descending order of their consumption. We then classify the top users which in aggregate account for 80% of the given industry's output as 'user' industries.

[24] In unreported tests we examine if the tariff changes affect the dynamics of the industry in which they occur. We compare the median industry profitability ($\frac{EBITDA}{Asset}$), sales growth and investments before and after the tariff change. We find that profitability, sales growth and investments decline in the years following a decrease in tariffs — suggest increased import competition — an opposite pattern is observed for tariff increases. This is consistent with mentions in the popular press about the tariff change episodes (e.g., see 'The plot thickens' *The Economist*, May 2001) and confirms that the tariff changes indeed result in shocks to the profitability and investment opportunities of firms operating in the industries affected by the tariff change.

The specification includes all the control variables used earlier and industry and time fixed effects to incorporate any other macro or time invariant industry level drivers of dividend payment. In addition, it includes a measure of investments by affiliated firms, $\widehat{Group\ investment}$. This variable is the predicted value of the investments of affiliated firms based on a first stage regression with group investment as the dependent variable and the average change in import duty across firms in the group as the exogenous instrument.[25] The first stage also includes other controls and industry and time fixed effects.[26] In the second stage we correct for the standard errors due to generated regressor on investments from the first stage. Our tests assess if dividend payments by a group firm are positively related to the investments of affiliated firms that are induced by changes in tariffs, i.e., $\beta_1 + \beta_2 > 0$.

Column (1) of Table 7 presents the results from this estimation. As can be observed across the three measures of dividend payout in Columns (1)-(3), $\beta_1 + \beta_2$ is positive and significant. The economic magnitudes are large and suggest about 15-30% increase in dividends by a group firm when there is a one standard deviation increase in investments by other member firms induced by changes in tariffs. For instance, Column (1) suggests that dividends (as measured by $\frac{Dividend}{Asset}$) in a group firm are higher by about 30% when there is a one standard deviation increase in investments by other member firms that is induced by changes in tariffs.

We repeat our estimation among the members of the 'pseudo-group', as described in Section 4.2.2. It is reassuring, as reported in Columns (4)-(6), to find the patterns observed in affiliated firms are absent in this sample (the sum of coefficients on group investments are negative and statistically insignificant). Overall, the results in this section provide strong evidence supporting the idea that a shock to the investment opportunity of a group firm is propagated through the internal capital market via payment of dividends by member firms.

4.3 Cross-sectional variation in the use of the dividend channel

In this section we investigate the manner in which the correlation between dividends and group investments varies with country governance, investment profitability, and investment size. We begin with the impact of country governance. As discussed in the model section, the prediction with regard to the impact of country governance on the dividend channel is ambiguous. The reason is that, while an improvement in governance favors the dividend over

[25] In constructing this average change we consider changes in import tariff either directly in a firm's industry or in its primary producer's industry. We code an increase (decrease) in import tariff in a firm's (primary producer's) industry as +1 and a decrease (increase) in import tariff in a firm's (primary producer's) industry as -1. No changes to import tariffs are coded as a 0.

[26] The coefficient on average change in import duty in the first stage is sensible. In particular, the coefficient is 0.0075 and significant at 1% level. The economic magnitude suggested by this coefficient implies that a one standard deviation increase in average change in import duty across firms in the group leads to around 8% increase in group investments.

Table 7
Evidence from import duty changes in India

	(1)	(2)	(3)	(4)	(5)	(6)
	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$	$\frac{Dividend}{Asset}$	$\frac{Dividend}{EBITDA}$	$\frac{Dividend}{Sales}$
$\widehat{Groupinvestment}_{-it}$	0.100*	1.026**	0.039*			
	(0.059)	(0.471)	(0.022)			
$\widehat{Groupinvestment}_{-it+1}$	0.052*	0.158	0.091*			
	(0.023)	(0.395)	(0.051)			
$\widehat{Groupinvestment}^{pseudo-grp}_{-it}$				0.015	−1.040*	0.247
				(0.016)	(0.571)	(0.239)
$\widehat{Groupinvestment}^{pseudo-grp}_{-it+1}$				−0.014	1.121	−0.235
				(0.026)	(0.864)	(0.233)
Observations	10640	10640	10640	10640	10640	10640
R^2	0.444	0.293	0.316	0.516	0.536	0.440
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls as Table 3	Yes	Yes	Yes	Yes	Yes	Yes
$\sum \beta_l$	0.152*	1.184**	0.130*	0.001	0.083	0.012

This table reports the results of regressions relating dividend payments by a group firm to investments by other member firms in the group around the import duty policy changes in India. Variables are described in Appendix C. The data sources are listed in Table 1. Data is for 1996 to 2005. The standard errors are robust, clustered at the individual firm level and corrected for the generated regressor from first stage. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

the intra-group channel, in a sufficiently strong governance system firms may rely largely on external financing rather than an ICM.

We examine the effect of country governance characteristics using a two-stage procedure. In the first stage we estimate Equation (5) after interacting *Group investment* with country fixed effects and obtain an estimate of $\sum_{k=1}^{2} \beta_k$ for each country in our sample. In this specification we also include within country-time fixed effects. In the second stage we relate $\sum_{k=1}^{2} \beta_k$ to various country level governance measures by estimating:

$$\sum_{0}^{k} \beta_l^c = \alpha_0 + \gamma X_c. \tag{7}$$

The coefficient of interest in these regressions is γ. The country level governance characteristics, X_c, that we analyze include *Corruption*, level of corruption, *Accounting*, degree of disclosure in accounting statements, *Autocracy*, general closedness of political institutions, *Self-dealing*, degree to with which controlling shareholder gets away with a transaction that involves self-dealing and *Anti-director*, shareholder rights.

In Table 8 we provide the results of the second stage regression. As can be seen, in general, the intensity of the dividend channel is negatively related to country level governance – the stronger the country level governance characteristic, the smaller is the intensity of the dividend channel. Of the characteristics we analyze, *Corruption* and *Autocracy* are significantly related to the intensity of the dividend channel. The economic magnitudes appear large.

Table 8
Dividend channel and country governance characteristics

	$\sum_0^2 \beta_l^c$					
	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	−0.0058*					−0.0062**
	(0.0030)					(0.0031)
Accounting		−0.0002				0.0003
		(0.0004)				(0.0004)
Autocracy			−0.0024**			−0.0024***
			(0.0009)			(0.0008)
Anti-director				−0.001		−0.006
				(0.004)		(0.006)
Self-dealing					−0.002	−0.006
					(0.017)	(0.015)
Observations	17	17	17	17	17	17
R^2	0.117	0.004	0.237	0.002	0.001	0.364

This table reports the results of regressions that relate the strength of the dividend channel in each country to the country level governance characteristics. We measure the strength of the dividend channel in a country using the estimates of $\sum_{k=1}^{2} \beta_k$ from a first stage estimation of Equation (5) augmented by interaction terms between country dummies and *Group investment*. Variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

For instance, a reduction in autocracy as measured by movement from a country that is in the 25^{th} percentile towards a country that is in the 50^{th} percentile (a more open country) leads to a reduction in intensity of the dividend channel by around 50%.[27] In fact, by around the 90^{th} percentile, the intensity of the dividend channel completely disappears. We find similar economic effects for corruption as well. These findings are consistent with the notion that firms make less use of ICMs when the governance system is strong and, presumably, external financial markets are well developed.[28] In unreported tests we obtain consistent results when we augment the first stage with industry or firm fixed effects.

Next, we investigate whether group firm dividends are more correlated with investments that are made by the more profitable firms in the group. To test this prediction, we classify firms as more (less) profitable if they are from industries that have above (below) median profitability the previous year. We then construct two measures of group investments, one aggregating the investments by more profitable group firms (*High*) and the other aggregating the investments by less profitable group firms, *Low*. We then re-estimate Equation (5) after including the contemporaneous and the future values of both modified

[27] The change in intensity of $\sum_{k=1}^{2} \beta_k$ is compared relative to average estimates in Table 3.

[28] One could worry that the distribution of dividends and investments in affiliated firms might be quite different across countries, making it hard to directly compare $\sum_{k=1}^{2} \beta_k$ across countries. In unreported regressions we repeat our analysis standardizing all the variables in the first stage. In particular, for each firm, we demean each variable by the mean of that variable across all firms in the country in a given year and normalize by the standard deviation of that variable across all firms in the country in a given year. Our results are very similar to those reported in Table 8.

Table 9
Cross-sectional variation in use of dividend channel

	Year t (1)	Year $t+1$ (2)	Year t (3)	Year $t+1$ (4)	Firm FE (5)	Time FE (6)	R^2 (7)	Obs (8)
	Panel A: Variation with Profits							
	High		Low					
	β_{1h}	β_{2h}	β_{1l}	β_{2l}				
Row (1)	0.0024**	0.0023**	0.0017*	0.0008	Yes	Yes	0.716	25338
	(0.0012)	(0.0012)	(0.0010)	(0.0012)				
	Panel B: Variation with Investment Size							
	Large		Small					
	β_{1L}	β_{2L}	β_{1S}	β_{2S}				
Row (2)	0.0014	0.0009	0.0026**	0.0016	Yes	Yes	0.729	25338
	(0.0011)	(0.0011)	(0.0013)	(0.0014)				
	Panel C: Variation with Amount of Debt Capacity Utilized							
	High debt		Low debt					
	β_{1H}	β_{2H}	β_{1L}	β_{2L}				
Row (3)	0.0011*	0.0017**	0.0005	0.0007	Yes	Yes	0.683	25338
	(0.0007)	(0.0007)	(0.0007)	(0.0008)				

This table reports the results of regressions investigating the cross-sectional variation in the relationship between affiliated firm dividends and investments of other member firms. In Row 1, $X^1(X^2)$ is the aggregate investments made by all the group firms, which are in industries with above (below) median profitability relative to all industries in a given country every year. We measure investment by a firm during any year as the change in total assets during the year. In Row 2, X^1 (X^2) is the aggregate investments of all the other group firms, which are above (below) median investment relative to all industries in a given country every year. In Row 3, (X^2) is the aggregate investments of all the other group firms, which are above (below) median debt to assets relative to all the firms in their industry in a given country every year. Variables are described in Appendix C. The data sources are listed in Table 1. Data for all countries is for 1996 to 2005. The standard errors are robust and clustered at the individual firm level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

investment measures. More specifically, we estimate:

$$y_{it} = \left\{ \begin{array}{l} \beta_0 + \beta_{1h}\text{Group investment}_{-it}^{High} + \beta_{2h}\text{Group investment}_{-it+1}^{High} \\ +\beta_{1l}\text{Group investment}_{-it}^{Low} + \beta_{2l}\text{Group investment}_{-it+1}^{Low} + \gamma X_{it} + \mu_t + \mu_i \end{array} \right\}. \quad (8)$$

We have four coefficient estimates of interest: β_{1h}, β_{2h}, β_{1l}, β_{2l}. We present the results of the regression in Panel A of Table 9. For brevity only the four coefficients of interest are presented. In reading the table, note that the coefficient in the column titled *Year t* and *High* is the coefficient on the investments by high profit firms in year t. The results indicate that firm dividends are significantly more responsive to investments by affiliated firms in more profitable industries.

In Panel B of Table 9, we test whether firm dividends respond more to smaller investments by other firms in the group. To do this we again construct two measures of group investments that separately aggregate group firm investments that are larger and smaller than the median investments by firms in the country the previous year, *Large* and *Small* respectively. We then re-estimate Equation (8) after including the contemporaneous and the future values of both the modified investment measures. The results indicate that firm dividends respond more to smaller investments in other group firms.

As mentioned earlier, we exclude debt financing in our model by focussing on all equity firms. If we include the possibility of debt financing, it is reasonable to argue that the dividend channel should be more important in situations where debt is less likely to be available. We test this in Panel C. We expect firms with high leverage to be more likely to finance incremental investments with equity. Following this rationale, we classify firms into high- and low-leverage firms depending on whether their $\frac{Debt}{Asset}$ is above or below the industry median the previous year. We then estimate Equation (5) separately aggregating investments of firms with high and low leverage. As can be observed, the dividend channel is primarily employed in groups where firms undertaking investments have high debt levels.

In summary, the results in this section generally support the model. We are able to show that dividend payout by a group firm responds more to investments in other firms in the group when the investments are more profitable, require less capital and are undertaken by firms with high leverage. The dividend responsiveness is also higher in countries with weak legal regimes, consistent with firms relying to a greater extent on ICMs in such environments.

4.4 Other tests

We conduct additional robustness tests that are unreported for brevity. In particular, we examine if the dividend channel is likely to be employed more in affiliated firms where intra-group debt is likely to be unavailable. To conduct this test we rely on Gopalan, Nanda, and Seru (2007) who show that intra-group loans are less likely to be observed in business groups that have fewer tangible assets (measured as a proportion of total plant, property and equipment in the group to total assets in the group). Accordingly, we examine if the effects we find are larger in groups that have fewer tangible assets. This is indeed what we find. In addition, for business groups in India we observe data on actual intra-group loans. For this sample, we include a measure of intra-group internal financing directly in our regressions and find that our results are qualitatively unchanged.

We also employ alternative proxies for investment opportunity, such as growth rates of assets and cash flows, and also estimate all the regressions using only non-Indian data. The results are similar to those reported in the paper.

5. Conclusion

We contend that the organization of an internal capital market can influence an affiliated firm's dividend policy. We develop a simple model in which business group insiders lower the cost of external finance via a dividend channel. The notion is that insiders distribute dividends from the cash-rich firms they control – and then use their share of the payout to help finance investments in other affiliated firms. By participating in the equity financing by firms in their group,

insiders are able to maintain their stake in affiliated firms and, thereby, preclude a costly diversion of resources. This lowers their cost of raising external capital. These predictions find support in an extensive firm-level data set from across several countries in Asia and Europe. The results suggest an explanation for the puzzling fact that group firms pay significantly more dividends than their unaffiliated counterparts.

The results are consistent with a type of 'second best' equilibrium. Weak legal rights and poor enforcement make it difficult for firms to raise outside financing. However, firms may be able to partially offset some of these limitations by developing suitable organizational structures and policies – including the use of dividends as a transparent way to finance equity investments and maintain insider stake via the ICM. In the paper we have not discussed the insider's choice between the business group structure with independent firms and the stand alone firm structure. The expectation of more dividend payments from affiliated firms due to their organization in comparison to stand alone firms, may provide part of the rationale for the business group structure. Given their greater dividend payments, affiliated firms may find it easier to raise external equity capital in environments with weak protection for investor rights. This could explain, in part, why this organizational form is dominant in emerging economies (see also Almeida and Wolfenzon 2006a).

Our paper suggests that laws that prevent consumption or investment of significant resources without transparent sources of income may improve firm governance. Governments in many countries employ such laws to enforce income taxes. Our findings highlight that effective enforcement of such laws may force insiders to employ more transparent means such as dividends to gain access to funds. This could increase efficiency of capital allocation by making it easier for firms to raise external financing for profitable investments.

Appendix A: Proofs

Proof of Lemma 1. The insider will divert from firm B if his effective shareholding is less than $1-\delta$. The insiders' effective shareholding in firm B if he invests W in the equity offering is $[\beta+\gamma\alpha][1-\frac{I}{P_B}]+\frac{W}{P_B}$. Thus the insider will not divert from firm B iff

$$[\beta+\gamma\alpha][1-\frac{I}{V+X}]+\frac{W}{V+X}\geq 1-\delta$$

$$\text{or if} \qquad W\geq W_{min}\equiv \max\{0,[\beta+\gamma\alpha]I-[\beta+\gamma\alpha-\{1-\delta\}][V+X]\}] \qquad \blacksquare$$

Proof of Lemma 2. The issue is only interesting for $W_{min}>0$. If the insider invests $W\geq W_{min}$, he precludes diversion from B at date 1. Since the equity offering is fairly priced, the existing shareholders of B capture all the NPV of the new project. Given the insider's ownership of $(\beta+\gamma\alpha)$ of the existing equity of B, his payoff with no diversion (ND) will be worth: $V_{ND}=(\beta+\gamma\alpha)(V+X-I)$.

If the insider does not participate in the equity offering, then from Lemma 2 we know that he will divert at date 1. This implies that the offering will be priced at $P_B=[1-\mu][V+X]$, and the insiders' effective holding in firm B will be $[\beta+\gamma\alpha][1-\frac{I}{[1-\mu][V+X]}]$. The insiders' total payoff

from firm B with diversion (D) will then be:

$$V_D = [\beta+\gamma\alpha][1-\frac{I}{[1-\mu][V+X]}][V+X][1-\mu]+[1-\delta]\mu[V+X]$$

. After some algebraic manipulation, we obtain:

$$\begin{aligned} V_D &= (\beta+\gamma\alpha)([V+X][1-\mu]-I)+[1-\delta]\mu[V+X] \\ &= (\beta+\gamma\alpha)(V+X-I)-(\beta+\gamma\alpha-[1-\delta])\mu[V+X] \\ &= V_{ND}-(\beta+\gamma\alpha-[1-\delta])\mu[V+X] \\ &< V_{ND}. \end{aligned}$$

In the third line of the derivation above we substitute V_{ND} for the expression $(\beta+\gamma\alpha)(V+X-I)$. In the last step, the inequality follows from Assumption 1 that $\beta+\gamma\alpha > 1-\delta$.

Hence, the insider does better by investing $W \geq W_{min}$, if possible, and avoiding having to bear the cost of the anticipated diversion. ■

Proof of Proposition 1. As discussed in the text, the insider will choose the dividend channel if

$$W_{min}[\frac{\alpha}{\alpha'}-1] \leq M.$$

We inspect the expression for $W_{min} \equiv \max\{0, [\beta+\gamma\alpha]I-[\beta+\gamma\alpha-\{1-\delta\}][V+X]\}]$. Given that $\beta+\gamma\alpha > 1-\delta$ from Assumption 1, it follows immediately that W_{min} is (weakly) increasing in I and decreasing in X. Hence, the dividend channel is more likely to be used when project investment I is lower and payoff X is higher.

As discussed in the text following Proposition 1, the effect of δ on the use of the dividend channel can be non-monotonic. An increase in δ, reduces W_{min} and, hence, the cost of using the dividend channel. On the other hand, with a sufficiently large δ, we have $W_{min}=0$. As a result, funds required for investment in firm B can be raised externally, with neither the dividend nor the intra-group channel being employed. ■

Appendix B: Summary of Predictions

We did not consider alternative modes of financing the investment in our model to keep it tractable and short. As discussed earlier, in a more general set-up one can consider alternative modes of financing such as inside and outside debt and outside equity with non-voting shares. Here we briefly summarize the situations when the group is likely to use these alternative financing methods.

Financing channel	Investment characteristics	Country characteristics
Dividends and outside equity	Smaller, more profitable investments	Non-monotonic relationship with investor protection
Inside equity from other group firms	Larger, less profitable investments	Non-monotonic relationship with investor protection
External debt	Investments with more tangible assets, less risky cash flows and in firms with lower costs of financial distress	
Internal debt	Larger; less profitable investments	
Non-voting external equity		Likely to be employed in countries with stronger investor protection.

Appendix C: Variable Definitions

The variables used in the empirical analysis are defined as follows:

- *Accounting*: An index measuring the extent to which 90 items are included in the balance sheet and income statement of firms from a country. It ranges from 0 (low disclosure) to 90 (high disclosure). The index is constructed by the Center for International Financial Analysis and Research (CIFAR) and we obtain this data from the website of Ross Levine.
- *Anti-director*: The index of shareholder rights index as constructed in Djankov et al. (2008).
- *Autocracy*: An index measuring the general closedness of political institutions in a country with zero implying high level of closedness and 10 implying low level of closedness. We obtain this data from the website of Ross Levine.
- *Corruption*: An index measuring the level of corruption in the country with a zero value implying high levels of corruption and ten implying low levels of corruption. We obtain this index from the website of Ross Levine.
- *Dividend payer*: A dummy variable that identifies the years in which a firm pays dividends.
- $\frac{Debt}{Asset}$: Ratio of the book value of total debt over book value of total assets.
- $\frac{Dividend}{Asset}$: The ratio of dividends over book value of total assets.
- $\frac{Dividend}{Sales}$: The ratio of dividends over sales.
- $\frac{Dividend}{EBITDA}$: The ratio of dividends over earnings before interest taxes, depreciation, and amortization.
- $\frac{EBITDA}{Asset}$: The ratio of earnings before interest taxes, depreciation and amortization over book value of total assets.
- *Group*: A dummy variable that identifies firms that belong to a business group.
- *Group equity*$_{-i}$: The aggregate equity-financed investments by other firms in the group over the aggregate book value of total assets of the other member firms. We measure equity-financed investments as the year-on-year change in book value of total assets less retained earnings for the year less the change in book value of total debt.
- *Group equity*$_{-i}^{ind-adj}$: The numerator is the difference between the aggregate equity-financed investments of other member firms in the group and the equity financed investment of unaffiliated industry comparables while the denominator is the book value of total assets of the other member firms in the group. The industry comparables are unaffiliated firms in the same industry, country, and closest in size to the group firms. We measure equity-financed investments as the year-on-year change in book value of total assets less retained earnings for the year less the change in book value of total debt.
- *Group investment*$_{-i}$: The aggregate investments by other firms in the group over the aggregate book value of total assets of the other member firms. We measure investment as the year-on-year change in book value of total assets.
- *Group investment*$_{-i}^{ind-adj}$: The numerator is the difference between aggregate investments of other member firms in the group and the investment of unaffiliated industry comparables and the denominator is the book value of total assets of the other member firms in the group. The industry comparables are unaffiliated firms in the same industry, country and closest in size to the group firm. We measure investment as the year-on-year change in book value of total assets.
- *Group investment*$_{-i}^{pseudo-group}$: The ratio of the aggregate investments of other member firms in the 'pseudo-group' to the book value of total assets of the other member firms in the 'pseudo-group'. We identify the 'pseudo-group' using the procedure outlined in Section 4.2.2. We measure investment as the year-on-year change in book value of total assets.
- *Industry investment*$_{-i}^{matched}$: The aggregate investments of unaffiliated industry comparables over the book value of total assets of the comparables. The industry comparables are unaffiliated firms that are closest in size and in the same industry and country as the other

member firms. We measure investment as the year-on-year change in the book value of total assets.
- *Insider holding (%)*: The percentage insider holding in the firm.
- $\frac{Investment}{Asset}$: The ratio of investment over book value of total assets. We measure investment as the year-on-year change in the book value of total assets.
- *Sales growth*: Annual growth rate of sales.
- *Size*: Logarithm of the book value of total assets.
- *Self-dealing*: A measure of the extent to which a firm's minority shareholders are protected from self-dealing by the controlling shareholders. We obtain this measure from Djankov et al. (2008).

References

Almeida, H., and D. Wolfenzon. 2006a. Should business groups be dismantled? The equilibrium costs of efficient internal capital markets. *Journal of Financial Economics* 79:99–144.

Almeida, H., and D. Wolfenzon. 2006b. A theory of pyramidal ownership and family business groups. *Journal of Finance* 61:2637–80.

Almeida, H., M. G. Subrahmanyam, S. Y. Park, and D. Wolfenzon. 2011. The structure and formation of business groups: Evidence from Korean chaebols. *Journal of Financial Economics* 99:447–75.

Bena, J., and H. Ortiz-Molina. 2013. Pyramidal ownership and the creation of new firms. *Journal of Financial Economics* 108:798–821.

Berger, P., and E. Ofek. 1995. Diversification's effect on firm value. *Journal of Financial Economics* 37:39–65.

Bertrand, M., P. Mehta, and S. Mullainathan. 2002. Ferreting out tunnelling: An application to Indian business groups. *Quarterly Journal of Economics* 117:121–48.

Burkart, M. C., F. Panunzi, and A. Shleifer. 2003. Family firms. *Journal of Finance* 58:2167–201.

Claessens, S., S. Djankov, and L. Lang. 2000. The separation of ownership and control in east asian countries. *Journal of Financial Economics* 58:81–112.

Claessens, S., S. Djankov, J. Fan, and L. Lang. 2002. Disentangling the incentive and entrenchment effects of large shareholdings. *Journal of Finance* 57:2741–771.

Coase, R. 1937. The Nature of the firm. *Economica* 4:386–405.

Djankov, S., R. La Porta, F. Lopez-De-Silanes, and A. Shleifer. 2008. The law and economics of self-dealing. *Journal of Financial Economics* 88:430–65.

Easterbrook, F. 1984. Agency cost explanations of dividends. *American Economic Review* 74:650–59.

Faccio, M., L. Lang, and L. Young. 2001. Dividends and expropriation. *American Economic Review* 91:54–78.

Fazzari S., R. G. Hubbard, and B. Petersen. 1988. Financing constraints and corporate investment. *Brooking Papers on Economic Activity* 1:141–95.

Fluck, Z. 1999. The Dynamics of the management-shareholder conflict. *Review of Financial Studies* 12:379–404.

Friedman, E., S. Johnson, and T. Mitton. 2003. Propping and tunneling. *Journal of Comparative Economics* 31:732–50.

Gopalan, R., V. Nanda, and A. Seru. 2007. Affiliated firms and financial support: Evidence From Indian business groups. *Journal of Financial Economics* 86:759–95.

Gopalan, R., and K. Xie. 2011. Conglomerates and industry distress. *Review of Financial Studies* 24: 3642–87.

Gomes, A. 2000. Going public without governance: Managerial reputation effects. *Journal of Finance* 55:615–46.

Hart, O., and J. Moore. 1994. A theory of debt based on the inalienability of human-capital. *Quarterly Journal of Economics* 109:841–79.

Jensen, M. 1986. Agency costs of free cash flow, corporate-finance and takeovers. *American Economic Review* 76:323–29.

Khanna, T., and Y. Yafeh. 2005. Business groups and risk sharing around the world. *Journal of Business* 78: 301–40.

Kim, W., and M. Weisbach. 2008. Motivations for public equity offers: An international perspective, *Journal of Financial Economics* 87:281–307.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1998. Law and finance. *Journal of Political Economy* 106:1113–55.

La Porta R., F. Lopez-de-Silanes, and A. Shleifer. 1999. Corporate ownership around the world. *Journal of Finance* 54:471–517.

La Porta R., F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny. 2000. Agency problems and dividend policies around the world. *Journal of Finance* 55:1–33.

Lins, K., and H. Servaes. 1999. International evidence on the valuation of corporate diversification. *Journal of Finance* 54:2215–39.

Maksimovic, V., and G. Phillips. 2002. Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence. *Journal of Finance* 57:721–67.

Maksimovic, V., and G. Philips. 2008. The industry life cycle, acquisitions and investment: Does firm organization matter? *Journal of Finance* 63:673–708.

Masulis, R., W. Pham, P. K. Zein. 2011. Family business groups around the world: Financing advantages, control motivations, and organizational choices. *Review of Financial Studies* 24:35–56.

Matsusaka, J. 2001. Corporate diversification, value maximization, and organizational capabilities. *Journal of Business* 74:409–31.

Mullainathan, S., and D. Scharfstein. 2001. Do firm boundaries matter? *American Economic Review* 91: 195–99.

Ozbas, O., and D. Scharfstein. 2010. Evidence on the dark side of internal capital markets. *Review of Financial Studies* 23:581–99.

Rajan, R., H. Servaes, and L. Zingales. 2000. The cost of diversity: The diversification discount and inefficient investment. *Journal of Finance* 55:35–80.

Scharfstein, D., and J. Stein. 2000. The dark side of internal capital markets: Divisional rent-Seeking and inefficient investment. *Journal of Finance* 55:2537–64.

Seru, A. 2014. Firm boundaries matter: Evidence from conglomerates and R&D activity. *Journal of Financial Economics* 111:381–405.

Stein, J. 2003. Agency, information, and corporate investment. *Handbook of the economics of finance*. North Holland, Amsterdam.