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Power Struggles, Tunneling Incentives, and Investment Efficiency in Diversified Business Groups*

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Abstract

Unlike conglomerates in the U.S., where investment flows may be distorted due to power struggles (Rajan, Servaes, and Zingales (2000)), we find that diversified business groups in India, on average, invest efficiently. Our analysis controls for the possibility of tunneling (Bertrand, Mehta, and Mullainathan (2002)).

Overall, our results suggest that investment decisions in diversified business groups are consistent with the Efficient Internal Capital Markets Hypothesis. We also find that the presence of relational contracts in business groups mitigates the adverse effects of tunneling incentives, consistent with the internal governance argument in Acharya, Myers, and Rajan (2011).

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1 Introduction

Business groups are a prevalent organizational form and account for a significant portion of the investments made in several important economies of the world.[1] For instance, in Korea, the assets of the top four conglomerates (Samsung, Hyundai, LG and SK Telecom) amount to 50 percent of the country's GDP, and their capital expenditure represents 35 percent of the country's total investment (Wang (2010)). It is therefore important to understand what drives the investment decisions within business groups. Stated otherwise, are the investments in business groups consistent with efficient resource allocation?

Business groups are essentially a diversified network of distinct (publicly or privately traded) firms that are mostly family-controlled. In many ways, business groups are akin to diversified conglomerates in the U.S. However, in sharp contrast to the diversification discount associated with U.S. conglomerates, business groups seem to enjoy a diversification premium. Khanna and Rivkin (2001) studied the performance of group affiliated firms in 14 emerging markets and found evidence of a diversification premium in 11 out of the 14 countries. One wonders why diversification, on average, is viewed unfavorably in the context of conglomerates whereas it seems to add value in the context of business groups.

Diversification can be associated with benefits as well as costs. In this article, we focus on the implications of diversification on the efficiency of internal capital markets in business groups. The Efficient Internal Capital Markets Hypothesis argues that internal capital markets within business groups serve the purpose of allocating resources efficiently when frictions in the marketplace cause the market mechanism to be prohibitively costly.

[1]Business groups are essentially a diversified network of distinct (publicly or privately traded) firms that are mostly family-controlled through an intricate web of cross holdings of shares in group-firms.

Stein (1997) suggests that diversified firms can direct investment flows toward more productive divisions.

Other research has suggested that diversification can adversely affect investment efficiency. We focus on two potential sources of investment distortions: power struggles (Rajan et al. (2000)) and tunneling of resources (Bertrand et al. (2002)).[2] Our study examines the nature of investment flows in a sample of diversified Indian business groups to find out whether investment flows are efficient or whether they suffer from investment distortions either due to power struggles or tunneling.

Rajan et al. (2000) argue that conglomerates suffer from investment distortions, which are required to mitigate power struggles between divisional managers. Too much diversity in resource-weighted opportunities between divisions causes tension between divisional managers. To ward off surplus divisions from pursuing defensive investment strategies (to protect their surplus), central headquarters (ex-ante) distorts investment flows in favor of divisions with lower resource-weighted opportunities. This behavior could be incongruous with efficient resource allocation. Greater diversity in resource-weighted opportunities requires greater ex-ante investment distortions to mitigate ex-post power struggles. Rajan et al. (2000)'s empirical analysis confirms this theory by showing that investment efficiency in U.S. conglomerates is negatively related to diversity in resource-weighted opportunities.

Two key aspects of business groups (in contrast to U.S. conglomerates) have an important bearing on investment efficiency. First, the distinct legal status of group-firms

[2]In general there could be other benefits as well as costs of diversification. Benefits could arise due to risk reduction, tax advantages, reduced financing costs (Almeida and Wolfenzon (2006), Masulis, Pham, and Zein (2011)) etc., and costs include sub-optimal capital structure choices (Lyandres (2007))), cross-subsidization of less productive division (Scharfstein and Stein (2000)), lack of focus, etc.

helps them establish property rights over the surplus they generate.[3] One would expect, therefore, that high surplus generating affiliates of a business group would be able to avoid defensive investment strategies in order to protect their surplus because they enjoy legal rights over their surplus. In short, the organization structure of business groups, *per se*, provide legal protection of surplus and thereby mitigates the problem of power struggles.

The second distinguishing feature of business groups (in comparison to conglomerates) is the presence of "pyramidal" and "horizontal" ownership structures with cross holdings. Most of the Indian business groups are controlled by families that hold equity stakes in group-firms either directly (horizontal ownership) or indirectly through other firms in the group (pyramid ownership or cross holdings). The net ownership claim on a group-firm, both due to the direct and indirect ownership of shares, affects the economic interests of the controlling family in a group-firm. Since the controlling family essentially acts like "central headquarters" it can take advantage of the differential cash flow rights it possesses in group-firms. It can move resources from group-firms where it holds low cash flow rights to group-firms where it holds high cash flow rights. As documented in Bertrand et al. (2002), this resource transfer increases the wealth of the controlling family at the expense of minority shareholders in group-firms where it holds low cash flow rights. More importantly, such a resource transfer moves funds from group-firms with good opportunities to group-firms with poor opportunities. Bertrand et al. (2002) refer to such investment distortions as tunneling.

Our study examines direct evidence on efficiency of investment flows in business groups

[3]It is important to recognize that a group-firm's independent legal status establishes property rights over the accounting surplus generated by the group firm. In general, a group-firm may also create economic surplus, e.g. a sustainable competitive advantage in a particular market. However, it is impossible to alienate property rights over this surplus in a world with incomplete contracting.

and investigates its relationship with power struggles and tunneling incentives. At the firm level, we find that investments flow from group-firms with lower growth opportunities to group-firms with higher growth opportunities, i.e, investment flows are consistent with the Efficient Internal Capital Markets Hypothesis. We also examine the basic premise of the theory of power struggles. Using diversity in resource-weighted opportunities as a proxy for power struggles (as proposed by Rajan et al. (2000)), we find that investment flows are similar across group-firms with low resource-weighted growth opportunities and high resource-weighted growth opportunities, thereby suggesting the absence of power struggles as a driver of investment flows in business groups. Finally, to investigate the role of tunneling, we examine the investment flows in group-firms based on the cash flow rights held by the controlling family. We find that investments flow from group-firms where the controlling family holds low cash flow rights to firms where the controlling family holds high cash flow rights. This preliminary evidence supports the Tunneling Hypothesis.

At first glance, these pieces of evidence suggest the possibility of contradiction. On the one hand investments seems to flow toward firms with higher growth opportunities, while at the same time, investments are headed toward firms where the controlling family holds high cash flow rights. We, therefore, establish more clear-cut hypotheses related to the Efficient Internal Capital Markets Hypothesis as well as the power struggles and tunneling explanations of diversification.

Rajan et al. (2000) argues that investment distortions should increase with the diversity in resource-weighted opportunities because greater diversity increases the possibility of power struggles. In contrast, the Efficient Internal markets Hypothesis would imply that investment flows increase with diversity of resource-weighted opportunities because

greater diversity increases the option value of transferring resources in the right direction - from group-firms with low growth opportunities to group-firms with higher growth opportunities. To test these predictions at the firm level, we sort firms into segments based on growth opportunities (based on Tobin's-q) and resource weighted growth opportunities (based on λq, where λ is a measure of the resource weightage in the group firm). The relationship between investment flows in these subset of group-firms and the group's diversity in resource-weighted opportunities is consistent with the Efficient Internal Capital Markets Hypothesis. The evidence suggests that among groups-firms with high λq, investment flows increase with the group's diversity in resource-weighted opportunities for high q group-firms. Results also suggest that investments reduce with diversity (in resource-weighted opportunities) in the low q group-firms. In other words, investments flow in the right direction (from low-q to high-q, high λq group-firms). Where it matters more, the allocation of resources is efficient.

We also sort firms into segments based on growth opportunities (Tobin's-q) and cash flow rights held by the controlling family. We argue that tunneling incentives are likely to be higher in groups where the controlling family's ownership claims across group-firms exhibits a high diversity (i.e., variation) in cash flow rights. (Consider the contrasting situation of zero diversity in cash flow rights; there would be no advantage in tunneling). Therefore, if tunneling drives investment flows, we would expect to see an increasing relationship between investment flows and the diversity in cash flow rights. On the other hand, the Efficient Internal Capital Markets Hypothesis would have no predictions on the relationship between investment and diversity in cash flow rights. We find that in group-firms with high Tobins-q, investments flows are consistent with efficiency considerations - investment flows are unrelated to diversity in cash flow rights. It is only in the low Tobin-q group-firms that investment flows are related to diversity in cash flow rights,

as predicted by the Tunneling Hypothesis. However, where it matters more (high Tobin's q group-firms) investment decision making in business groups is efficient.

Interestingly, we find that in the segment of firms where tunneling seems to exist, the impact of tunneling incentives is mitigated in group-firms whose CEOs have close personal ties with the controlling family. The Managerial Power Hypothesis would suggest that tunneling would increase if more CEO's in group firms have personal ties with the controlling family.[4] Our evidence, however, suggests exactly the opposite. The presence of relational contracts (Baker, Gibbons, and Murphy (2002)) has a mitigating influence on the relationship between investment flows and diversity of cash flow rights. This evidence negates the perception that tunneling would be higher in groups where family control is stronger. In fact, the evidence supports the internal governance hypothesis (Acharya et al. (2011)) which argues that potential successors from within a firm affect incumbent top management's welfare and are consequently able to discipline them. The internal governance of business groups is based on relational contracting and it is likely that the group's successor will come from one of the group-firm CEOs. Closer family ties increase the incentives to preserve the size of the pie rather than eat into it.

Finally, we also examine investment efficiency at the group level. We find that, at the group level, investment efficiency is positively related to diversity in resource-weighted opportunities and insignificantly related to diversity in the cash flow rights held by the controlling family. This overall group-level evidence suggests that investment efficiency in groups is largely driven as per the Efficient Internal Capital Markets Hypothesis. At the group level, investment distortions due to power struggles and tunneling incentives

[4]Managers can extract rents through a variety of mechanisms such as self-dealing, insider trading, etc. (Bebchuk and Christine (1999)) and through their executive compensation (Bebchuk, Fried, and Walker (2002)).

are swamped by efficiency considerations.

Our results are echoing the conclusions of recent literature on corporate governance in business groups in India. Dharmapala and Khanna (2008) find no significant degree of tunneling in Indian business groups post 1999. Siegel and Choudhury (2011) show that business groups place greater emphasis on value addition strategies as compared to stand-alone firms. After controlling for this difference in corporate strategy, Siegel and Choudhury (2011) find that there is no evidence of tunneling in business groups. Our work also confirms that business groups, on average, operate efficiently and tunneling is virtually absent. More importantly, our evidence is based on direct evidence on investment flows, as opposed to the tunneling literature, which relies on indirect evidence (based on the sensitivity of a firms' response to industry shocks) to make inferences about investment decisions. Overall, our results suggest that the business group organizational form helps address issues of power and politics within organizations. Section 2 discusses the framework to develop testable empirical implications. Section 3 discusses the empirical methodology and Section 4 presents the empirical findings. Section 5 concludes.

2 Central Hypotheses

In this article, we examine how power struggles and tunneling incentives affect investment efficiency in business groups. Before developing the central hypotheses of the study, we discuss the various theories of investment efficiency in diversified firms. First, the Efficient Internal Capital Market theory (proposed by Stein (1997)) says that diversification within firms is an off-market solution to address frictions in the market place which prevent transfer of resources from cash-rich firms with poor opportunities to cash-poor firms with good opportunities. Central Headquarters (or the internal capital markets) of diver-

sified firms ensure that resources are transferred from divisions with poor opportunities to divisions with good opportunities.

Rajan et al. (2000) point out that diversification has a dark side to it. If diversity (in the surplus created by different divisions) is high, central headquarters may resort to an ex-ante transfer of resources in the "wrong" direction (investment distortions) to prevent value-eroding investment decisions by divisional managers with excess surplus.[5] On the other hand, if diversity is low, there is no need of investment distortion. Thus, diversity holds the key: diversification based on high levels of diversity is costly, but diversification based on low levels of diversity is beneficial.

While the Efficient Internal Capital Market theory is straightforward and claims that resource allocations are in the "right" direction (from divisions/firms with poor opportunities to divisions/firms with good opportunities), the logic of the Rajan et al. (2000) theory is more nuanced. In their model, divisional managers have ex-post incentives to bargain away surplus created as a result of prior investment decisions made in other divisions. Rajan et al. (2000) refer to the ex-post bargaining as "power struggles", which arise because explicit contracts are incomplete and cannot be used to clearly assign property rights over the surplus. Thus, fearing erosion of their surplus, divisional managers have ex-ante incentives to take up (defensive) investment opportunities that may be less valuable (from the firm's perspective) but offer greater protection against ex-post bargaining of surplus.

Rajan et al. (2000) show that the likelihood of undertaking defensive investments can be increasing in diversity, which is measured by the difference in resource-weighted

[5]Investment distortions need not always occur in the Rajan et al. (2000) model. Sometimes, ex-ante transfers that occur in the "right" direction are consistent with productive investments.

opportunities among divisions in a firm. Headquarters can (ex-ante) align investment incentives of divisional managers by transferring resources from a division with good resource-weighted opportunities to a division with poor resource-weighted opportunities in order to reduce the diversity between divisions, and thereby ensuring that divisional managers prefer a more productive investment rather than a defensive investment. In essence, diversity exacerbates power struggles, and ex-ante investment distortions help avoid power struggles and the associated bad investment decisions.

The main implication of Rajan et al. (2000) model is that investment efficiency (a measure of the directionality of the average transfers in a diversified firm) is decreasing in diversity.[6] On the other hand, the Efficient Internal Capital Market theory suggests that diversity offers a greater option value in transferring resources from firms with poor opportunities to firms with good opportunities, and, therefore, investment efficiency should be increasing in diversity.

The role of diversity varies in these models. Diversity improves investment efficiency in the Efficient Internal Capital Market theory because it increases the option value of transferring resources in the right direction. In the Rajan et al. (2000) theory, diversity at low levels is beneficial but it is detrimental at high levels. When diversity is too high, headquarters resorts to investment distortions (to reduce diversity) in order to avoid worse investment decisions associated with power struggles.[7]

[6]Rajan et al. (2000)'s work is insightful in that they offer a model which explains when diversified firms trade at a discount and when they trade at a premium. This insight into the cross-sectional variation in the diversification discount is useful because many firms trade at a premium. If diversity is too high, investment distortions are necessary to avoid even worse outcomes. Such firms would experience a diversification discount. If diversity is low, investment distortions are not required and such firms would trade at a premium.

[7]In contrast to the Efficient Internal Capital Market theory and the Rajan et al. (2000) model is Scharfstein and Stein (2000)'s theory, which suggests that resources would be transferred from high-q divisions to low-q divisions. Their model implies that diversity has no impact on the investment efficiency.

The key focus of the paper is to tailor the above empirical implications in the context of business groups. As discussed earlier, business groups differ from conglomerates in significant ways. In particular, business groups consist of firms that are distinct legal entities. Unlike divisional conglomerates, group-firms hold exclusive property rights over the surplus they generate. Unlike a conglomerate, where divisional managers may be concerned about other managers lobbying to expropriate surplus generated in her division, CEOs of group-firms can potentially shield their surplus. We conjecture that a business group, as an organizational form, is well-designed to address the problem of power struggles. Investment distortions are less likely to arise because power struggles are mitigated in a business group.

Another key feature of business groups is that they are often family-controlled through extensive direct and indirect share holdings in group-firms. The distribution of cash flow rights of the controlling family in the group-firms may promote investment distortions. Bertrand et al. (2002) find a significant amount of tunneling for Indian business groups. Headquarters may have a preference for moving resources from group-firms where the controlling family holds low cash flow rights to group-firms where it holds high cash flow rights. These investment flows may transfer funds in the "wrong" direction causing investment distortions. This effect can be measured by the variation in cash flow rights across group-firms in a business group. The greater the variation in cash flow rights, the greater is the likelihood of investment distortion because the benefits of distortion increase with variation in cash flow rights. This becomes obvious when we consider the extreme case where there is virtually no variation in cash flow rights of the controlling family across the group-firms within a group. The controlling family's incentive to move resources from a group-firm with low cash flow rights to a group-firm with high cash flow

rights is quite low. As the difference in cash flow rights across group-firms increases, the incentives to tunnel resources increases. In general, the implication is that investment efficiency is decreasing in the variation or diversity of cash flow rights. More importantly, any study of investment efficiency in business groups should simultaneously account for power struggles as well as tunneling incentives.

Most firms within a business group are headed by managers who have close relationships (or are relatives of) the family that created the business group. It is likely that they have an implicit contracting relationship with the founding family.[8] These family ties give rise to relational contracts, which are informal agreements that are self-enforcing due to the nature of family ties. Relational contracting in business groups addresses the lacuna created by rigid and incomplete formal contracting.[9]

It is likely that relational contracting (or informal and implicit contracting) affects tunneling incentives, which are driven by formal and explicit contracts in the form of share holdings. There are no clear cut implications about the role of relational contracting in determining investment efficiency in business groups. It is plausible that relational contracting exacerbates tunneling incentives and business groups with a greater degree of relational contracting experience lower investment efficiency (Managerial Power Hypothesis). On the other hand, one could also argue that relational contracting facilitates higher investment efficiency if the marginal benefits from investment efficiency overshadow the

[8]Encarnation (1989, p. 45), referring to Indian "business houses", emphasizes multiple forms of ties among group members: "In each of these houses, strong social ties of family, caste, religion, language, ethnicity and region reinforced financial and organizational linkages among affiliated enterprises."

[9]Some researchers argue that family relationships help to lower intra group transaction costs by "encouraging information dissemination among group firms, reducing the possibility of contractual disputes, and providing a low-cost mechanism for dispute resolution" Khanna and Palepu (2000b, p. 271). Also, according to Luo and Chung (2005, p. 411) "Compared with total strangers, family ties provide informal norms such as unconditional trust, deference for family authority, and altruism that are particularly valuable for reducing transaction costs when formal market-supporting institutions are lacking."

wealth effects associated with tunneling activities. Recent work by Acharya et al. (2011) suggests that internal governance - the discipline bought about on incumbent top level managers by potential successors within the firm - can mitigate agency problems. Incumbent managers depend on effort by potential successors to improve current cash flows, which affect their wealth. Thus, in their own self-interest, incumbents have to take care of their potential successors and avoid too much expropriation that can hurt future growth and leave potential successors uninterested in putting in the optimal effort. Although Acharya et al. (2011) discuss stand-alone firms in their model, similar governance issues may arise in business group where the controlling family has to worry about not indulging in too much tunneling lest it eats into future growth that potential successors care about. It is easier to enforce internal governance when relational contracts exist because senior incumbent management is more beholden to the interests of potential successors who are likely to be related to the controlling family. According to this line of reasoning, relational contracting should mitigate tunneling. Ultimately though, the role of relational contracting in affecting tunneling incentives is an empirical question that can be addressed only in the data.

To summarize, the central hypotheses of this paper are that (i) investment efficiency is likely to increase with diversity of resource-weighted opportunities), as suggested by the Efficient Internal Capital Market theory rather than decrease with diversity of resource-weighted opportunities, as suggested by the power struggles argument, (ii) investment efficiency should be decreasing in the diversity of cash flow rights held by the controlling family (tunneling incentives), and (iii) the extent of relational contracting in a business group is likely to affect the relationship between investment efficiency and diversity of cash flow rights held by the controlling family.

3 Empirical Analysis

3.1 Data

Our dataset consists of a longitudinal sample of group-firm-years (firms affiliated to the business group) of data. The sample covers 200 listed firms affiliated to 48 business groups for the years 2001-2007; 1400 group-firm years of data and 336 group years of data.

Data was obtained from the Prowess database.[10] Data for 6083 firms belonging to 3868 Indian business groups in the private sector are available in Prowess. Out of which, 1368 firms belonging to 982 groups are listed on the Bombay Stock Exchange or the National Stock Exchange of India Ltd. After removing firms in the financial services sector, observations reduce to 1208 firms belonging to 518 business groups.

We consider only those business groups which have three or more firms affiliated to them. The sample reduces to 728 firms belonging to 173 business groups after removing business groups with fewer than three affiliated firms. After removing firms with unavailable data, the sample size drops to 200 firms belonging to 48 business groups for the years 2000-2008. Year 2000 data is used for calculating beginning of period values for 2001. Hence, the sample consists of 200 firms belonging to 48 business groups for the years 2001-2008, i.e., 1600 group-firm-years of data and 384 group years of data. Year 2008 is removed on account of economic recession. The final sample consists of 1400 group-firm years of data, 336 group years of data for the period 2001-2007.

[10]Prowess is a database product of Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE). A number of studies on Indian industry have used data available from the Prowess database, maintained by CMIE. (see Khanna and Palepu (2000a), Bertrand et al. (2002), Gopalan, Nanda, and Seru (2007), etc.)

Data on 2692 firms not affiliated to any business group were also collected from Prowess. After removing firms with unavailable data, we have 881 standalone firms for the year 2001-2007. These standalone firms are used for forming matching portfolios based on NIC (National Industrial Classification provided by Central Statistical Organization of Ministry of Statistics and Program Implementation of India) Industry classification.

The controlling family's share holding data for firms belonging to business groups is obtained from corporate filing website (The Corporate filing and Dissemination System) where companies provide their shareholding patterns.[11] The data on Managing Directors and Board of Directors of the firms are obtained from annual reports of the firms from INSIGHT database.[12]

3.2 Empirical measures of variables

The following sub-sections define the various measures of variables used in our analysis.

Tobin's q of firm (Firm level)

$$Tobin's\ q = \frac{Total\ Market\ Value\ of\ outstanding\ securities}{Total\ Replacement\ Cost\ of\ Net\ Assets} \tag{1}$$

The above definition of Tobin's q is taken from Lindenberg and Ross (1981). Total market value of outstanding securities is measured as the sum of the market values of its equity, debt and preferred stock. Market value of equity is calculated as the product of a firm's share price at the end of the year and the number of common stock shares outstanding, market value of preferred stock as well as debt is taken at their book values.

[11]The Corporate filing and Dissemination system is a portal developed and maintained by IRIS Business Services Ltd. on behalf of the Bombay Stock Exchange and the National Stock Exchange of India Ltd. This portal aims at providing a single interface to the investors to keep track of the latest filings of all the listed companies in India irrespective of the Stock Exchange.

[12]INSIGHT is a comprehensive India focused research platform maintained by Dion Global Solutions Ltd's Research and Advisory Division. This platform provides access to annual reports and prospectus of companies dating back to 1995 which are stored in a digital format.

Total replacement cost of net assets is taken as book value of the firm's assets minus current liabilities. The denominator measures the firm's funded investment in fixed assets plus net working capital. We do not calculate the replacement cost of assets as suggested in Lindenberg and Ross (1981) but assume that it equals the book value of assets minus current liabilities.[13] Tobin's q proxies for growth (investment) opportunities[14] for a firm in a business group. Beginning of period values are calculated as end of the previous year values.

Adjusted Investment in firm (Firm level)

$$T_j = I_j/BA_j - I_j^{ss}/BA_j^{ss} - \sum_{j=1}^{n} w_j(I_j/BA_j - I_j^{ss}/BA_j^{ss}) \tag{2}$$

where ss refers to standalone firms belonging to the same 3 digit NIC code as the affiliated firm (a portfolio of at least 3 stand alone firms is considered), w_j is the firm j's share of total group sales; BA_j is the beginning of period assets of firm j, n is number of firms in a group, I_j is the capital expenditure of firm j for the year. (For example $CAPEX\,2007 = Net\,Fixed\,assets\,2007 - Net\,Fixed\,assets\,2006 + Depreciation\,2007$).

The above definition follows that in Rajan et al. (2000). Adjusted Investment in a firm is an indirect measure of the funds transferred to/from a firm in a business group. As in the Rajan et al. (2000) model, all the transfers made/received correspond to a decrease/increase in investments. Just like the Rajan et al. (2000)'s model, the difference between the investment ratio of a group-affiliated firm and the weighted investment ratio

[13]Lindenberg and Ross (1981) algorithm is too complex and cumbersome to be calculated based on the information available from the CMIE database. The advantage of assuming the replacement cost of net assets as book value of assets minus current liabilities is the ease of computation and the anticipated larger sample size.

[14]The Tobin's q theory of investments posits that the firm's investment is a function of its marginal q defined as the ratio of the market value of the new additional investments to their replacement costs. However, the marginal q which the theory relates to the firm's investment is not observable or measurable. The average Tobin's q calculated is assumed equal to the marginal Tobin's q, which is true under restrictive set of assumptions such as perfect competition and constant returns to scale (Hayashi (1982)).

of a portfolio of similar industry (based on 3 digit NIC code) standalone firms represents a measure for transfers made (if negative) or received (if positive) within the group. This proxy of transfer is denoted as industry adjusted transfer measure.

Diversified Business groups might have superior access to capital and more funds overall, perhaps because they have better access to foreign capital. For example, Khanna and Palepu (2000a) test and confirm that groups have better access to foreign capital.

Since, diversified business groups have better access to capital, the industry adjusted transfer measure calculated as above might not correctly calculate the transfer between group-firms (as also suggested by Rajan et al. (2000)). To correct for this, a group-adjustment measure (calculated as the investment ratio adjusted for industry averaged across the group-firms) is subtracted from the group-firm's industry-adjusted transfer measure. This industry and group adjusted investment ratio, referred to as the adjusted investment ratio, is a proxy for the transfers the firms in a group make (if negative) or receive (if positive) to other firms in the same group.

Cash Flow Rights (Firm level)

Public firms report their shareholding pattern and provide the percentage shareholdings of the promoters of the firm. Promoters are the firms' founders and essentially the controlling family. Cash Flow Rights is measured as the percentage of the promoter holdings in a group-firm. A group average is calculated and if a firm's promoter holding is less (more) than its group average; group-firm is said to have low (high) cash flow rights.

4 Empirical Findings

4.1 Descriptive Statistics of the variables

Table I provides the summary statistics of the variables under study. Table I shows that the mean and the median values of Tobin's q of group-firm for a sample of 1400 group-firm-years of data are 1.366 and 0.8783 respectively. A higher Tobin's q (> 1) is a reflection of higher future growth opportunities. The mean and the median values of Group average Tobin's q (which is calculated as weighted average of Tobin's q of all firms in a business group, where the weights are the share of sales of group-firm to the total group sales) for a sample of 336 group-years of data are 1.2958 and 0.9651 respectively. The average growth opportunity of a group-firm is higher than that of a group average.

The mean and the median values of adjusted investments in group-firms for a sample of 1400 group-firm years of data are -0.0040 and -0.0071 respectively. To probe further, our sample of 1400 group-firm years of data is classified into four sets depending on growth opportunities (q) of group-firm being greater or less than group average growth opportunities (q_{bar}) and cash flow rights (CFR) being greater or less than group average cash flow rights (CFR_{bar}). The values of adjusted investments is recomputed for the four sets as a weighted average of adjusted investment for firms of a group belonging to a particular set and is set to zero if there are no firms in a particular set. Table I shows that the mean and the median values of adjusted investments in the set where $q < q_{bar}$ and $CFR < CFR_{bar}$ are negative (-0.0242 and -0.0070 respectively). For other sets, values are positive.

The sample of 1400 group-firm years of data is also classified into sets depending on growth opportunities (Tobin's q) being greater or less than group average growth op-

portunities (q_{bar}) and resource-weighted growth opportunities (λq) being greater or less than group average resource-weighted growth opportunities (λq_{bar}). We find that the mean value of adjusted investments is positive for the sets where growth opportunities of group-firms is greater than a group average and negative for the sets where growth opportunities of group-firms is less than a group average.

Diversity in resource-weighted opportunities which captures the dispersion in resources and opportunities across group-firms has a mean value of 0.3310 and median value of 0.2446. The mean and the median value of cash flow rights for a sample of 1400 group-firm years of data are 45.96% and 45.54% respectively showing that business groups have concentrated ownership structure. The diversity in cash flow rights which captures the coefficient of variation of cash flow rights has a mean value of 0.3445 and median value of 0.2813. Group size is calculated as logarithm (base e) of sum of sales of all firms in a business group and has a mean value of 7.0552 and median value of 7.1202. The number of affiliate firms in a business group for our sample are 4.1667 on average and 3 as a median value. All variables are winsorized at 1% and 99% percentiles of their distribution to avoid potential problems with outliers.

4.2 Allocation of funds in a Business group

For testing the Efficient Internal Capital Market Hypothesis, our sample of 1400 group-firm years of data is divided into two sub samples based on the average growth opportunities ($q > q_{bar}$ and $q < q_{bar}$) of the group-firms.[15] A univariate test (difference in means t-test) is performed to find if investments in the two sub samples are different and as per Efficient Internal Capital Market Hypothesis. Table II Panel A1 shows that diver-

[15]Group average growth opportunities is calculated as weighted average of Tobin's q of all firms in a business group, where the weights are the share of sales of group-firm to total group sales.

sified business groups invest more in group-firms with good growth opportunities than in group-firms with poor growth opportunities. We also find that funds are channelled away from the group-firms with low growth opportunities. (0.00837 versus -0.01287, difference is significant at 1% level, t statistic of 3.85 with t critical being 1.64. We also tested the difference in the medians and found it to be significantly different at 1% level using Wilcoxon-Signed Rank test.). This is in accordance with Efficient Internal Market Hypothesis which predicts that diversified business groups should transfer funds to group-firms with good growth opportunities.

Rajan et al. (2000)'s model predicts that investment flows might be distorted to mitigate power struggles between group-firm managers. In order to reduce power struggles, funds may be transferred from group-firms with high resource-weighted growth opportunities to group-firms with low resource-weighted growth opportunities. In order to test Rajan et al. (2000)'s Hypothesis, our sample of 1400 group-firm years of data is divided into two sub samples based on group average resource-weighted opportunities ($\lambda q > \lambda q_{bar}$ and $\lambda q < \lambda q_{bar}$). Table II, Panel A2 shows that the adjusted investment is not different for the two sub samples. (0.0005 versus -0.0054, difference is not significant at 10% level, t statistic of 0.9919 with t critical being 1.64. We also tested the difference in the medians and found it to be not significant at 10% level using Wilcoxon-Signed Rank test). Allocation of funds does not depend on resource-weighted growth opportunities. This result indicates that power struggles are less important in business groups.

The tunneling hypothesis suggests that controlling family can move resources from group-firms where it holds low cash flow rights to group-firms where it holds high cash flow rights. Table II Panel A3 divides the sample based on high (higher than a group average) and low (lower than a group average) cash flow rights holding of the controlling

family. The results show that there is more allocation of funds to group-firms where controlling-family holds high cash flow rights. We also find evidence of channelling of funds away from group-firms where controlling family holds low cash flow rights. (0.0095 versus -0.0159, difference is significant at 1% level, t statistic of 4.64 with t critical being 1.64. We also tested the difference in the medians and found it to be significantly different at 1% level using Wilcoxon-Signed Rank test.) Unlike the indirect evidence of tunneling in Bertrand et al. (2002)[16], our test provides a direct evidence of tunneling by analyzing investment flows.

We conclude from our univariate data analysis that investment decisions are as per Efficient Internal Capital Market Hypothesis. The investment distortions as per power struggles (Rajan et al. (2000)'s model) are not present. However, investment distortions in the form of tunneling of resources are present. There is evidence of tunneling of funds from group-firms where controlling-family holds low cash flow rights to group-firms where controlling-family holds high cash flow rights.

4.3 Investment Flows and Diversity in resource-weighted opportunities

Efficient Internal Capital Market Hypothesis suggests that "Central Headquarters" will reallocate funds from firms/divisions with low growth opportunities to firms/divisions with high growth opportunities and this reallocation will increase with an increase in diversity in resource-weighted opportunities among firms/divisions (because of the option value associated with the allocation). On the other hand, Rajan et al. (2000)'s model

[16]Bertrand et al. (2002) methodology tests the tunneling hypotheses by analyzing the propagation of earnings shocks across firms within a group.

predicts that an increase in diversity in resource-weighted opportunities will increase the investment flows from firms/divisions that have resource-weighted opportunities above the group/firm average and an increase in investment flows to the firms/divisions that have resource-weighted opportunities below the group/firm average. Investment flows might be in the "wrong" direction to improve the incentives of the firm/division to make appropriate investments by mitigating power struggles between managers of the firm/division. We would like to test the above predictions for our sample of group-firms. The distinct legal status of business group-firms mitigates the problem of power struggles among managers of group-firms by establishing property rights over the surplus the group-firms generate. We hypothesize that investment incentives of the group-firms are in place and allocation of funds should be in "right" direction and increase with diversity in resource-weighted opportunities as per Efficient Internal Capital Market Hypothesis.

We divide our sample of 1400 group-firm years of data into four sets depending on growth opportunities (Tobin's q) being greater or less than group average growth opportunities (q_{bar}) and resource-weighted growth opportunities (λq) being greater or less than group average resource-weighted growth opportunities (λq_{bar}). For each set, we recompute a measure of adjusted investment. We calculate the adjusted investment ratios for each year for group-firms that fall in the particular set. We calculate a weighted average of adjusted investment for all group-firms of a particular group belonging to a particular set. If a set has no group-firms from a particular group, the adjusted investment of group in the particular set is set to zero. The dependent variable is the adjusted investment measure calculated for each group-year for firms in the particular set.

To test the effect of diversity in resource-weighted opportunities on the adjusted

investment in group-firms, panel data fixed effects regressions are performed.[17] The dependent variable is adjusted investment and independent variables are diversity in resource-weighted opportunities with controls for group size, total productivity ($invqbar$, the inverse of group average Tobin's q) and group diversification. Diversity in resource-weighted opportunities is calculated as the ratio of the deviation in resource-weighted opportunities in a group to the average q in a group.

$$Diversity\,in\,resource-weighted\,q = \frac{\sqrt{\sum_{j=1}^{n} \frac{(w_j q_j - (wq)_{bar})^2}{n-1}}}{\frac{\sum_{j=1}^{n} q_j}{n}} \tag{3}$$

where $(wq)_{bar}$ is the sales weighted average q for the group. This measure of diversity captures the dispersion of resources and opportunities across affiliated firms in a group.

One of the control variables is corporate diversification. We follow Jacquemin and Berry (1979) proposed Entropy measure of corporate diversification. We consider a group of firms operating in n industries (4 digit NIC code). Let P_i be the share of ith industry firm in the total sales of the group. Then,

$$Entropy\,Measure\,of\,Total\,Diversification = \sum_{i=1}^{n} P_i Ln(\frac{1}{P_i}) \tag{4}$$

The Entropy measure, takes into account the number of industry firms in which the group operates and the relative importance of each of the industry firm in the total sales of the group. We also measure corporate diversification based on Herfindahl Index of diversification (Jacquemin and Berry (1979)).

[17]Panel data fixed effects regression solves for omitted variable bias when the omitted variables are constant over time such as organizational culture, organizational strategy, etc., hence controlling for unobserved heterogeneity constant over time. The estimator for fixed effects panel data regression is the within estimator.

In our panel data fixed effects regression, we include group effects and time effects. We also correct for heteroskedasticity and serial autocorrelation.

Table III , Panels A and B show that the average adjusted investment increases with diversity in resource-weighted opportunities for the subset where growth opportunities (q) is greater than group average growth opportunities (q_{bar}) and resource-weighted growth opportunities (λq) is greater than a group average (λq_{bar}). (A one standard deviation increase in diversity in resource-weighted opportunities increases adjusted investment in the particular set ($q > q_{bar}$, $\lambda q > \lambda q_{bar}$) by 142.24%). The effect is significant even after controlling for corporate diversification.[18] We also find that the adjusted investment decreases with diversity in resource-weighted opportunities for the subsets of group-firms where growth opportunities (q) is less than group average growth opportunities (q_{bar}) and resource-weighted growth opportunities (λq) is greater than a group average (λq_{bar}) and less than a group average. The results are as per Efficient Internal Capital Market theory which states that adjusted investment in the particular set (where growth opportunities is greater than a group average) increases with diversity in resource-weighted opportunities[19] (and adjusted investment in the particular set where growth opportunities is less than a group average) decreases with diversity in resource-weighted opportunities due to option value associated with the allocation. After controlling for group level corporate diversification, we find that the the estimated coefficient on diversity has the sign predicted by the Efficient Internal Capital Market model (the coefficient is statistically different from zero for three of the sub-sets, $q > q_{bar}$, $\lambda q > \lambda q_{bar}$ at 5%, $q < q_{bar}$, $\lambda q > \lambda q_{bar}$ and

[18]Table shows the result with Entropy measure of diversification. We also use Herfindahl measure of diversification and find similar results. We also use diversity in cash flow rights as additional control variable and find similar results.

[19]Strictly, EICM refers to the dispersion in investment opportunities and we run tests using diversity in investment opportunities as the measure of diversity and find similar results for the first set. Results can be made available on request.

$q < q_{bar}$, $\lambda q < \lambda q_{bar}$ at 10%). Investments in group-firms with high (low) growth opportunities increases (decreases) with diversity in resource-weighted opportunities. [20]). Our results suggest evidence consistent with the Efficient Internal Capital Markets Hypothesis. We find some evidence of power struggles, but even that evidence is not clinching because it is also consistent with the Efficient Internal Capital Markets Hypothesis.

4.4 Investment Flows and Diversity in Cash Flow Rights

The Tunneling Hypothesis suggests that investments flow from group-firms where controlling family holds low cash flow rights to group-firms where controlling family holds high cash flow rights. We conjecture that such investment flows will increase with an increase in diversity in cash flow rights. This is because the controlling family gains more by diverting resources for private benefits while at the same time bearing a smaller proportion of the financial consequence of such expropriation if there is greater diversity in cash flow rights. On the other hand, Efficient Internal Capital Market Hypothesis will suggest that investment flows will not depend on diversity in cash flow rights.

In order to test the above hypotheses, our sample of 1400 group-firm years of data is divided into four sets depending on growth opportunities (q) being greater or less than group average growth opportunities (q_{bar}) and cash flow rights (CFR) being greater or less than group average cash flow rights (CFR_{bar}). For each set, a measure of adjusted investment is recomputed. For each group year, we compute the adjusted investment ratios for group-firms that fall in the particular set. We calculate a weighted average of adjusted investment for all group-firms of a particular group belonging to a particular set. If a set has no group-firms from a particular group, the adjusted investment of group in the particular set is set to zero. The dependent variable is the adjusted investment

[20]This effect is not significant only for the sub-set where resource-weighted opportunities is less than a group average and growth opportunities greater than group average.

measure calculated for each group-year for firms in the particular set.

To test the effect of diversity in cash flow rights on the adjusted investment in group-firms, panel data fixed effects regressions are performed with diversity in cash flow rights as the independent variable with controls for group size, total productivity ($invqbar$), the inverse of group average Tobin's q) and corporate diversification. Diversity in cash flow rights is measured as the coefficient of variation of controlling family's percentage shareholdings in group-firms.

$$Diversity\,in\,CFR = \frac{\sqrt{\sum_{j=1}^{n} \frac{(CFR_j - (CFR)_{bar})^2}{n-1}}}{\frac{\sum_{j=1}^{n} CFR_j}{n}} \tag{5}$$

where $(CFR)_{bar}$ is the average CFR for the group, j is a group-firm. Diversity in cash flow rights measures the dispersion in promoter shareholdings across a business group.

In our panel data fixed effects regression, we include group effects and time effects. We also correct for heteroskedasticity and serial autocorrelation.

Table IV, Panels A and B show that the average adjusted investment increases with diversity in cash flow rights for the subset of group-firms (with lower degree of relational contracting) where growth opportunities (q) is less than group average growth opportunities (q_{bar}) and cash flow rights (CFR) is greater than group average cash flow rights (CFR_{bar}). (A one standard deviation increase in diversity in cash flow rights increases adjusted investment in the particular set ($q > q_{bar}$, $CFR > CFR_{bar}$ and groups with lower relational contracts) by 14.5 times). Diversity in cash flow rights has the effect of increasing investments in group-firms with above average cash flow rights (and below average growth opportunities) and decreasing investments in group-firms with below av-

erage cash flow rights (and below average growth opportunities).[21] This result suggests the presence of tunneling in a segment of group-firms where investment opportunities (q) is less than group average investment opportunities (q_{bar}). The effect is significant even after controlling for corporate diversification.[22]

We also test the role of relational contracting in business groups. Degree of relational contracting is calculated as the ratio of group-firms in a business group for which member of the controlling family is the CEO/Managing Director of the firm.
The relation between the managing director/CEO and the promoting (controlling) family is collected from the Corporate Governance report in the annual reports of group-firms. A median value of the measure of relational contracting is calculated for all groups in our sample. Groups are classified into having higher degree of relational contracting (if the measure for the group is above median) and lower degree of relational contracting (if the measure for the group is below median).

We like to test if relational contracting mitigates tunneling incentives or exacerbates such incentives. Table IV, Panels A and B show that the tunneling effect is mitigated in the presence of higher degree of relational contracting. (A one standard deviation increase in diversity in cash flow rights decreases adjusted investment in the particular set ($q > q_{bar}$, $CFR > CFR_{bar}$ and with higher degree of relational contracts) by 11.98 times).

[21] We also find that the adjusted investment decreases for the sub-set where investment opportunities (q) is less than group average investment opportunities (q_{bar}) and cash flow rights (CFR) is less than group average cash flow rights (CFR_{bar}) (A one standard deviation increase in diversity in cash flow rights decreases adjusted investment in the particular set ($q > q_{bar}$, $CFR < CFR_{bar}$ and groups with lower relational contracts) by around 8 times, though statistically significant at 10% level. This regression analysis is done after removing the control for the inverse of group average investment opportunities, the coefficient on diversity in cash flow rights is -0.0712 and significant at 10% level with and without controlling for diversification.

[22] Table shows the result with entropy measure of diversification. We also use Herfindahl measure of diversification and find similar results. We also control for diversity in resource-weighted opportunities as additional control and find similar results.

Thus, we find that for a segment of group-firms, which have lower growth opportunities and where controlling-family holds high cash flow rights, investment flows are increasing in diversity in cash flow rights held by the controlling family.[23] The marginal impact of tunneling incentives (diversity in cash flow rights) is mitigated in the presence of relational contracts. This evidence supports the internal governance arguments put forth in Acharya et al. (2011) that incumbent management is disciplined by the interests of potential successors in the controlling family. The evidence is inconsistent with the Managerial Power Hypothesis, which argues that closer family ties will lead to greater tunneling. For other segments of firms, the coefficient on diversity in cash flow rights is insignificant. For these group-firms, the Efficient Internal Capital Market Hypothesis, which has no prediction on the relationship between investment flows and diversity in cash flow rights.

4.5 Investment Efficiency

In order to test the effect of diversity in resource-weighted opportunities on the efficiency of internal allocation of funds, panel data fixed effects regressions are performed which controls for unobserved heterogeneity constant over time. For each group year, efficiency of allocation of funds is calculated, which is measured as the weighted sum of the measure of the industry adjusted investment of all firms in a business group, with the weight being the difference between group firms' Tobin's q and 1. The measure of efficiency follows that in Rajan et al. (2000).

[23] We also find that investment flows are decreasing with diversity in cash flow rights for segment of group-firms which have lower growth opportunities and where controlling-family holds low cash flow rights.

$$AVA = \frac{\sum_{j=1}^{n} BA_j(q_j - 1)(I_j/BA_j - I_j^{ss}/BA_j^{ss})}{BA} \tag{6}$$

where j is the group-firm and ss is standalone firm belonging to the same 3 digit NIC code as the affiliated firm j.

The dependent variable is our efficiency measure (AVA). The explanatory variables are diversity in resource-weighted opportunities and diversity in cash flow rights. We control for group size and total group productivity. We include group effects, time effects and correct for heteroskedasticity and serial autocorrelation.

Table V Panel A1 shows that the efficiency of allocation of funds increases with increase in diversity in resource-weighted opportunities. (A one standard deviation increase in diversity in resource-weighted opportunities increases AVA by 185.5%). Table V Panel A2 shows that the positive effect of diversity in resource-weighted opportunities on efficiency remains even if we control for diversity in cash flow rights. Allocative efficiency does not increase or decrease with diversity in cash flow rights for a business group. Table V Panel A3 controls for corporate diversification and finds that the above results still hold.

We find that at the group level, power struggles and tunneling incentives are swamped by efficient decision making in groups, and overall business group investment decisions are efficient.

4.6 Excess Value and Investment Efficiency

In order to understand how market values the efficiency of allocation of funds in a business group over and above a matched portfolio of standalone firms, panel data fixed effects regressions are performed with Excess Value as dependent variable. Excess Value is a measure of the relative value of firms in a business group as compared to a portfolio of standalone firms.

$$EV = Ln(\frac{\sum_{j=1}^{n}(\frac{MV}{S})\frac{S_j}{S}}{\sum_{j=1}^{n}(\frac{MV}{S})_j\frac{S_j}{S}}) \tag{7}$$

The portfolio of standalone firms is matched based on the same three digit NIC Code of the firm in the business group. MV is the end of the year market value of assets of the firm, S is the sales of the firm, $(\frac{MV}{S})_j$ is the sales weighted median market to sales ratio of a portfolio of standalone firms in the same three digit NIC industry as firm j. The above valuation approach follows that in Berger and Ofek (1995) and in Rajan et al. (2000).

The independent variable for our study is Efficiency (AVA) and group size is the control variable. We include group effects and time effects. We correct for heteroskedasticity and serial autocorrelation. Table VI shows that excess value increases with efficiency of allocation of funds. (A one standard deviation increase in AVA increases efficiency by 10.2%). The result suggests that the value of a business group (over a matched portfolio of standalone firms) increases with increase in efficient internal capital market.

4.7 Excess Value and Diversity Effects

The effect of diversity on excess value of the group is tested directly. Table VII gives us the result of the fixed effects panel data regression with excess value as dependent variable. We include time effects, group effects and correct for heteroskedasticity and serial autocorrelation.

Table VII Panel A1 shows that excess value of the group increases with increase in diversity in resource weighted opportunities. (A one standard deviation increase in diversity in resource-weighted opportunities increases excess value by 17.72%). The positive effect of diversity in resource-weighted opportunities remains even if we control for diversity in cash flow rights as shown in Table VII; Panels A2 and corporate diversification as shown in Table VII; Panel A3. The results suggest that the value of a business group (over a matched portfolio of standalone firms) increases with increase in dispersion in resources and opportunities across group-firms. We also find that the coefficient on diversity in cash flow rights is insignificant. Furthermore, the degree of relational contracting also does not seem to influence excess value. These overall findings suggest that, at the group, level, investment flows are largely consistent with the Efficient Internal Capital Markets Hypothesis and power struggles and tunneling effects are virtually absent.

5 Conclusion

This study is an attempt to understand the investment policy of diversified business groups in India. In contrast to diversified conglomerates in the U.S., Indian business groups avoid investment distortions due to power struggles and do not suffer from investment distortions caused by power struggles. Even after controlling for tunneling incentives, we find that business groups tend to direct resources from less productive

group-firms to more productive group-firms.

At the firm level, we find that investment flows are consistent with the Efficient Internal Capital Markets Hypothesis and there is no evidence of investment distortions due to power struggles. We also find that investment flow (in the "right direction") increases with diversity in resource-weighted opportunities among those group-firms that have high resources attached to them, suggesting that the allocation of resources is consistent with the Efficient Internal Capital Markets Hypothesis in situations where it matters more.

Investments tend to flow from group-firms where the controlling family holds low cash flow rights to firms where the controlling family holds high cash flow rights. This evidence suggests the presence of tunneling. However, we find that it is only in the group-firms with low growth opportunities (and where controlling family holds high cash flow rights) that investment flows are related to diversity in cash flow rights. Where it matters more (in group-firms with high growth opportunities), investment decision making in business groups is unrelated to diversity in cash flow rights, consistent with the Efficient Internal Capital Markets Hypothesis. We also find that the presence of relational contracts in business groups mitigates the adverse effects of tunneling incentives, consistent with the internal governance argument in Acharya et al. (2011).

Overall at the group level, our results suggest that investment distortions due to power struggles and tunneling are swamped by efficiency considerations, and investment decisions in diversified business groups are largely consistent with Efficient Internal Capital Markets Hypothesis. These findings suggest that the organization structure of business groups plays a key role in resolving power conflicts in diversified firms and ensuring investment efficiency and success of business groups.

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Tables

Table I: Summary Statistics

Tobin's q of a group-firm is defined as market value of outstanding securities to replacement cost of net assets. Market value of outstanding securities is sum of market value of equity calculated as product of firm's share price and number of common stock shares outstanding, market value of preferred stock taken as book value and market value of debt taken as book value of debt. The replacement cost of assets is taken as book value of total assets minus the current liabilities. Tobin's q for the year is calculated as beginning period Tobin's q. Adjusted Investment in firm is calculated as $T_j = I_j/BA_j - I_j^{ss}/BA_j^{ss} - \sum_{j=1}^{n} w_j(I_j/BA_j - I_j^{ss}/BA_j^{ss})$ where ss refers to standalone firms belonging to the same 3 digit NIC code as the affiliated firm (atleast a portfolio of 3 standalone firms should be present), w_j is the firms j's share of total group sales; BA_j is the beginning of period assets of firm j, n is number of firms in a group, I_j is the capital expenditure of firm j for the year. Group average Tobin's q is calculated as the weighted average of Tobin's q of firms in a business group. Value added by allocation (absolute) is calculated as $AVA = \frac{\sum_{j=1}^{n} BA_j(q_j-1)(I_j/BA_j - I_j^{ss}/BA_j^{ss})}{BA}$ where j=1 to n is firms in the business group and ss is standalone firm belonging to same 3 digit NIC code as the affiliated firm j. Diversity in resource weighted opportunities is calculated as $Diversity\,in\,resource-weighted\,q = \frac{\sqrt{\sum_{j=1}^{n} \frac{(w_j q_j - (wq)_{bar})^2}{n-1}}}{\frac{\sum_{j=1}^{n} q_j}{n}}$ where $(wq)_{bar}$ is the sales weighted average q for the group. $j = 1$ to n are the firms in the group. Entropy measure is also a measure of corporate diversification calculated as $DT = \sum_{i=1}^{n} P_i Ln(\frac{1}{P_i})$ where n is an industry firm defined at 4 digit NIC code and P_i be the share of ith firm in the total sales of the group. Group size is calculated as logarithm base e of sum of sales of all firms in the business group. Excess value is calculated as $EV = Ln(\frac{\sum_{j=1}^{n}(\frac{MV}{S})\frac{S_j}{S}}{\sum_{j=1}^{n}(\frac{MV}{S})_j\frac{S_j}{S}})$ where j=1 to n is the firms in the business group. MV is the end of the year market value of assets of the firm, S is the sales of the firm, $(\frac{MV}{S})_j$ is the sales weighted median market to sales ratio of portfolio of standalone firms in the same three digit NIC industry as firm j. Inverse of q_{bar} is calculated as inverse of Group average Tobin's q. Cash flow rights is the total percentage shareholding of controlling family in the group firms. Diversity in Cash Flow Rights is the coefficient of variation of cash flow rights in a business group. Group firms having higher degree of relational contracting are those where member of the founding family is the CEO/Managing Director of the firm. For a business group, we calculate the ratio of group-firms for which the above condition holds as mentioned above. This ratio is our measure of degree of relational contracting. All data are for years 2001 to 2007.

Variable	**Mean**	**Median**	**Standard deviation**	**N**
Tobin's q of group-firm	1.3660	0.8783	1.3528	1400
Adjusted investments in group-firms	-0.0040	-0.0071	0.1010	1400
Above group's average q and above group's average CFR	0.0120	0.0000	0.0945	336
Below group's average q but above group's average CFR	0.0017	0.0000	0.0688	336
Above group's average q but below group's average CFR	0.0009	0.0000	0.0677	336
Below group's average q and below group's average CFR	-0.0242	-0.0070	0.0845	336
Above group's average q and above group's average λq	0.0085	0.0000	0.0622	336
Above group's average q but below group's average λq	0.0042	0.0000	0.0826	336
Below group's average q but above group's average λq	-0.0082	0.0000	0.0392	336
Below group's average q and below group's average λq	-0.0088	-0.0012	0.0771	336
Group average Tobin's q	1.2958	0.9651	0.9937	336
Value added by allocation (absolute)	0.0381	0.0051	0.1477	336
Diversity in resource-weighted opportunities	0.3310	0.2446	0.3082	336
Entropy measure of Diversification	0.6700	0.6812	0.3892	336
Number of firms in a group	4.1667	3.0000	2.2876	336
Group size as Ln(Group Sales)	7.0552	7.1202	1.1724	336
Excess Value	0.8973	0.8394	0.7076	336
Inverse of q_{bar}	1.1091	1.0013	0.7471	336
Cash Flow rights	45.9568	45.5400	16.9680	1400
Diversity in Cash Flow Rights	0.3445	0.2813	0.2826	336
Degree of Relational Contracting	0.5188	0.6000	0.4024	336

Table II: Allocation of funds in a Business group

Tobin's q of the group-firm is denoted as q. Tobin's q of a group-firm is defined as market value of outstanding securities to replacement cost of net assets. Market value of outstanding securities is sum of market value of equity calculated as product of firm's share price and number of common stock shares outstanding, market value of preferred stock taken as book value and market value of debt taken as book value of debt. The replacement cost of assets is taken as book value of total assets minus the current liabilities. q_{bar} is the sales weighted group average of Tobin's q. λq is the asset weighted q's of the firm and λq_{bar} is the sales weighted group average of asset weighted q. Adjusted Investment in group-firm is calculated as $T_j = I_j/BA_j - I_j^{ss}/BA_j^{ss} - \sum_{j=1}^{n} w_j(I_j/BA_j - I_j^{ss}/BA_j^{ss})$ where ss refers to standalone firms belonging to the same 3 digit NIC code as the affiliated firm (a portfolio of atleast 3 standalone firms should be present), w_j is the firms $j's$ share of total group sales; BA_j is the beginning of period assets of firm j, n is number of firms in a group, I_j is the capital expenditure of firm j for the year. Group-firms having high cash flow rights are those where controlling family have higher percentage shareholding in the firm than their group average and low when they have lower shareholding than their group average. All data is for the year 2001-2007. The unit of analysis is group-firm. The values are the mean values of adjusted investment and difference are difference in mean values.

Panel A1 : Sub-samples based on growth opportunities			
Funds Allocated	**Firms with $q > q_{bar}$**	**Firms with $q < q_{bar}$**	**Difference**
Adjusted Investment in firms	0.00837	-0.01287	0.02124*** [3.8515]
Number of firms	584	816	

Panel A2 : Sub-samples based on resource-weighted growth opportunities			
Funds Allocated	**Firms with $\lambda q > \lambda q_{bar}$**	**Firms with $\lambda q < \lambda q_{bar}$**	**Difference**
Adjusted Investment in firms	0.0005	-0.0054	0.0059 [0.9919]
Number of firms	331	1069	

Panel A3 : Sub-samples based on Cash Flow rights (CFR)			
Funds Allocated	**High CFR Firms**	**Low CFR Firms**	**Difference**
Adjusted Investment in firms	0.0095	-0.0159	0.0253*** [4.6417]
Number of firms	656	744	

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics

Table III: Investment Flows and Diversity in resource-weighted opportunities

Adjusted Investment in group-firm is calculated as $T_j = I_j/BA_j - I_j^{ss}/BA_j^{ss} - \sum_{j=1}^{n} w_j(I_j/BA_j - I_j^{ss}/BA_j^{ss})$ where ss refers to standalone firms belonging to the same 3 digit NIC code as the affiliated firm (atleast a portfolio of 3 standalone firms should be present), w_j is the firms j's share of total group sales; BA_j is the beginning of period assets of firm j, n is number of firms in a group, I_j is the capital expenditure of firm j for the year. Group-firms are classified into four sets based on q (investment opportunities of group-firm) greater or less than group average q_{bar} (average investment opportunities of a group) and asset weighted q of firm greater or less than that of a group average. For each set and for each group year, adjusted investment is calculated as adjusted investment weighted average of firms in the set and is zero if there is no firm in a particular set. This Adjusted Investment is the dependent variable. Diversity in weighted opportunities is calculated as $Diversity in resource-weighted\, q = \frac{\sqrt{\sum_{j=1}^{n} \frac{(w_j q_j - (wq)_{bar})^2}{n-1}}}{\frac{\sum_{j=1}^{n} q_j}{n}}$ where $(wq)_{bar}$ is the sales weighted average q for the group, $j = 1$ to n are the firms in the group. Inverse of q_{bar} is calculated as inverse of Group average Tobin's q. Group size is calculated as logarithm base e of sum of sales of all firms in the business group. Entropy measure is a measure of corporate diversification calculated as $DT = \sum_{i=1}^{n} P_i Ln(\frac{1}{P_i})$ where n is an industry firm defined at 4 digit NIC code and P_i be the share of ith firm in the total sales of the group. The sample period is 2001-2007.

	Adjusted Investment in firms with			
	$q > q_{bar}$ $\lambda q > \lambda q_{bar}$	$q > q_{bar}$ $\lambda q < \lambda q_{bar}$	$q < q_{bar}$ $\lambda q > \lambda q_{bar}$	$q < q_{bar}$ $\lambda q < \lambda q_{bar}$
Panel A : Basic Specification				
Diversity in resource-weighted opportunities	.0392292** [2.08]	-.0056853 [-0.27]	-.0171098* [-1.73]	-.0498583* [-1.79]
Inverse of average q	-.0131711* [-1.72]	-.0046695 [-0.51]	.0109113*** [2.79]	.0153424* [1.68]
Group Size	-.0202529 [-1.02]	-.0726195*** [-3.14]	.0153858 [1.55]	.0000926 [0.01]
R^2	0.2440	0.1876	0.2610	0.2650
N	336	336	336	336
Panel B : Effect of Diversification (Entropy)				
Diversity in resource-weighted opportunities	.0425261** [2.20]	-.0024742 [-0.11]	-.0192475* [-1.92]	-.0535425* [-1.91]
Entropy	.0558915 [1.15]	.0544375 [0.62]	-.0362403 [-1.50]	-.0624577 [-0.82]
Inverse of average q	-.0140747* [-1.83]	-.0055496 [-0.60]	.0114972*** [2.87]	.0163522* [1.79]
Group Size	-.0198661 [-0.98]	-.0722428*** [-3.16]	.015135 [1.53]	-.0003396 [-0.02]
R^2	0.2465	0.1889	0.2636	0.2670
N	336	336	336	336

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics

Table IV: Investment Flows and Diversity in Cash Flow Rights

Adjusted Investment in group-firm is calculated as $T_j = I_j/BA_j - I_j^{ss}/BA_j^{ss} - \sum_{j=1}^{n} w_j(I_j/BA_j - I_j^{ss}/BA_j^{ss})$ where ss refers to standalone firms belonging to the same 3 digit NIC code as the affiliated firm (atleast a portfolio of 3 standalone firms should be present), w_j is the firms j's share of total group sales; BA_j is the beginning of period assets of firm j, n is number of firms in a group, I_j is the capital expenditure of firm j for the year. Group-firms are classified into four sets based on q (investment opportunities of group-firm) greater or less than group average q_{bar} (average investment opportunities of a group) and cash flow rights (CFR) of group-firm greater or less than that of a group average (CFR_{bar}). For each set and for each group year, adjusted investment is calculated as adjusted investment weighted average of firms in the set and is zero if there is no firm in a particular set. This Adjusted Investment is the dependent variable. Diversity in cash flow rights is calculated as the coefficient of variation of cash flow rights (total percentage ownership of group-firms) for a business group. The degree of relational contracting is a dummy variable. The value is 1 if the groups have higher (higher than all groups median value) degree of relational contracting and 0 if lower (lower than all groups median value) degree of relational contracting. Inverse of q_{bar} is calculated as inverse of Group average Tobin's q. Group size is calculated as logarithm base e of sum of sales of all firms in the business group. Entropy measure is a measure of corporate diversification calculated as $DT = \sum_{i=1}^{n} P_i Ln(\frac{1}{P_i})$ where n is an industry firm defined at 4 digit NIC code and P_i be the share of ith firm in the total sales of the group. The sample period is 2001-2007.

	Adjusted Investment in firms with			
	$q > q_{bar}$ $CFR > CFR_{bar}$	$q < q_{bar}$ $CFR > CFR_{bar}$	$q > q_{bar}$ $CFR < CFR_{bar}$	$q < q_{bar}$ $CFR < CFR_{bar}$
Panel A : Basic Specification				
Diversity in CFR	-.0348999	.0878714**	.0281848	-.0644553
	[-0.65]	[2.33]	[0.49]	[-1.55]
Diversity in CFR X Degree of RC	.0032288	-.1608439**	.0895413	.109047
	[0.02]	[-2.19]	[1.05]	[1.01]
Inverse of average q	-.0091806	-.0047	.0005747	.013819
	[-1.18]	[-0.77]	[0.10]	[1.19]
Group Size	-.06654***	-.0097316	-.0195343	.0521783**
	[-2.62]	[-0.78]	[-1.15]	[2.41]
R^2	0.3151	0.2109	0.2444	0.2706
N	336	336	336	336
Panel B : Effect of Diversification (Entropy)				
Diversity in CFR	-.0351647	.0873119**	.0289161	-.063639
	[-0.65]	[2.35]	[0.51]	[-1.53]
Diversity in CFR X Degree of RC	.002424	-.1625447**	.0917643	.1115284
	[0.02]	[-2.21]	[1.08]	[1.03]
Entropy	-.0272147	-.057512	.0751698	.0839077
	[0.33]	[-0.89]	[1.27]	[1.04]
Inverse of average q	-.0091879	-.0047156	.000595	.0138417
	[-0.33]	[-0.78]	[0.11]	[1.16]
Group Size	-.0667915***	-.0102632	-.0188396	.0529538**
	[-2.64]	[-0.82]	[-1.12]	[2.47]
R^2	0.3154	0.2131	0.2483	0.2736
N	336	336	336	336

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics

Table V: Investment Efficiency

Value added by allocation (absolute) referred to as AVA is calculated as $AVA = \frac{\sum_{j=1}^{n} BA_j(q_j-1)(I_j/BA_j - I_j^{ss}/BA_j^{ss})}{BA}$ where $j = 1$ to n are firms in the business group and ss is standalone firm belonging to same 3 digit NIC code as the affiliated firm j. AVA is the measure of efficiency of allocation of funds and is the dependent variable in this fixed effects regression analysis. The calculation of the measure of diversity in resource weighted opportunities can be found in Table III, the measure of diversity in cash flow rights (CFR) and dummy variable degree of relational contracting (RC) can be found in Table IV. The measure of the variables Inverse of average q, group size and entropy measure of diversification can be found in Table IV. The period of study is 2001-2007.

Panel A1 : Full Sample with effect of diversity in resource-weighted opportunities	
	AVA **is dependent variable**
Diversity in resource-weighted opportunities	.2293762***
	[3.63]
Inverse of average q	-.0790803***
	[-2.59]
Group size	.0364785
	[1.14]
R^2	0.4619
N	336

Panel A2 : Full Sample with additional effect of diversity in CFR	
	AVA **is dependent variable**
Diversity in resource-weighted opportunities	.2300073***
	[3.52]
Diversity in CFR	-.0078357
	[-0.10]
Diversity in CFR X Degree of RC	-.0015766
	[-0.02]
Inverse of average q	-.079445**
	[-2.50]
Group size	.0364655
	[1.11]
R^2	0.4619
N	336

Panel A3 : Full Sample with additional effect of entropy	
	AVA **is dependent variable**
Diversity in resource-weighted opportunities	.2202236***
	[3.43]
Diversity in CFR	-.0079194
	[-0.10]
Diversity in CFR X Degree of RC	-.0037858
	[-0.04]
Entropy	-.1676571
	[-1.52]
Inverse of average q	-.0767831**
	[-2.45]
Group size	.0352345
	[1.08]
R^2	0.4657
N	336

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics

Table VI: Excess Value and Investment Efficiency

Excess value is calculated as $EV = Ln(\frac{\sum_{j=1}^{n}(\frac{MV}{S})\frac{S_j}{S}}{\sum_{j=1}^{n}(\frac{MV}{S})_j\frac{S_j}{S}})$ where $j = 1$ to n are the firms in the business group. MV is the end of the year market value of assets of the firm, S is the sales of the firm, $(\frac{MV}{S})_j$ is the sales weighted median market to sales ratio of portfolio of standalone firms in the same three digit NIC industry as firm j. Excess Value is the dependent variable in this fixed effects regression analysis. Value added by allocation (absolute); AVA is calculated as $AVA = \frac{\sum_{j=1}^{n} BA_j(q_j-1)(I_j/BA_j - I_j^{ss}/BA_j^{ss})}{BA}$ where $j = 1ton$ are firms in the business group and ss is standalone firm belonging to same 3 digit NIC code as the affiliated firm j. Group size is calculated as logarithm base e of sum of sales of all firms in the business group. The period of study is 2001-2007.

Full Sample	
	Excess Value is dependent variable
AVA	.6188775***
	[2.83]
Group size	-.2752806**
	[-2.03]
R^2	0.6542
N	336

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics

Table VII: Excess Value and Diversity Effects

Excess value is calculated as Excess value is calculated as $EV = Ln(\frac{\sum_{j=1}^{n}(\frac{MV}{S})\frac{S_j}{S}}{\sum_{j=1}^{n}(\frac{MV}{S})_j\frac{S_j}{S}})$ where $j = 1$ to n are the firms in the business group. MV is the end of the year market value of assets of the firm, S is the sales of the firm, $(\frac{MV}{S})_j$ is the sales weighted median market to sales ratio of portfolio of standalone firms in the same three digit NIC industry as firm j . Excess Value is the dependent variable. The calculation of the measure of diversity in resource weighted opportunities can be found in Table III, the measure of diversity in cash flow rights (CFR) and dummy variable degree of relational contracting (RC) can be found in Table IV. The measure of the variables Inverse of average q, group size and entropy measure of diversification can be found in Table IV. The period of study is 2001-2007.

Panel A1 : Full Sample with effect of diversity in resource-weighted opportunities	
	Excess Value is dependent variable
Diversity in resource-weighted opportunities	.5159978***
	[3.87]
Inverse of average q	.1306669**
	[2.04]
Group size	-.1960164
	[-1.48]
R^2	0.6717
N	336

Panel A2 : Full Sample with additional effect of diversity in CFR	
	Excess Value is dependent variable
Diversity in resource-weighted opportunities	.5150831***
	[3.90]
Diversity in CFR	.28557
	[0.73]
Diversity in CFR X Degree of RC	.0829435
	[0.13]
Inverse of average q	.1380023**
	[2.13]
Group size	-.1966128
	[-1.47]
R^2	0.6734
N	336

Panel A3 : Full Sample with additional effect of entropy	
	Excess Value is dependent variable
Diversity in resource-weighted opportunities	.5061568***
	[3.80]
Diversity in CFR	.280462
	[0.70]
Diversity in CFR X Degree of RC	.0616901
	[0.10]
Entropy	-.6438024
	[-1.46]
Inverse of average q	.1373951**
	[2.11]
Group size	-.205066
	[-1.55]
R^2	0.6759
N	336

Note: *** is 1% significance, ** is 5% significance, * is 10% significance, [ ] are the robust t statistics