

Do Indian Business Group Owned Mutual Funds Maximize Value For Their Investors?

Pulak Ghosh

*Quantitative Methods and Information Systems Group
Indian Institute of Management Bangalore
Bannerghatta Road, Bangalore 560076, INDIA
(pulak.ghosh@iimb.ernet.in)*

Jayant R. Kale

*Department of Finance, J. Mack Robinson College of Business,
Georgia State University, Atlanta, GA – 30345
Finance and Control Group
Indian Institute of Management Bangalore
Bannerghatta Road, Bangalore 560076, INDIA
(jkale@gsu.edu)*

Venkatesh Panchapagesan

*Finance and Control Group
Indian Institute of Management Bangalore
Bannerghatta Road, Bangalore 560076, INDIA
(venky.panchapagesan@iimb.ernet.in)*

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Abstract

The manager of an Indian business group (BG) fund can have access to private information on its own BG firms and their industries. However, since the fund belongs to a BG, the fund manager may also have incentives to undertake investments that benefit the BG firm managers and not its fund investors. In this paper, we examine the relation between a business group (BG) mutual fund's return performance and its ownership levels in (i) its own BG firms, and in (ii) the rivals of its BG firms that operate in the same industries. Using return and portfolio holdings data on a survivorship-bias free sample of Indian BG mutual funds for the period 2002 – 2010 we find that the relation between a BG fund's risk-adjusted returns and its ownership in its own BG firms or firms in BG industries is roughly in the form of an inverted "V," i.e., funds underperform whenever they increase or decrease their investment in group firms or rival firms beyond what a typical fund invests in these firms. The effect is stronger for underinvestment. This finding for BG firms suggests opportunistic behavior on the part of the BG fund manager.

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1. Introduction

A typical Indian mutual fund is at the tail of an organizational hierarchy which starts with a mutual “fund sponsor.” A fund sponsor, according to the Securities and Exchange Board of India (Mutual Funds) Regulations of 1996, is “any person who, acting alone or in combination with another body corporate, establishes a mutual fund.”¹ A unique feature of the Indian mutual fund industry is that many of these fund sponsors are business group (BG) families. These business group families (BGs) have significant ownership in a large number of firms that operate in several industries. For example, the Aditya Birla Group operates approximately 40 companies, many of which are listed on the major exchanges, and span such diverse sectors as fibers, metals, cement apparel, chemicals, fertilizers, telecom, and information technology. In addition to these, this group also operates in the financial services sector and owns the Birla Sun Life Asset Management Company Ltd., which is the investment manager for Birla Sun Life Mutual Fund that operates dozens of mutual funds, or schemes as they are referred to in India.

The fact that BGs own exchange-listed firms and also operate mutual funds has two major implications. First, the manager of such a BG fund is likely have access to private information about firms that are owned by her BG as well as superior information of the industries in which these BG firms operate. This information may result from the manager’s personal knowledge or experience interacting with these BG firms and their industries; or the manager may be part of a social or professional network that includes managers from these BG firms and industries. If the manager indeed has this informational advantage, then she can use it improve the wealth of her fund investors by generating superior returns to the BG fund she

¹ Securities and Exchange Board of India, or SEBI, is the regulator of financial markets in India including the mutual fund industry.

manages. She can either invest a larger portion of her assets under management (AUM), or a smaller portion, depending on whether she anticipates good or bad information on her group firms. Similarly she can exploit informational advantage on industry prospects by overweighting or underweighting other firms that operate in the same industry as the BG firms. In terms of an empirically testable hypothesis, this informational advantage would imply that the fund would generate superior (appropriately risk-adjusted) returns by deviating from the investment levels of a typical fund.

Alternatively, the BG fund manager may also utilize the fund's assets to trade in her BG firms' stocks for opportunistic motives that do not necessarily benefit the investors in her fund but rather help the management of the BG firm. The BG fund manager's opportunistic motives can arise for a variety of reasons including loyalty to her BG family or her own career concerns. The fund manager can take several actions that can benefit the management of the BG firm. For example, the fund manager may overweight BG firms' stocks in her fund portfolio when the BG firm is to release unfavorable information in order to support the BG firm's stock price. If opportunistic motives prevail, then overinvestment in BG firms (as compared to a typical mutual fund) by BG funds should result in inferior risk-adjusted performance to the detriment of the BG fund's investors.

It is difficult to imagine opportunism to be a motive for under investment in group firms' stocks unless such an underinvestment is necessary to free up capital to be invested in the group firms' debt. The reason that this could be possible is because SEBI regulations prohibit investment in listed securities of group companies beyond 25 percent of a fund's net assets. Listed securities include stocks as well as corporate bonds and other forms of debt that

companies issue and are traded in the country's two premier exchanges, the BSE and the NSE.² Though we find that the SEBI-imposed cap is not even close to being binding for stock investments, we are unable to test whether they become binding once debt investments are included for want of data on debt investments.³

In this paper, we explore the above issues in detail using return and portfolio holdings data for a large survivorship-bias free sample of Indian BG mutual funds over the period 2002 – 2010. In particular, we examine the relation between BG fund's return performance and its level of investments (i) in its own BG firms, and (ii) in the rivals of its BG firms in their industries.⁴ Since some of the BG firms and its rivals are large and sought after by non-BG fund managers as well, we use an excess investment measure that controls for investment in these firms by an average mutual fund in the industry. We use several risk-adjusted measures for returns including style or characteristic benchmark-adjusted returns as proposed by Daniel, Grinblatt, Titman and Wermers (1997) as well as the traditional 4-factor alpha proposed by Carhart (1997).

We find that the relation between a BG fund's risk-adjusted returns and its ownership in its own BG firm stock is roughly in the form of an inverted "V," i.e., both positive (over investment) and negative (under investment) excess investment yields negative risk-adjusted returns for the fund. The impact of under investment on returns is stronger and a BG fund would lose as much as 15 basis points a month for every 1 percent under investment in their own group

² The third exchange, MCX-SX, commenced trading in stocks only in February 2013 after our sample period.

³ We have heard anecdotal evidence that opportunistic investment in debt of group firms is prevalent among Indian mutual funds.

⁴ We have recently become aware of Anagol and Pareek (2013) who present evidence on the relation between a BG fund's ownership in the industries where its own BG firms operate and its performance. Using data from Morningstar for the period 2003 – 2013, they find a positive relation between a BG fund's excess return (over a risk-free rate) and the funds excess (over the market portfolio weight) ownership in BG firm industries. The authors attribute this positive association to BG fund managers' private information. They do not consider the BG fund managers opportunistic motives.

stock. While the loss due to over investment can be attributable to opportunistic motives on the part of the fund manager, it is not clear how to interpret the loss due to under investment.⁵

We also find similar evidence for a BG fund's investments in industry rivals of its own BG firms. Though there is a strong positive association between the fund's return and its investment in rival firms, it is mostly driven by the relationship between under investment and under performance. A BG fund underperforms to the tune of 4 basis points when it underinvests in its rival stocks by 1 percent relative to an average fund. Unlike investment in its own group stocks, it is more difficult to attribute this result to opportunism of the fund manager since there are no SEBI regulations that restrict investment in rival firms. The only other possibility could be is that fund managers may not want to be seen investing in rival stocks to protect their career concerns especially when the rival stocks is doing well. We see some evidence of this in the time series patterns of excess investments of different fund families (Figure 1).

To determine whether the fund performance can be attributed to the performance of the underlying group stocks and their rivals, we examine the relationship between excess investment and stock performance. Group stocks in which the BG funds under invest outperform the market index by 1.29 percent in the month when the underinvestment happens suggesting that such an underinvestment is either due to poor stock selection by the fund manager or due to cap constraints that require them to replace stocks with debt. Similar results are seen with underinvestment in rival stocks suggesting that BG fund managers view their own stocks and rivals not differently.

⁵ We are currently working on appending debt investments data to test whether underinvestment in stocks was compensated by over investment in debt.

We also investigate the determinants of a BG fund's excess ownership in its own BG firms and rivals. We find that BG funds degree of investment concentration is largely unrelated to its excess investment in own BG firms but is positively related with excess investment in rival firms. Finance literature (Kacperszyk, Sialm, and Zheng (2005)) suggests that greater investment concentration indicates superior ability/effort on the part of the fund manager. Thus our findings support the earlier interpretation that BG fund managers invest more in their own BG firms for reasons unrelated to their ability while their underinvestment in rival firms suggest poor ability to pick stocks.

Our research adds to the growing literature on the activities and practices of business groups in general and Indian business groups in particular. Khanna and Yafeh (2007) provide an excellent discussion on why diversified business groups form in developing markets. Almeida *et al* (2011) study Korean BGs (*chaebols*) to show how business groups optimally organize into pyramidal structures as suggested in Almeida and Wolfenzon (2007). Masulis, Pham, and Zein (2011) provide cross-country evidence on how business groups form as a response to financing constraints prevalent in emerging markets. Khanna and Palepu (2000) study Indian BGs and provide evidence on how BGs create value in economies where there are severe agency and informational problems. Gopalan, Nanda, and Seru (2007) suggest that BGs are a mechanism to facilitate internal capital markets and provide evidence from Indian BGs that is consistent with their hypothesis.

There is also considerable literature that highlights the “dark” side of BGs. When a BG owner has control rights on several firms but cash flow rights in only some of them, it creates an incentive for the owner to expropriate wealth or “tunnel” by transferring profits from firms

where they have lower cash flow rights to those where they have greater such rights.⁶ On a sample of Indian BGs, Bertrand, Mehta, and Mullainathan (2002) provide evidence of such tunneling.⁷

While the concept of tunneling does not apply directly when BGs own mutual funds, it opens up for another possibility for opportunistic behavior.⁸ Cohen and Schmidt (2009) examine the portfolios and trading behavior of mutual fund families who handle retirement funds of corporate clients as trustees. They find that such mutual funds of these trustees significantly overweight the stocks of their corporate clients and that this overweighting is greater when the benefit to the trustee of this relationship is higher. The authors also provide evidence that these trustee funds are more likely to be buyers of their corporate clients' stocks when other funds are selling them. The findings from our research complement the Cohen and Schmidt study. In the Cohen and Schmidt, opportunistic behavior on the part of trustee mutual funds is due to the relationship between the trustee and the corporate client. In our setting, the relationship likely exists because the mutual fund belongs to the BG family. It is possible that the BG fund manager may have a social relationship with the BG firm managers, or may have been recruited by the BG owner/managers, or her job may depend on remaining in their good books. As a result of these relationships, the BG fund manager may have the incentive to undertake actions that are more in the interest of the BG firms than fund investors. Our finding that a BG fund's return performance deteriorates when its ownership in its own BG firms is relatively high is then not inconsistent with such a possibility.

⁶ See Shleifer and Wolfenzon (2002), Morck, Wolfenzon, and Yeung (2005), and Bebchuck and Weisbach for arguments on tunneling.

⁷ However, using a different methodology, Seigel and Choudhury (2012) provide evidence that tunneling is not overly prevalent among Indian BGs and that they are, by and large, "good" corporate citizens.

⁸ Tunneling exists here too if BG firms invest their surplus with their own BG funds and thereby earn asset management fees.

The rest of the paper is organized as follows. The next section provides details on our data sources, variable construction, and sample characteristics. In Section 3, we provide our empirical results on the relation between BG fund performance and BG fund portfolio characteristics as well as on the determinants on BG funds' ownership levels in their own BG firms, industries, and rivals. In Section 4, we offer some concluding remarks.

2. Data, Variable Descriptions, and Sample Characteristics

2.1 The Hierarchy in Indian Mutual Fund Industry

While we use the term mutual fund in the paper, it is instructive to see how mutual funds in India are organized.⁹ A typical Indian mutual fund is at the tail of the following hierarchy:

Fund Sponsor → *Fund Trustee* → *Fund Family (a separate legal entity)* → *Asset Management Company* → *Fund* → *Scheme*

An example of the above structure is

Axis Bank Ltd. → *Axis Mutual Fund Trustee Ltd.* → *Axis Mutual Fund* → *Axis Asset Management Company Ltd.* → *Axis Equity Fund* → *Axis Equity Fund - Growth*

For each scheme, we record information of the full hierarchy except for the Fund Trustee. There are three main types of schemes: Dividend, Growth, and Bonus. The only difference is in the method of payout - dividend schemes make regular dividend distributions while growth schemes reinvest dividends. Bonus schemes provide additional units in the mutual fund as bonus at special intervals. Although the different schemes under the same fund have different net asset values (NAV) and AUM, the asset portfolio is always managed at the Fund level. In other words, portfolios for growth and dividend schemes are the same although they have different

⁹ Mutual funds are also referred to as “schemes” in India.

NAVs. This implies that the NAV of the growth scheme is the sum of the NAV of the dividend scheme and the dividend payout. Therefore, the appropriate unit for our analysis is the Fund and we focus on the portfolios of only the growth schemes, but use the AUM for the total of all the schemes under the same Fund name. The advantage of this approach is that it enables us to calculate gross fund returns directly from NAVs without having to adjust for dividends or bonuses.

2.2 Data Sources

Our analysis covers all equity mutual funds that were available for investment in India in the approximately nine-year period from January 1, 2002 to October 31, 2010. The reason we end the sample period at October 2010 is that we use monthly returns and holdings in our analysis and the AUM reporting frequency changed from monthly to quarterly from December 2010. Though most mutual fund databases in India contain only current (“survived”) funds, we construct a survivorship-bias free sample of mutual funds by piecing together several sources including fund fact sheets, vendor archives and the internet. Appendix I provides details of our sample construction process.

Our final sample contains as many as 367 funds belong to 36 fund families, of which 39 funds were closed during the sample period. Moreover, 35 more funds were absorbed or renamed either as part of a merger or as part of fund rationalization. Of the 367 funds with data, we classify 118 as belonging to one of the eight business group families and the remaining 249 as managed by non-BG sponsors. The number of funds increases steadily from 64 (16 BG and 48 non-BG) in the year 2002 to 338 (115 BG and 223 non-BG) in the year 2010.

We obtain mutual funds related information such as AUM, NAV, expense ratios, age, and portfolio holdings primarily from the Mutual Fund Industry Explorer database provided by

the Investment Information and Credit Rating Agency of India Ltd. (ICRA). When fund data are missing in this source and for validation purposes, we use several other sources. These include Association of Mutual Funds in India (AMFI), Value Research, Bloomberg, Money Control, and individual fund data sheets. We obtain stock-related data such as BG and firm IDs, industry codes (NIC), index prices, and stock prices primarily from the Prowess database made available by the Centre for Monitoring the Indian Economy (CMIE). For missing data and validation, we also use the National and Bombay Stock Exchanges (NSE and BSE) websites, ACE Equity data from Accord Fintech India Pvt. Ltd., Bloomberg, and Central Depository Services Ltd. (CDSL). The Prowess database from CMIE is also the source for our data on business groups. Finally, we obtain size, book-to-market, momentum, and market factor returns for Indian stocks from Professor Sandy Lai (see Eun, Lai, de Roon, Zhang (2010)).

2.3 Variable Descriptions

All prices and values are in the Indian currency Rupee (Rs). The variable *Fund Size* represents the AUM of the fund and is expressed in Rs. 10M (called a “crore” in India). The number of months from the fund’s launch date is the variable *Fund Age*. The fund’s *Expense Ratio* is expressed as a percentage. The variable *Net Inflow* measures the net amount of funds that a fund receives every month and is computed as follows:

$$Net\ inflow_{i,t} = [AUM_{i,t} - AUM_{i,t-1} \times (1 + Ret_{i,t})] / AUM_{i,t-1}$$

Where $AUM_{i,t}$ and $Ret_{i,t}$ denote fund i ’s assets under management at the end of month t and its return during the month t . The variable *Number of Funds in Family* denotes the number of funds in a fund family (described earlier) in a given month. We denote by *Gross Return* the funds’ monthly return before expenses computed using the NAVs of the growth scheme. Each scheme/fund specifies the benchmark to which it compares itself. The variable *Fund*

Benchmark-Adjusted Return is the excess of the *Gross Return* over the return on the stated benchmark. In addition to the benchmark-adjusted return, which is the *fund's choice* for performance measurement, we compute more objective performance measures used in the literature: the Carhart *4-Factor Alpha*, which is computed as the residual from the four-factor model that uses the factors supplied by Professor Sandy Lai and the *Characteristic Benchmark-Adjusted Return*, based on the style characteristic portfolios suggested by Daniel, Grinblatt, Titman and Wermers (1997). All these returns are expressed in basis points.

A mutual fund's investments are generally in domestic equity (*% Equity holdings*), domestic debt (*% Debt holdings*), foreign equity, and indexes, which we lump together into *% Foreign/Index*. We split the domestic equity investments into *% Small-cap firms*, *% Mid-size firms* and *% Large firms*. The variable *Investment Concentration Index* (or Herfindahl index) is the sum of squares of the portfolio weights of the fund's equity investments and is a measure of the fund's investment concentration in the spirit of Kacperszyk, Sialm, and Zheng (2005).

Finally, we construct variables to measure investments by BG funds that may be based either on private information or on agency considerations. The first among these variables is *% Own BG Firms (gross)*, which is the sum of the portfolio weights of a BG fund's investments in the stocks of firms that are in its own business group. Following Huang and Kale (2013), in most of our analysis, we use the variable *Excess % Own BG Firms*, which is the difference between *% Own BG Firms (gross)* and the ratio of the total investment by *all* funds in these BG firms over the total AUM of all funds. In other words, *Excess % Own BG Firms* captures the excess portfolio weight (positive or negative) that a BG fund assigns to its own firms as compared to what a typical fund does. The second variable in this category is *% BG Rivals (gross)* which is the sum of the portfolio weights that the BG fund has assigned to firms in the

industries in which its BG operates but that do not belong to the BG. In other words, this variable measures the investment in the BG firms' rivals. The variable *Excess % BG Rivals* is defined analogously to the previous variable and measures the difference in portfolio weight assigned to BG rivals by the BG fund and the typical fund. The variable *% Own BG Industries (gross)* is the sum of the portfolio weights of a BG fund's investments in the stocks of firms that are in the industries in which its own business group operates. The final variable, *Excess % Own BG Industries*, is the difference between *% Own BG Industries (gross)* and the portfolio weight that a typical fund assigns to these BG industries. *% Own BG Industries* is the sum of *% Own BG Firms* and *% Own BG Rivals*.

3. Results

3.1 Summary Statistics and Findings from Univariate Analyses

Table 1 presents the summary statistics (mean, median, minimum, and maximum) for all the above variables for both BG and non-BG funds, categorized by fund characteristics, fund returns, portfolio holdings and excess investment in their group firms and rival firms. Note that excess investment variables in the last category are not defined for non-BG funds. The table also presents findings from t-tests (Kruskall-Wallis tests) for differences in means (medians) of BG and non-BG funds. For space considerations, we do not report the actual statistics from these tests but denote by "stars" those means and medians that are statistically significantly greater than the corresponding means and medians for the BG/non-BG sample at 1%, 5% and 10% confidence intervals.

There are some distinguishing characteristics of BG funds as compared to their non-BG counterparts. The size of the BG mutual fund families is almost twice as that of non-BG fund families though the average fund size of BG funds (Rs. 572 crores) is only slightly greater than

that of non-BG funds (Rs. 468 crores). The average BG fund is also younger (62 months compared to 71 months for non-BG funds) and has a statistically significantly higher expense ratio. The values in Table 1 indicate that, as compared to non-BG funds, BG funds have higher net inflows, higher benchmark-adjusted return, lower equity holdings, higher investments in small and mid-caps investments but lower investments in large-size firms, and a lower investment concentration index.

The table also highlights that the average (median) investment by a BG fund in firms belonging to its BG is 2.01% (0.00%), in its own BG industries is 24.68% (18.14%), and 22.81% (16.92%) in its rival firms. The mean and median values for the excess of these investments as compared to a typical fund are, as expected, small though there is some dispersion as seen in the minimum and maximum values.

Table 2 presents the summary statistics by each BG fund family. Except for the fund net inflow, fund characteristics, returns and portfolio holdings vary widely and significantly among the eight families. There is a reasonable skewness in fund family size with Family 3 larger by several orders of magnitude than Family 5, the smallest family in the group. There are distinct return performance differences across the 8 families though most of them are negative when risk-adjusted measures are considered. The funds' portfolio holdings are more similar than their returns though there seems to be a variation in the investment concentration index.

The variation in funds' gross and excess investments is probably the most striking. Family 1 has around 57% of its AUM invested in either its group firms or their rivals while Families 7 and 8 have only around 12% of AUM invested. Gross investment in rival firms, in general, is substantially larger than similar investment in group firms. Interestingly, three out of eight families do not invest in their group firms on average while every family seems to invest a

substantial part of their assets on group rivals. Also, while Family 3 overinvests in their group firms (by 1.49%), they underinvest in their group rivals (by 0.13%). Funds belonging to Family 2 do exactly the opposite – they under invest in their group firms (-0.70%) and over invest in their rivals (1.37%). Interestingly, Family 3 outperforms Family 2 in every return measure, suggesting that holdings in group and rival firms may influence fund returns.

Figure 1 provides the time series variation in excess investment in own group firms and rival firms for each of the fund families. We do not include Family 8 as they do not have any excess investment in own group firms. It is apparent that fund families differ in their strategies to invest in group firms and rival firms. While Family 3 has always followed a contrarian approach by overinvesting in group firms and underinvesting in rivals for most of the sample period, other families such as Family 1 and 2 follow a mixed strategy wherein they selectively overinvest or underinvest. Our later analyses, therefore, include explicit fixed fund family fixed effects to control for these differences across families.

We present the yearly variation in returns and flows for BG and non-BG funds in Table 3. Though there are no major differences in fund flows and returns across BG and non-BG funds overall, there are clear differences during certain years. For example, BG funds underperform compared to non-BG funds in each of the post-financial crisis years in their characteristic benchmark-adjusted returns. Similarly, BG funds outperform non-BG funds in every return measure in 2007 and experience greater net inflows as compared to non-BG funds. Like in the case of fund families before, we control for yearly variations by using year fixed effects in all our subsequent analyses.

While we have considered each mutual fund separately when it comes to their investment in group and rival firms, it is possible that there is herding among funds that belong to the same

family. Funds that belong to the same family may all overinvest or underinvest in their group or rival firms at the same time. To determine that, we compute a fund herding measure that aggregates the percentage of family funds that overinvest and underinvest in a given stock in a given month, first across stocks and then across months in our sample. We aggregate both using without weights as well as with weights where we use market capitalization and AUM as weights for stock and fund aggregation respectively. As before, we examine over or under investing by comparing with investments made by an average mutual fund.

Table 3 presents this herding measure in group firms (Panel A) and in rival firms (Panel B) separately for each fund family. Overall, we find that the degree of herding in overinvesting in group and rival firms is substantially less than herding in underinvesting. A typical BG firm stock gets no investment from half of their group funds while a little bit more than 40 percent of funds underinvest in that stock at a point in time. Similarly, a typical BG rival stock gets no investment from roughly about two-thirds of all BG owned funds while 20-30 percent of funds underinvest in that stock at a point in time. Herding in overinvesting is very small with the maximum being only 8.48 percent of all funds overinvesting in a typical stock that belong to Family 3.

There is little difference between equally-weighted and AUM-weighted herding measures suggesting that fund size does not matter when it comes to excess investment in group and rival firms. Interestingly, when we aggregate across stocks using market capitalization, the percentage of funds not investing in group/rival stocks falls dramatically suggesting that it is the smaller stocks within the business group that get little attention from their mutual fund subsidiaries. Also, we find variations across families that are consistent with patterns noticed in

Figure 1. Our results indicate that funds belonging to the same family tend more likely to underinvest or not invest together as compared with over investing in their group or rival firms.

3.2 BG Fund Performance and Ownership in Own Firms/Rivals

In this section, we report our findings on whether BG fund performance reflects BG fund managers' superior information about the firms in their own BG firms and/or in the industries in which their firms operate. We also recognize that a BG fund's ownership in its own firms may reflect agency problems where the investment is not based on superior information but to benefit the BG firm management. We examine *three* measures of fund performance: the fund's excess return over the benchmark stated by the fund, the fund's excess return over the style characteristic benchmark portfolio (Daniel, Grinblatt, Titman and Wermers (1997) and the 4-factor alpha (Carhart (1997))). Our predictor variables include two measures of fund ownership and several commonly used control variables. The first is the BG fund's excess investment in the firms belonging to its own BG, and the second is the excess ownership in the other firms in industries where its own firms operate, or rivals. Excess investment is computed as the difference between the BG fund's investment and the investment of an average fund in BG firm or rival stocks.

The control variables are the fund's expense ratio, its age, size, net monthly inflows, percentage of portfolio invested in mid-sized and large firms, percentage invested in foreign firms and indexes, the investment concentration index, lagged fund return, the total net inflow into all fund in the BG family, the number funds in the BG family, and dummy variables for year and BG Family to control for fixed effects. We also include a crisis dummy variable (for periods greater than September 2008) to capture the effect of the financial crisis that has affected the

Indian mutual fund industry significantly. All significance tests use heteroskedasticity robust standard errors that are clustered at the fund level.

Table 5 reports the OLS estimates from regressing the various return measures (in basis points) of BG funds on the two BG fund ownership variables and their control variables. The three columns represent the results for each of the return measure used as the dependent variable. Though we report results for fund's reported benchmark-adjusted returns, we focus more on the other two return measures as they are less likely to be gamed by the fund manager. There were 5,175 fund months used in the regression and the average adjusted R-square was around 7 percent, except for the 4-factor alpha regressions wherein it was 2 percent.

The coefficient on excess investment in own BG firms is positive in two of the three return regressions but is significant in only the 4-factor alpha regression. However, the coefficient on excess investment in BG rival firms is positive and significant in two of the three cases suggesting that fund performance does increase with greater investment in rival firms. This positive association is consistent with the hypothesis that fund investors may be benefitting from BG fund managers' private information on their own firms and industries. Also note that the coefficient on the fund's investment concentration index, which is a measure of manager effort (Kacperszyk, Sialm, and Zheng (2005)) is not significantly different from zero.

Among the control variables, the crisis dummy and the lagged return variable are statistically significant in all the three return regressions. Fund performance seems to indicate mild mean reversion as past month performance is negatively related to current month performance. The financial crisis seems to have reduced monthly fund performance by 3 percent when you adjust for style characteristics and by 59 basis points when you consider four-factor alphas.

While a BG fund's ownership in its own firms may reflect superior information that is beneficial to fund investors, it may also reflect, at least in part, opportunistic behavior on the part of BG fund managers to benefit BG firm management. If the excess investment in own firms is opportunistic, it may be detrimental to fund investors. In order to examine this possibility, we split the excess ownership in own BG firms into two variables, namely over and under investment as follows: Over Investment in Own BG Firms (BG Rivals) equals the Excess Investment in Own BG Firms (BG Rivals) when it is positive and is zero otherwise; and Under Investment in Own BG Firms (BG Rivals) equals the Excess Investment in Own BG Firms (BG Rivals) when it is negative and is zero otherwise. So, by construction, Over Investment variable will be either zero or positive, while Under Investment variable will be zero or negative. Also, it is important to separate over and under investment given that most of the funds within the same family tend to herd more so in underinvesting than in overinvesting in their group or rival stocks. When both these variables are included in the specification, we can observe whether the relation with performance changes for more/less than typical investment in BG firms (rivals).

We present the regression results from using these split variables in Table 6. As in Table 5, results are presented for each of the three return measures separately. The positive relation between fund performance and excess investment in own group firms and rival firms seem to be primarily driven by the underinvestment part, indicating the funds underperform significantly when they underinvest in their group or rival firms. Note that the underinvestment variable is either negative or zero and the coefficient for this variable in the regression is positive and strongly significant. This means that greater the under investment (more negative the variable is), greater is the fund's underperformance. A one percentage increase in under investment by a

BG fund relative to an average fund in its own group stocks results in a fall in fund's monthly performance by more than 15 basis points.

Why would funds choose to under invest in their own firms relative to their peer funds, especially when it translates to poorer fund performance? The answer may lie in regulatory restrictions that may cap a group fund's investments in all securities, and not just stocks, of their group firms. It could be opportunistic for a fund manager to divert more funds to invest in debt securities of its group firms and provide direct funding rather than indirectly invest in its stocks. Anecdotal evidence seems to indicate that this is reasonably prevalent in the Indian mutual fund industry. We are currently working to get data on debt investments as well to answer this question.

Interestingly, the over investment variable has a negative coefficient as well suggesting that overinvestment in own group firms leads to poor performance too. The separation of excess investment in own group firms into under and over investment leads to an interesting inverted 'V' shaped relationship between fund performance and excess investment. BG funds perform poorly when they increase or decrease their investment in group firms significantly compared to their peers.

The more puzzling result is on the effect of under and overinvestment in rival stocks on BG fund performance. Greater underinvestment in rival firms leads to greater fund underperformance while greater over investment has no significant impact on fund performance. For example, a BG fund's performance will go down by 4 basis points a month for every 1 percent decrease in its holdings of rival firms compared to the holding of an average fund. This result is puzzling since there are no regulatory restrictions governing a BG fund's investment in its rival firms. So why then would BG funds choose to underinvest in their rival firms and face

the wrath of their investors by delivering poor returns? Here too, it is possible to attribute opportunistic motives since fund managers may choose not to join the bandwagon in investing in rival firms for fear of antagonizing their BG parents and would rather face the wrath of their fund investors.

The fund's investment concentration index, indicating a manager's skill, does not enter significantly in any of these regressions. The crisis dummy and lagged monthly return remain significant as before. The number of funds in the family is positive and significant indicating the BG fund's performance increases with the size of its family reflecting economies of scale.

Since funds underperform when underinvest in their group firm stocks or their rival stocks, it must be the case that these stocks must be performing better than expectations and are underrepresented in the BG funds' portfolios. To determine whether this is indeed the case, we examine the performance of BG firm stocks and their rivals when BG funds underinvest or overinvest in them. We take all BG firm stocks (and rivals) and group them into tertiles based on the degree of excess investment by BG funds: Low excess investment (characterized by high under investment), Medium and High excess investment (characterized by high over investment). We then compute the average and median monthly return of stocks in each tertile to see whether stocks that have greater underinvestment indeed perform significantly better. We use the excess return over the BSE 500 index to determine the stock's performance. Table 7 reports these results and as expected, stocks that are underinvested by BG funds tend to perform better than stocks that have been overinvested. Clearly this suggests that BG funds are leaving money on the table by choosing to underinvest compared to their peers.

3.3 Determinants of BG Fund Investments in Own BG Firms and Rivals

Next, we investigate whether there are aspects of the BG fund's decisions to invest in their own BG firms and their rivals that may explain the earlier results on the impact of these variables on fund performance. In Table 8, we present the findings from regressing excess investment in own BG firms (Model 1) and in rivals (Model 2) on variables that may impact that decision. Excess investment in own BG firms and in rival firms relates negatively to fund age and investment in foreign firms/indexes. The coefficients on the investment levels in large firms, on fund inflows as well as on the investment concentration index are significantly positive only in the rival regressions. It is possible that the negative coefficient on the investment level in foreign/index is because the sum of all investments must sum to 100%. There is weak evidence that higher excess investments in BG rivals may be associated with fund manager quality.

In Table 9, we present results from estimating a Tobit model of over and under investment in own BG firms and rivals. Recall that the positive excess investment (over investment) in own firms (rivals) equals excess investment in own firms (rivals) when it has positive values and is zero otherwise; the definition of negative excess investment (under investment) is analogous. Note that under investment variables have non-positive values. Thus, in order to estimate a Tobit, we multiply this variable by -1. Thus, a positive coefficient on a variable implies that an increase in that variable makes the excess investment more negative. Columns one and two present the results for over and under investment in own BG firms while columns three and four present results for over and under investment in BG rivals. Given the construction of the dependent variables, if the sign on the coefficient in the two columns is opposite, the effect is the same for both positive and negative values. For example, the

coefficient on fund age is negative in column 1 and positive in 2, which implies that an increase in fund age makes excess investment less positive and more negative, respectively.

The interesting cases are when the coefficients in the two columns have the same sign implying that the variable has opposite effects in the positive and negative ranges. Thus, funds expense ratio relates negatively with excess investment in own BG firms when it is positive and positively when it is negative. Similarly, investment concentration index relates positively with excess investment in the positive range and negatively in the negative range. The coefficient on investment concentration index is smaller in the positive range of excess investment in own BG firms. On the other hand, this coefficient is larger in the positive range when the dependent variable is excess investment in rivals. Thus, the coefficients on the investment concentration index present a picture that is consistent with our earlier inference that higher investment by BG funds in their own BG firms appears to be driven by opportunistic behavior. On the other hand, when BG funds invest more in rival firms, it seems to be more consistent with better skill/effort.

4. Concluding Remarks

The Indian mutual fund industry has the unique feature that a significant number of funds belong to business group families. These BG families are typically well-diversified conglomerates that comprise several other firms that operate in a wide range of industries. In other words, mutual funds are but a part of the typical BG. It is natural to assume that the managers of BG funds and BG firms have a relationship/network that could affect the investment and return performance of the BG fund. Specifically, the BG fund manager may have access to private information on the firms that belong to its own BG, the industries in which these BG firms operate, and the rivals of these BG firms. This informational advantage should lead to superior fund performance. On the other hand, the BG fund manager may also act

opportunistically because of her relationship with the owner/managers of her BG firms. For example, the BG fund manager may owe her job to the BG firm owner/manager, may be related to him, or he may be in a position to affect her career. As a consequence of such possibilities, the BG fund manager may make portfolio choices and investment decisions that may benefit the BG firm owner/manager rather than fund investors. If the fund manager overweighted own BG firm's stocks because of these motives, then we should see a non-positive relation between greater ownership in own BG firms and the fund's return performance.

In this paper, we investigate the above possibilities on a sample of Indian BG fund ownership and returns during the period 2002 – 2010. We use a survivorship-bias free data of mutual funds during this period that was constructed by integrating several different sources. Though we find a positive relationship between BG fund performance and their investments in own group firms and rivals (in excess of what a typical fund does), it is the underinvestment that seems to be driving most of this result. That is, funds that tend to underinvest in their group stocks or their rivals tend to underperform on a risk-adjusted basis. This result is robust to different measures for returns including the more objective 4-factor alphas and characteristic benchmark-adjusted returns. We find weak evidence that over investment in group firms and rivals also leads to underperformance. This suggests that the relationship between performance and excess investment is like an inverted "V" where funds underperform whenever they increase or decrease their investment in group firms or rival firms beyond what a typical fund invests in these firms.

While underinvestment in group firms can be attributable to opportunistic motives, especially in the face of regulatory restrictions capping the maximum amount that can be invested in all group securities, it is puzzling to see why BG fund managers leave money on the

table by underinvesting in their rivals. We do not have data currently on debt investments by BG funds in their group firms to directly test this opportunistic motive but the work is in progress to include that in our analysis.

We also show that, the degree of investment concentration of the BG fund's portfolio, which is suggested by the literature as a measure of managerial ability/effort, relates positively with the level of ownership in its BG firms' rivals. However, we also find evidence that suggests opportunistic behavior on the part of BG fund managers. When a BG fund invests more in its own BG firms than a typical fund, there is a significantly negative relation between this ownership level and the fund's return. We also find a negative relation between the fund's ownership in its own BG firms and the portfolio's investment concentration ratio which also suggests a lack of managerial ability/effort. The obvious implication of our findings for investors in BG mutual funds is that they should pay closer attention to the fund's investments in its own firms and in their rivals.

Our findings should also be of interest to policymakers and regulators. The assets under management of the Indian mutual fund industry have grown considerably since 1964 when the first fund was established. When private entities were allowed to launch mutual funds, the growth in AUM was even faster. Since the first so called mutual fund, the Unit Scheme of the Unit Trust of India, was launched in India in 1964 by an Act of Parliament (in 1963), the size of assets under mutual fund management (AUM) have grown from Rs. 25 crores (one crore = 10 million) to Rs. 592,250 crores by March, 2011.¹⁰ Despite this significant growth in assets, only about 3.5% of the Indian population (40 million out of 1.25 billion) are mutual fund investors; the comparable proportion in the United States is 44%. Despite this sizeable number for AUM,

¹⁰ Source: The website of the Association of Mutual Funds in India (AMFI), www.mfindia.com. One

Indian mutual funds account for only about 3% of the market capitalization of the Bombay Stock Exchange; for comparison, foreign institutional investors account for approximately 15%.¹¹

The relatively small ownership of listed Indian corporations by Indian mutual funds and the low level of mutual fund ownership by the Indian population has prompted the Indian Government to launch schemes such as the Rajiv Gandhi Equity Savings Scheme (RGESS), which encourages mutual fund investment by smaller investors by offering significant tax incentives. Many reasons have been suggested for the low interest levels of smaller/retail investors in mutual funds. One possible reason could be the lack of faith in non-sovereign financial investment vehicles. The Securities and Exchange Board of India has laid down a code of conduct that those associated with mutual funds having fiduciary duties are required to follow.¹² Additionally, the Association of Mutual Funds in India has also laid down a code of conduct (the AMFI Code of Ethics or ACE) for mutual fund managers. These documents do not, however, address the possibility of a conflict of interest that may arise between the BG mutual fund manager and the owner/manager of the BG firms.¹³ More recently, the proposal to grant bank licenses to corporate houses is gathering steam among the government and the Reserve Bank of India while critics call for caution in the face of obvious conflicts of interest. Our results, using the mutual fund experience, suggest that sensible regulations and tight monitoring could resolve some of these conflicts.

¹¹Source: NDTV Report, August 28, 2012. The Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) are the two most significant stock exchanges in India, and together account for a vast majority of equity trades. The BSE's key index is the SENSEX, which comprises of 30 largest and most actively traded companies on the BSE. The NSE's key index is the S&P CNX Nifty, known as the NSE NIFTY, which is made up of fifty major stocks weighted by their market capitalization.

¹²See Schedule Five of Securities and Exchange Board of India (Mutual Funds) Regulations of 1996.

¹³We checked the prospectuses of some BG funds and found that they cite the SEBI code of conduct almost verbatim. However, we could not find any discussion of what the fund will do with respect to investments in its own BG firms or about any conflicts of interest that may arise because the fund is a part of a diversified BG fund family.

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Table 1
Summary Statistics

This table presents the summary statistics of a survivorship-bias free sample of 367 Indian equity mutual funds during the period 2002 – 2010. The statistics are presented separately for Business group (BG) owned funds (118 funds) and for non-Business group owned funds (249 funds). BG affiliation for funds and firms they invest in are derived from CMIE's Prowess database. Mutual fund data are primarily obtained from ICRA and are supplemented with data from individual fund datasheets, and other sources reported in the main text of the paper. Fund net inflow is the product of the difference between closing and opening assets under management with 1+fund return for the month, as a percentage of opening assets under management. Characteristic-adjusted return is based on the methodology followed in Daniel, Grinblatt, Titman and Wermers (1997) while the 4-factor alpha is based on Carhart (1997). Fund investment concentration index (Herfindahl) is computed as the sum of squares of portfolio weights of the fund's equity investments. % Debt holdings include short-term debt and cash. Excess investment in BG firms by BG funds represents the difference in the percentage of assets invested by a BG fund over a typical fund. BG rivals are non-BG firms that belong to the same industry in which the business group operates. ***, **, * imply significance at 1%, 5%, and 10% respectively.

	Business Group (BG) Funds (Up to 8 Fund Families, 118 Funds)				Non-Business Group Funds (Up to 28 Fund Families, 249 Funds)			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
<u>Fund Characteristics</u>								
Number of funds in family	7.60*	6*	1	24	7.16	6	1	22
Family size (Rs.10M)	8,431	3,921`	28	40,387	4,165	911	15	19,110
Fund size (Rs.10M)	572	152*	5	8,271	468	176	5	9,358
Fund age (months)	62.37***	49***	1	213	70.66	53	0	290
Fund expense ratio (%)	2.3***	2.36***	0.02	6.31	2.16	2.28	0.03	6.3
Fund net inflow (%)	2.60%	-0.91%	-89.49%	10254%	1.95%	-0.67%	-91.93%	6750%
<u>Fund Monthly Returns</u>								
Gross return (bps)	131.30	246.97	6203.47	4244.51	124.21	219.14	-8048.97	4482.23
Fund Benchmark-adjusted return (bps)	2.44	5.32	-3745.09	1991.01	-0.43	4.3	-10618.4	2871.79
Characteristic Benchmark-adjusted return (bps)	-157.55*	-130.84**	-4123.76	1321.54	-146.99	-121.91	-10128.3	1584.78
4-Factor alpha (bps)	-10.82	11.86*	-4101.48	1866.83	-18.44	3.13	-9099.77	2104.55
<u>Fund Portfolio Holdings</u>								
In Debt (%)	0.49***	0.00***	-0.43	69.24	0.83	0.00	0.00	49.53
In Equity (%)	89.21***	92.13***	15.61	99.99	91.18	93.48	11.91	100
In Small-Cap Equity (%)	19.85***	16.80***	0.00	87.19	15.66	11.04	-0.06	88.62
In Mid-Cap Equity (%)	27.27***	26.60***	0.00	75.42	24.5	23.11	-0.12	85.39
In Large-Cap Equity (%)	37.83***	37.80***	0.00	97.74	47.66	49.61	0	99.99
In Foreign/Index Equity (%)	2.04***	0.00***	-13.65	65.9	1.56	0.00	-19.9	84.06
Fund investment concentration Index	380.70***	314.38***	9.46	4654.15	414.16	328.8	9.14	7520.98
<u>Fund Business Group Holdings</u>								
Own BG Industries								
Gross % Invested	24.68	18.14	0.00	99.49	N/A	N/A	N/A	N/A
Excess % Invested	0.36	-0.90	-50.20	80.19	N/A	N/A	N/A	N/A
Own BG Firms								
Gross % Invested	2.01	0.00	0.00	19.76	N/A	N/A	N/A	N/A
Excess % Invested	0.18	-0.07	-6.49	14.34	N/A	N/A	N/A	N/A
Own BG Rivals								
Gross % Invested	22.81	16.92	0.00	99.49	N/A	N/A	N/A	N/A
Excess % Invested	0.31	-0.90	-46.30	80.19	N/A	N/A	N/A	N/A

Table 2
Summary Statistics by Business Group Fund Family

This table presents the various fund statistics presented in Table 1 for different business group (BG) fund families. Descriptions of variables are provided in Table 1. The ANOVA tests for equality of means across BG families jointly. ***, **, * imply significance at 1%, 5%, and 10% respectively.

	Family #1	Family #2	Family #3	Family #4	Family #5	Family #6	Family #7	Family #8	ANOVA p-values
<u>Fund Characteristics</u>									
Number of funds in family	5.04	7.71	12.97	6.24	4.02	3.37	4.28	7.52	0.0001***
Family size (Rs.10M)	5,312	6,969	40,387	10,457	28	2,529	1,631	131	0.0001***
Fund size (Rs.10M)	312.49	331.87	1,835.75	580.94	7.12	229.9	116.49	11.95	0.0001***
Fund age (months)	87.12	69.29	51.34	52.23	56.44	60.28	62.79	45.08	0.0001***
Fund expense ratio (%)	2.37	2.49	2.07	2.24	2.44	2.35	2.36	2.11	0.0001***
Fund net inflow (%)	-0.0033	0.014	0.011	0.0147	0.0987	-0.0097	0.1777	-0.0092	0.2169
<u>Fund Monthly Returns</u>									
Gross return (bps)	164.68	135.18	153.12	158.82	37.57	109.45	23.76	162.84	0.0491**
Fund Benchmark-adjusted return (bps)	10.38	22.89	51.93	-8.37	-12.34	-0.68	-120.07	12.43	0.0001***
Characteristic Benchmark-adjusted return(bps)	-144.78	-143.78	-87.71	-205.21	-154.81	-161.03	-246.7	-169.05	0.0001**
4-Factor alpha (bps)	5.09	2.7	37.98	-10.83	-32.46	-24.58	-136.23	9.12	0.0001***
<u>Fund Portfolio Holdings</u>									
In Debt (%)	0.08	0.17	0.27	0.52	6.11	1.61	0.09	0.54	0.0001***
In Equity (%)	93.15	91.61	86.22	89.14	75.41	90.09	87.26	86.13	0.0001***
In Small-Cap Equity (%)	20.83	20.67	16.44	16.84	19.98	20	26.96	18.56	0.0001***
In Mid-Cap Equity (%)	31.34	28.36	22.94	26.05	24.26	28.09	28.88	26.19	0.0001***
In Large-Cap Equity (%)	37.92	38.17	37.3	43.37	26.64	40.07	28.58	40.01	0.0001***
In Foreign/Index Equity (%)	1.57	1.22	7.13	0.07	1.82	0.77	1.19	0	0.0001***
Fund investment concentration	360.96	368.62	463.51	272.43	263.47	404	514.1	244.97	0.0001***
<u>Fund Business Group Holdings</u>									
Own BG Industries									
Gross % Invested	56.69	15.73	26.91	25.12	21.42	12.60	14.49	11.55	0.0001***
Excess % Invested	-0.02	0.34	1.30	2.07	0.90	-0.09	-0.11	-3.32	0.0001***
Own BG Firms									
Gross % Invested	5.61	2.10	3.07	0.48	0.00	0.00	0.05	0.00	0.0001***
Excess % Invested	0.55	-0.70	1.49	0.21	-0.09	-0.35	0.04	0.00	0.0001***
Own BG Rivals									
Gross % Invested	51.09	13.95	23.91	24.64	21.86	12.61	14.45	11.88	0.0001***
Excess % Invested	-0.56	1.37	-0.13	1.87	1.44	0.27	-0.13	-2.99	0.0001***

Table 3
Flow and Return Statistics by Year for Business Group and for Non Business Group Mutual Funds

This table presents the various fund statistics by year for BG and non-BG funds in India. There are 118 funds that belong to 8 business group (BG) families and 249 funds that belong to the 28 non-BG entities in the sample. Gross return is computed using simple close-to-close return of a fund NAVs while fund benchmark-adjusted return is gross return minus the return of its reported benchmark. Characteristic-adjusted return is based on the style return methodology followed in Daniel, Grinblatt, Titman and Wermers (1997) while the 4-factor alpha is the fund's alpha over the return of four factors suggested by Carhart (1997). Monthly flows are obtained by multiplying the difference between closing and opening assets under management with 1+return for the month. They are expressed as percentage of opening assets under management.

Year	Average Monthly Fund Flows (%)		Average Monthly Gross Return (bps)		Average Monthly Fund Benchmark-adjusted Return (bps)		Average Monthly Characteristic Benchmark-adjusted Returns(bps)		Average Monthly 4-Factor Alpha (bps)	
	BG Funds	Non-BG Funds	BG Funds	Non-BG Funds	BG Funds	Non-BG Funds	BGFunds	Non-BG Funds	BG Funds	Non-BG Funds
All Years	2.6	1.95	131.3	124.21	2.44	-0.43	-157.55*	-146.99	-10.82	-18.44
2002	80.28	12.18	-15.63	-49.6	98.71**	21.79	-155.54	-200.94	-9.14*	-70.31
2003	15.43	17.12	599.87**	482.92	69.7	21.7	-158.67**	-223.1	116.47**	45.41
2004	1.05	4.92	182.81	120.52	77.66	44.14	-98.98	-135.95	-11.12	-49.77
2005	0.27	7.59	223.81	222.98	28.56	25.55	-133.56	-123.98	-46.86	-51.8
2006	-1.49%**	0.00	206.92	164.76	-32.17*	-58.09	-130.2	-148.37	-16.62*	-46.53
2007	1.14%*	-0.72	414.61**	364.85	1.87**	-33.91	-174.21*	-209	49.6***	7.13
2008	0.58%***	-0.12	-638.9	-625.81	1.83	11.58	-196.43**	-165.24	-18.77	-6.47
2009	-0.31%**	0.45	456.05	468.03	-28.81*	-8.25	-191.19***	-131.33	-15.67	2.47
2010	-0.83	-0.73	116.11	128.49	-3.08***	22.41	-115.27***	-82.33	-55.43*	-34.14

Table 4
Herding Behavior Among Funds Belonging to the Same Business Group Family

This table presents the degree to which different funds belonging to the same group family herd in their investment strategies, especially when it comes to investing in their group firms or rival firms (non-group firms that belong to the same industry). We calculate the percentage of family funds (both equally-weighted and AUM-weighted) that are either over-invested, under-invested or with no investment in each group stock, or its rival in the same industry, compared to an average mutual fund. We compute this measure first for each stock for a given month and then average across stocks either using equal weights or using their market capitalization. We then compute a simple average across months to present the percentage of funds that overinvest, underinvest and not invest at all in their own stocks or in their rivals for each fund family.

Panel A: Investment in own group firms

Fund-weighting	Equally-weighted						AUM-weighted					
	Equally-weighted			Market-cap weighted			Equally-weighted			Market-cap weighted		
Nature of investment	% Over-invested	% Under-invested	% No investment	Over-invested	Under-invested	No investment	Over-invested	Under-invested	No investment	Over-invested	Under-invested	No investment
Family 1	6.49	45.57	47.94	21.89	74.86	3.25	7.15	44.90	47.94	24.60	72.15	3.25
Family 2	5.75	39.67	54.59	12.18	85.83	2.00	8.01	37.40	54.59	18.72	79.29	2.00
Family 3	8.48	40.93	50.59	21.70	73.13	5.17	11.38	38.02	50.61	31.45	63.38	5.17
Family 4	2.90	39.27	57.83	9.20	80.06	10.74	4.55	37.65	57.80	14.74	74.65	10.61
Family 5	0.00	91.30	8.70	0.00	91.30	8.70	0.00	91.30	8.70	0.00	91.30	8.70
Family 6	0.00	51.09	48.91	0.00	100.00	0.00	0.00	51.09	48.91	0.00	100.00	0.00
Family 7	0.00	51.46	48.54	0.00	51.46	48.54	0.00	51.46	48.54	0.00	51.46	48.54

Panel B: Investment in rival firms

Fund-weighting	Equally-weighted						AUM-weighted					
	Equally-weighted			Market-cap weighted			Equally-weighted			Market-cap weighted		
Nature of investment	Over-invested	Under-invested	No investment	Over-invested	Under-invested	No investment	Over-invested	Under-invested	No investment	Over-invested	Under-invested	No investment
Family 1	4.72	40.38	54.89	18.51	76.15	5.34	5.14	39.96	54.90	22.52	72.14	5.34
Family 2	5.86	42.72	51.42	18.97	75.03	6.00	6.80	41.77	51.43	24.28	69.72	6.00
Family 3	0.91	30.03	69.05	3.31	83.97	12.72	0.94	30.01	69.05	4.07	83.21	12.72
Family 4	4.37	28.32	67.31	27.76	63.79	8.45	3.98	28.71	67.31	24.90	66.65	8.45
Family 5	1.15	33.49	65.35	0.96	82.60	16.43	1.26	33.38	65.35	0.97	82.59	16.43
Family 6	0.71	23.88	75.42	5.32	57.71	36.97	0.72	23.86	75.42	5.48	57.55	36.97
Family 7	0.76	23.37	75.87	4.41	72.88	22.70	0.77	23.36	75.87	4.44	72.85	22.70

Table 5
Excess Investment in Own Business Group Firms and Other Group Rivals and Fund Performance

This table presents the parameter estimates and t-statistics from regressions of gross fund return (monthly mutual fund return) on over and under investment in their own business group firms, in their rival firms or in the industries they operate in. Over (under) investment in BG firms is signified by positive (negative) excess ownership, i.e., the fund holds more (less) of BG firms than a typical fund in the industry. We use only fund-month data that belong to BG funds. Both dependent and independent variables have been winsorized at the 1 and 99% level. All specifications include year and business group fixed effects. Errors are clustered by fund and t-statistics are in parentheses. ***, **, * imply significance at 1%, 5%, and 10%, respectively.

Dependent Variable →	Fund	Characteristic	4-Factor
	Benchmark- adjusted Return (bps)	Benchmark- adjusted Returns(bps)	Alpha (bps)
	Model 1	Model 2	Model 3
Intercept	-8.90 (-0.22)	-197.43*** (-4.60)	-46.83 (-1.00)
Excess Investment in Own BG Firms (%)	-0.45 (-0.28)	2.19 (1.05)	3.15* (1.66)
Excess Investment in BG Rival Firms (%)	0.11 (0.43)	0.72* (1.75)	1.21*** (2.56)
Fund Expense Ratio (%)	26.41** (2.36)	7.81 (0.59)	18.48 (1.47)
Fund Age (Months)	0.18** (2.12)	0.11 (1.25)	0.19** (2.12)
Fund Size (Rs. 10M)	0.00 (0.29)	-0.02*** (-2.79)	-0.01** (-2.10)
Fund Net Inflow (%)	-87.90* (1.72)	66.85 (1.18)	-28.43 (-0.48)
% Invested in Mid Cap Firms	0.92*** (2.63)	0.28 (0.67)	-0.42 (-1.00)
% Invested in Large Cap Firms	0.70*** (2.80)	-0.21 (-0.69)	-0.59** (-2.01)
% Invested In Foreign/Index Firms	0.98 (0.95)	0.69 (0.71)	1.41 (1.37)
Fund Investment Concentration Index	0.00 (0.07)	0.00 (0.16)	-0.03 (-0.97)
Lagged Gross Monthly Return	0.07*** (12.83)	-0.05*** (-11.58)	-0.03*** (-4.92)
Fund Family Size (Rs. 1B)	0.11 (1.23)	-0.03 (-0.42)	-0.12** (-1.12)
Number of Funds in Family	-0.20 (-0.24)	2.33** (2.02)	3.13* (1.90)
Crisis Dummy	229.14*** (10.72)	-306.12*** (-11.47)	-58.97** (-2.44)
Number Of Observations	5,175	5,175	5,175
Adjusted R-square	0.07	0.07	0.02

Table 6
Over and Under Investment in Own Business Group Firms and Other Group Rivals and Fund Performance

This table presents the parameter estimates and t-statistics from regressions of gross fund return (monthly mutual fund return) on over and under investment in their own business group firms, in their rival firms or in the industries they operate in. Over (under) investment in BG firms is signified by positive (negative) excess ownership, i.e., the fund holds more (less) of BG firms than a typical fund in the industry. We use only fund-month data that belong to BG funds. Both dependent and independent variables have been winsorized at the 1 and 99% level. All specifications include year and business group fixed effects. Errors are clustered by fund and t-statistics are in parentheses. ***, **, * imply significance at 1%, 5%, and 10%, respectively.

Dependent Variable →	Fund Benchmark- adjusted Return (bps)	Characteristic Benchmark-adjusted Returns(bps)	4-Factor Alpha (bps)
	Model 1	Model 2	Model 3
Intercept	10.26 (0.25)	-173.11*** (-3.84)	-17.48 (-0.34)
Over Investment in Own BG Firms (%)	-5.34* (-1.79)	-5.52 (-1.58)	-4.15 (-1.13)
Under Investment in Own BG Firms (%)	7.70* (1.92)	15.43*** (2.97)	15.30*** (2.42)
Over Investment in BG Rival Firms (%)	-0.53* (-1.92)	-0.02 (-0.04)	0.23 (0.40)
Under Investment in BG Rival Firms (%)	2.10** (2.38)	2.97*** (2.77)	4.28*** (4.05)
Fund Expense Ratio (%)	22.68** (2.07)	2.25 (0.16)	12.89 (0.97)
Fund Age (Months)	0.19** (2.33)	0.12 (1.42)	0.20*** (2.37)
Fund Size (Rs. 10M)	0.00 (0.29)	-0.02*** (-2.81)	-0.01* (-1.94)
Fund Net Inflow (%)	-86.66* (-1.69)	66.64 (1.21)	-26.35 (-0.46)
% Invested in Mid Cap Firms	0.85** (2.41)	0.16 (0.37)	-0.53 (-1.21)
% Invested in Large Cap Firms	0.53** (2.05)	-0.44 (-1.33)	-0.84*** (-2.53)
% Invested In Foreign/Index Firms	0.91 (0.89)	0.49 (0.49)	1.32 (1.18)
Fund Investment Concentration Index	0.02 (0.84)	0.03 (1.17)	-0.00 (-0.03)
Lagged Gross Monthly Return	0.07*** (12.83)	-0.05*** (-11.69)	-0.03*** (-4.98)
Fund Family Size (Rs. 1B)	0.13 (1.51)	-0.00 (-0.04)	-0.09 (-0.84)
Number of Funds in Family	-0.31 (-0.39)	2.16** (2.03)	2.96* (1.91)
Crisis Dummy	223.09*** (10.48)	-315.00*** (-11.81)	-68.11*** (-2.84)
Number of Observations	5,175	5,175	5,175
Adjusted R-square	0.07	0.07	0.02

Table 7
Fund Excess Investment and Underlying Stock Performance

This table presents the relationship between BG funds' excess investment in group stocks and rival stocks and the underlying stocks' performance in the month of excess investment. Excess investment (investment by the group fund over the investment by an average mutual fund) in each BG (or rival) stock (in each month) is computed and grouped into tertiles. Stocks' performance is based on monthly excess returns, i.e. stocks' returns from CMIE's Prowess data over the return on the BSE 500 index. Panel A contains results for group firms and Panel B contains results for rival firms.

Panel A: Excess Monthly Returns of Group firm stocks

Fund Excess Investment Tertile	Mean Excess Investment (%)	Excess Monthly Return (%)		
		Mean	Median	Standard Error
Low	-0.61%	1.29%	0.27%	0.10%
Medium	-0.06%	0.93%	-0.55%	0.13%
High	0.76%	0.45%	-1.13%	0.13%

Panel B: Excess Monthly Returns of Rival firm stocks

Fund Excess Investment Tertile	Mean Excess Investment (%)	Excess Monthly Return (%)		
		Mean	Median	Standard Error
Low	-0.45%	1.41%	0.07%	0.09%
Medium	-0.05%	1.16%	-0.20%	0.11%
High	0.48%	0.54%	-1.74%	0.12%

Table 8**Determinants of Excess Investment in Own Business Group (BG) Firms and their Rivals – OLS Estimates**

This table presents the parameter estimates and t-statistics from OLS regressions of excess ownership variables (in BG firms, in BG industries and in BG rivals) on several fund control variables. Both dependent and independent variables have been winsorized at the 1 and 99% level. All specifications include year and business group fixed effects. Errors are clustered by fund and t-statistics are in parentheses. ***, **, * imply significance at 1%, 5%, and 10%, respectively.

Dependent Variable →	Excess Investment in	Excess Investment in
	Own BG Firms (%)	BG Rival Firms (%)
	Model 1	Model 2
Intercept	1.02 (1.18)	-18.26*** (-3.24)
Fund Expense Ratio (%)	-0.23 (-0.74)	-1.22 (-0.71)
Fund Age (Months)	-0.01** (-2.40)	-0.03** (-2.47)
Fund Size (Rs. 10M)	0.0004** (2.36)	-0.002 (-1.23)
Fund Net Inflow (%)	-0.84 (-1.13)	10.45** (2.05)
% Invested In Mid Cap Firms	-0.01 (-1.15)	0.10 (1.67)
% Invested In Large Cap Firms	0.01 (1.19)	0.11*** (2.67)
% Invested In Foreign/Index Firms	-0.09*** (-2.97)	-0.80*** (-2.73)
Fund Investment Concentration Index	-0.0006 (-0.55)	0.02** (2.35)
Lagged Gross Monthly Return	-0.00 (-0.61)	0.00* (1.80)
Fund Family Size (Rs. 1B)	0.0002 (0.14)	-0.02 (-1.41)
Number of Funds in Family	-0.0031 (-0.08)	0.22 (1.25)
Number of Observations	5,175	5,175
Adjusted R-square	0.16	0.23

Table 9
Determinants of Over and Under Investment in Own Business Group (BG) Firms and their Rivals
– Tobit Estimates

This table presents the parameter estimates and t-statistics from Tobit regressions of excess ownership variables (in BG firms, in BG industries and in BG rivals) on several fund control variables. Both dependent and independent variables have been winsorized at the 1 and 99% level. All specifications include year and business group fixed effects. Chi-square statistics are in parentheses. ***, **, * imply significance at 1%, 5%, and 10%, respectively.

Dependent Variable →	Excess Investment in Own BG Firms (bps)		Excess Investment in BG Rival Firms (bps)	
	Over investment	Under investment	Over investment	Under investment
Intercept	115.77*** (22.08)	7.41 (0.18)	-570.5*** (15.41)	933.76*** (179.27)
Fund Expense Ratio (%)	-33.94*** (18.58)	-12.79*** (5.66)	-106.83*** (5.29)	-3.09*** (0.02)
Fund Age (Months)	-0.32*** (46.58)	0.32 (100.51)	-2.39** (75.34)	0.66*** (25.52)
Fund Size (Rs. 10M)	0.03** (70.07)	-0.02*** (60.54)	-0.11*** (29.52)	0.06*** (35.89)
Fund Net Inflow (%)	-79.31*** (9.07)	0.63*** (0.00)	759.58*** (23.91)	-53.5*** (0.49)
% Invested In Mid Cap Firms	-1.3*** (36.74)	-0.13*** (0.66)	6.81*** (28.99)	-1.89*** (9.21)
% Invested In Large Cap Firms	0.29*** (4.48)	-0.87 (79.75)	6.28*** (59.98)	-6.46*** (269.12)
% Invested In Foreign/Index Firms	-6.60*** (146.28)	1.32*** (12.01)	-38.89*** (145.85)	26.59*** (301.47)
Fund Investment Concentration Index	0.01*** (0.2)	0.10 (113.28)	1.28*** (311.1)	-0.14*** (13)
Lagged Gross Monthly Return	-0.00*** (0.2)	0.00*** (0.29)	0.01*** (0.78)	-0.01*** (0.57)
Fund Family Size (Rs. 1B)	0.18*** (22.63)	0.17*** (38.02)	-1.40*** (38.23)	0.33*** (9.15)
Number of Funds in Family	-1.49*** (3.39)	-0.93*** (2.81)	10.48*** (4.79)	-5.90*** (7.02)
Number of Observations	5,669	5,175	5,669	5,175
Log Likelihood	-36,570	-31,316	-46,632	-38,523

Appendix I

Details on survivorship-bias sample of Indian mutual funds between January 2002 and October 2010

Number of funds ¹⁴ that were issued to investors that survived under its original name/owner as on October 31, 2010	309
Number of funds that were issued first by a different family or as a different fund under the same family that was renamed/absorbed by a survived fund	35
Number of funds that were closed between Jan 2002-Oct 2010	39
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Total number of survived and closed funds during the sample period	383
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Number of funds with full data availability (“Survivorship-bias” free sample)	367 (= 96%)
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¹⁴ Only “growth option” funds (schemes) are considered in this computation. Indian mutual funds are marketed separately based on their reinvestment option. A typical fund would be sold separately as “growth” scheme – fund that automatically reinvests fund payouts, and “dividend” scheme – fund that pays out periodic dividends to its investors. Though the two schemes are reported as two funds by the asset management company, they are managed by the fund manager as one fund.

Figure 1

Excess Investment in Own Group Firms and Rival Firms by BG Families Over Time

