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### **Project Attributes and Market Reaction to Capital Expenditure Projects: Indian Evidence**

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**Abstract:** This paper examines the impact of project type (new unit or subsequent expansion), project focus (core or diversified) and foreign collaboration on the market reaction to capital expenditure project announcements. Using a large sample of 1336 projects spanning the period from 1996 to 2010, we establish several new results. First, we show that the market reaction to new units is higher than that for subsequent expansions. Second, we find a negative market reaction for projects with diversified focus. Third, we find that the market reaction to projects involving foreign collaboration is higher than that for other categories of projects. Taken together, our results highlight the importance of project attributes in determining the market reaction to capital expenditure projects.

**JEL Classification:** G30, G31, G39

**Keywords:** Capital expenditure, project announcements, market reaction, project attributes

## Project Attributes and Market Reaction to Capital Expenditure Projects: Indian Evidence

### I. Introduction

This paper examines the impact of project type, project focus and foreign collaboration on the market reaction to capital expenditure (hereafter capex) projects so as to understand the underlying motivation behind capex decisions by Indian firms. Project type captures whether the project is a new unit or a subsequent expansion. Project focus captures whether the project's focus is in the core industry of the firm or is in an unrelated industry (unrelated diversification). Foreign collaboration captures whether the project involves association with a foreign firm.

Prior research<sup>1</sup> shows that agency issue plays an important role in capex decisions. The key agency issue examined in prior research is expropriation of equity shareholders by self-serving managers. Prior research also shows that strong corporate governance norms and strict implementation of these norms restrict opportunities for such managers to indulge in self-serving and value destructive projects (Gompers, Ishii and Metrick, (2003) and Hope and Thomas, (2008)). Emerging markets such as India are characterized by high promoter ownership and existence of business groups (La Porta, Lopez-de-Silanes and Shleifer (1999)). The key agency issue in emerging markets is the expropriation of minority shareholders by promoters exercising executive control over the firm. Firm control coupled with weak implementation of corporate governance laws in India permits promoters to take self-serving decisions without much opposition from minority shareholders (Shleifer and Vishny (1997), Chakrabarti, Megginson and Yadav, (2008) and Sarkar (2010)).

Capex decisions are an attractive avenue for such promoters to expropriate funds of minority shareholders by investing in projects which are beneficial to them at the expense of minority shareholders (Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000) and Bertrand, Mehta and Mullainathan (2002)). Minority shareholders have no direct contribution towards capex investment decision making process. They can only analyze the observable attributes of the project being announced to decide whether the project is beneficial for them. If they believe that the project is not beneficial, they react by selling the shares resulting in a negative market reaction to the announcement. To understand the impact of these different project attributes, we are the first to investigate the impact of these observable project attributes on the market reaction to capex announcements.

Our study is closely related to McConnell and Muscarella (1985) as we also examine the market reaction to capex announcements. However, we differ from McConnell and Muscarella (1985) as we examine the market reaction to capex project announcements whereas their focus is on firm-wide capex announcements. Our study is similar to Burton, Lonie and Power (1999) as

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<sup>1</sup> Thakor (1993) shows that managers focus on project cash-flows rather than project value endorsing investment myopia in capex decisions. Chen and Ho (1997) investigate the agency issues involved in capex announcements and document a positive impact of growth opportunities and negative impact of free-cash flow on the market reaction. Vogt (1997) and Chen, Ho, Lee and Yeo (2000) document a positive impact of cash-flow on investment size and negative impact of cash-flow on the market reaction to capex announcements. Chen, Ho and Shih (2007) document a negative reaction by competing firms to any capex announcement and that, competitors having poorer investment opportunities experience more negative reaction. Jian and Lee (2011) find that CEO reputation mitigates the agency issue associated with capex decisions.

we also examine the market reaction to capex project announcements. However, we differ from Burton et al., (1999) as we focus on project's structural attributes whereas they focus on project cash flows. Our study is also similar to Ayyagari, Gopalan and Yerramilli, (2011), as they also examine capex decisions by Indian firms but our study is unique as we focus on project attributes whereas they focus on insider ownership.

We contribute to the extant literature on capital expenditure announcements by being the first to examine the impact of project attributes on market reaction to capex projects. Our results record the significant role of project attributes in determining the market reaction to capex projects. We find that market reaction to new units is higher than that for subsequent expansions. We find a negative market reaction to projects with diversified focus i.e. project announced in an industry different from the core industry of the firm. We find that the market reaction to projects involving foreign collaboration is higher than that for other categories of projects. Our results stress the importance of project attributes in determining the market reaction to capex projects.

The rest of the paper proceeds as follows. The next section discusses prior literature and develops the testable hypotheses. Section III discusses the data sources and sample selection process. Section IV details the methodology employed. Section V discuss the results and section VI presents the results of the business group affiliation impact. Section VII concludes.

## **II. Related Literature and Hypothesis Development**

The market value maximization hypothesis states that markets compel managers to follow the market value maximization rule while making investment decisions. This assumption results in the expectation that capex decisions will generally add value to the firm. Fama and Jensen (1985) demonstrate that forces at play during capital expenditure decision-making for different organizations are different and managers may not behave according to the market value maximization rule. McConnell and Muscarella (1985) analyze market reaction to firm-wide capex announcements and document a positive market reaction for announcements by industrial firms. They document insignificant reaction for public utility firms and negative market reaction for mining firms. Since the main objective of our paper is to examine the impact of project attributes on the market reaction to capex projects the literature review focuses on papers examining the impact of project attributes on market reaction to capex announcements.

Woolridge and Snow (1990) examine market reaction to various strategic investment decisions (joint ventures (JVs), research and development, large capex and new product announcement) to compare the existence of shareholder value maximization hypothesis with rational expectations hypothesis and institutional investor hypothesis. They document a positive reaction to such announcements supporting the shareholder value maximization hypothesis. They record a positive impact of investment size and negative impact of implementation duration on the market reaction. Burton, Lonie and Power (1999) extend the study of Woolridge and Snow (1990) and examine the market reaction to JV announcements and capex project announcements. They further categorize projects into immediate cash generating (ICG) and non-immediate cash generating (NICG) projects. They document a positive reaction to JVs but an insignificant reaction to project announcements. They find that the market reaction increases with project size but only in case of ICG projects underlining the importance of immediacy of cash generation to the outside investors.

Jones, Danbolt and Hirst (2004) categorize capex projects based on their underlying value creation ability into projects that create value (like R&D and diversification) and projects that exercise existing investment options (like asset expenditure and cost reduction). They record that markets react more favorably to projects that create value in comparison to projects that exercise existing investment options. They find that the market reaction has positive relationship with project size and negative relationship with interest rate. Titman, Wei and Xie, (2004) investigate the impact of abnormal capital expenditures by firms on the long-term returns of the firm. They find negative long-term returns for firms having greater investment discretion i.e. high cash-flow and low debt ratios. They conclude that investors tend to underreact to the empire building implications of increased capital expenditure resulting in negative long-term returns.

Nwaeze (2005) categorizes projects into replacement investments and adaptation investments. He compares the market impact of these capex categories and finds that market impact of replacement investments is negative and increases with the market to book value ratio of the firm. The market impact of adaptation investments is found to be positive. In a recent paper, Ayyagari, Gopalan and Yerramilli (2011) study capex decisions by Indian firms to investigate the impact of insider ownership and level of free cash-flows on market reaction to capex announcements. They record a negative market reaction to announcements by firms having lower levels of insider ownership and they find that the negative reaction is more severe for firms having low ownership and higher levels of free cash-flows. They record a strong negative reaction for projects in new industries announced by business group firms having lower levels of insider holdings indicating existence of tunneling in capex decisions by group firms.

Prior studies have classified projects based on immediacy of cash generation (Burton et al., (1999)), underlying value creation ability (Jones et al., (2004)) and replacement versus adaptation strategy (Nwaeze, (2005)). Even though these classifications are important, detailed information regarding the projects is necessary to classify projects appropriately. Our argument is that outside shareholders analyze the observable project attributes and perceive the intentions of the promoters behind announcing such projects. Hence, observable project attributes are expected to play an important role in determining the market reaction to capex decisions.

Project type captures whether the project is structured as new unit or subsequent expansion. Investment into a completely new facility or new product line is categorized as new units. Expansion of existing facility or of existing product line is categorized as subsequent expansion. New units are a source of new lines for business as well new sources of value. Many firms start new units in special economic zones (SEZ), export processing zones (EPZ) or designated backward areas to obtain tax exemptions (Business Asia - 1997<sup>2</sup>, Political Risk Services - 2005<sup>3</sup>). Thus, new units providing tax benefits further contribute to the value of the firm. Investors' naturally expect the firm to expand its capacity and incorporate these expectations in stock prices. Thus, even though subsequent expansions provide value enhancement through economies of scale, these benefits are expected unlike new units wherein minority shareholders have no prior expectations. This discussion leads to our first hypothesis.

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<sup>2</sup> Asia corporate tax rates, *Business Asia January 27, 1997, The Economist Intelligence Unit Ltd.*, Pg.6-7.

<sup>3</sup> India Country Conditions: Investment Climate, *Political Risk Services – September 1, 2005, PRS Group*, Pg. 1-10.

***Hypothesis 1:** The market reaction to new unit project is higher than that for subsequent expansion project.*

Prior research shows that firms which diversify into areas related to the core activity or competence of the firm perform better than firms which are into unrelated diversification (Palepu (1985)). The key reason behind the lower performance of firms diversified across unrelated areas is the manager's empire building intention which is prominent in diversification decisions (Montgomery (1994)). Diversification across unrelated areas allows owner-managers to diversify their wealth yet retain control, but these decisions reduce value for the outsider investor who is neither equally diversified nor has the same investment horizon as that of the owner-manager. These decisions also allow the owner-managers to expropriate the outside shareholders (Amihud and Lev (1981)). Individual firms operating in a single industry perform better than firms associated with business groups having relatively higher levels of diversification (Khanna and Palepu (2000)). Prior research also show that even in emerging markets diversification in long-run results in value reduction for a firm (Delios and Ma (2010)). Hence, investment by a firm in areas other than its core business will be viewed negatively by investors and will have a negative market value impact. This discussion leads to our second hypothesis.

***Hypothesis 2:** The market reaction for projects focused on core business is higher than that for projects in diverse (unrelated) areas.*

Collaboration with foreign firms (financial or technical) provides access to capital and new technology required for successful implementation of the project (Gorg and Greenway (2004) and Alfaro and Chen (2010)). Foreign partnership results in technology spillover and increase in plant productivity for the partnering firm and negatively impacts the domestic firms competing with the partnering firm (Aitken and Harrison (1999), Javorick (2004)). Foreign partnerships attract skilled employees provide on-the-job training to these employees further increasing their productivity (Gonclaves (1986)). These benefits increase value of the firm over and above the benefits accruing from the project. Foreign firms generally prefer large, reputable firms with foreign market presence and avoid firms with dominant owner-managers who would continue with their own strategies (Dahlquist and Robertson (2001)). Thus, when foreign collaboration takes place, additional scrutiny by foreign partner reduces expropriation by owner-managers further adding value to the firm. This discussion leads us to our third hypothesis.

***Hypothesis 3:** The market reaction for projects involving foreign collaboration is higher than market reaction for projects without foreign collaboration.*

### **III. Data and Sample Description**

We obtain the data for this study from the CAPEX and PROWESS databases maintained by the Center for Monitoring Indian Economy (CMIE). The data on capital expenditure projects (project name, firm name, announcement date, project type, project industry and project cost) are obtained from the CAPEX database. The stock prices (adjusted closing prices), firm affiliation, National Industrial Classification, 1998<sup>4</sup> (NIC) codes and firm financial data are

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<sup>4</sup> The NIC code is a five digit industrial classification system developed by the Central Statistical Organization, India in line with the International Standard Industrial Classification (ISIC). NIC categorizes firms into different groups solely based on the economic activity. NIC implements a five

obtained from the PROWESS database. Our data spans the period June 1996 to March 2010.

The data on capex decisions by Indian firms is rich with around 27000 capex announcements captured by CMIE in the CAPEX database. They capture data on status of the project, project announcement date, project cost, project type, announcing firm, project industry, ownership group (business group or stand-alone) and foreign associations. This richness and granularity in our database allows us to examine the impact of project attributes on the market reaction to capex project announcements.

Our initial sample consists of 4202 completed projects (domestic) or projects under implementation (domestic) announced by listed Indian firms. We delete 1857 projects which have concurrent announcements i.e. their announcement coincides with other announcements by the same firm (such as earnings announcements). We further delete 58 projects as more than one project has been announced on the same date by the firm. This is necessary as we cannot ascertain the effect of project attributes on the market reaction where two or more projects have been announced on the same date. We then exclude 698 projects with missing firm level data. We exclude 99 projects where the total project expenditure is more than twice the existing firm size. We exclude 36 projects where the project size is less than 1% of the current firm size. Finally, to mitigate the effect of outliers we exclude 118 projects where firm variable values were outside the  $\pm 3$  standard deviation limit.

The above filtering criteria results in our final sample of 1336 projects by 597 listed firms operating across 14 industry groups based on the NIC classification. Of the 1336 project announcements 891 are new units and 445 are subsequent expansions. 872 projects are in the core area of the firm and 464 projects are in diversified area. Of the 1336 project announcements 109 projects involve foreign collaboration. Business group affiliated firms have announced 926 projects and 410 projects are by stand-alone firms.

**Table 1**

Project Selection Process [Sample Period: 1996-2010]

	<b>Initial</b>	<b>CA</b>	<b>ABF</b>	<b>Final</b>
Projects	4202	1857	698	1336
Firms	1239	811	417	597
Industries	681	458	161	119
Business group projects	2419	925	429	926
Stand-alone firm projects	1783	932	269	410
New Unit Projects	2982	1349	514	891
Subsequent Expansion Projects	1220	508	184	445
Mean Project Cost (Rs. Crore)	492	512	469	339

Notes: This table provides the details of the project selection process. We present the initial data (Initial), final sample (Final) and the main deletions that have taken place. Deletions are due to concurrent announcements (CA) and project deletions are due to absence of required firm data (ABF).

digit (2+1+1+1) code where the first two digits indicate the firm's/project's main economic activity. The next three digits indicate further sub-classification based on detailed economic activity.

Table 2 presents the descriptive statistics of the variables. The average project cost is Rs.339 crore<sup>5</sup> and the average firm size is Rs.1608 crore. The average market to book ratio for the sample firms is around 1.33 and the average leverage (debt to assets ratio) is 0.49 or 49%. The average promoter's holding is 50% indicating existence of concentrated ownership in Indian firms. The average free cash-flow available with firm prior to the project announcement is around 4% of the total assets of the firm. The average age of the sample firms is 33 years.

**Table 2**

Descriptive statistics [Sample Period: 1996-2010]

Variable	Mean	Median	SD	Min	Max
Project Cost (Rs. Crore)	338.7	50.0	1534.7	1.0	22000.0
Firm Size (Rs. Crore)	1607.9	307.2	6875.2	5.1	107060.9
Project Size	0.37	0.21	0.42	0.00	2.00
M/B ratio	1.33	1.12	0.86	0.11	9.14
Leverage	0.49	0.47	0.28	0.00	1.00
% Promoters' Holding	50.0	50.5	17.1	0.0	96.5
Free Cash-flow	0.04	0.003	0.25	-0.76	3.91
Age (Years)	33	25	23	2	127

Notes: This table provides the descriptive statistics for the sample under analysis. SD is Standard Deviation. Min is minimum value and max is maximum value. M/B ratio is defined as the ratio of market value to book value of the firm.

#### IV. Methodology

In this section we explain the methodology employed to analyze the market reaction to capex project announcements. To measure market reaction we calculate the 3-day cumulative abnormal returns (CAR) around the project announcement using the standard event study methodology as in Brown and Warner (1985). We define announcement of capex project as the event and announcement date as event date. We use an event window starting one-day before the announcement date and ending one-day later similar to that of the prior studies (McConnell and Muscarella (1985) and Chen et al. (2007)). We use the "Market weighted CMIE overall share price index" (COSPI)<sup>6</sup> as the market index. Estimation window used for calculating  $\alpha$  and  $\beta$  of the market model is spread over a period of 150 days (-170 to -21 days) prior to the event. The CAR associated with the announcement of project  $i$  belonging to firm  $j$  are calculated as

$$CAR_{ij} = \sum_{\tau=-1}^1 [R_{ij\tau} - (\hat{\alpha}_{ij} + \hat{\beta}_{ij} \times R_{m\tau})] \quad (1)$$

where,  $R_{ij\tau}$  are returns for firm  $j$ , on day  $\tau$  and  $R_{m\tau}$  are returns for the market on day  $\tau$ .

<sup>5</sup> 1 crore = 10 million

<sup>6</sup>COSPI is the largest and the most comprehensive index for India. An algorithm developed by CMIE takes into account on a daily basis, the trading frequency and maturity of price discovery mechanism and the firms are added or dropped from the index based on this algorithm. This ensures that the index covers a large number of firms (almost 95% of the total market capitalization of the stock exchanges), but still does not get influenced by the use of stale information (CMIE Prowess database).

The three key project attributes (project type, project focus and foreign collaboration) are defined as follows.

**a) Project Type (PT):** CMIE categorizes projects based on the type of investment i.e. whether the investment results in creation of new unit/capacity (new unit) or whether it is meant for expansion of an existing unit/capacity (subsequent expansions). We use a dummy variable to capture project type by assigning a value '0' if it's a new unit and '1' if it is a subsequent expansion.

**b) Project Focus (PF):** Project focus measures whether the project is in the core area of the firm or into a diversified area. We use a dummy variable to capture project focus with the variable carrying a value of '0' for core focus projects and '1' for diversified focus projects. We calculate project focus by comparing the NIC code of the industry in which the project is intended with the announcing firm NIC code. As we are interested in identifying whether the firm is diversifying into unrelated area by announcing the project, we capture the difference between the project industry NIC code and firm's core industry NIC code. If the difference is more than 5000 i.e. project NIC code indicates an economic activity division completely unrelated to announcing firm's economic activity, we classify it as a diversified area project.

**c) Foreign Collaboration (FC):** The CAPEX database provides information on collaboration of the announcing firm with a foreign firm regarding the project. We capture this collaboration under the foreign collaboration variable. We use a dummy variable to capture foreign collaboration with the variable carrying a value of '1' when foreign collaboration is present (FCP) and '0' when foreign collaboration is absent (FCA).

To investigate the impact of project attributes on the market reaction, we perform a series of cross-sectional regressions with the CAR for the announcing firm as the dependent variable and project attributes as independent variables. The three project attributes capture three different facets of the manager's decision regarding the project. The interaction between the three attributes results into eight different categories of projects. To examine the market reaction to the eight project categories we conduct a dummy variable regression as presented in model 1 below.

Model 1:

$$CAR_{ij} = \beta_0 + \beta_1 PT_i + \beta_2 PF_i + \beta_3 FC_i + \beta_4 (PT_i \times PF_i) + \beta_5 (PT_i \times FC_i) + \beta_6 (PF_i \times FC_i) + \beta_7 (PT_i \times PF_i \times FC_i) + u_i \quad (3)$$

The regression coefficients obtained are partial regression coefficients and provide the differential CAR for the specific category of project captured through the interaction. To estimate the net CAR of any particular category of project we sum-up the coefficients obtained from model 1 and present the results in table 3.

**Table 3**

Classification of projects into separate groups based on project type, project focus and foreign collaboration

$$CAR_{ij} = \beta_0 + \beta_1 PT_i + \beta_2 PF_i + \beta_3 FC_i + \beta_4 (PT_i \times PF_i) + \beta_5 (PT_i \times FC_i) + \beta_6 (PF_i \times FC_i) + \beta_7 (PT_i \times PF_i \times FC_i) + u_i$$

PT	PF	FC	Project Description	Net CAR
0	0	0	New unit projects having core focus without foreign collaboration	$\beta_0$
1	0	0	Subsequent expansion projects having core focus without foreign collaboration	$\beta_0 + \beta_1$
0	1	0	New unit projects having diversified focus without foreign collaboration	$\beta_0 + \beta_2$
1	1	0	Subsequent expansion projects having diversified focus without foreign collaboration	$\beta_0 + \beta_1 + \beta_2 + \beta_4$
0	0	1	New unit projects having core focus involving foreign collaboration	$\beta_0 + \beta_3$
1	0	1	Subsequent expansion projects having core focus involving foreign collaboration	$\beta_0 + \beta_1 + \beta_3 + \beta_5$
0	1	1	New unit projects having diversified focus involving foreign collaboration	$\beta_0 + \beta_2 + \beta_3 + \beta_6$
1	1	1	Subsequent expansion projects having diversified focus involving foreign collaboration	$\beta_0 + \beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 + \beta_7$

Notes: The table describes the classification of projects based on the three project attributes. They are: project type, project focus and foreign collaboration. . PT stands for project type dummy variable taking the value 0 for new units and 1 for subsequent expansions. PF stands for project focus dummy variable taking the value 1 for diversified focus projects and 0 for core focus projects. FC stands for foreign collaboration dummy variable taking the value 1 for projects involving foreign collaboration and 0 for projects without foreign collaboration.

We examine the statistical significance of the net CAR as shown below.

$$t = \frac{\sum_{l=1}^q \beta_l}{S.E.(\sum_{l=1}^q \beta_l)} \quad (4)$$

where,  $\beta_l$  is the regression coefficient and  $q$  is the number of coefficients being added. The standard error for the net CAR captured in eq. 5 is provided below.

$$S.E.(\sum_{l=1}^q \beta_l) = \sqrt{\sum_{l=1}^q Var(\beta_l) + \sum_{l=1}^q \sum_{p=1}^q Cov(\beta_l \beta_p)} \quad (5)$$

where  $l \neq p$ .

To examine the consistency in the CAR of project attributes, we run model 1 after controlling for project size, various firm characteristics (firm affiliation, market-to-book value of firm, firm size, firm leverage, promoters' ownership, free cash-flow and firm age), interest rate (capturing macroeconomic effects) and firm's industry affiliation (using industry dummies). Model 2 can be shown as follows.

Model 2:

$$CAR_{ij} = \beta_0 + \beta_1 PT_i + \beta_2 PF_i + \beta_3 FC_i + \beta_4 (PT_i \times PF_i) + \beta_5 (PT_i \times FC_i) + \beta_6 (PF_i \times FC_i) + \beta_7 (PT_i \times PF_i \times FC_i) + \beta_8 Size_{ij} + \beta_9 FA_{ij} + \beta_{10} MB_{ij} + \beta_{11} FS_{ij} + \beta_{12} Lev_{ij} + \beta_{13} PH_{ij} + \beta_{14} FCF_{ij} + \beta_{15} Age_{ij} + \beta_{16} Rate + Ind Dum + u_i \quad (6)$$

## V. Results

The 3-day cumulative abnormal returns (CAR) for different projects are reported in Table 4. The average CAR for all capex announcements is 0.53% whereas the median CAR is 0.44%. The new unit project announcements have a mean CAR of 0.64% and the CAR of subsequent expansion projects is 0.30% but insignificant. The independent sample t-test results indicate that there is no significant difference between the mean CAR of new units and subsequent expansions. The projects with investment focus in core area have a mean CAR of 1.38% and significantly higher than projects focusing on diverse areas having a CAR of -1.08%. Projects involving foreign collaboration have a mean CAR of 2.90% which is higher than the mean CAR of 0.32% for projects not involving foreign collaboration. The average CAR for business group projects is around 0.57% and the CAR for stand-alone firm projects is 0.42% but the market reactions for these two project groups are not significantly different. In summary the CAR for various projects are positive indicating that projects add value to the firm.

**Table 4**  
Market Reaction for various categories of projects  
Sample Period: 1996-2010

Project Category	N	CAR (%)		
		Mean	Diff	t-stat
All projects	1336	0.53**	-	-
New unit projects	891	0.64**	0.34	1.7 <sup>b</sup>
Subsequent expansions	445	0.30		
Core area investments	872	1.38**	2.46	10.2**
Diverse area investments	464	-1.08**		
Foreign collaboration present	109	2.90**	2.58	6.0**
Foreign collaboration absent	1227	0.32**		
Business group projects	926	0.57**	0.15	0.6
Stand-alone firm projects	410	0.42 <sup>b</sup>		

Notes:

\*\* , \* , <sup>b</sup> denote statistical significance at the 1%, 5% and 10% levels respectively.

This table presents the results for the analysis of market reaction to capex projects announcements. 'n' denotes the number of projects categorized under the specific class. Mean is mean value of the market reaction (CAR).

Diff indicates the difference between the two means. The t-statistic tests the statistical significance of the difference.

We discuss below the cross-sectional regression results detailing the impact of project attributes on the market reaction to capex projects presented in table 6. Model 1 analyses the cross-sectional effect of project classes arising from the interaction between the three project attributes on the market reaction. Model 2 analyses this effect after controlling for project size, firm characteristics, interest rate and industry affiliation.

The constant in model 1 captures the market reaction for the base category i.e. new units announced in core area and not involving any foreign collaboration. The regression constant

for CAR analysis is positive indicating a positive market reaction of 1.5% for new units announced in core area and not involving foreign collaboration. The project type coefficient captures the differential impact of subsequent expansions in core area and not involving foreign collaboration. We report a significant negative coefficient for project type indicating a lower CAR of 0.7% for these types of projects. Investors' *a priori* expect expansion of existing projects depending on the project's past performance resulting in the lower CAR.

The project focus coefficient captures differential impact of new units announced in an unrelated field (unrelated diversification) and not involving foreign collaboration. The project focus coefficient is significant but negative resulting in a negative market reaction of -1.1% for new units in a diverse field and not involving foreign collaboration. This finding implies that investors are skeptical about the managers' capabilities to manage projects in a diverse field. The foreign collaboration coefficient captures differential impact of new units in core area and involving foreign collaboration. The foreign collaboration coefficient is positive and significant resulting in a positive CAR of 3.3%. The results indicate that investors react positively to announcement of new units involving foreign collaboration expecting benefits to accrue from foreign contribution.

The coefficient of the interaction term between project type and project focus captures differential impact of subsequent expansion projects in diverse area and not involving any foreign collaboration. The coefficient is not significant but the resulting net CAR is -2.0%. It clearly shows that when firms continue to invest in an industry which is unrelated to the projects core industry, then the investors believe that the managers' decision is value destructive resulting in the negative market reaction. The coefficient of the interaction term between project type and foreign collaboration captures the differential impact of subsequent expansions in core area and involving foreign collaboration and our findings show that the coefficient is positive and significant. The net CAR for these projects is 5.6% indicating that CAR for subsequent expansions involving foreign collaboration is higher than new units involving foreign collaboration. Expansion of projects involving foreign collaboration in core area indicates successful partnership with foreign firms, further increasing investors' expectations from such projects.

The interaction of project focus and foreign collaboration captures the differential impact of new units in diverse field and involving foreign collaboration. The interaction term coefficient is not significant and the resulting net CAR is only 1.4%. This might be a result of combination of positive expectations associated with foreign collaboration but negative expectations associated with diversification. The three way interaction of project type, project focus and foreign collaboration captures the differential CAR for subsequent expansions in diverse area and involving foreign collaboration. The interaction term coefficient is significant and negative but the net CAR for these projects is not significant.

Model 2 analyses the market reaction of project attributes after controlling for project size, firm characteristics, prevalent interest rate and industry affiliation. We find that the results of model 1 hold true even after controlling for other project and firm variables. We report significant impact of free cash-flow and interest rate on CAR. Free cash-flow indicates availability of financing for the project. As Indian firms have promoters with large equity ownership, the agency problem of expropriation of share-holders by managers is not relevant resulting in the positive impact of free cash-flow. High interest rate indicates higher cost of financing resulting in negative impact.

**Table 5**

Effect of project attributes on the market reaction (3-day CAR) to capital expenditure project announcements

Sample Period: 1996-2010

Variable	Model 1		Net CAR		Model 2	
	Coeff.	t-stat	CAR	t-stat	Coeff.	t-stat
Constant	0.015	8.2**	0.015	8.2**	0.016	1.4
Project Type	-0.008	2.5*	0.007	1.9 <sup>b</sup>	-0.008	2.4*
Project Focus	-0.026	-8.7**	-0.011	-3.2**	-0.027	-8.9**
Foreign Collaboration	0.018	2.9**	0.033	5.0**	0.022	3.6**
Type x Focus	-0.001	-0.2	-0.020	-4.1**	-0.001	0.1
Type x Collaboration	0.031	2.6**	0.056	5.7**	0.030	2.6**
Focus x Collaboration	0.006	0.6	0.014	1.7 <sup>b</sup>	0.007	0.7
Type x Focus x Collaboration	-0.032	1.8 <sup>b</sup>	0.004	0.29	-0.034	1.9 <sup>b</sup>
Project Size					0.004	1.3
Firm Affiliation					0.002	0.7
M/B Ratio					0.002	1.2
Firm Size					0.001	0.2
Firm Leverage					0.007	1.6
Promoter Holdings					0.006	0.9
Free Cash-flow					0.006	2.0*
Firm Age					-0.002	-1.2
Interest Rate					-0.109	1.9 <sup>b</sup>
R <sup>2</sup>	0.11				0.13	
S.E. (Reg. estimate)	0.041				0.041	
F-statistic	23.9**				6.9**	
N	1336				1336	

Notes

\*\* , \* , <sup>b</sup> , denotes statistical significance at the 1% , 5% and 10% levels respectively.

This table reports the results of the full sample OLS regression examining the impact of project attributes on the market reaction to capital expenditure project announcements. Model 1 examines the market reaction for different classes of projects resulting from the interaction of the three project attributes. Net CAR captures the market reaction to different classes of projects. Model 2 presents the results of the full model examining the impact of project attributes after controlling for firm characteristics, interest rate and industry affiliation. Heteroscedasticity has been controlled using the White's standard errors correction technique.

## VI. Business group affiliation impact

The cross-sectional results clearly demonstrate the impact of business group affiliation on the market reaction to project announcements. Business group is a complex structure which allows ownership and control of various firms in pyramidal form or through cross-holdings amongst firms (La Porta et al., (1999) and Johnson et al., (2000)). Firms affiliated to a business group gain from the internal capital markets and shared resources within the group but also suffer from tunneling (Khanna and Palepu (1997) and Bertrand et al., (2002)). To examine impact of group affiliation we conduct regression analysis on subset of projects classified on the basis of firm affiliation.

Table 7 presents the findings of the cross-sectional analysis conducted separately for business group and stand-alone projects. The CAR for new units in core area not involving foreign collaboration are positive for both business groups as well as for stand-alone firms. The CAR for subsequent expansions in core area not involving foreign collaboration is lower than that for new units and insignificant for both business groups and stand-alone firms. The CAR for new units in diverse area and no foreign collaboration is negative for business group projects. The CAR for subsequent expansion of these projects is also negative and higher than that for new units. These market reactions indicate that investors are wary of business group firms investing in projects in unrelated industries as these can be effective modes of tunneling and expropriation. Expansion of these projects further strengthens this view resulting in the larger negative market reaction. In case of stand-alone firms the market reaction to new projects in diverse industry as well as for subsequent expansion of projects in diverse area is insignificant. Stand-alone firms do not suffer for tunneling and hence the negative impact of tunneling seen in business groups does not exist here. At the same time, investors are not sure whether the promoters will continue with these projects resulting in the insignificant response.

In the case of business groups, the CAR for new units in core area involving foreign collaboration are positive and higher than for new units in core area not involving foreign collaboration indicating that foreign collaboration is expected to increase value of the project. Subsequent expansion of projects in core area involving foreign collaboration report higher CAR in comparison to new units in core area involving foreign collaboration. Business groups are larger in size and scope than stand-alone firms and hence have stronger bargaining power than stand-alone firms while dealing with foreign partners. At the same time the monitoring by the foreign partner reduces the risk of tunneling and expropriation. Hence, we document strong market reactions to projects with foreign collaboration by business groups.

In the case of stand-alone firms, the market reaction to announcement of new units in core area and involving foreign collaboration is insignificant but the market reaction for subsequent expansion of these projects is positive. In emerging economies, resource availability and production capability of stand-alone firms is lower in comparison to group firms (Khanna and Palepu (1997)). Foreign firms prefer larger and more capable domestic firms for collaboration (Dahlquist and Robertson (2001), Rajagopalan and Zhang (2008)). Even if a foreign firm collaborates with a stand-alone firm for the project, there is a distinct possibility that the stand-alone firm may not be able to fulfill the project implementation requirements due to the resource and capability constraints. In such cases, there is possibility that the foreign firm might not continue the collaboration. Investors hence have low expectations from new projects involving foreign collaboration announced by stand-alone firms resulting in the insignificant market reaction. Interestingly the CAR for subsequent expansions of such projects in core area

are positive and significant. Expansion of project involving foreign firm indicates long-term relationship and continued benefits from the foreign association resulting in the significant market reaction.

The CAR for new units in diverse area and involving foreign collaboration is positive for business groups. Investors view announcement by any business group firm as announcement by the business group (which has already illustrated successful diversification) rather than by one of the business group firms. Hence, even though the investment is in diverse area, involvement of a foreign firm reduces the risk of tunneling resulting in the positive market reaction. The CAR for new units in diverse area and involving foreign collaboration is not significant for stand-alone firms. The negative expectation associated with diverse area projects are balanced by the positive expectation arising from foreign collaboration resulting in the insignificant market reaction.

The CAR for subsequent expansion of these projects is not significant for business group firms and negative for stand-alone firms. Expansion of a project in diverse industry where the firm does not have expertise but has ventured with the help of foreign collaboration results in the firm's increased dependence on the foreign partner for successful completion of the project. Investors are not sure if the benefits of the project will accrue to the firm in such a situation as the foreign partner can use the project for simply entering a new market. This situation does not arise when the project is in the core industry of the domestic firm as the firm has expertise in the industry and can protect its interest.

We report that the market-to-book ratio has a positive impact on CAR for projects announced by group firms. Market-to-book ratio reflects growth and projects announced by growth firms are deemed to be more profitable. Firm leverage has a positive impact on CAR of group firms as high leverage not only indicates higher availability of funding but also acts as control measure against tunneling. We find a negative impact of interest rate on CAR. Promoter holdings have a significant positive impact on CAR for stand-alone firm projects. High promoter holdings indicate promoters entrenched interests in successful completion of the project assuring the investors regarding the success of the project. We find that free cash-flow has a positive impact on CAR for projects announced by stand-alone firms. Stand-alone firms do not suffer from tunneling and availability of free cash-flow represent capabilities to implement projects effectively. The comparative analysis clearly shows that impact of project attributes differs for business groups and stand-alone firms. The factors impacting the market reaction also differ across these two groups clearly delineating the impact of business group affiliation.

**Table 6**

Effect of project attributes on the market reaction (3-day CAR) to capex projects announced by business groups and stand-alone firms [Sample Period: 1996-2010]

Variables	Business Groups				Stand-alone Firms			
	Net CAR		Full Model		Net CAR		Full Model	
	CAR	t-stat	CAR	t-stat	CAR	t-stat	CAR	t-stat
Constant	0.016	7.8**	0.024	1.9 <sup>b</sup>	0.012	3.6**	0.018	0.8
Project Type	0.006	1.6	-0.009	2.6*	0.007	1.0	-	-0.7
Project Focus	-0.012	-2.9**	-0.029	-8.1**	-0.009	-1.4	-	-
Foreign Collaboration	0.038	5.4**	0.026	3.7**	0.020	1.3	0.015	1.2
Type x Focus	-0.024	-4.9**	-0.002	-0.4	-0.008	-0.7	0.010	0.8
Type x Collaboration	0.058	5.4**	0.030	2.3*	0.036	7.3**	0.010	0.6
Focus x Collaboration	0.018	2.2*	0.009	0.8	-0.009	-0.5	-	-0.9
Type x Focus x Collaboration	0.008	0.6	-0.032	1.5	-0.052	-10.7**	-	-2.1*
Project Size			0.006	1.5			0.001	0.1
M/B Ratio			0.004	2.3*			0.002	-0.8
Firm Size			-0.001	-0.2			0.001	0.2
Firm Leverage			0.011	2.0*			0.002	-0.2
Promoter Holdings			-0.007	-0.9			0.040	2.4**
Free Cash-flow			0.005	1.1			0.008	2.0*
Firm Age			-0.002	-0.8			0.006	-1.5
Interest Rate			-0.162	-2.5*			0.064	-0.5
R <sup>2</sup>	0.16		0.16		0.05		0.10	
S.E. (Reg. estimate)	0.038		0.038		0.047		0.047	
F-statistic	25.1**		7.3**		2.80**		1.59*	
N	926		926		410		410	

Notes

\*\* , \* , <sup>b</sup>, denotes statistical significance at the 1%, 5% and 10% levels respectively.

This table reports the results of the OLS regression examining the impact of project attributes on the market reaction to capex projects announced by business group affiliated firms. Net CAR captures the net market reaction of different classes of projects resulting from the interaction of the three project attributes viz., project type, project focus and foreign collaboration. Full model provides the results of the regression examining the impact of project attributes after controlling for firm characteristics, interest rate and industry affiliation. Heteroscedasticity has been controlled using the White's standard errors correction technique.

## VII. Conclusion

In this paper, we examine the impact of project type, project focus and foreign collaboration on the market reaction to capex projects in India. Our results document a positive market reaction suggesting that capex projects are value additive. We report a higher market reaction for new unit projects in comparison to subsequent expansion projects. We report a negative market reaction for projects having a diversified focus indicating negative expectations associated with such projects. In terms of foreign collaboration we report a positive impact of foreign collaboration on the market reaction. Foreign firms provide new technology and cheap capital contributing to increased value of such projects. We conduct separate analysis for business group projects and stand-alone projects and document differing market reaction to business group affiliated projects in comparison to stand-alone projects. Our results substantiate the fact that in an emerging economy observable project attributes provide an insight into the reasoning behind project initiation and play an important role in determining the market reaction to any capital expenditure decision.

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## Appendix A

### Variable Definitions and Sources

Variable	Symbol	Definition
Age		Period between incorporation date of firm and announcement date of project in years. Data are obtained from CMIE Prowess database.
Firm Affiliation	FA	Firm affiliation captures whether the firm is affiliated to any business group or is a stand-alone firm. It is a dummy variable which takes value of '1' in case of business group projects and '0' for projects announced by stand-alone firms.
Firm Size	FS	Natural log of total assets of the firm in crores of rupees. Data are obtained from CMIE Prowess database.
Free Cash-flow	FCF	Ratio of cash-flow available with the firm at the time of project announcement to the total assets of the firm. Data are obtained from CMIE Prowess database.
Industry Dummy	Ind. Dum	Captures the industry affiliation (core operating industry) of announcing firms. Firms are categorized into 14 industry groups based on their core industry.
Leverage	Lev	Ratio of total debt to the total assets of the firm. Data are obtained from CMIE Prowess database.
Market to Book value ratio	MB	Ratio of market value of all the firm's liabilities to book value of the firm's total assets. Data are obtained from CMIE Prowess database.
Project Cost	PC	Total amount planned to be invested in that particular project as announced by the firm. Data are obtained from CMIE Capex database.
Project Size	Size	Ratio of project cost to total assets of the firm at the time of announcement. Data are obtained from CMIE Prowess and CMIE Capex database.
Promoter's holdings	PH	Ratio of total number of shares held by the promoters of the firm to the total number of outstanding shares issued by the firm. Data are obtained from CMIE Prowess database.
Interest Rate	Rate	The 91-day T-bill yield for the financial year prevailing at the time of announcement. Data are obtained from Reserve Bank of India Database.