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DIVERSIFICATION STRATEGY AND FIRM PERFORMANCE

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Whereas many scholars have examined the business group affiliation-performance relationship, very few have examined the mediating role that industry and diversification (related vs unrelated) strategy plays in this focal relationship (Carney et al. 2011). We provide empirical evidence that the effect of diversified business groups on the performance of affiliated firms is dependent on i) the industry to which the firm belongs and ii) the type of diversification strategy followed by the group. We find that in Chemical & Allied Products industry ROA has a negative relationship with unrelated diversification but ROA has a positive relationship in Transportation Equipment industry. In Electronics & other Electrical Equipment industry, ROA has a negative relationship with unrelated diversification while it has a positive relationship with related diversification.

Key Words: Business groups, Related diversification, Unrelated diversification, Firm performance, Emerging economies

INTRODUCTION

Several studies propose that diversification is more likely to be profitable in emerging economies. Based on data between 1970s and 1990s, studies in Chile (Khanna and Palepu, 2000a), China (Keister, 2000; Li and Wong, 2003; Ma, Yao, and Xi, 2006; Yiu, Bruton, and Lu, 2005), India (Khanna and Palepu, 2000b; Ramaswamy, Li, and Pettit, 2004), Indonesia (Mursitama, 2006), South Korea (Chang and Choi, 1988; Chang and Hong, 2000, 2002), and a variety of emerging economies (Guillen, 2000; Khanna and Rivkin, 2001; Nachum, 2004) report a diversification premium, with some (although not all) business group-affiliated firms outperforming non-affiliated, independent firms. These findings have led to an institution-based theory of diversification, which posits that conglomeration may help member firms overcome market imperfections prevalent in emerging economies (Khanna and Palepu, 2000b; Kogut, Walker, and Anand, 2002).

Despite the plausibility of the institution-based theory of diversification, a question that immediately comes to mind is: Is the diversification premium found in emerging economies due to related or unrelated diversification strategy? This question becomes more pertinent as majority of the empirical studies have not made a clear distinction between related and unrelated diversification. A large number of them have used a dummy variable to indicate whether or not a firm derived a majority of its revenues from a single two-digit SIC code (Li and Wong, 2003). Thus, any firm that is not a

dominant business (Rumelt, 1974) is automatically categorized as a diversified firm hence leaving untapped the related and unrelated dimensions. Further, there is no clear evidence to support the beneficial effects of different diversification strategies. For example, Chang and Hong (2000) in their study of Korean firms found that both related and unrelated diversification have a positive impact on firm performance; Kakani (2000) found that unrelated diversification has a negative impact on Indian firm performance while Li and Wong (2003) found that the interaction effect of related and unrelated diversification is significant for performance of Chinese firms. Without a clear synthesis of the existing studies, the effect of the type of diversification strategy on performance cannot be answered. Thus the primary motivation of this study is to provide empirical evidence to the question ‘*what is the relationship between the different diversification strategies (related & unrelated) and firm performance?*’

Researchers such as Schmalensee (1985) argue that around 20% variation of firm profitability is due to industry affects. We argue that the industry affects in the case of an emerging economy would be more pronounced because of marked differences among industries which are at different stages of development. For example, the emerging economies of Asia, Latin America and Southern Europe developed in the 1960s and 1970s by entering into mature industries like simple assembled goods, electrical appliances, rubber, transportation equipment and steel (Haggard, 1990). These industries are likely to be less dynamic than new age industries like pharmaceuticals and telecommunications. Most of the studies have examined the relationship between diversification and firm performance at the aggregate level (Khanna and Palepu, 2000a, 2000b; Chang and Hong, 2002; Chu, 2004). Very few authors have argued that diversification-performance relationship depends on the industry characteristics (Santalo and Becerra, 2006) or have examined them at the industry level (e.g. Palepu, 1985 in food products industry). This study fills up this gap by examining the relationships across each industry. Thus, a more in-depth analysis could be provided by studying each industry separately.

The plan of the paper is as follows. In Section 2, we review the literature on diversification and firm performance. In Section 3, we present the hypotheses followed by the results of the study in Section 4. We conclude the paper with a discussion of the results in Section 5.

BACKGROUND STUDY

Business group diversification and firm performance

Studies examining the relationship between diversification and performance can be categorized into three broad perspectives- institutional, sociological and resource based. The institutional perspective probes how institutional factors dictate diversification. Khanna and Palepu (1997) identified five factors in institutional environments: the product market, the capital market, the labour market, laws and regulation, and contract enforcement, the absence or inefficiency of which would make unrelated diversification an effective form of business operations. This is because by creating internal capital markets, internal labour markets and internal product markets, a business group fills in institutional voids by internalizing key external institutes. These internal markets will function effectively if business entities competing for resources and support are autonomous (Hill, 1988) and if the internal markets resemble key market conditions of variety and choice (Li and Simerly, 1998). Unrelated diversification allows for both these and thus is an effective way of organizing business.

Moving away from the transaction cost perspective to the sociological perspective, Kock and Guillen (2001) propose that protectionism and other barriers in the less economically and institutionally developed economies distort the value of resources, and make diversification more viable than in advanced economies. They propose that in addition to competencies and technological abilities, resources such as political and bureaucratic contacts and connections are important for determining the incentives and outcomes of diversification in such environments. Since these contacts are generic in nature and can be used across industries they propose that in emerging economies unrelated diversification would be more profitable than related diversification. Backman (1999) proposes that for many Asian firms' diversification is motivated by aspects which market efficiency factors do not adequately capture, such as exploitation of privileged access to information, licenses and markets. However, such advantages decline with development, suggesting that unrelated diversification is less beneficial in more developed institutional environments (Kock and Guillen, 2001).

The resource based perspective suggests that superior performance will emerge because of cross-utilization of unique, valuable, in-imitable and immobile resources and

capabilities within firms of a business group. Peng, Lee and Wang (2005) argue that superior performance of affiliated firms arises not only from product relatedness but also from institutional relatedness. They define institutional relatedness as ‘the degree of informal embeddedness or interconnectedness’ (p. 623) within firms in the same business groups. They argue that higher the institutional and product relatedness among affiliated firms, the better should be its performance. According to resource based view, close linkages and uniform resource support among affiliated firms would lead to superior performance (Li and Wong, 2003). Related diversification allows multiple businesses to share resources and core competencies and to jointly identify and develop core competencies further. Thus, related diversified business groups are uniquely positioned to deal with the challenge of resource building and leveraging.

Thus the debate on related and unrelated diversification and its impact on firm performance have two important dimensions. Emphasizing only on resource based explanation and equating related diversification as the optimal corporate scope in emerging economies may be misleading, as there exists important institutional voids that companies must manage. Equally, emphasizing only on the institutional explanation and therefore focusing on unrelated diversification as the optimal corporate strategy may be misleading since pure unrelated diversification may be value destroying if top managers have their own self-interest in mind rather than firm performance.

Rationale for industry-wise analysis

Considering that in most of the studies in this literature, researchers have examined the relationship between diversification and performance by aggregating data at the industry level (Chu, 2004; Kakani, 2000; Khanna and Palepu, 2000a, b; Zattoni, Pedersen and Kumar, 2009), the industry-wise analysis used in our study deserves explanation. We argue, following Santalo´ and Becerra (2006), that the impact of diversification on firm performance depends on industry characteristics such as industry concentration, firm investments in that industry and size of the industry. In a highly competitive (fragmented) industry, integration of a firm into a larger entity, such as an unrelated business group, results in the introduction of a new layer in the hierarchy which could distort the optimal incentives provided by the market, thereby increasing co-ordination costs resulting in destruction of value. For example, this destruction of value could happen by the creation of a new principal-agent problem or by an increased

influence of costs inside the organization (Meyer, Milgrom, and Roberts, 1992). Secondly, following Hart (1995) and Klein, Crawford and Alchian (1978), we argue that in a competitive industry, incentives to make firm-specific investments will decrease if the owner of the asset is not able to appropriate the ex-post quasi-rents of his investment. This problem could be mitigated by reassigning the property rights through vertical integration (Santalo´ and Becerra, 2006). Thus, industries which are highly competitive and require large firm specific investments will see a dominance of firms which are affiliated to vertically integrated (related) business groups. Finally, following Stigler (1951) who proposed that large demand results in the emergence of specialized firms that operate exclusively in one end of the product value chain, we argue that in industries of smaller market size, the existence of affiliated firms to specialized (related) business groups is not possible because of not enough volume to cover the fixed costs needed to set up independent firms in each step of the value chain. In such industries, firms affiliated to unrelated business groups will dominate due to cross-subsidization and apportioning the cost of fixed assets across industries.

HYPOTHESES, DATA AND MEASURES

Hypotheses

Emerging markets are characterized by ineffective intermediary institutions such as poor communication facilities, inadequate labour market and inefficient capital market, resulting in market imperfections. These conditions are coupled with lack of laws and regulations and inconsistent contract enforcements. Business groups when confronted with these challenges must devise, we argue, a dual approach of (a) market internalization to deal with market condition deficiency (institutional perspective) and (b) social-exchange based on mutual trust and reciprocity for uncertainty reduction (sociological perspective). The internal markets will function effectively if the affiliated firms competing for resources and support are autonomous (Hill, 1988) and the markets themselves resemble conditions of variety and choice (Li and Simerly, 1998). From a social-exchange perspective, a business group engaged in diverse industries may be able to influence its external stakeholders and may be able to secure consistent and favorable treatment from them, such as government agencies in the case of India. Unrelated diversification is a likely direction for meeting these conditions while related

diversification does not because the latter requires close co-ordination and consistency in management.

However, the extent of diversification could vary with some groups being focused on fairly narrow segments of industry, such as TVS Group or Hero Group which have built dominant empires within the transportation industry while others such as the Aditya Birla Group or Tata Group encompasses diverse industries. We argue that the benefit that a firm derives from being affiliated to a business group will depend upon the type of diversification strategy followed by the business group. In particular, a firm in chemical industry, as our paper suggests, should be affiliated to a related diversified business group whereas a firm in transportation equipment industry should be affiliated to an unrelated diversified business group. Nagarjuna Fertilizers & Chemicals Limited would benefit more by being affiliated to related diversified business group like the Nagarjuna Group whereas Tata Motors Limited would benefit more by being affiliated to an unrelated diversified business group like the Tata's. Thus, industry plays a mediating role on determining the effect of diversification strategy on firm performance. Thus,

Hypothesis 1: The relationship between unrelated diversification of business group and its affiliated firm performance will be moderated by the industry in which the affiliated firm belongs

Hypothesis 2: The relationship between related diversification of business group and its affiliated firm performance will be moderated by the industry in which the affiliated firm belongs

Data sources and identifying group affiliation

The data for our study is collected from CMIE (Centre for Monitoring the Indian Economy). Firms affiliated to the top 100 business groups (classified in terms of sales revenue) are considered in our study. We considered those firms that had average sales of not less than Rs 50 million in any period 1 (1997/98-1999/00) or period 2 (2000/01-2002/03) or period 3 (2003/04-2005/06)¹. We segregated the firms into their respective

¹ Further, we discarded groups that were present only in service industry (e.g. ICICI or HDFC) or had only one firm. Firms that had negative average net-worth for the three periods were dropped from the study. Moreover, firms with less than two years of sales revenue data in the database within a three year period were also excluded from the study. The list of firms included in the study can be obtained from the authors.

2 digit SIC industries. We could categorize firms to 12 two digit SIC industries. We, however, present here the results of the three industries, viz, Chemical & Allied Products (SIC 28), Electronics & other Electrical Equipment (SIC 36) and Transportation Equipment (SIC 37) industries. We studied these industries primarily because of two reasons. Firstly, these three industries are at different stages of development and secondly because relatively higher number of firms in these industries as compared to other industries². We also calculated the proportion of the number of firms (sales) in the study to the total number of firms (sales) in the CMIE database across the three industries separately for each time period (Table 1). In our study the proportion of the number of firms to total number of firms ranges from 0.61 to 0.79, The proportion of the sales of firms to the total sales of firms in the industry ranges from 0.75 to 0.85 Thus, the number of firms considered is fairly representative of the total number of firms in the three industries considered in our study.

Table 1: Proportion of the number of firms and sales for three periods for the three industries considered in the study

Industry	Number of firms			Proportion of number of firms			Proportion of sales of firms		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
CAP	67	73	84	0.70	0.73	0.79	0.75	0.79	0.79
EOEE	47	51	65	0.61	0.63	0.69	0.75	0.76	0.79
TE	61	71	80	0.71	0.79	0.73	0.82	0.88	0.85

CAP, EOEE and TE stand for Chemical & Allied Products, Electronics & other Electrical Equipment and Transportation Equipment industries respectively
P1, P2 and P3 stand for period 1 (1997/98-1999/00), period 2 (2000/01-2002/03) and period 3 (2003/04-2005/06) respectively.

²The results of the other industries can also be obtained from the authors.

Palepu (1985) suggests that the time period of the study does affect firm performance. To avoid temporal instability and economic/business cycles, we used a longer time period of nine years. As already indicated, the total period of nine years has been subdivided into 3 sub-periods of 3 years each. Period 1 (1997-98 to 1999-00) is the second phase of liberalization wherein financial reforms were established (average GDP growth 5.8%), period 2 (2000-01 to 2002-03) is the period of recession (average GDP growth 4.7%) and period 3 (2003-04 to 2005-06) is the period of growth (average GDP growth 8%).

Measures

Most of the entries into new lines of business by existing firms in India are carried out by floating a new firm. In contrast, individual firms within a group appear to be remarkably undiversified (Khanna and Palepu, 2000b). We have used the entropy measure of diversification as espoused by Jacquemin and Berry (1974). The entropy measure allows the decomposition of total diversification into two additive components- an unrelated component that measures the extent to which a business group's output is distributed in products across unrelated industry groups and a related component that measures the distribution of the output among related products within the industry groups. We have used ROA as the performance measure³.

RESULTS

Descriptive Statistics

We report in Table 2, descriptive statistics for selected attributes of firms. For example, in Chemical & Allied Products industry, we find that the mean sales, assets and age of firms across the three periods are Rs 14060 million, Rs 1602 million and 34 years respectively. Thus, we find that firms in the Chemical & Allied Products industry are the biggest in terms of assets and also oldest. Assets are bigger for firms in Electrical & Electronics Equipment industry than in Transportation Equipment industry, although firms in both these industries are almost equal in age⁴.

³ To validate our results we also used ROS and Tobin's Q. The results obtained are similar but less significant at conventional levels.

⁴ We also compared the mean sales, assets and age across the three periods by using Bonferroni's test. We found that assets of firms in Chemical & Allied Products Industry is the highest followed by firms in Electronics & other Electrical Equipment Industry and then in Transportation Equipment Industry. There were no significant differences in the mean sales and ages of firms across the three different industries.

Thus, the three industries are at different stages of their life-cycle.

Table 2: Descriptive statistics for the three industries across three different time periods

Mean Statistics	Chemical & Allied Products Industry			Electronics & other Electrical Equipment Industry			Transportation Equipment Industry		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
Sales(Rs in millions)	4800	15580	21800	5330	5720	11290	4520	5400	7380
Assets(Rs in millions)	7330	16970	23780	7250	8340	10310	6210	5650	5640
Age (yrs)	35	34	33	29	30	30	28	29	29

P1, P2 and P3 stand for period 1 (1997/98-1999/00), period 2 (2000/01-2002/03) and period 3 (2003/04-2005/06) respectively.

Multiple Regression Analysis

The base models for relating performance to the type of diversification strategy (related or unrelated) are estimated using the OLS (for period-wise and pooled regressions) and panel regression (for the entire sample) techniques and are specified in equations (1) and (2) as follows:

For period-wise regression

$$\text{Performance } y_{ij} = \alpha + \xi (\text{Group covariates})_j + \delta X_{ij} + \varepsilon_{ij} \text{----- (1)}$$

For pooled and panel regression

$$\text{Performance } y_{ijt} = \alpha + \xi (\text{Group covariates})_{jt} + \delta X_{ijt} + \varepsilon_{ijt} \text{----- (2)}$$

$$\text{And } \varepsilon_{ijt} = \mu_i + \lambda_t + u_{ijt}$$

Where, μ_i denotes the individual effect, λ_t denotes the time effect and u_{ijt} are random variables with mean zero and constant variance; i is the firm, j is the business group to which the firm i belongs in time t . $(\text{Group covariates})_j$ includes either the related or unrelated diversification measure (Table 3 & 4) and their squared terms (Table 5). The regression analysis includes a vector of additional control variables (X) that influence firm performance. This vector includes size of the firm, its age, current ratio (CR), working capital ratio (WCR), trade intensity (TI) and leverage (Lev). The relationship between performance and diversification is estimated using OLS regression (period-

wise) and also with pooled regression for the entire sample with ROA as the dependent variable. However, as Certo and Semadeni (2006) observe that the use of panel data is more relevant and offer advantages over cross-sectional approaches such as less collinearity among the explanatory variables, increased degrees of freedom, and control for firm heterogeneity (Baltagi, 2005), we also use panel regression.

Table 3: Industry-wise and period-wise estimated regression results for unrelated diversification on firm performance

Chemical & Allied Products Industry												
DV		Intercept	Unrelated Diversification	Firm size	Age	CR	WCR	Lev	TI	TM ^a	R ²	F Stat
ROA	P1	0.130 (1.054)	-0.210* (-1.849)	0.0012 (0.194)	-0.092*** (-2.629)	-0.168 (-0.452)	0.188 (1.136)	0.003 (-0.852)	-0.032 (-0.162)	No	0.14	2.35**
ROA	P2	0.047 (0.264)	-0.125* (-1.838)	0.0512 (0.622)	-0.008 (-0.180)	0.531 (1.327)	-0.327 (-0.123)	0.232*** (3.517)	0.416 (1.012)	No	0.16	2.43**
ROA	P3	0.111 (1.452)	-0.009* (-2.025)	0.0929 (1.609)	-0.013*** (-2.436)	-0.003 (-0.038)	0.474 (0.876)	0.021 (-1.058)	0.219* (2.562)	No	0.22	2.82** *
ROA	Pooled	-0.867* (-1.798)	-1.082*** (-2.945)	0.154* (1.901)	0.008 (1.116)	0.064 (0.775)	0.147*** (3.54)	-0.013 (-0.098)	1.180* (2.586)	Yes	0.32	3.88** *
ROA	Panel	2.225*** (9.941)	-1.354*** (-3.552)	0.251** (2.281)	0.101** (2.273)	0.025 (0.836)	0.241*** (3.781)	0.064** (2.301)	0.011 (0.148)	Yes	0.42	5.17** *
Electronics & other Electrical Equipment Industry												
DV		Intercept	Unrelated Diversification	Firm size	Age	CR	WC R	Lev	TI	TM ^a	R ²	F Stat
ROA	P1	0.099 (1.111)	-0.149*** (-3.190)	0.0153 (1.113)	-0.001 (-1.086)	0.015*** (3.570)	0.044 (1.065)	-0.01 (-0.615)	-0.042 (-0.550)	No	0.21	2.76***

ROA	P2	0.135 (0.932)	-0.239*** (-3.108)	-0.108* (-1.838)	0.005 (0.159)	0.463*** (3.126)	-0.035 (-0.070)	0.002 (0.120)	0.346 (0.128)	No	0.26	3.11***
ROA	P3	0.478 (0.189)	-1.015** (-2.104)	-0.585*** (-3.135)	0.001 (-0.051)	0.001 (0.001)	0.831 (0.237)	-0.028 (-1.028)	-0.0547 (-0.235)	No	0.18	2.52**
ROA	Pool	1.118 (0.767)	-0.851*** (-3.772)	-0.180 (-0.849)	-0.027** (-2.429)	0.031 (0.432)	0.726*** (3.083)	-0.032 (-1.304)	4.107** (3.165)	Yes	0.34	4.16***
ROA	Panel	0.747** (2.105)	-0.327*** (-3.468)	-0.421*** (-3.251)	0.111*** (2.851)	-0.021 (-0.295)	-0.133 (-0.827)	0.013*** (2.948)	-0.061 (-0.092)	Yes	0.39	4.88***

Transportation Equipment Industry

DV		Intercept	Unrelated Diversification	Firm size	Age	CR	WC R	Lev	TI	T M ^a	R ²	F Stat
ROA	P1	0.641 (1.288)	0.920** (2.023)	-0.071 (-0.715)	-0.025 (-0.463)	-1.245 (-0.750)	1.309 (0.162)	-1.131** (-2.423)	0.828* (1.913)	No	0.20	2.67***
ROA	P2	-0.010 (-0.197)	0.002** (2.039)	0.001 (0.093)	-0.047** (-2.052)	0.185* (1.721)	-0.133* (-1.881)	-0.001 (-0.748)	0.183*** (4.996)	No	0.35	4.19***
ROA	P3	0.126*** (2.933)	0.033 (1.211)	0.001 (0.071)	-0.036* (-1.724)	0.016** (2.102)	0.011 (0.683)	-0.003* (-1.825)	0.032 (-1.482)	No	0.25	3.09***
ROA	Pool	0.998 (0.965)	2.792*** (4.263)	-0.173 (-0.955)	-0.018** (-2.009)	0.105*** (3.721)	-3.105** (-2.403)	0.158 (1.319)	1.604* (1.976)	Yes	0.38	4.81***
ROA	Panel	0.102** (2.314)	0.178*** (3.512)	-0.005 (-0.075)	-0.126** (-2.345)	0.041** (-2.541)	0.058* (1.780)	-0.102*** (-3.394)	0.093*** (3.196)	Yes	0.40	5.01***

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*, ** & *** denote significance at 10%, 5% and 1% respectively

a- Refers to whether time dummies have been included

Heteroscedacticy-consistent standard errors were used to control for t-statistics, which are reported in parenthesis.

P1, P2 and P3 stands for period 1(1997-1999), period 2(2000-2002) and period 3 (2003-2005) respectively

Table 4: Industry-wise and period-wise estimated regression results for related diversification on firm performance

Chemical & Allied Products Industry												
DV		Intercept	Related Diversification	Firm size	Age	CR	WC R	Lev	TI	T M ^a	R ²	F Stat
RO A	P1	0.245*** (3.815)	0.018 (0.538)	0.014 (1.549)	0.001 (0.174)	0.013 (1.570)	-0.103* (-1.833)	0.112 (0.831)	0.083 (1.145)	No	0.17	2.45**
RO A	P2	0.188* (1.739)	0.046* (1.740)	0.008 (0.626)	-0.003** (-2.229)	0.081 (1.465)	-0.041 (-0.929)	0.005 (0.054)	0.048 (0.535)	No	0.18	2.51**
RO A	P3	0.038 (0.152)	0.311* (1.692)	0.042 (1.384)	-0.002 (-0.698)	0.024 (0.224)	-0.074 (-0.374)	-0.001*** (-3.387)	0.205 (0.869)	No	0.16	2.44**
RO A	Pool ed	-0.792 (-1.652)	1.787*** (2.657)	0.138*** (2.652)	0.008 (1.045)	0.119 (1.503)	0.344 (0.653)	-0.052*** (-3.622)	0.329 (1.035)	Yes	0.33	4.09**
RO A	Panel	0.135 (0.764)	0.921*** (2.914)	0.129 (1.154)	-0.003*** (-3.478)	0.013 (0.552)	-0.061 (-1.271)	0.182*** (-2.787)	0.106** (2.125)	Yes	0.36	4.34**
Electronics & other Electrical Equipment Industry												
DV		Intercept	Related Diversification	Firm size	Age	CR	WC R	Lev	TI	T M ^a	R ²	F Stat

RO A	P1	-0.707 (-0.799)	0.168** (2.481)	1.170 (0.546)	0.010 (1.284)	0.116 (0.568)	0.321 (0.446)	-0.138** (-2.777)	-0.181 (-0.274)	No	0.18	2.50**
RO A	P2	-0.649 (-1.294)	0.567** (2.104)	-0.179 (-.105)	0.007 (0.462)	0.005 (0.092)	0.868 (0.675)	0.085 (0.345)	0.796 (0.612)	No	0.12	2.30**
RO A	P3	-0.002 (-0.003)	0.462* (1.909)	-0.955** (-3.931)	0.007 (1.211)	-0.039 (-1.199)	-0.392 (-0.967)	0.103 (0.792)	1.091* (1.929)	No	0.20	2.69***
RO A	Pool ed	1.743*** (3.585)	1.292*** (2.766)	-0.122** (-3.371)	0.014 (0.529)	-0.032 (-0.224)	-1.188 (-0.776)	-0.457 (-0.873)	-0.730 (-1.046)	Yes	0.33	4.06***
RO A	Panel	-0.912* (-1.756)	0.421*** (4.391)	0.421** (3.145)	0.107* (1.879)	-0.031 (-0.445)	-0.049 (-0.933)	0.015 (0.273)	0.343*** (2.875)	Yes	0.37	4.52***

Transportation Equipment Industry

DV		Intercept	Related Diversification	Firm size	Age	CR	WCR	Lev	TI	T M ^a	R ²	F Stat
RO A	P1	0.148 (1.697)	-0.052 (-1.642)	0.019* (1.810)	-0.001 (-1.321)	0.022 (-0.614)	-0.267 (-0.619)	-0.046*** (-3.607)	0.051 (0.777)	No	0.15	2.40**
RO A	P2	-0.019 (-0.187)	-0.135*** (-3.253)	-0.001 (-0.084)	0.001 (0.638)	0.061 (0.885)	0.089 (-0.403)	0.008 (0.638)	0.214* (1.865)	No	0.14	2.36**
RO A	P3	-0.085 (-0.993)	-0.011* (-1.828)	0.016* (1.807)	-0.001 (-0.645)	0.056 (0.974)	-0.179 (-0.945)	-0.012 (-1.112)	0.066 (1.637)	No	0.13	2.33**
RO A	Pool ed	0.003 (0.002)	-2.570*** (-3.578)	-0.164 (-0.651)	-0.034*** (-2.888)	0.066 (0.417)	1.567*** (2.815)	0.044 (1.626)	2.280* (1.894)	Yes	0.33	4.08**

ROA	Panel 1	0.523 (0.798)	-0.653 *** (-3.604)	0.129 *** (2.985)	-0.009 (-0.395)	0.023 *** (2.664)	-0.337 *** (-3.064)	-0.014 (-0.235)	0.373 (1.135)	Years	0.38	4.84 **
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*, ** & *** denote significance at 10%, 5% and 1% respectively

a- Refers to whether time dummies have been included

Heteroscedasticity-consistent standard errors were used to control for t-statistics, which are reported in parenthesis.

P1, P2 and P3 stands for period 1(1997-1999), period 2(2000-2002) and period 3 (2003-2005) respectively

From Table 3, we find that in Chemical & Allied Products and Electronics & other Electrical Equipment industries, ROA has a negative relationship whereas in Transportation Equipment industry, it shows a positive relationship with unrelated diversification. Similarly, from Table 4 we find that in Chemical & Allied Products and Transportation Equipment industries, ROA has a positive relationship while in Transportation Equipment industry; it has a negative relationship with related diversification. The results are in conformity with our hypotheses which state that industry mediated the relationship between unrelated diversification (hypothesis 1) /related diversification (hypothesis 2) and firm performance.

Following Khanna and Palepu (2000a, 2000b), we also examined whether there is a curvilinear relationship between firm performance and related/unrelated diversification. Rationalizing from institutional theory, we argue that diversified business groups' needs to invest in creating institutions and co-ordinating mechanism that will facilitate the sharing of information and the enforcement of explicit and implicit intra-group contracts (Gerlach, 1992; Lincoln et al., 1996). Investment required to create such mechanism are characterized by fixed costs, thereby implying that there is an economic rationale to undertake them only when the benefits exceed the costs. For example, if internal capital markets are predicated on having a large enough pool of businesses across which to collectively smooth cash flows, such benefits are likely to increase with the extent of diversification. We also add to the body of literature by examining the relationship across each industry separately as we argue that the relationship is moderated by the characteristics of the industry. We present the results in Table 5 using

regression equation 1 (page 12). The co-efficients of the control variables are not presented because of paucity of space.

Table 5: Industry-wise and period-wise estimated coefficients of unrelated and related diversification along with the threshold values for selected performance measures

	Chemical & Allied Products Industry			Electronics & other Electrical Equipment Industry			Transportation Equipment Industry		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
	ROA			ROA			ROA		
Unrelated diversification	-0.053* ** (-3.578)	-0.497* ** (-5.422)	-0.232 (-0.131)	-0.293** * (-6.551)	0.336* ** (-3.067)	0.149* ** (-3.190)	1.672 (0.112)	1.793 (0.120)	0.920* * (2.023)
(Unrelated diversification)²	0.050* ** (3.122)	0.370* * (2.154)	0.037 (0.122)	0.765* ** (5.409)	0.739* ** (3.894)	0.388* ** (3.234)	-1.154 (-0.027)	-1.208 (-0.028)	-0.392* * (-1.742)
Type of relationship	U shaped	U shaped	Not significant	U shaped	U shaped	U shaped	Not significant	Not significant	Inverted U shaped
Threshold Point	0.53	0.67	-----	0.19	0.23	0.19	-----	-----	1.17
Maximum	1.96	2.02	2.23	1.96	2.02	1.93	2.02	2.02	2.23
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average	0.82	0.78	1.07	0.93	0.85	0.88	0.90	0.69	0.81
	ROA			ROA			ROA		
Related diversification	0.931* (1.847)	1.432* * (2.567)	0.449* (1.980)	0.112 (0.009)	1.121 (0.043)	0.403* ** (4.446)	-5.090* ** (-4.621)	-5.274* * (-2.619)	-2.570* ** (-4.578)
(Related diversification)²	-0.857* (-1.681)	-0.848* * (2.088)	-0.436* (-1.787)	-0.483 (-0.008)	-1.051 (-0.051)	-0.218* ** (-3.321)	5.995* ** (3.141)	5.917* * (2.237)	3.021* * (2.277)
Type of relationship	Inverted U shaped	Inverted U shaped	Inverted U shaped	Not significant	Not significant	Inverted U shaped	U shaped	U shaped	U shaped
Threshold Point	0.54	0.84	0.51	-----	-----	0.92	0.42	0.45	0.43
Maximum	1.22	1.26	1.44	1.22	1.20	1.46	1.30	1.31	1.44
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	0.34	0.52	0.47	0.43	0.47	0.44	0.75	0.75	0.81

*, ** &*** denote significance at 10%, 5% and 1% respectively

Heteroscedasticity-consistent standard errors were used to control for t-statistics, which are reported in parenthesis.

P1, P2 and P3 stands for period 1(1997-1999), period 2(2000-2002) and period 3 (2003-2005) respectively

The results show curvilinear dependence of firm performance on diversification. From Table 5, in Chemical & Allied Products and Electronics & other Electrical Equipment industries, we find that ROA has a U shaped relationship with unrelated diversification, while in Transportation Equipment industry, ROA follows an inverted U shaped relationship. We also find that in Chemical & Allied Products and Electronics & other Electrical Equipment industries, ROA follows an inverted U shaped relationship, while in Transportation Equipment industry, it follows U shaped relationship with related diversification.

As performance has either a U shaped or an inverted U shaped relationship with related and unrelated diversification, the threshold values represent the level beyond which diversification either creates value or destroys it. When diversification has an inverted U shaped relationship, the threshold diversification indicates the level beyond which marginal increase in diversification results in decrease in firm performance. In the case of a U shaped relationship, marginal increase in diversification beyond the threshold level will result in increase in firm performance.

From Table 5, we find that in all the three industries, the threshold level lies between the minimum and maximum values. Across the time periods, on an average 34.83% of firms in Chemical & Allied Products industry, 18.81% of firms in Electronics & other Electrical Equipment industry and 60.14% of firms in Transportation Equipment industry are affiliated to business groups whose unrelated diversification levels are less than the threshold. In the first two industries, as unrelated diversification follows a U shaped relationship, firms with unrelated diversification levels beyond the threshold will result in increase in performance with marginal increase in diversification. In the Transportation Equipment Industry, on the other hand, where firm performance has an inverted U shaped relationship, increase in unrelated diversification beyond the threshold levels will result in decrease in firm performance.

Similarly, we also find that across the time periods, on an average 69.49%, 89.05% and 27.22% of firms in Chemical & Allied Products, Electronics & other Electrical Equipment and Transportation Equipment industries respectively are affiliated to business groups whose related diversification levels are less than the threshold level. In the first two industries, marginal increase in related diversification beyond the threshold level will result in decrease in firm performance while the reverse is true for firms in Transportation Equipment industry.

SUMMARY & DISCUSSION

Our study suggests that the effect of diversification on firm performance varies on two dimensions-one the effect of industry and the other, the effect of diversification strategy. A summary of the results from Tables 3, 4 & 5 is presented in Table 6.

Table 6: Summary of the results

Diversification Strategy/ Industry	Chemical & Allied Products Industry	Electronics & other Electrical Equipment Industry	Transportation Equipment Industry
Unrelated diversification	Negative/U shaped relationship	Negative/U shaped relationship	Positive/Inverted U Shaped relationship
Related diversification	Positive/Inverted U Shaped relationship	Positive/Inverted U Shaped relationship	Negative/U shaped relationship

It is evident from Table 6 that in Chemical & Allied Products industry and Electronics & other Electrical Equipment industry, ROA follows a U shaped relationship while in Transportation Equipment industry; it follows an inverted U shaped relationship with unrelated diversification. The relationship between diversification and performance is moderated by industry characteristics. Whether the performance of a firm entering a new business improves or deteriorates depends among other things on the characteristics of the industry. If significant economies of scope and lowering of transactions costs between groups affiliated firms can be achieved at lower levels of diversification, then the relationship would be inverted U shaped. If such benefits can be obtained at higher levels of diversification, then the relationship would be U shaped. In any case, this study finds that it is the underlying industry characteristics that determine the diversification -performance relationship. No study in the Asian context

has looked at effects of performance and diversification on an industry-wise basis⁵. This study is an encouragement to researchers to investigate this relationship over long periods in other emerging economies.

The other finding of the study is that the performance of firms also depends on the type of diversification strategy of the business group. For example, in Chemical & Allied Products industry, ROA has a negative relationship with unrelated diversification while it has a positive relationship with related diversification (Table 6). The diversification strategy of the business group, in turn, might depend on at least two dimensions: leverage and internationalization. Following agency theorists, we argue that higher the leverage of a business group, the higher would be the effective control of the majority shareholders (Berglof and Perotti, 1994), who are more than likely to engage in unrelated diversification in order to appropriate wealth through pyramiding and tunneling (Carney et al., 2011). Finally, a less pronounced international orientation of the business group might result in an unrelated diversified strategy. This might be because of two reasons. First, the specialized service that business groups provide to remedy institutional voids of their home countries may be more valuable domestically than abroad. Second, many of the potential benefits of business groups are grounded in a group's network of social and economic ties (Lamin, 2006) and the benefits of such network benefits are strongest in the home market. Further, as such networks are generic in nature (Granovetter, 2005) and can be used across industries, business groups with a dominant domestic orientation are more likely to be unrelated diversified. Managers therefore need to match the diversification strategy of the business group before entering a particular industry. For example, if a business group follows an unrelated diversification strategy, it would not be advisable to enter in Chemical & Allied Products and Electronics & other Electrical Equipment industries, specifically if its unrelated diversification level is below the threshold level.

The U shaped relationship is in line with the institutional argument of business groups filling in the missing institutional voids. Filling these voids entails fixed costs and thus

⁵ Santalo´ and Becerra (2006) look at diversification-performance relationship across individual industries but with data from US firms.

firms affiliated to highly diversified business groups⁶ are able to distribute these costs optimally and hence are more profitable. The inverted U shaped relationship can be explained from the resource based view (Barney, 1991; Lengnick-Hall and Wolff, 1999) which states that superior performance will result from the development of a coherent set of unique, valuable, in-imitable and immobile resources and capabilities. The resource based view crystallizes the link between resources and capabilities and synergy, or the cross-utilization of strengths across businesses in a diversified business group, a concept central to related diversification. . However, effective exploitation of synergy across a business group requires that there is a high level of co-ordination among affiliated firms. Such co-ordination would not be possible if the business group is diversified beyond a certain threshold. The inverted U shaped relationship specifies that if business groups are diversified beyond a certain threshold, the co-ordination cost will outweigh the benefits of group identify and synergy resulting in poorer performance.

Most of the existing studies have eschewed a multidisciplinary approach while explaining the performance of firms affiliated to business groups. Studies have either addressed the institutional aspect (Chang and Choi, 1988; Khanna and Palepu, 2000a & b) or the resource based aspect (Li and Wong, 2003; Peng, Lee and Wang, 2005). Our article is an attempt to combine these two important aspects so that a richer argument for superior performance of business groups can be formulated. Our results are consistent with both resource based view that suggest business groups may be characterized by superior co-ordination and synergies and also with institutional argument which suggest that business groups have a role in filling up the voids left by the inefficient open market. We are of the opinion that business groups in an emerging economy perform multiple functions such as economic and social and this combination of functions needs to be further researched.

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⁶Rumelt (1974) rationalizes that firms initiate diversification by moving into related industries and gradually moves towards unrelated diversification. Hence, highly diversified firms are more likely to be unrelated diversifiers.

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<i>Abstract:</i> Whereas many scholars have examined the business group affiliation-performance relationship, very few have examined the mediating role that industry and diversification (related vs unrelated) strategy plays in this focal relationship (Carney et al. 2011). We provide empirical evidence that the effect of diversified business groups on the performance of affiliated firms is dependent on i) the industry to which the firm belongs and ii) the type of diversification strategy followed by the group. We find that in Chemical & Allied Products industry ROA has a negative relationship with unrelated diversification but ROA has a positive relationship in Transportation Equipment industry. In Electronics & other Electrical Equipment industry, ROA has a negative relationship with unrelated diversification while it has a positive relationship with related diversification.	
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