A Replication Approach Towards Assessment of Performance of Group Affiliated Firms during Institutional Transition in India

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Abstract

We try to replicate findings of a previously published paper that differentiates firm performance of group affiliated firms from unaffiliated ones during institutional transition in India using different sampling approaches. We vary the sampling and approaches to question the assumptions underlying the earlier model and hence enrich the understanding of the phenomena. Data for firms based in India over a period of 17-23 years is collated to test the model using balanced and an unbalanced panels and the SAS procedure Time Series Cross Section Regression for analysis. We report different results than that of underlying paper, and suggest that an unbalanced panel leads gives richer results in business studies spanning institutional transitions.

Keywords: replication studies; institutional transitions; developing country; business groups

A Replication Approach Towards Assessment of Performance of Group Affiliated Firms during Institutional Transition in India

Extant literature in the areas of strategic management and organizational studies has often focussed on the performance of firms in the context of their affiliations with other firms with common ownership, or organizational structures that permit common managerial resources (Chandler, 1962, Khanna & Palepu, 2000). As in many other constructs in studying modern management practices, the literature initially focussed largely on companies in the developed, western countries for many decades, and it is only in the recent past that we have seen a steady stream of studies from emerging countries (eg: Adidam, Banerjee & Shukla, 2012; Gullien, 2000; Khanna & Palepu, 1999; Vissa, Greve & Chen, 2010).

Studies of business groups across the world have expanded our understanding of this structure, and have bought forth the various nuances by which different business groups vary across different economies. The Japanese groups called 'keiretsu', Korean groups called 'chaebol' and Indian business groups might exhibit some similarities in terms of a common ownership of affiliated firms, but they vary considerably across various dimensions (Khanna & Yafeh, 2007) like types of ties amongst affiliated firms, and the intensity of coordination inside the group (Zattoni, Pedersen & Kumar, 2009). To what extent these differences are explained by historical institutional contexts or broader societal contexts is a matter both difficult to judge and beyond the scope of this paper; yet it can be acknowledged that due to the presence of these differences it is a considerably complicated task to meaningfully and coherently compare business phenomena across these groups (Yiu, Lu, Brunton, & Hoskisson, 2007).

One of the papers that study performance of business groups in an emerging economy context is "The Performance of Group-affiliated Firms during Institutional Transition: A

longitudinal Study of Indian Firms" by A. Zattoni, T. Pederson and V. Kumar. Looking at firm performance during an evolving institutional environment, the authors utilize the institutional theory and transaction-cost theory to explore the effect of business group-affiliation on firms. Using a sample of 547 Indian firms over a 17 year period forming a balanced panel, the authors track the performance of firms during a period of institutional transition that started in 1991 with the introduction of large-scale macro-economic reforms by the Union Government of India.

In this paper, we replicate the study in the spirit of definition of Hubbard and Armstrong (1994, p. 236) as "a duplication of a previously published empirical study that is concerned with assessing whether similar findings can be obtained upon repeating the study". We also take the effort forward by addressing some methodological and design issues that we identified with the original paper, and extend the study to cover more recent years and more companies to the evaluation sample. We believe that due to these changes that have been incorporated in our study, we are in a position to challenge some of the findings of the previous authors, comment on the effect of on-going macro-economic changes in India in our sample, and contribute more meaningfully towards contemporary academic discussions in the areas of strategic management and international business.

Synopsis of Base Paper and Literature Review

The theoretical foundation of the paper can be found in the institutional and transaction-cost theories, which are complementary to each other in their scope. The prior emphasizes the importance of formal and informal constraints, socio-cultural norms and values, and effect of law and judicial system on the behaviour and structure of organizations (North, 1990). The latter looks at markets and hierarchies of organizations as alternative mechanisms for exchanging goods & services amongst participants with different implicit

and explicit sets of cost and advantages, and suggests that managers are required to choose a structure that minimizes the cost of transactions (Williamson, 1975). In absence of institutions and a formal rule based exchange system in the macro economy where the firms indulge in an exchange, the costs of transactions could be lowered by the firm by internalizing some of the activities that would otherwise have been managed by the environment.

Such internalization could lead to intermediate organization forms or 'hybrids' as well, like long-term contracts, franchising, joint ventures etc. (Williamson, 1991) or strategic networks and business groups. However, business groups are differentiated from the other forms in two crucial ways: presence of multiple ties amongst the firms- such as cross-ownership, interlocks of directors, market transactions, societal relations, and inter-firm loans- that hold them together (Khanna & Rivkin, 2001; Goto, 1982); and the presence of a central core entity that co-ordinates the actions and strategy of various firms (Leff, 1978). An example of such a business group is the Tata Group in India, which had over 100 operating companies in seven business sectors and a total revenue of $100.09 billion (around Rs. 475,721 Crore) in 2011-12 (Tata Group Financials, 2013). To tackle an environmental constraint in India of a lack of suitable managerial talent and suitable training institutions, the group had launched Tata Administrative Services in 1956 to create a pipeline of business leaders from within the group, hence overcoming an institutional void.

The emergence of business groups as a structure, whether in response to institutional voids in the environment or to internal resource allocation priorities, is not without its own set of drawbacks. Misallocation of resources could take place amongst the firms in a business group due to any conflict of interest that might exist between major and minor shareholders, and other decisions taken at the central level at the holding company level could also be suboptimal in nature (Khanna & Palepu, 2000). Yet, the affiliation of a firm with a business

groups also confers some advantages in the form of the ability of the group firms to share resources like managers and capital, access to labour and product markets, and other intangible assets like reputation and identity (Khanna & Palepu, 2000; Chang & Hong, 2002; Khanna & Rivkin, 2001). A general consensus amongst researchers, though, is that the advantages of group affiliation for firms outweigh the costs in emerging economies, and this is reflected in better performance for the firms (Chang & Choi, 1988; Khanna & Palepu, 2000).

Yet, underlying these arguments is an assumption of a steady state of institutional forms, that is, the advantages derived by the firms by being in a group affiliated structure are possible when there are institutional voids present in the environment in which these firms operate. In some of the major emerging economies like India and China, in the last couple of decades we have seen the development of new institutions and an emergence of comparatively stronger rule-based interaction amongst firms. Hence, some of the imperfections in the markets for capital, final and intermediate products, and managerial and entrepreneurial talent (Caves, 1989; Khanna, Palepu & Sinha, 2005) that are generally associated with emerging economies might not hold true for these countries once the process of transitioning to a rule based system is underway. Such development of institutions can bring about comprehensive and fundamental change in the environment, and hence can directly or indirectly impact the behaviour and performance of firms (North, 1990). Zattoni, Pedersen and Kumar (2009) indicate that barring a few studies, the impact of such a change on firm's behaviour and performance has not been studied in adequate detail (Khanna & Yafeh, 2007), a research gap that they attempted to fill by way of their paper which we are extending here.

The authors use the two-phase model of market oriented institutional transitions as developed by Peng (2003), that is, a movement from relationship-based contracting to a rule

based contracting amongst market participants. The authors proffer a hypothesis that in the earlier stage of institutional transitions, the performance of group affiliated firms is higher than that of unaffiliated firms due to suitable responses by the group to a changing external environment. They argue that the evolution of these changes are incremental in nature and take time to get implemented even after the initial directives for policy changes have been made explicit by the regulators. The authors further rely on studies by Ghemawat and Khanna (1998) and Peng and Heath (1996) to point out that during initial stages of institutional transitions, competition intensifies even when though older market infrastructure is present, managers have to rely on informal and inter-personal relationships, and informal dealings are the most efficient way of exchange.

The authors further hypothesize that the superior performance of group affiliated firms relative to unaffiliated firms levels out in the late phase of institutional transitions. This they argue based on the findings of Peng (2003) and Oliver (1992) who suggest that even when the market realities change to a more rule-based competition, the group affiliated firms are slow to react to the changes due to them being deeply embedded in old institutions. This inertia of motion becomes an impediment to their dynamic capabilities to respond quickly to external environment and align themselves in a way to exploit maximum benefits out of the newly emerged market opportunities.

The authors posit that the changes are more difficult to adapt to for firms that have been embedded in an earlier institution for a longer period of time. In such a situation, the legitimacy gained by a firm by way of being embedded in a set of institutions (Yiu, Brunton & Lu, 2005) is no longer valuable when the institution itself is in a transition. Consequently, the authors hypothesize that younger group-affiliated firms are better able to cope with institutional transition than older group-affiliated firms.

Basing their arguments on a superior international expansion performance of service industry, and the strength of tradable services, the authors expect manufacturing industry to do much worse than service industry. More specifically, they expect group-affiliated service firms to be better able to cope with institutional transition than group affiliated manufacturing firms.

For segregating the two phases of the process of institutional transition, the authors select 1995-96 as the timeframe. They argue that before 1995-96, the markets for corporate controls in India were absent, most Indian corporations were family managed, and that the product market was shielded from foreign competition. It was around this time that institutions like Securities and Exchange Board of India (SEBI) started operations, the Indian Rupee became fully convertible on current account, stock exchanges shifted to electronic trading, bank lending became easily available, and foreign direct investment was allowed in a few sectors. As per the authors, the presence of all these factors is a strong indicator that the institutional transition of the Indian economy had moved to the next phase.

However, the institutional transition of the economy is a long drawn process, with emergence of new institutions that allow for a more rule- based behavior by firms. One such institution, the Competition Commission of India was set up in the early 2000s to probe instances of illegal market operations by firms in the form of cartelization, but started functioning only a few years later after detailed notifications of its powers and responsibilities, and the legal framework for its operation were defined by the regulators. The emergence of such an institution is likely when the process of institutional transition is not complete, but is still on. Other attempts by the regulators to streamline corporate governance are still in the process of being implemented, for example the proposal to limit the simultaneous numbers of periods when the same auditor can investigate and audit a firm (Kumar, 2012).

The hypotheses proposed by the authors are grounded on some assumptions that might not hold true completely. For example, the authors insist that in an economy like India, service industries hold a natural advantage over manufacturing industries. However, other emerging countries like Bangladesh have attracted significant foreign direct investment in manufacturing sector by way of outsourcing activities, and the same is also true for many regions of India. Sectors such as knowledge-process-outsourcing that attract media attention have certainly been an industry with a steep graph of growth, and some of it can be attributed to firms of business groups that were formed once the boom was noticed in the late 1990s.

For this reason, we do not make a foray into replicating Zattoni, Pedersen and Kumar (2009) in testing the hypothesis that differentiate performance of firms in service vis-à-vis manufacturing industry. Our replication is limited to testing whether the firm performance differs between the group affiliated firms as compared to the unaffiliated ones and whether the positive effect of affiliation wears out over a period of time i.e. the first two hypotheses proposed in base paper (Zattoni, Pedersen & Kumar, 2009).

Methods

The descriptions of the sample creation in Zattoni, Pedersen and Kumar (2009), formed guidelines for the sample construction for this study. The data for the study is drawn from the Prowess database of Centre for Monitoring Indian Economy (CMIE). This firm level database is widely used by researchers in firm level analysis (see Khanna & Palepu, 2000; Rajakumar & Henley, 2007). Zattoni, Pedersen and Kumar (2009) bring into use the balanced panel to test their model. Their sample consists data for 547 firms over a period of 17 years, drawn from the 2006 edition of the Prowess database. We replicate the sample selection and analysis guidelines completely in the first part of our analysis. The second part

of the analysis is based on our concerns about the use of balanced panel in the model and its repurcussions on the results in Zattoni, Pedersen and Kumar (2009).

For the replication of the base study and the extension using the unbalanced panel approach for the period 1990-2006, we drew data firm identity data such as group affiliation, industry affiliation from the 2006 edition of the Prowess database and the financial data from the 2012 edition of the Prowess database. For the extension for the period 1990-2012, we only use the 2012 edition of the database, both for the identity and financial information. The use of different editions to capture the financial data does not change the data. This data is maintained for each firm, yearwise and irrespective of the edition take in the analysis, this does not change. On the other hand, the identity information, such as the industry of operation, business group affiliation, registered address are maintained as a static entry. Any change in any of these fields is overwritten on the existing entry. Thus, it is highly likely that identity information for the same firm is different between 2006 and 2012. Thus, we use different editions of the database to capture the identity information, while using the same edition to capture the financial data.

Measures

We use the same measures as used by Zattoni, Pedersen and Kumar (2009) for the replication and the extension of the paper using unbalanced panel.

Dependent Variable. The firm performance is measured by the Return on Sales (RoS) of a firm. RoS was calculated by dividing the Profit After Tax (PAT) by the total sales of the firm.

Independent Variables. The key independent variable, affiliation to a business group, was measured as a dummy variable. Firms that were affiliated to a business group

were coded as '1', while the unaffiliated firms were coded as '0'. This variable is static i.e. it does not change over the period of the study. An interaction effect of this variable with time was also calculated.

Time, as an independent variable, was measured as the time elapsed since 1990. Since 1990 marks the year in which the institutional transition set in, this variable is aimed at capturing the impact of the insitutional structures setting up and becoming more formalized. The value of time is calculated as the number of years between 1990 and the year in which data is being recorded, thus making it a dynamic variable.

Age represents the age of the firm. While this variable is used by Zattoni, Pedersen and Kumar (2009) to test the hypotheses that concern only the group affiliated firms, this variable still forms a part of the model capturing the difference between the group affiliated firms from the unaffiliated ones.

Control Variables. Firm size, industry that the firm is operating in, firm centrality in the group and group diversity are the four control variables used. Firm size is measured by the logarithm of the total assets.

The Prowess database records more than one industry classifications. In absence of clear indications of which industry database was used in the original study, we used the CMIE industry classification for collating industry data for the firms in our sample. For the replication of the base study, we find that the sample is distributed over 23 industries while for the extension of the study (1990-2006) the sample is distributed over 35 industries. Industry was thus coded as a dummy variable.

Firm centrality represents the importance of the firm within a group. To measure this, a ratio of the total assets of a firm to the assets of the group is calculated. If the ratio is greater

than 0.25 then this variable is coded as '1', and if the ratio is less than 0.25 it is coded as '0'. Group diversity is also measured as a dummy variable. If the business group is present in more than one industries, then it is coded as '1', else it is coded as '0'.

While the measures of firm centrality and group diversity may be able to capture these constructs for group affiliated firms, they fail to do so for unaffiliated firms. How would one calculate the ratio of assets of a firm to the group when the firm is not affiliated to a business group. Similarly, how would the number of industries the group is present in be calculated if the firm is not affiliated to a group. While these questions trouble us, we continue to use these measures and focus our analysis for this study replicating the work by Zattoni, Pedersen and Kumar (2009).

Replication – Sample Selection

The 2006 edition of Prowess comprises of about 17291 companies out of which 18 companies do not find presence in 2012 edition, thus leaving a total group of 17273 companies for the construction of the sample for replication of the model. As outlined in Zattoni, Pedersen and Kumar (2009), companies which belonged to the government sector, cooperatives and those belonging to the financial sector were removed to reach a slightly a smaller set of 11645 companies. To achieve a balanced panel, companies incorporated after 1990 and those with incomplete data were dropped, thus reaching a figure of 9962 observations belonging to 586 firms for 17 years (1990-2006). Out of these firms, 421 were affiliated to business groups and 87 belonged to the service sector. The 586 firms were found to be spread over 23 industries using this classification.

Replication - Results

The SAS procedure suited to the analysis of panel data – Time Series Cross Section Regression (TSCSREG) – was used for analyzing the data for 586 firms over 17 years. This procedure accounts for both the random firm and time effects in the analysis and thus, is found suitable to the objective of the study. Table 1 outlines some of the key estimates for the replication using balanced panel models.

Zattoni, Pedersen and Kumar (2009), argue for the difference in the institutional frameworks that differ across industries. However, the institutional transition brought in post 1990 has been highly in favour of the financial services. The reforms undertaken by the Indian government put the Indian financial services sector on a trajectory of high growth (Das & Drine, 2011). While the presence of firms belonging to the financial service industry could have radically influenced the results, these firms have not been made a part of the sample in Zattoni, Pedersen and Kumar (2009). Despite not including the firms enagaged in financial services, Service industry, as a dummy variable was found to be significantly influencing the firm performance in Zattoni, Pedersen and Kumar (2009). In 2006, over 45% of the firms in service industry belonged to the financial services. In dropping the financial services firms, a substantial part of the services industry has been dropped. We, thus, wonder about the validity of these claims about the 'service industry' having an impact on the relationship between group affiliation and firm performance.

We find, however, that service industry is represented by a combination of three of the 23 industries captured in our model. These industries include services like media and broadcasting, construction, consultancy, engineering, transport and trade. Because of the perfect collinearity with the other variables in the model, this dummy is dropped and the analysis is run without the service industry dummy.

In line with the findings of Zattoni, Pedersen and Kumar (2009), the interaction effect of business group affiliation with time component is found to be significant for the entire period 1990 – 2006 (coefficient: -0.014, $p<0.1$). These results provide some support to hypothesis 1, where the performance of a group affiliated firm varies with an element of time, that is, as time progresses, the performance of group-affiliated firms diminishes. On the other hand, just the affiliation to a business group does not hold significance in any time period.

Total assets are found to have a be significant across all three time periods – 1990-2006 (coefficient: 0.185, $p<0.01$), 1990-95 (coefficient: 0.140, $p<0.05$) and 1996-2006 (coefficient: 0.251, $p<0.01$) - in our analysis, while the same was found significant for 1990-2006 and 1996-2006 only by Zattoni, Pedersen and Kumar (2009).

Table 1

Result – Replication (1990 – 2006)

	1990-2006		1990-95		1996-2006	
Variable	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Intercept	-0.588***	0.213	-0.292	0.187	-0.917***	0.324
Business Group Affiliation	0.252	0.171	0.093	0.162	0.301	0.293
Business Group Affiliation X Time	-0.014*	0.008	0.014	0.025	-0.012	0.015
Age	-0.002	0.002	-0.002	0.002	-0.001	0.003
Logarithm Total Assets	0.185***	0.065	0.140**	0.067	0.251***	0.093
Group Diversity	0.043	0.120	-0.059	0.106	0.056	0.175
Share of Group	-0.114	0.111	-0.1	0.102	-0.176	0.164
Industry Dummies	23		23		23	
Number of Observations	9962		3516		6446	
Number of Firms	586		586		586	
Number of Years	17		17		17	
R-Square	0.014		0.004		0.023	
Variance Components						
Firm	0.395		0		0.903	
Time Series	0		0.002		0	
Error	8.137		3.951		10.145	

****, ** and * represent significance levels 1, 5 and 10 percent, respectively.*

Zattoni, Pedersen and Kumar (2009) report a R-square of 0.10 to 0.16 for three time periods. Our results show an R-square in the range 0.004 to 0.023. We wonder how the difference in R-square of the same model be so different, especially when the sample was drawn from the same population (going by the same sampling guidelines) and the model built using the same measures as Zattoni, Pedersen and Kumar (2009).

Selection bias in Zattoni, Pedersen and Kumar (2009)

Furthermore, while the use of balanced panel finds acceptance in existing literature (eg: Khanna & Palepu, 2000), its use for the current model is questionable. We believe that the use of a balanced panel brings selection bias in the model proposed by Zattoni, Pedersen and Kumar (2009). The use of a balanced panel ensures that only those organizations that have survived for 17 years i.e. from 1990 to 2006, are captured as the data for the model. Organizations that have wound up during this period do not figure at all in the sample. Such a sample implies that the worst that could have happened for a firm was incurring losses; but going out of business was never a possiblility. The worst performing firm in the balanced panel sample, thus, was the one that survived through the 17 years of institutional transition. Evidently, the use of this kind of panel does not consider the effect of institutional transition on the firm's life. The presence of organizations that wound up could have given one significant insights into the performance of organizations, that ranges from going out of business to superior business performance.

The balanced panel approach also ignores the effect of institutional transition as an impetus to new firms coming into business. According to Prowess, about 12,000 public and private limited companies were incorporated between 1990 and 2006 in India. Since data for these firms is not present for all the 17 years, these do not form a part of the balanced panel drawn in Zattoni, Pedersen and Kumar (2009).

Extension - Sample Selection

Going by the time period in which the model was tested in Zattoni, Pedersen and Kumar (2009), we limit the time period of the unbalanced panel from 1990 to 2006 as our first modification. We follow all the sample selection guidelines presented in Zattoni, Pedersen and Kumar (2009) except the ones that describe the construction of a balanced panel, to select the sample for this extension of the study.

Drawing from the 2006 edition of the Prowess database with 17291 firms, we first remove firms belonging to cooperatives, government and financial sector. Further, after accounting for missing data, we get a sample of 80419 observations for 10192 firms. 2941 firms in this sample were affiliated to business groups and all the 10192 firms were spread across 35 industries. The industry classification, here again, was based on the CMIE industry classification as discussed earlier.

Under the unbalanced panel approach, we add another modification and increase the time period limits from 1990 – 2012. For this, we referred to only the 2012 edition of the Prowess database which includes data for 27195 public and private limited companies based in India. After removing firms belonging to the cooperative, government and financial services sector and accounting for missing data, we get a sample of 12765 firms and 122852 observations over a 23 year period. In this sample, 3659 are observed to be affiliated to a business group.

Extension - Results

The interaction of the business group affiliation with time is found to be highly significant in its impact on firm performance (coefficient: -0.249, $p<0.001$) in the period 1990-2006. However, this ceases to be significant when the time period is extended till 2012.

In this extended time period, however, the business group affiliation is found to be significantly impacting the firm performance (coefficient: -5.492, $p<0.1$). This possibly implies that affiliation to a business group has a negative impact on firm performance if assessed over a long period of time. Perhaps, it makes better long term choice for firms to not be affiliated to a business group. This is an interesting finding and could elicit further investigation.

Table 2:

Extension (Unbalanced Panel) Results for two time periods

	1990 - 2006		1990-2012	
Variable	Coefficient	Std Error	Coefficient	Std Error
Intercept	-1.817#	0.520	-0.920	1.323
Business Group Affiliation	-0.744	0.975	-5.492*	2.929
Business Group Affiliation X Time	-0.249#	0.047	-0.071	0.101
Age	-0.002	0.008	-0.008	0.022
Logarithm Total Assets	0.224	0.211	0.576	0.518
Group Diversity	3.064#	0.809	5.271**	2.504
Share of Group	-0.452	0.533	4.000**	1.58
Number of Observations	80419		122852	
Number of Firms	10192		12765	
Number of Years	17		23	
R-Square	0.001		0.0001	
Variance Components				
Firm	65.12		553.42	
Time Series	0.205		0	
Error	1017.717		12987	

*#, ***, ** and * represent significance levels 0.1,1, 5 and 10 percent, respectively.*

Group diversity, a group level characteristic in the model, is found to be significant in both time periods i.e. 1990-2006 (Coefficient: 3.064, $p<0.001$) and 1990-2012 (Coefficient: 5.271, $p<0.05$). Group diversity is operationalized as a dummy variable that differentiates groups that are present in just one industry from groups that are present in more than one

industry. The positive coefficient signifies at the benefits that accrue to the firm performance if the group to which it is affiliated is present in more than one industry. While the results could be significant, the construct of group diversity is meaningless for the firms unaffiliated to a business group.

The importance of the firm within a group or the variable share of group or firm centrality is also found to be significant is the extended time period 1990-2012 (Coefficient: 5.271, $p<0.05$). This construct again does not apply to the firms that are not affiliated to any business group.

Discussion and Future Research

Our primary aim of replicating and extending the study of Zattoni, Pedersen and Kumar (2009) was to test the results of the paper and report the veracity of the same. However, such an approach has an inherent weakness that we continue on the path as specified by the original authors. Some of the operating definitions as used by the authors have hence been used in the same form, though we believe that a more accurate operationalization of constructs is required.

The construct of group centrality is measured as '1' by the original authors if the value of firm assets is more than 25 percent of group assets. We believe that this measures can be made more accurate by including the effect of director's network interlocks which has been ignored. Some recent literature (eg: Jackling & Johl, 2009) have considered the importance of presence of key individuals on the boards of group companies arguing that such a presence indicates a managerial emphasis from the owners towards growth and better control on group firms that require more attention from the owners, particularly if it is a family owned business group.

Also, measuring group centrality from an assets perspective could lead to biased results as the calculations could at best be done on the basis of publically held information regarding group companies and their financial data. However, business groups in India have been known to have complex and complicated holding structures, with the ownership stakes held in ways that could be a black box to academics and researchers at a scale that permits large sample data analysis as was done by this paper. In such a condition, it becomes important that other proxies, like board interlocks and group cross-holdings are used to measure constructs like group centrality.

The multiple changes in regulatory inputs, competitive scenario and institutional environment impacts the behavior of a group structure and the relative position of singular firms within them at a rapid rate. There have been multiple instances identified where the main business industry of a firm itself changes over a year to next primarily because of the diversified interests that the firm has, and the relative strength of a particular industry in the macro-economic cycle in a particular year. However, the paper does not take into account this dynamic nature of changes in firm and business group strategy and its outcomes, and hence not adequately capture the changes in these variables on a year to year basis. Some variables like ‘industry’ are captured at a singular point of time, which is the year the data for the study was picked from Prowess database. Measuring these variables dynamically could bring forth more enriched results.

The Prowess database has been extensively used in this paper and many other papers studying Indian firms (Khanna & Rivkin, 2001; Khanna & Palepu, 1999); however some issues relating to selection bias in the database are not addressed. The bigger issue that we identified relates to the changes in industry classifications that the database incorporates , but have not been addressed in the paper. The schema of classification of ‘industry’ used by

Prowess is also different from the otherwise used National Industrial Classification (NIC) schema, and this could impact the interpretation of some industry- specific results.

Neither the original paper by Zattoni, Pedersen and Kumar (2009), nor ours, explicitly address the issue of 'how' institutional transition affects the dependent variables. Such an answer can better be found my using mixed-mode research by including in-depth case studies in the research design. Another interesting insight that such a case study could throw up is the different ways in which institutional or market changes affect business groups and firms within those business groups.

Zattoni, Pedersen and Kumar (2009) mention other lacunae of their study in the 'limitations' section of their paper as well. We believe that the limitations mentioned here open up avenues for further research in the field, and we ourselves are working on addressing some of the said limitations in our upcoming work.

Conclusions

Our work of replicating and extending the study of Zattoni, Pedersen and Kumar (2009) throws up some interesting results. The first is about the differences in the results that we get vis-à-vis what the base paper mentions. While the direction of most of the results are in line with each other, the effect sizes vary by a big extent; of particular concern is the R squared value that differs between the papers by a factor of 10. Some of this difference could be traced back to the slight differences in the sample that we were able to create based on some very limited and vague definitions mentioned by the original authors in their paper. In line with other authors who have emphasized the importance of clear data definitions and variable operationalizations, and the necessity of availability of final data used in a study to be put for public scrutiny (Borgman, 2012; Piwowar, Day & Fridsma, 2007), we request researchers to actively share the data used in their studies with their peers in their fields, so

that the results are verified in more detail and the society is better-off with more robust, reliable and accurate results.

Table 3:

Comparison of Results*

Variable	Base Paper (1990-2006)	Replication (1990-2006)	Extension (1990-2006)	Extension (1990-2012)
Intercept	Sig (10%)	Sig(1%)	Sig(.1%)	
Business Group Affiliation				Sig(10%)
Business Group Affiliation X Time	Sig(1%)	Sig(10%)	Sig(.1%)	
Age	Sig (10%)			
Logarithm Total Assets	Sig (0.1%)	Sig(1%)		
Group Diversity			Sig(.1%)	Sig(5%)
Share of Group				Sig(5%)
Service Industry	Sig (10%)			
Industry Dummies	27	23	34	35
Number of Observations	9299	9962	80419	122852
Number of Firms	547	586	10192	12765
Number of years	17 (Balanced)	17 (Balanced)	17 (Unbalanced)	23 (Unbalanced)
R-Square	0.15	0.014	0.0008	0.0001

**Boxes in grey indicate values not significant, boxes in black indicate variable dropped from analysis*

Table 3 outlines the difference in results between the time periods and panel methods. Practitioners in the field of management in India and other developing countries might find our extension relevant as it tracks some impacts of institutional and market changes on the performance of firms over a long period of time. Since the time-frame of the study is large- one for 17 years and the other for 23 years, we believe that other practioners might find the results and interpretations useful and will be able to align their firm strategies, behavior and responses to market and regulatory changes accordingly.

Academics and researchers might find our effort at replication and extension useful as it supports the findings of Zattoni, Pedersen and Kumar (2009) by using a larger sample and a different method of analyzing the data, though the effect sizes calculated by us differ from what they reported. We believe that the larger sample adds value to the findings of the original paper, and overcomes some of the drawbacks of the original study. As such, this study is done in the spirit of replication studies to make management sciences more 'perfect' by following the call of Hubbard and Armstrong (1994) and Hunter (2001).

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