

DRIVERS OF SYNERGY GAINS IN INDIAN M&As: A SYSTEM GMM APPROACH

Anjala Kalsie*, Neha Singh**

Abstract *The aim of this article is to show the potential realisation of synergistic advantages for Indian firms experiencing M&A, by examining 120 M&A deals which took place between 2005 and 2015. The aim of the present study is to examine: (a) if the target is small relative to acquirer, then synergy gains will also be small, (b) if the mode of payment for the deal is cash, greater synergies are gained, and (c) if the acquisitions take place in related industries more synergies are gained. The paper uses system generalised methods of moments (GMM) estimation method to estimate the relationship. The results demonstrate that the profitability of acquiring entities increases in post-M&A stage, when the deal is settled in cash and mergers take place in related industries. Synergistic advantages of M&A appear to be perceived by enhanced market cap to assets, improvement in financial leverage, and a positive operating cash flow return on asset. The paper examines a comprehensive set of Indian domestic M&A deals. Such extensive study to assess the potential realisation of synergistic advantages for Indian firms experiencing M&A has not been undertaken in the literature so far. The study's policy ramifications are that regulators should facilitate the creation of an effective market for corporate regulation. The M&A strategy is highly important in the post-liberalisation phase in the corporate restructuring process. M&A creates synergy with the effective utilisation of capital in the long run.*

Keywords: *Mergers and Acquisitions, Corporate Performance, India, Synergies, System Generalised Methods of Moments*

JEL Code: *G34, C33, C26*

INTRODUCTION

Any inorganic change to a firm's portfolio, cost structure, or ownership is referred to as corporate restructuring. The most popular means of corporate restructuring is mergers and acquisitions, which is primarily a strategy of inorganic growth. Mergers are defined as an amalgamation of two or more firms' assets, liabilities, and businesses into one. Mergers serve a variety of purposes, including gaining access to new markets, capturing economies of scale, knowledge sharing, and risk sharing. Yet, the primary goal of any type of restructuring is to benefit from synergies created by the merger.

In general, businesses work with limited opportunities and resources. A value creation process is therefore focused on the best use of the assets and capabilities of the organisation in the constrained environment. Companies possess various skills and resources from a resource-based perspective (Penrose, 1959). In the field of mergers, the fusion of two companies' resources builds the base of value formation. The reasons for the merger of the two companies is to acquire unique capabilities or assets that the companies possess, which may be of different nature: innovation, product, access to markets, financing, marketing, and human capital. On the basis of these numerous tools, various arguments were

presented on how the amalgamation of resources of two merged organisations produces value. Such arguments cover economies of reach, economies of scale, market strength, financial diversification, and co-insurance. It is possible to sum up all the claims as synergies.

The additional value generated by combining two companies is defined as synergy, providing opportunities that might not have been possible for companies that operate independently (Seth, 1990). The relation can be depicted as $U(AT) > U(A) + U(T)$, where $U(AT)$ corresponds to the worth of the merged firms, and the separate value of A and T is referred to as $U(A)$ and $U(T)$. It suggests that the concept of synergy is the difference between the combined entities' worth and the two firms' standalone worth; $S = U(AT) - (U(A) + U(T))$. The two major types of synergies are revenue creating and cost reducing, with the former being tougher to realise. Financial synergies entail merging the balance sheets of both the target and acquirer firms in order to enhance financial metrics (Godbole, 2015). The synergies that are created are not necessarily positive; in fact, negative synergies can occur, resulting in the inverse of positive synergies (Harding & Rovit, 2004).

In studies analysing the efficacy of entities that were the subjects of mergers or acquisitions, two separate frameworks

* Associate Professor, Faculty of Management Studies, University of Delhi, Delhi, India. Email: kalsieanjala@gmail.com

** Senior Research Scholar, Faculty of Management Studies, University of Delhi, Delhi, India.
Email: nehasingh.usms@gmail.com

were used. The financial approach assesses and measures developments in the stock values of firms engaged in mergers or acquisitions to a reference category of businesses. Corporate efficiency is assumed to have increased if, after the acquisition or merger, the returns to stakeholders are higher. The conclusions collected using this method indicate that corporate takeovers typically have positive shareholder ramifications. Capital markets tend to have a favourable view of announcements of M&A among companies. The industrial organisation approach explores certain economic and financial success indicators in companies. As related to the reference group, the patterns in these variables give an indicator of the overall impact of the acquisition in terms of potential gains.

Research Gap

The impact of mergers on the equity of shareholders has been widely analysed in recent decades. The study results, however, are inconsistent. Researchers do not find consensus on one of the commonly asked issue, whether or not mergers are worthwhile strategies. This question is significant from the viewpoint of corporate finance theory. Thus, the development of shareholder capital is a required condition for the presence of mergers, otherwise corporations will not participate in such processes in the economic sense. Nevertheless, several studies characterise merger operations as an unyielding activity (Franks et al., 1991; Agrawal et al., 1992; Ghosh, 2001) or also acknowledge a detrimental effect on the equity-valuation (Asquith, 1983; Langetieg, 1978; Gregory, 1997). Some indicate an overall positive impact (Moeller, Schlingemann & Stulz, 2004; Jarrel, Brickley & Netter, 1988; Jensen & Ruback, 1983).

The efficiency theory goes with these observations. The efficiency theory asserts that acquisitions arise by the realisation of synergy, leading to value generation (Weston et al., 1990). The aim of this article is to show the potential realisation of synergistic advantages for Indian firms experiencing M&A, and thus, real economic benefits emerging from mergers and acquisitions, given the limited studies that have been performed. The current paper investigates 120 M&A transactions involving Indian companies that occurred between 2005 and 2015. The key aim of the present study is to examine synergy gains for the acquirer. The paper uses system generalised methods of moments (GMM) estimation method to estimate the relationship.

The following are the 6 sections that the paper comprises. Section 2 presents a review of the different methods utilised in existing literature and their conclusions. The current study's objectives are presented in Section 3. The research

design, variables, data source, and methods are all discussed in Section 4. The findings of the econometric analysis are discussed in Section 5. The conclusion and implications given in Section 6 bring the paper to a close.

LITERATURE REVIEW

Many mergers and acquisitions review papers employ the technique of event study to assess if the target and acquiring entities gained from consolidations. These studies based on the impact of the merger activity on shareholder's wealth revealed contradictory results. The change in stock prices over short and long run give inconsistent results, indicating that acquirers, in the long term, cannot maintain their optimistic gains from the announcement (Campa & Hernando, 2006; Dutta & Jog, 2009; Laabs & Schiereck, 2010; Dargenidou, Gregory & Hua, 2016). In the long run, the acquiring entities' buy-and-hold abnormal returns and average abnormal returns were stated to be significant. It was also noticed that 12 months previous to the acquisition announcement, the merging firms had undergone a statistically significant shoot in stock values. The market impression of a potential merger may be due to part of this shoot, and the impact of the official announcement would still underestimate the real gains of the deal (Mohanty & Mishra, 2014). Some other research found that all abnormal short-term gains would undo the announcement after just a few days, while reversals occur about three days longer for related transactions than reversals for non-related transactions. Non-related market diversification has resulted in brief, but noticeable, underachievement. That is, the valuation of non-related acquisitions against non-event companies in the same sector was lost (Barai & Mohanty, 2014). In his study, Dash (2004) explored the effect of mergers on shareholder wealth over a five-year period. In the 1994 to 1996 span, he studied a sample of ten mergers and used the technique of event study. For the first to 5th year since the merger announcement, the analysis examined the influence of mergers on the equity of shareholders. The analysis found a substantial reduction in shareholder equity over a period of five years.

That being said, the case study methodology is unable to address the issue of if mergers lead to real economic advantages. A second research stream uses an accounting-based framework which, as discussed below, analyses the improvement in post-merger results of the combined company.

The association of the final bid premium charged to the target owners and the improvement in the pre- and post-acquisition operational results of the target's property and the acquirer's property is one way of examining whether financial synergies have been realised. The study shows that the premium is due to efficiency changes in the properties of

the acquirer, and is not linked to those of the properties of the target (Kim & Canina, 2013). Mooney and Shim (2015) found that when cash flow correlation is small, there is insignificant effect of the volatility difference on shareholder returns. The findings indicate that the main variation between conglomerate and horizontal mergers is due to the vulnerability of the financial gains to the volatility of the cash flow of the target firms, notably when the target is financially limited. Financial synergies are expected to result from the degree of debt of the acquirer and target's relative size. In addition, the most critical source of operational synergies is cutbacks in investment expenditures. In addition, in focused takeovers, both total and operational synergies are higher (Hamza, Sghaier & Thraya, 2016; Devos, Kadapakkam & Krishnamurthy, 2009).

Tsung-Ming and Hoshino (2002) took a sample of 20 Taiwanese firms that went for acquisitions from 1987 to 1992. The study used both market-based (share-price return) and accounting-based (ROA and ROE) measures to evaluate the performance after the consolidation and realised that mergers announcement had a significant influence on shareholder capital. However, relative to pre-merger results, the analysis did not discern any increase in post-merger company performance. In their research, Sharma and Jonathan (2002) used accrual and cash flow efficiency metrics to assess the influence of mergers and acquisitions on the success of Australian acquirers. They observed that the type of transaction payment, i.e., whether cash, equity or a combination of both, and the form of acquisition, i.e., conglomerate or non-conglomerate merger, did not have a substantial consequence on success after the acquisition. In their research, Pillania et al. (2008) analysed post-merger corporate success in India. This quantitative study made use of secondary financial data and applied techniques for ratio analysis and correlation to validate the Indian corporate sector's claims supporting the advantages of mergers and acquisitions. The findings demonstrate that long-term synergies were generated by the acquiring firms in the form of better cash flows, increased revenue, growth, and cost cuts. In his analysis exploring Indian companies' post-merger operating results for a sample size of 30 acquiring companies, Kumar (2009) suggested that there was no change in the acquiring companies' post-merger solvency, liquidity, and efficiency status relative to their pre-merger values. In their report, Verma et al. (2013) analysed the influence of mergers and acquisitions on the business performance of seven Indian banks. In order to assess and measure the financial performance of the chosen companies before and after the acquisition, they used Economic Value Added as a metric and observed positive substantial improvements in the financial output of the acquiring banks after the merger. Finally, it can be said that no definitive evidence is available

to date to support the hypothesis that mergers lead to substantial improvements in the acquirer's financial results, summarising the findings of different research on the subject. The present study evaluates the impact of domestic mergers in India from 2005 to 2015 on the financial performance of acquirer companies.

Table 1: Review of Studies that Examine Post-M&A Financial Performance

Authors	Sample Period	Country	Major Findings
Healy et al. (1992)	1979-1984	USA	Merged companies demonstrate substantial improvements in financial efficiency.
Ghosh (2001)	1981-1995	USA	Acquisitions fail to achieve synergy gains.
Sinha et al. (2010)	2000-2008	India	In India, M&A cases demonstrate a high association in the long period between financial output and the M&A deal, and the acquiring companies have been able to create value.
Sharma and Ho (2002)	1986-1991	Australia	Operating performance does not improve post-merger.
Ramakrishnan (2008)	1996-2002	India	Merged firms realise synergy benefits post-merger.
Moeller et al. (2004)	1980-2001	USA	Large firms' merger announcements are associated with the presence of negative synergies. The business arising from the acquisition, in other words, is worth less than the individual entities on their own.
Cummins, J. D., and Weiss, M. A. (2004)	1990-2002	Europe	The findings show that there is a transition of wealth from the buyers to the targets, which is greater for domestic than for cross-border transactions. Since cross-border M&As for acquirers tend to be value-neutral and value-creating for targets, these transactions appear to be economically feasible on average.
Manson et al. (2000)	1985-1987	UK	Acquirers experience significant operating as well as non-operating profits.

Authors	Sample Period	Country	Major Findings
Yeh and Hoshino (2000)	1987-1992	Taiwan	No post-merger efficiency increase.
Rani, N., & Asija, A. (2017)	2003-2015	India	During the three-day event window, owners of acquiring companies in India engaged in cross-border acquisition observe a favourable abnormal return. During the window of 41 days, stakeholders of acquiring firms experience good results.

Source: As per authors' compilation based on the review of literature.

OBJECTIVES OF THE STUDY

The major objective of this research is to analyse: (a) if the target is small relative to acquirer, then synergy gains will also be small, (b) if the mode of payment for the deal is cash, greater synergies are gained, and (c) when acquisitions take place in related industries more synergies are gained.

RESEARCH DESIGN

The empirical model, including data sources, variables, and analytical framework used to classify factors identifying the synergies obtained for M&A companies in India, is presented in this section.

Description of Data

The paper analyses a panel data of 120 mergers and acquisitions that occurred in India during 2005 and 2015. For each merger, data was collected over a seven-year period (three years post-consolidation, year of consolidation, three years before the consolidation). As a result, the study's data spans the years 2002 to 2018. Because of the different accounting, operational, and risk-based aspects, non-listed acquirer firms, as well as financial and banking organisations, were omitted from the research. Bloomberg terminal was utilised to gather accounting and financial data of the variables used in the study. Based on the theoretical definition, existing literature, and data availability for Indian companies, these variables are listed. The variables used in

the study are defined in Appendix 1. For the purposes of this study, the merged entity's post-acquisition performance was compared to that of the target and acquirer (A+T) companies. Every variable is deflated by the tangible assets of the examined firms for a proper comparison, removing the size influence (Healy, Palepu & Ruback, 1992).

Research Methodology

Static and dynamic panel data modelling was implemented in the article. Static panel estimation resolves the problem of unnoticed heterogeneity. The paper used a lagged dependent variable to study the influence of the past year's synergy. This introduces dynamism to the static panel and results in the dilemma of endogeneity. The probable consequence of endogeneity is the association with a differenced error value, where inconsistent and biased results arise from the least square approximation (Baltagi, 2008). Incorporating the instrumental variable, which contains the lagged outcome of the dependent and independent variable, has fixed this problem (Arellano & Bond, 1991). The paper employs the estimation method of the system generalised moments methods (GMM) to overcome the endogeneity problem.

Static Panel

The following specification can be extended to static panel estimates in order to investigate the factors that contribute to synergy achieved in the M&A.

$$Synergy_{it} = c + \sum_{j=1}^j \beta_j X_{it}^j + \sum_{k=1}^k \beta_k X_{2it}^k + \sum_{l=1}^l \beta_l X_{3it}^l + \sum_{m=1}^m \beta_m X_{4it}^m + e_{it} \quad (1)$$

$$e_{it} = v_i + u_{it}$$

Where, X1, X2, X3, and X4 are different-dimensional vectors. The error term has two components: the fixed effects, v (v_i is time invariant heterogeneity across firms) and the idiosyncratic shocks, u_{it} .

The paper uses three models of static panel estimation with synergy as a dependent variable for all three models and various independent variables.

$Synergy_{it} = f(\text{Payment dummy}, \text{Industry relatedness dummy}, \text{Financial variables}, \text{Operating variables})$

Equation 1:	$Synergy_{it} = \alpha + \beta_1 \text{Relative_Size}_{it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + e_{it}$
Equation 2:	$Synergy_{it} = \alpha + \beta_1 \text{Payment_Cash}_{it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + e_{it}$
Equation 3:	$Synergy_{it} = \alpha + \beta_1 \text{Industry_Relatedness}_{it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + e_{it}$

The paper uses cash flow to total assets, cash flow to net assets, and debt ratio as proxy variables for synergy gains (Junge, 2014). To test for stationarity of variables, the Fisher-type (Choi, 2001) is performed. Most of the variables in the research were determined to be stationary at the level (29 variables out of 31).

Three methods are endorsed in the paper to model synergy benefits. First, pooled OLS regression methodology is employed (Results reported in Appendix 6, 7 and 8). Pooled OLS disregards heterogeneity across cross-sectional units and time. In the existence of unobserved heterogeneity, OLS ignores the data's panel structure and estimates the lagged dependent variable's upward bias coefficient (Bond, 2002). In the Breusch-Pagan Lagrange Multiplier test, the study rejects the null hypothesis (No randomness in the intercept) at less than 1 per cent level for all the three equations and supports the alternative hypothesis proposing that random effects is to be used in the place of pooled OLS. Random effect estimator assumes absence of endogeneity. Since fixed effects are omitted in pooled OLS estimates, the results are skewed and inconsistent. F-test in the pooled OLS regression refutes the null hypothesis that all the dummies are zero or all the differential intercepts are equal to zero, indicating that fixed effect model is preferred over pooled OLS (F-test reported in Appendix 6, 7 and 8). Next, we apply fixed effect estimator that resolves endogeneity issues caused due to the omission of time-invariant variables (individual fixed effects) and cross-section invariant variables (time fixed effects). However, it cannot resolve endogeneity issues due to simultaneity. The least squared dummy variables (fixed effect) estimation accounts for unobserved time-invariant heterogeneity, while also resulting in skewed coefficient estimations. Because we presume that former synergy values influence current synergy values, the error term is linked with the lagged past values of the dependent variable (Baltagi, 2008). The panel structure of the dataset is taken into account, but the correlation among the lagged dependent variable and regression error is ignored. For the lagged dependent variable, the fixed effect produces downward bias coefficient estimates (Nickle, 1981). Fixed and random panel models are used for static panel models.

Heteroscedasticity and autocorrelation has been checked for both OLS and static panel model estimations. To check for heteroscedasticity, the Breusch-Pagan and Cook-Weisberg tests have been used. For the Breusch-Pagan and Cook-Weisberg tests, the null hypothesis states that "variance is homoscedastic". When variance is homoscedastic, it implies that each observation's variance is about the same definite value (i.e., variance is uniform). When there is heteroscedasticity in linear regression, it means that the variance is determined by one or more variables instead of being uniform. The outcome of this test is as follows:

$\chi^2(1) = 122.93$; $\text{Prob} > \chi^2 = 0.0000$ for equation (1); $\chi^2(1) = 175.06$, $\text{Prob} > \chi^2 = 0.0000$ for equation (2); and $\chi^2(1) = 2371.49$, $\text{Prob} > \chi^2 = 0.0000$ for equation (3). Hence, the null hypothesis of homoscedasticity is rejected. Since serial correlation influences standard errors and makes findings less reliable, researchers must define serial correlation in the idiosyncratic error term in a panel-data model. The paper uses Wooldridge (2002) to test the autocorrelation with the null: "There is no serial correlation". The test indicates the presence of autocorrelation in the model at less than 1% level of significance, $F(1,79) = 8.439$, $\text{Prob} > F = 0.0048$ for equation (1); $F(1,77) = 11.754$, $\text{Prob} > F = 0.0010$ for equation (2); $F(1,79) = 20.702$, $\text{Prob} > F = 0.0000$ for equation (3). The preference among random effects and fixed effects is driven by the Hausman test (Rizvi et al., 2018). The result of Hausman test is reported in Appendix 6, 7, and 8.

Static panel models resolve endogeneity issues caused due to the omission of time invariant variables (individual fixed effects) and cross-section invariant variables (time fixed effects). However, they cannot be used for dynamic dependent variables. Further, they do not resolve endogeneity issues due to simultaneity. Simultaneity issues are caused by reverse causality, which indicates that an independent variable might be affected by the dependent variable. Such independent variables which are effected by the lagged variable of the dependent variables are called pre-determined variables. Endogeneity means a correlation between explanatory variable and error term in a regression (Roberts & Whited, 2011). The OLS estimator produces skewed and unreliable estimates of parameters in the incidence of endogeneity, thereby rendering them uninterpretable for inferential analysis (Wooldridge, 2015).

Issue of Endogeneity

The failure to ascertain endogeneity emanating in the model has been one of the constraints of static panel regression. Unrecognised heterogeneity and simultaneity are the two major causes of endogeneity. When an element of endogeneity is not factored into the equation, it is the influence of selected synergy estimates of past values. It can have serious effects on conclusions. Therefore, estimation through fixed effects generates skewed outcomes (Baltagi, 2008), suggesting that prior known values of the variable are not influenced by dependent variables, which is questionable as being accurate. The dynamic panel approach would be acceptable in such a situation. The lagged values of the dependent variable are being used as instruments to accommodate for the potential endogeneity in the GMM method suggested by Arellano and Bover (1995) and Blundell and Bond (1998). In past empirical research, both difference GMM and system GMM have gained much attention. Bond and Windmeijer (2002)

argued that if the data is not stationary, the approximation will be skewed; thus, using the GMM system can obtain a better precision of the estimation outcome, as the process uses a greater range of instruments and combines regression at the thresholds with regression at the first differences. In addition, the system GMM is relatively stronger because the instruments in the level estimation are effective predictors for the endogenous variables whenever the time series is a random walk framework (Blundell & Bond, 1998). Consequently, this study will utilise system GMM framework.

Dynamic Panel Estimation

After recognising the existence of endogeneity problems in static panel models, the paper utilises dynamic panel estimates. The estimates will not be reliable in the case of a static panel, as existing independent variables will influence past realisations of the dependent variable (synergy).

Arellano and Bover (1995) and Blundell and Bond (1998) presented a framework built on the system GMM estimation method to avoid the weak instrument concern. This estimation method combines: (i) the normal set of first-differential equations with appropriately lagged levels as instruments and (ii) the supplementary set of level-based equations with appropriately lagged first-differences as instruments. A two-step GMM estimation method to resolve the issue of heteroscedasticity has also been developed by Blundell and Bond (1998). First, from the first-step calculation, they recommend getting the residuals. Second, in order to carry out a rigorous calculation of the matrix of variance-covariance, they suggest using them. Blundell and Bond (1998) illustrate, using Monte Carlo simulations, that the two-step process of estimation is asymptotically more robust than the first-step process. The reliability of the GMM estimator system depends on two assumptions. First, there must be a justifiable set of instrumental variables, i.e., not associated with error terms. The Hansen test of over-identifying constraints is used to support this hypothesis. Secondly, it is necessary to verify the lack of second-order autocorrelation (AR2) in residuals, whereas unfavourable first-order autocorrelation (AR1) may be found.

Roodman (2009) reveals that in GMM estimation, using many instruments will yield skewed results. While there is no evidence in the academic literature on the optimal number of instruments to be used, the minimal requirement would be to use fewer instruments than individuals. Arellano and Bover (1995) also propose that only the nearest difference can be used as a tool for the description of level of explanatory variables, as higher lagged first-differences would lead to circumstances of redundant moment. We limit the number of lags, both for the dependent and explanatory variables.

Taking all this into account, with Windmeijer's correction approach for the variance-covariance matrix, we evaluate the equation using a two-step GMM estimator.

Dynamic panel GMM model

$$Synergy_{it} = c + \alpha Synergy_{it-1} + \sum_{j=1}^k \gamma_j X_{it} + \sum_{j=1}^k \delta_j Z_{it} + e_{it} \quad ; \quad e_{it} = \mu_i + v_{i,t} \quad (2)$$

$$\Delta Synergy_{it} = \alpha \Delta Synergy_{it-1} + \sum_{j=1}^k \gamma_j \Delta X_{it} + \sum_{j=1}^k \delta_j \Delta Z_{it} + \Delta e_{it} \quad (3)$$

Where, i denotes the examined companies and t specifies the span of time. $Synergy_{it}$ is a vector of present and lagged endogenous explanatory variables. X_{it} a vector of explanatory time-variant and time invariant regressors. e_{it} is the collective error term, where e_{it} constitutes two error components: μ_i is the unobservable discrete effects and v_{it} is the remainder error term. The lagged value of synergy is expressed by $Synergy_{it-1}$ and the α coefficient represents the adjustment rate. Z represents the set of instrument variables used. Equation (3) is the transformed equation for system GMM.

Two post-estimation examinations, which test for autocorrelation (AR test (2), AR test (3), and AR test (4)) and instrument accuracy (Hansen test), follow the credibility of the GMM estimation. Serial correlation must be tested for the lags used in the model (Arellano & Bond, 1991). Absence of serial correlation is demonstrated by the null hypothesis; null hypothesis dismissal affirms the instrumental variable (Garza et al., 2011). Hansen test validates the authenticity of over-identified instrument subsets. The null hypothesis notes that residuals cannot be associated with instruments that are true for all instruments.

RESULTS AND EMPIRICAL ASSESSMENT

The descriptive analysis of significant variables are presented in Appendix 2. The correlation between the significant variables of the models is shown in Appendices 3, 4, and 5. The bulk of variables are reported to have a weak correlation. Results of pooled OLS and static panel estimations are reported in Appendix 6, 7, and 8.

Estimations of Dynamic Panel Data

The static panel results do not take into account the future impact of the level of previous dependent variable estimates on the projections for the current year. Equation (2) is calculated by the GMM methodology introduced

by Arellano and Bond (1991) to analyse this potential endogeneity, which cannot be resolved by fixed and random effect models. Equation (2) is run for objectives 1, 2, and 3. The results are presented in Tables 2, 3, and 4, respectively.

Table 2 presents Model 1, 2, and 3 run for the hypothesis ‘if the target is small compared to acquirer, then synergy benefits will also be small’. It shows the findings of a two-step system GMM estimates. In the dynamic models, cash flow to total asset has been used as an estimate of synergy in the study. The findings suggest that the larger the target compared to the bidder that is captured via relative size of assets of target over acquirer, the higher the performance gain around the merger, as can be seen in all three models, and vice versa. Significant and positive past values are observed to have a consistent influence (Model 1, 2, and 3). This means that synergy created in the past is likely to have a positive consequence on synergy inflows in the present year, where $Synergy_{t-1}$ is the drag on the bidding entities. Similarly, market cap to assets and financial leverage were also found to be positive and statistically significant in the model. Across all the three models, post-estimation tests, viz., Arellano-Bond Test for AR(2) and Hansen test are deemed to be credible. AR(2) tests for second-order serial correlation, with insignificant coefficients that do not indicate autocorrelation in the results. The Hansen test is an indicator for over-identifying constraints, meaning that in describing the model, instruments are legitimate. Each model is statistically significant at less than one per cent level (Prob(F-Statistic)).

Table 2: Synergy Estimates, Dynamic Panel Evaluation for Indian M&As for the Duration 2002-2018

Variables	Model 1	Model 2	Model 3
Syn_CF_TO_TOT_ASSETS L1	0.4126 (4.64)***	0.3337 (3.74)***	0.2795 (2.54)**
RelativeTotalAssetsizes-TonA	0.02257 (2.78)***	0.0239 (2.89)***	0.02813 (2.07)**
Operating_Income	-0.1159 (-2.1)**	-0.1138 (-1.32)	-0.1633 (-2.03)**
FncL_Lvrg	0.0049 (1.77)*	0.0106 (2.26)**	0.0079 (1.15)
Mkt_Cap_To_Assets	0.0211 (5.31)***	0.0213 (3.79)***	0.0229 (3.23)***
PE_Ratio	-0.0005 (-1.86)*	-0.0004 (-1.46)	-0.0008 (-2.23)**
OPCFROA_Cornett		0.3583 (1.57)*	0.2626 (0.71)
Sales_To_Cash		-0.00003 (-1.82)*	-0.00002 (-1.28)
Return_on_Com_Eqy		-0.0012 (-1.6)*	-0.0009 (-0.54)

Variables	Model 1	Model 2	Model 3
Cce_Detailed			0.05087 (2)**
Constant	0.0228 (1.59)*	-0.00005 (0)	0.02251 (0.78)
F-Statistic	17.59	23.31	18.55
Prob (F-Statistic)	0.000	0.000	0.000
No. of Observations	462	462	461
AR(1) (Pr > Z)	0.000	0.000	0.000
AR(2) (Pr > Z)	0.571	0.253	0.396
AR(3) (Pr > Z)	0.283	0.230	0.454
AR(4) (Pr > Z)	0.555	0.441	0.619
Hansen Test of Overid. Restrictions	0.312	0.299	0.353

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1

Table 3 presents Model 1, 2, and 3 run for the hypothesis ‘if the mode of payment for the deal is cash, greater synergies are gained’. It shows the results of a two-step system GMM estimates. In the dynamic models, cash flow to net assets has been used as an estimate of synergy in the study. It has been found that payment cash dummy has a positive and statistically significant association with the synergy variable in all the three models. Significant and positive past values are observed to have persistent influence (Model 1, 2, and 3). This means that synergy produced in the past is likely to have a positive effect on synergy inflows in the present year, where $Synergy_{t-1}$ is the drag for bidding firms. However, sales to cash and profit margin were found to have a statistically significant and negative association in the model. Each model is statistically significant at the level of less than one per cent (Prob(F-Statistic)). In all the three models, the Hansen test and post-estimation tests, viz., Arellano-Bond Test for AR(2) was found to be reliable.

Table 3: Synergy Estimates, Dynamic Panel Evaluation for Indian M&As for the Duration 2002-2018

Variables	Model 1	Model 2	Model 3
Syn_CF_TO_NET_ASSETS L1	0.3639165 (2.48)**	0.3872917 (2.59)**	0.4145788 (3.35)***
Payment_Cash	0.2542042 (2.49)**	0.2956381 (2.61)**	0.1945003 (2.99)**
RelativeNetAssetsizes-TonA	0.2650207 (2.2)**	0.2508154 (1.71)*	0.3290108 (2.20)**
PX_Book_Ratio	0.0123688 (1.64)*	0.0135054 (1.38)	0.0150254 (2.23)**
FncL_Lvrg	0.0418006 (2.19)**	0.0232215 (1.29)	0.0156542 (0.99)*

Prof_Margin	-0.0010057 (-1.55)*	-0.0011723 (-2.67)***	-0.0011048 (-2.36)**
Sales_To_Cash	-0.0000718 (-2.06)*	-0.0000823 (-1.56)*	-0.0000463 (-1.52)*
Personnel_Expn__ Sales	0.010023 (1.37)	0.0003092 (0.25)	
Return_on_Com_Eqy	0.0014271 (0.68)	0.0027704 (1.64)*	0.0031851 (2.1)**
MktCap_Revenue	-0.0157766 (-1.29)		
Cur_Ratio		-0.0214595 (-0.69)	-0.0246652 (-2.15)**
Eff_Int_Rate		-0.0000785 (-0.42)	
OPCFROA_Healy			-0.0684369 (-1.78)*
Cap_Ratio			-0.0004781 (-0.33)
Constant	-0.2994164 (-2.22)**	-0.1327525 (-0.92)	-0.0420595 (-0.75)
F-Statistic	7.64	4.55	9.33
Prob(F-Statistic)	0.000	0.000	0.000
No. of Observations	399	399	399
AR(1) (Pr > Z)	0.004	0.004	0.001
AR(2) (Pr > Z)	0.738	0.538	0.650
AR(3) (Pr > Z)	0.515	0.400	0.335
AR(4) (Pr > Z)	0.604	0.121	0.235
Hansen Test of Overid. Restrictions	0.360	0.189	0.334

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1

Table 4 presents Model 1, 2, and 3 run for the hypothesis 'when acquisitions take place in related industries more synergies are gained'. It shows the findings of a two-step system GMM estimates. In the dynamic models, debt ratio has been used as an estimate of synergy in the study. Further, it has been found that industry relatedness dummy has a positive and statistically significant association with the synergy variable in all the three models. Significant and positive past values are observed to have persistent influence (Model 1, 2, and 3). This means that synergy produced in the past is likely to have a positive effect on synergy inflows in the present year. Similarly, operating cash flow return on asset and EBITDA-WC/Assets is observed to have a statistically significant and positive association in the model, indicating an overall better financial performance when the merger takes place in a related sector. Each model is statistically significant at the level of less than one per

cent (Prob(F-Statistic)). In all the three models, the Hansen test and post-estimation tests, viz., Arellano-Bond Test for AR(2) was found to be reliable.

Table 4: Synergy Estimates, Dynamic Panel Estimation for the Period 2002-2018 for Indian M&As

Variables	Model 1	Model 2	Model 3
syn_DebtRatio L1	0.1933395 (1.63)*	0.7216288 (3.43)***	0.6590762 (2.99)***
Industry_Related- ness	1.226867 (1.65)*	1.431364 (2.57)**	1.548188 (2.39)**
EBITDAWC/Assets	2.079411 (1.44)*	1.623764 (1.58)*	1.597965 (0.99)
OPCFROA_Healy	-0.4475742 (-2.11)**	0.8288041 (2.4)**	-0.7772275 (-1.88)*
WACC_Total_Capi- tal	0.0533298 (0.38)		
WACC_NOPAT	-5.949011 (-2.86)***	-1.760955 (-1.37)*	-2.420092 (-1.7)*
Sales_To_Cur_As- set	0.1075368 (0.4)	-0.8485674 (-1.93)*	-0.0000714 (-1.42)*
Acct_Rcv_Turn	0.000789 (0.15)		
RelativeTotalAsset- sizeTonA	-0.9294349 (-0.92)		
Growth_Sales	0.0000117 (0.71)		
Tot_Debt_To_ Com_Eqy		0.0001102 (0.44)	0.000148 (0.92)
RDExpense		6.215466 (0.1)	0.8765181 (2.29)**
Free_Cash_Flow_ Margin		-0.0000681 (-1.25)	-0.0270884 (-0.13)
Constant	0.1581497 (0.17)	-0.69529 (-1.3)	-0.7227182 (-0.99)
F-Statistic	34.45	9.96	11.63
Prob(F-Statistic)	0.000	0.000	0.000
No. of Observations	472	693	693
AR(1) (Pr > Z)	0.097	0.10	0.092
AR(2) (Pr > Z)	0.498	0.483	0.487
AR(3) (Pr > Z)	0.336	0.433	0.367
AR(4) (Pr > Z)	0.673	0.598	0.513
Hansen Test of Overid. Restrictions	0.129	0.265	0.340

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1

CONCLUSION

The aim of the study is to analyse the synergies gained by businesses engaged in M&A in India. The wider assumption is that the post-M&A success of acquiring entities has increased. The empirical evidence reinforces the hypothesis that, relative to their success in the pre-M&A era, Indian acquirers fared better financially post M&A. The paper indicates that M&A tends to be financially favourable to the acquiring firms in the short to medium run, up to three years after a merger. The long run estimation was not considered, to avoid the problem of multiple acquisitions by the acquirers. The results demonstrate that the cash flow to assets of acquiring entities increases in the post-M&A stage, if the mode of payment for the deal is cash, and mergers take place in related industries. This development in performance can be credited to M&A. Synergistic advantages of M&A appear to be perceived by acquirers: enhanced market cap to assets, improvement in financial leverage, and a positive operating cash flow return on asset. Higher liquidity condition after the M&A has also been detected. These outcomes are globally in line with the results of Switzer (1996) and Ghosh (2001), and in an Indian context, with Sinha et al. (2010), Ramakrishnan (2008), and Leepsa and Mishra (2012). Such observations, however, are in contradiction to the findings of Kumar (2009). Based on the results, it is reasonable to conclude that, overall, acquisition companies in India seem to do considerably better after M&A than they did pre-M&A. However, where the payment is made in cash, sales-to-cash and profit margin were found to be negative and statistically significant.

From the results of this analysis, some insights can be identified. First of all, it confirms the findings of past research that acquired firms in India tend to have done well financially post-M&A. Second, when the payment is made in cash, although synergies in terms of cash flow to net assets are generated, for a medium period of term it negatively impacts the sales-to-cash ratio. Thirdly, it is always better to go for horizontal M&A, as more synergies can be realised.

REFERENCES

- Agrawal, A., Jaffe, J. F., & Mandelker, G. N. (1992). The post-merger performance of acquiring firms: A re-examination of an anomaly. *The Journal of Finance*, 47(4), 1605-1621.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29-51.
- Asquith, P. (1983). Merger bids, uncertainty, and stockholder returns. *Journal of Financial Economics*, 11(1-4), 51-83.
- Baltagi, B. (2008). *Econometric analysis of panel data*. John Wiley & Sons.
- Barai, P., & Mohanty, P. (2014). Role of industry relatedness in performance of Indian acquirers—Long- and short-run effects. *Asia Pacific Journal of Management*, 31(4), 1045-1073.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115-143.
- Bond, S. R. (2002). Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal*, 1(2), 141-162.
- Bond, S. R., & Windmeijer, F. (2002). Finite sample inference for GMM estimators in linear panel data models.
- Brañas-Garza, P., Bucheli, M., & García-Muñoz, T. (2011). Dynamic panel data: A useful technique in experiments.
- Campa, J. M., & Hernando, I. (2006). M&As performance in the European financial industry. *Journal of Banking & Finance*, 30(12), 3367-3392.
- Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20(2), 249-272.
- Cummins, J. D., & Weiss, M. A. (2004). Consolidation in the European insurance industry: Do mergers and acquisitions create value for shareholders? *Brookings-Wharton Papers on Financial Services*, 2004(1), 217-258.
- Dargenidou, C., Gregory, A., & Hua, S. (2016). How far does financial reporting allow us to judge whether M&A activity is successful? *Accounting and Business Research*, 46(5), 467-499.
- Dash, A. (2004). Value creation through mergers: The myth and reality. *The ICAI Journal of Applied Finance*, 10(10), 20-38.
- Devos, E., Kadapakkam, P. R., & Krishnamurthy, S. (2009). How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies. *The Review of Financial Studies*, 22(3), 1179-1211.
- Dutta, S., & Jog, V. (2009). The long-term performance of acquiring firms: A re-examination of an anomaly. *Journal of Banking & Finance*, 33(8), 1400-1412.
- Franks, J., Harris, R., & Titman, S. (1991). The postmerger share-price performance of acquiring firms. *Journal of Financial Economics*, 29(1), 81-96.
- Ghosh, A. (2001). Does operating performance really improve following corporate acquisitions? *Journal of Corporate Finance*, 7(2), 151-178.

- Godbole, P. G. (2015). *Mergers, acquisitions and corporate restructuring*. Vikas Publishing House Pvt Ltd.
- Gregory, A. (1997). An examination of the long run performance of UK acquiring firms. *Journal of Business Finance & Accounting*, 24(7-8), 971-1002.
- Hamza, T., Sghaier, A., & Thraya, M. F. (2016). How do takeovers create synergies? Evidence from France. *Studies in Business and Economics*, 11(1), 54-72.
- Harding, D., & Rovit, S. (2004). *Mastering the merger: Four critical decisions that make or break the deal*. Harvard Business Press.
- Healy, P. M., Palepu, K. G., & Ruback, R. S. (1992). Does corporate performance improve after mergers? *Journal of Financial Economics*, 31(2), 135-175.
- Jarrell, G. A., Brickley, J. A., & Netter, J. M. (1988). The market for corporate control: The empirical evidence since 1980. *Journal of Economic Perspectives*, 2(1), 49-68.
- Jensen, M. C., & Ruback, R. S. (1983). The market for corporate control: The scientific evidence. *Journal of Financial Economics*, 11(1-4), 5-50.
- Junge, L. M. (2014). *Operating synergy: Types and their impact on post-merger performance* (Unpublished thesis).
- Kim, J. Y., & Canina, L. (2013). Acquisition premiums and performance improvements for acquirers and targets in the lodging industry. *Cornell Hospitality Quarterly*, 54(4), 416-425.
- Kumar, R. (2009). Post-merger corporate performance: An Indian perspective. *Management Research News*.
- Laabs, J. P., & Schiereck, D. (2010). The long-term success of M&A in the automotive supply industry: Determinants of capital market performance. *Journal of Economics and Finance*, 34(1), 61-88.
- Langetieg, T. C. (1978). An application of a three-factor performance index to measure stockholder gains from merger. *Journal of Financial Economics*, 6(4), 365-383.
- Leepsa, N. M., & Mishra, C. S. (2012). Post-merger financial performance: A study with reference to select manufacturing companies in India. *International Research Journal of Finance and Economics*, 83(83), 6-17.
- Manson, S., Powell, R., Stark, A. W., & Thomas, H. M. (2000, December). Identifying the sources of gains from takeovers. *Accounting Forum*, 24(4), 319-343.
- Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics*, 73(2), 201-228.
- Mohanty, P., & Mishra, S. (2014). Run-up in stock prices prior to merger & acquisitions announcements: Evidence from India. NSE Working Paper.
- Mooney, T., & Shim, H. (2015). Does financial synergy provide a rationale for conglomerate mergers? *Asia-Pacific Journal of Financial Studies*, 44(4), 537-586.
- Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417-1426.
- Penrose, E. T. (1959). *The theory of the growth of the firm*. Oxford: Oxford University Press.
- Pillania, R. K., Kumar, S., & Bansal, L. K. (2008). The impact of mergers and acquisitions on corporate performance in India. *Management Decision*.
- Ramakrishnan, K. (2008). Long-term post-merger performance of firms in India. *Vikalpa*, 33(2), 47-64.
- Rani, N., & Asija, A. (2017). Signalling power of corporate name change: A case of Indian firms. *Global Journal of Flexible Systems Management*, 18(3), 173-181.
- Rizvi, N. U., Kashiramka, S., & Singh, S. (2018). Basel I to Basel III: Impact of credit risk and interest rate risk of banks in India. *Journal of Emerging Market Finance*, 17(1_suppl), S83-S111.
- Roberts, M. R., & Whited, T. M. (2011). Endogeneity in empirical corporate finance. In G. Constantinides, M. Harris & R. Stulz (Eds.), *Handbook of the Economics of Finance* (vol. 2).
- Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, 9(1), 86-136.
- Seth, A. (1990). Value creation in acquisitions: A re-examination of performance issues. *Strategic Management Journal*, 11(2), 99-115.
- Sharma, D. S., & Ho, J. (2002). The impact of acquisitions on operating performance: Some Australian evidence. *Journal of Business Finance & Accounting*, 29(1-2), 155-200.
- Sinha, N., Kaushik, K. P., & Chaudhary, T. (2010). Measuring post-merger and acquisition performance: An investigation of select financial sector organizations in India. *International Journal of Economics and Finance*, 2(4), 190-200.
- Switzer, J. A. (1996). Evidence on real gains in corporate acquisitions. *Journal of Economics and Business*, 48(5), 443-460.
- Torres-Reyna, O. (2009). *Panel data analysis: Fixed & random effects: Version 3.0*. Princeton University.
- Tsung-Ming, Y. E. H., & Hoshino, Y. (2002). The impact of M&As on shareholder wealth: Evidence from Taiwanese corporations. *The Developing Economies*, 40(4), 553-563.
- Verma, B. P., Maji, P., & Nair, S. (2013). Mergers and acquisitions and their impact on corporate values: Pre-and post-merger analysis of Indian Banks. *Indian Journal of Finance*, 7(2), 5-16.
- Weston, J. F., & Chung, K. S. C. (1990). *Mergers, restructuring, and corporate control* (No. 338.8 W5284m Ej. 1). Prentice Hall.

Wooldridge, J. M. (2015). Control function methods in applied econometrics. *Journal of Human Resources*, 50(2), 420-445.

Yeh, T. M., & Hoshino, Y. (2000). The effects of mergers and acquisitions on Taiwanese corporations. *Review of Pacific Basin Financial Markets and Policies*, 3(2), 183-199.

APPENDICES

Appendix 1: Description of the Variables

Sr. No.	Variable	Symbol	Definition
1	Cash Flow to Total Assets	Syn_CF_TO_TOT_ASSETS	Free Cash Flow / Total Assets
2	Cash Flow to Net Assets	Syn_CF_TO_NET_ASSETS	Free Cash Flow / Net Assets
3	Debt Ratio	Syn_DebtRatio	Total Debt / Total Assets
4	Payment Dummy	Payment_Cash	If the mode of payment is cash, the value is 1, otherwise it is 0.
5	Industry Relatedness Dummy	Industry_Relatedness	If the acquisition is horizontal, value is 1, otherwise it is 0.
6	Relative Size	RelativeTotalAssetSizeTonA	Total Asset of Target / Total Asset of Acquirer
7	Operating Cash Flow Returns on Assets	OPCFROA_Healy	Operating Cash Flows = Sales – Selling Expenses – Administrative Expenses – Cost Of Goods Sold + Goodwill Expenses + Depreciation
8	Operating Cash Flow Returns on Assets	OPCFROA_Cornett	Operating Cash Flow Return on Assets = Income before Taxes and Extraordinary Items + Interest on Notes And Debentures / Book Value of Assets
9	Market Capitalisation to Assets	Mkt_Cap_To_Assets	Market capitalisation of a company compared to company's total assets. Unit: Actual. Calculated as: Market Capitalisation / Assets
10	Price Earnings Ratio	PE_Ratio	Price of a Stock / Earnings Per Share
11	Sales to Cash	Sales_To_Cash	Revenue / Cash & Near Cash
12	Return on Common Equity	Return_on_Com_Eqy	Estimate how much revenue a company generates as a proportion of the capital invested by its shareholders.
13	Cash and Cash Equivalentents	Cce_Detailed	Cash in Vaults + Deposits in Banks.
14	Price to Book Ratio	PX_Book_Ratio	Last Price / Book Value Per Share
15	Profit Margin	Prof_Margin	This ratio is a calculation of how much of the income incurred over the time was held as revenue.
16	Personnel Expense as % Sales	Personnel_Expn_Sales	Personnel Expenses / Net Sales * 100
17	Market Capitalisation to Revenue	MktCap_Revenue	Market Value of Equity / Trailing 12 Month Net Revenue
18	Current Ratio	Cur_Ratio	Ratio to demonstrate the potential of the company for its short-term assets to pay down its short-term liabilities.
19	Effective Interest Rate	Eff_Int_Rate	Percentage of the gross interest paid over the duration over the mean of the total debt.
20	Capitalisation Ratio	Cap_Ratio	Long-Term Debt / (Long-Term Debt + Total Equity) x 100
21	EBITDA-WC/Assets	EBITDAWC/Assets	Calculated as: (EBITDA – Working Capital) / Total Assets
22	WACC Total Capital	WACC_Total_Capital	Total Capital = Market Capitalisation of Equity + Short Term Debt + Preferred Equity + Long Term Debt
23	WACC NOPAT	WACC_NOPAT	Net Operating Profit minus cash operating taxes.
24	Sales to Current Assets	Sales_To_Cur_Asset	The turnover ratio of current assets tests how often a corporation makes use of its capital assets to produce revenue.
25	Accounts Receivable Turnover	Acct_Rcv_Turn	Trailing 12 Month Sales / Average Account Receivable
26	Revenue Growth Year over Year	Growth_Sales	(Sales from Present Period – Sales from Prior Year) * 100 / Sales from Prior Year

27	Tot Debt to Common Equity	Tot_Debt_To_Com_Eqy	Total Debt * 100 / Common Equity
28	R&D Expense	RDExpense	R&D expenses in profit and loss account + capitalised R&D through the period
29	Free Cash Flow Margin	Free_Cash_Flow_Margin	Free Cash Flow / Revenue
30	Operating Income	Operating_Income	Net Sales + Other Operating Income – Cost of Goods Sold – Other Operating Expenses
31	Financial Leverage	FncL_Lvrg	Average assets divided by average equity
32	Net Debt	Net_Debt	(Total Debt – Financial Subsidiary Debt) – (Cash & Marketable Securities + Collaterals for Debt – Financial Subsidiary Cash and Cash Equivalents – Financial Subsidiary Marketable Securities)
33	Depreciation & Amortisation	Is_Depreciation_And_Amor-tization	Sum of all depreciation and amortisation expenses included as a part of Cost of Goods Sold and Selling, General and Administrative Expenses

Source: Bloomberg terminal.

Appendix 2: Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Min	Max
Syn_CF_TO_TOT_ASSETS	821	0.091313	0.187153	-0.49209	4.050787
Syn_DebtRatio	840	1.194083	2.356526	-11.9401	35.01426
Syn_CF_TO_NET_ASSETS	823	0.281959	0.566579	-1.55704	8.806063
Mkt_Cap_To_Assets	823	0.996241	1.138615	0.0095	7.0902
FncL_Lvrg	810	3.758848	3.783172	0.3331	48.80993
Sales_To_Cash	840	138.3334	382.2292	0	4058.125
Prof_Margin	838	14.34813	137.6902	-1091.41	3300.078
RelativeTotalAssetsizeTonA	562	0.225922	0.558225	8.26E-05	11.14983
OPCFROA_Healy	830	4.315055	47.31476	0	1161.425
EBITDAWC/Assets	830	-0.0754	0.239774	-3.92822	1.250547

Source: Authors' estimation.

Appendix 3: Correlation Matrix of Model 1

	Operating_Income	RelativeTotalAssetsizeTonA	FncL_Lvrg	PE_Ratio	OPCFROA_Cornett	Sales_To_Cash	Return_on_Com_Eqy	Cce_Detailed
Operating_Income	1							
RelativeTotalAs-setsTonA	-0.0762	1						
FncL_Lvrg	-0.0804	0.0265	1					
PE_Ratio	-0.1271	0.2051	-0.0599	1				
OPCFROA_Cor-nett	0.1172	-0.0133	-0.0153	-0.0874	1			
Sales_To_Cash	-0.0413	0.0313	0.0714	-0.0715	-0.0381	1		
Return_on_Com_Eqy	0.115	0.1425	0.167	-0.1001	0.1495	-0.1262	1	
Cce_Detailed	-0.0748	0.1153	-0.0837	0.1859	-0.0373	-0.105	-0.05	1

Source: Authors' estimation.

Appendix 4: Correlation Matrix of Model 2

	Payment_Cash	Relative Total Asset size Ton A	PX_Book_Ratio	FncL_Lvrg	Prof_Margin	Sales_To_Cash	Return_on_Com_Eqy	Cur_Ratio	OPCFROA_Healy
Payment_Cash	1								
RelativeTotalAssetsTonA	-0.1212	1							
PX_Book_Ratio	0.0167	-0.0131	1						
FncL_Lvrg	0.0343	0.0229	0.0149	1					
Prof_Margin	-0.0553	0.0396	-0.0081	-0.016	1				
Sales_To_Cash	0.0706	0.03	0.0555	0.071	-0.029	1			
Return_on_Com_Eqy	-0.0801	0.1588	0.1674	0.154	0.079	-0.124	1		
Cur_Ratio	-0.0575	0.0609	0.0101	-0.189	-0.012	-0.0452	0.07	1	
OPCFROA_Healy	-0.0436	0.034	0.0385	-0.006	-0.01	0.002	0.01	-0.02	1

Source: Authors' estimation.

Appendix 5: Correlation Matrix of Model 3

	Industry_Relatedness	EBITDAWC/Assets	OPCFROA_Healy	WACC_NOPAT	Sales_To_Cash	RDExpense
Industry_Relatedness	1					
EBITDAWC/Assets	0.0099	1				
OPCFROA_Healy	0.0339	-0.0228	1			
WACC_NOPAT	0.0226	-0.0119	0.0193	1		
Sales_To_Cash	0.0243	0.1653	-0.0284	0.0597	1	
RDExpense	0.0163	-0.1673	-0.0009	0.1581	-0.0692	1

Source: Authors' estimation.

Appendix 6: Static Panel Estimations for Hypothesis 1

Variables	Pooled OLS	Fixed Effect	Random Effect
RelativeTotalAssetsTonA	.0108499 (1.87)*	.014656 (2.29)**	.0081174 (1.37)
Operating_Income	.0036959 (0.07)	-.0351415 (-0.55)	-.0204312 (-0.38)
FncL_Lvrg	.000288 (0.24)	-.0023086 (-1.38)	-.0002066 (-0.17)
Mkt_Cap_To_Assets	.0085916 (2.49)**	.0082814 (1.29)	.0059526 (1.66)*
PE_Ratio	-.0000378 (-0.77)	-.0000157 (-0.25)	-.0000533 (-1.04)
OPCFROA_Cornett		.0137017 (0.23)	.0477581 (0.82)
Sales_To_Cash		6.21e-07 (0.05)	-4.80e-06 (-0.42)

Return_on_Com_Eqy		.0004556 (2.22)**	0002975 (1.58)*
Cce_Detailed		0189578 (2.21)**	.0147667 (1.92)*
Constant	.0232545 (2.95)***	.0492839 (4.20)***	.020743 (2.50)**
R-Squared	0.3646		
F-Statistic		3.88	
Prob (F Statistic)		0.0000	0.0000
Hausman Specification Test (χ^2 statistics)		248.02	
Prob		0.0000	
Applicability of Model		Fixed Effect	
No. of Observations	461	461	461

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1

Appendix 7: Static Panel Estimations for Hypothesis 2

Variables	Pooled OLS	Fixed Effect	Random Effect
Payment_Cash	.0673562 (1.83)*		0853964 (1.28)*
PX_Book_Ratio	.0128083 (2.52)**	.014467 (1.89)*	.012915 (2.06)**
Net_Debt	.2579538 (4.92)***	.0930236 (1.72)*	.1445728 (2.84)***
Prof_Margin	.0002329 (1.08)	.000222 (1.18)	.0002205 (1.19)
Sales_To_Cash	.0000106 (0.23)	-.0001036 (-1.95)*	-.0000656 (-1.36)
Return_on_Com_Eqy	-.001967 (-4.32)***	-.0010814 (-2.10)**	-.0013413 (-2.83)***
MktCap_Revenue	-.0004632 (-0.97)	-.0005001 (-1.19)	-.000477 (-1.16)
Is_Depreciation_And_Amortization	-3.025324 (-4.11)***	.2880508 (0.22)	-1.335049 (-1.36)
_cons	.2197575 (6.72)***	.2279744 (6.04)***	.2279254 (4.88)***
R-Squared	0.3960		
F-Statistic		2.35	
Prob (F Statistic)		0.0224	0.0007
Hausman Specification Test (χ^2 statistics)		15.49	
Prob		0.0085	
Applicability of Model		Fixed Effect	
No. of Observations	461	461	461

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1

Appendix 8: Static Panel Estimations for Hypothesis 3

Variables	Pooled OLS	Fixed Effect	Random Effect
Industry_Relatedness	.2833734 (2.57)**		.2606455 (1.26)*
EBITDAWC/Assets	.8824983 (3.23)***	.7772591 (2.33)**	.8146322 (2.79)***
OPCFROA_Healy	-.0032063 (-3.31)***	-.0029326 (-3.72)***	-.0029857 (-3.84)***
WACC_Total_Capital	.1493267 (-3.52)***	.026025 (0.38)	-.0554942 (-1.02)
WACC_NOPAT	-1.125288 (-2.17)**	-1.217395 (-2.75)***	-1.184141 (-2.74)***
Sales_To_Cur_Asset	-.00733 (-0.23)	-.0382792 (-0.82)	-.025223 (-0.65)
Acct_Rcv_Turn	.0002085 (0.21)	.0004962 (0.59)	.0004599 (0.56)
RelativeTotalAssetsizeTonA	-.0196267 (-0.22)	-.007387 (-0.09)	-.0084067 (-0.10)
Growth_Sales	5.83e-06 (4.95)***	6.16e-06 (5.81)***	6.07e-06 (5.92)***
_cons	.5814696 (4.17)***	.5527078 (3.68)***	.4653983 (2.17)**
R-Squared	0.6172		
F-Statistic	86.74	107.66	
Prob (F Statistic)	0.0000	0.0000	0.0000
Hausman Specification Test (χ^2 statistics)		6.19	
Prob		0.6263	
Applicability of Model		Random Effect	
No. of Observations	461	461	461

Source: Authors' estimations.

Robust t-stats in parentheses.

***p < 0.01, **p < 0.05, *p < 0.1