



Review Paper

# Characterizing and Predicting Takeover Targets: A Review

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## Abstract

Mergers and acquisitions (M and A hereon) is one of the most important corporate restructuring process. Western countries have experienced titanic waves of M and A's for the past four decades which had prompted the researchers to investigate M and A in various aspects. One major area of research in M and A is the characterizing and predicting the M and A targets. This paper explores and reviews the research in this area for the past forty years. The study analyzes the improvements and gaps in research in this area over the years. This study also provides the scope for future research in this area with special reference to emerging market economies. Though emerging economies were liberalized in the early 1990's, research in M and A is still at its infant stage. Thus this study analyzes and provides the scope for future researchers in the area of characterizing and predicting M and A targets.

**Keywords:** Mergers, acquisitions, takeover, prediction, targets, abnormal returns.

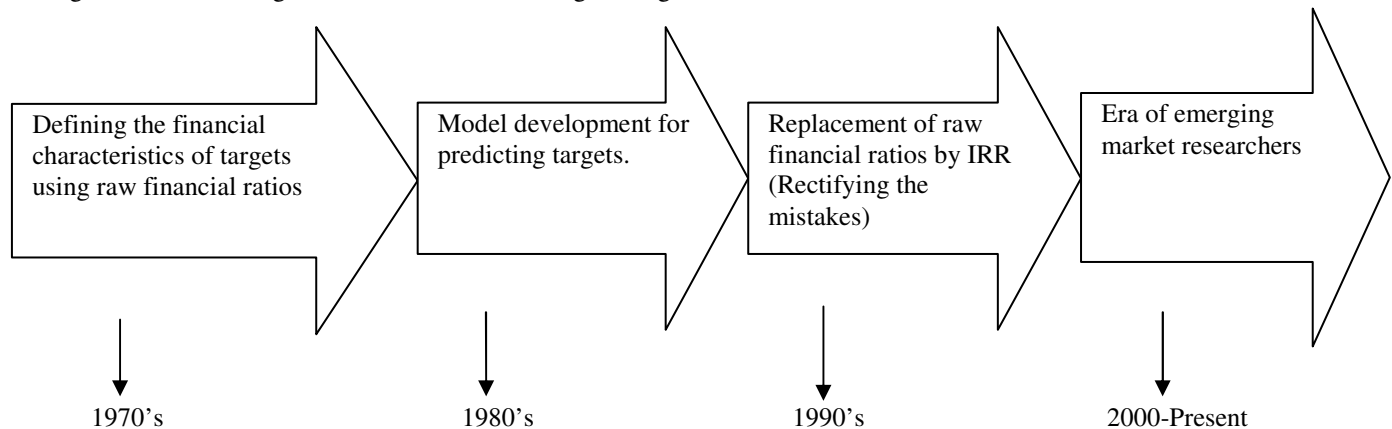
## Introduction

The research in M and A has seen drastic improvements and has taken various dimensions in the past four decades. The drastic increase in the number of acquisitions in the western countries has captured the attention of researchers in the west to investigate on various aspects of M and A. The forty years of research in M and A in the west has laid a strong foundation for the emerging market researchers. Emerging countries like India were subjected to various restrictions until liberalization in 1991. The liberalization of the emerging countries allowed them to participate in the global restructuring process through M and A. M and A is spreading like a rapid fire across the emerging markets which necessitate the need for more research in the emerging markets.

Researchers investigated M and A on various aspects and among the areas investigated was the characterizing of targets

and predicting them. Through prediction models, researchers have not only tried to simply classify targets and non-targets but have also tried to bring out the characters that determine M and A and the motives behind M and A<sup>1</sup>. Characterizing and predicting the takeover targets helps the practioners and industrialists to beat the market by investing in successful targets as it is said that investing in the right targets will yield average abnormal returns for targets around the announcement period of acquisitions<sup>2,3</sup>. Thus the significance of research in this area cannot be underrated.

This paper provides a review of literature from the early 1970's to the present era citing the developments and improvements in research in this area and also the gap in research with special implications to the developing economies. The figure below shows the timeline of research in this area and the significant dimensions and directions the research has taken:



The researchers of the 1970's were the earliest researchers who tried to determine the financial characteristics of targets. The researchers in this period focused on the raw financial ratios which best discriminated between targets and non-targets. The research in 1980's took a new dimension of model development where they not only tried to classify targets but also tried to predict them. The 1990's saw the use of IRR<sup>1</sup> which replaced the raw financial ratios. The researchers found that the raw financial ratios were unstable overtime and across industries which delivered unreliable results and thus IRR proved as the perfect solution for the instability problem of raw ratios. Later 2000's to present the research in emerging markets have started to spring up. Emerging markets have finally been relieved of the restrictions and are actively participating in the global restructuring process. Thus research in M and A has become a prominent in and the researchers in emerging market economies have started to pour their attention to research in M and A. The following sections of the paper thus provides the literature through 1970's to present with developments and gap with special implications to emerging market research.

### 1970's: The Financial Characteristics of Targets

This was the early period of research where researchers tried to capture the financial characteristics which best discriminated between targets and non-targets. Researchers used raw financial ratios to determine the financial characteristics of targets. Most of the research in this period originated from the UK and US as those period recognized drastic increase in the number of M and A.

Simkowitz and Monroe was one of the earliest was one of the earliest studies using MDA<sup>2</sup> in an attempt to specify the financial profile of firms that are acquired by conglomerate firms. This model could correctly classified 82.6 percent of the acquired firms. His study was the first UK study of M and A activity<sup>4</sup>. Singh attempted to discriminate between the acquired and the surviving firms, between the acquiring and the acquired firms and between the acquiring and the non-acquiring firms. When comparing between the acquiring and the acquired firms acquiring firms appear to have higher rate of growth, much larger size and more profitable<sup>5</sup>. Tzoannos and Samuels investigated the distinguishing financial characteristics of both the bidder firms and the target firms using a discriminant analysis approach. The characteristics of the bidder firms were an above average downward trend in capital gearing, a lower absolute level of capital, a higher than average increase in profits to capital employed and a higher than average increase in the trend of dividends<sup>6</sup>. Stevens studied the financial characteristics which distinguish the acquired firms from the non acquired firms. The purpose of this study was to analyze a group of acquired firms and a group of non acquired firms and to determine if they could be distinguished from one another based upon differences in their financial characteristics. In order to reduce the multicollinearity problems arising in the MDA phase, the data was first subjected to factor analysis, which can

be used to simplify and to group or discover the patterns in the data. The six factors according to factor analysis taken into consideration was: leverage, profitability, activity, liquidity, dividend policy and price earnings. The findings imply that financial characteristics alone provide a means by which acquired firms can be separated from others<sup>7</sup>. Kuehn sought to discriminate between merged and non-merged firms. Six financial variables were chosen to represent the six financial dimensions which Kuehn believed were important in the determination of the probability of a merger. Kuehn found that acquired firms had low valuation ratios, low profitability and low growth. Among liquid ratios 'working capital to total assets' proved to be significant<sup>8</sup>. Levine and Aaronovitch examined the financial characteristics of the firms with the view of testing various hypothesis drawn from theories of the firm. Acquiring firms was larger with higher valuation ratio and price-earnings ratio than both the acquired and the average firms<sup>9</sup>. Rege examined if financial ratios based on historical accounting information can differentiate between firms which are likely to be acquired and those which are not. Multiple discriminant analysis was employed with 44 firms chosen from each group at random so as to derive the coefficients. The results failed to reject the null hypotheses of no difference in group means. As a result, the classification was not successful, and thus, no classification result was reported in the study. The results indicated that financial characteristics of the acquired firm considered in this study neither distinguish between domestic and non-acquired, foreign and non-acquired, non foreign and domestic acquired firms based on published accounting information. This was the only study to find contradictory evidence from other studies<sup>10</sup>.

The major limitations of research in this era was that researchers used only financial characteristics and that market characteristics were given no attention. Also most of the studies used MDA, which is also a limitation. The number of M and A were large but the model could not accommodate huge number of data, the results from MDA cannot be generalizable for the whole population. Another important drawback of research in this period was that the researchers failed to recognize the ratio stability problem. Financial data for over nine years as in Belkoui were considered in studies but the financial ratios would not have been stable overtime<sup>11</sup>.

### 1980's and 1990's: Developing the Best Model for Predicting Targets and Rectifying the Mistakes of the Past:

The researchers in this period focused on developing a best model for predicting targets. This period saw researchers including the market and industrial characteristics in the prediction model. This is the period where researchers started to concentrate on various motives of M and A. Logit and Probit were the popular models used in this era. The period has some significant contribution from researchers as they tried to identify the research gap in the previous studies and tried rectifying them. Palepu used Logit

binary regression analysis to predict takeover targets. Several published studies claimed that acquisition targets can be accurately predicted by models using public data. This paper points out a number of methodological flaws which bias the results of these studies. Palepu's study was a crown for several studies in future. A fresh empirical study was carried out after correcting these methodological flaws. The results showed that it is difficult to predict targets, indicating that the prediction accuracies reported by earlier studies were overstated. The methodological issues addressed in this paper were also relevant to other research settings that involve binary state prediction models with skewed distribution of the two states of interest. In order to rectify this problem, the empirical study in this paper used optimal cut-off probability derived below a well-defined decision context. The acquisition likelihood model was employed in this study to specify the exact functional relationship between a firm's characteristics and its acquisition likelihood in a given period. The prediction test results show that investing in the potential targets identified by the model does not yield significant excess returns. This implies that the models ability to predict takeover targets is not superior to that of stock markets. The results for Palepu's study support 'market for corporate control' hypothesis and 'inefficient management' hypothesis. Though Palepu rectified the sampling errors in previous papers, the difference between various industries had not been taken into account in his study. Palepu had studied both mining and manufacturing industries together as one, which might not have captured the industry specific characters and led to biased results. And the secondly the number of acquired and non-acquired firms were not matched and unequal number of acquired and non-acquired firms were selected not from the same time periods<sup>12</sup>.

Platt and Platt were the first to address the problem of ratio stability. They focused on the instability of financial ratios on the prediction of bankruptcy failures which led to ex ante and ex post biased classification results. They developed the IRR (Industry Relative Ratio) in place of ordinary financial ratios to control for the stability problems. IRR has shown to improve the predictive ability of the logit model and can be used in various other areas of research in order to effectively control industry variation and to produce more efficient forecasts<sup>13</sup>. Barnes in his study had pointed out the various flaws in computing the prediction of takeovers using MDA models. He argued that the predictive ability of models in previous studies has been exaggerated. The purpose of his study was to address these matters further and then report the results of a preliminary and exploratory study in UK. There are three main areas which he had assessed in his study: i. the strict statistical assumptions on which the estimating procedures are biased. ii. Further statistical implications arising from the way in which sample was chosen iii. the stability of the prediction models overtime. Barnes assessed these implications and pointed out the flaws in it. The attention of his study was strictly with whether individual takeovers can be predicted using one particular type of information in the form of accounting ratios.

Barnes did a small study of UK firms correcting the above mentioned flaws with 92 successful bids of UK during 1986-87. Each company was matched with a non-acquired company within the same industrial sector whose market capitalization immediately prior to the merger was the nearest. Nine basic financial ratios were obtained and subjected to factor analysis in order to avoid problems on multi-co linearity. The industry-relative ratios of the firms were used. The study basically examined the classification ability of the model and the predictive accuracy of the model after rectifying the flaws which he had pointed out. The results showed a high rate of classifying and predictive ability of the model<sup>14</sup>.

Ambrose and Meggison extended the Palepu's acquisition likelihood model by incorporating measures of insider and institutional shareholdings, by examining the deterrent effects of various takeover defenses and by considering the effects of various proportions of fixed assets in a firms total asset structure. The study found that the probability of receiving a takeover bid is positively related to tangible assets and negatively related to firm size and to net change in institutional holdings. This study also found that the explanatory power used in Palepu's logit model is much reduced during this period<sup>15</sup>.

Meador, Church and Rayburn's analyses mergers in the American industry. During the five-year period of 1981-1985 the largest number of business mergers in American history were consummated. This study examined the accounting, financial, and market variables which predict merger and acquisition target companies for this active time of business combinations. The extreme difference in results of horizontal and vertical mergers showed that merger studies should consider the type of business combination as a potentially significant factor in explaining relationships. One of the limitation of this study stems from the high multicollinearity of the variables used<sup>16</sup>.

Barnes examined the proposition that takeover targets may be forecasted by using similar methods as bankruptcy prediction which had been very successful in UK and USA. The study showed that they cannot be predicted simply by using published accounting data as inputs into these models<sup>17</sup>. The study by Cudd and Duggal explored the importance of capturing Industry specific distributional characteristics in analyses based on financial ratios. As a test case, this study had replicated Palepu, who employed financial ratios in logit models to investigate the usefulness of six acquisition hypothesis in predicting takeover targets. Without adjustment for industry specific distributional characteristics, this study's findings were only consistent with one of the six acquisition hypothesis. After adjusting for distributional properties, the results were consistent with four of the six acquisition hypothesis<sup>18</sup>.

### **2000's: ERA of emerging market researchers**

This era saw the relaxation of rules and regulations in emerging markets which motivated the firms to merge and acquire. Thus

as the number of M and A started to spring up in emerging markets, the researchers started to gain attention to this area. Alcade and Espitia analysed the characteristics presented by Spanish firms that had been the subject of takeover bids that allow them to be differentiated from other firms. The results showed that the firms that were subject to a takeover bid were not, in general, characterized by having lower profitability or a worse market valuation than other firms operating in the same sector. This result made it difficult to argue that takeovers in Spain have in their majority been driven by disciplinary or speculative motives<sup>19</sup>.

Siriopoulos et al tested the 'market for corporate control' hypothesis in a small open economy of Greece. The results appeared to favor rejection of this hypothesis indicating that acquisitions have not been driven by managerial-disciplinary motives. Moreover it was also found that logit models outperform other statistical tests<sup>20</sup>. Srinivasan and Mishra studied the direction and determinants of the aggregate M and A activity directed to developing countries in 1990s. The study adopted a dynamic panel data model to gauge the macro-economic determinants of aggregate M and A. Results indicated that M and A activity embodies a moderate level of inertia, though much less than one previously estimated for total FDI<sup>21</sup>.

The research paper by Kumar and Rajib focused on companies that used serial mergers as a strategic tool for growth. The study aimed to analyze the financial characteristics of firms that engage in multiple mergers. The study attempted to determine the characteristics of the acquiring firms and observed whether multiple merger firms showed superior corporate performance compared to a matched control group. The results showed that acquirer firms which have undergone multiple mergers found that average sales, profits and cash flow for a period of ten years were higher for merger firms as compared to a control group matched by industry and size. This study also found evidence for market power and size hypothesis<sup>22</sup>.

Mirza in her study attempted to test the 'market for control' hypothesis in food and beverages industry of the Indian economy. A suitable sample of merged and non-merged firms from the same industry was taken for analysis. Logit regression had been used to find determinants of target firms in a takeover. Results of the logit analysis supported the 'market for control' hypothesis only partially indicating that acquisitions in Indian food and beverages industry had been driven only partially by managerial efficiency and disciplinary motives<sup>23</sup>. Bhalla aimed to investigate the motives of 288 entities belonging to the financial services sector of India for the period 1997-08 to 2007-08. The study used the logit model to relate some financial factors to the probability of M and A activity. The findings supported the market for control hypothesis. The study also found that the acquiring firms were the ones characterized by greater size, better capital position and asset management<sup>24</sup>.

Jurcao, Andreicovici and Matis aimed to identify the factors that influence the value of cross-border M and A in Romania over the period 1995 – 2008. The focus of the research was on the following macro-economic variables: size of the economy, its growth rate, the financial market size, the domestic credit provided to the private sector and the domestic exchange rate<sup>25</sup>. Erdogan examined the financial variables that predicted the M and A targets in Turkey. Cox-Regression with segmented time - dependent co-variables was used to determine the factors that predict target companies for M and A<sup>26</sup>. Barai and Mohanty developed a prediction model for acquisition targets in India using Logit Regression. Traditional determinants like size and growth-resource imbalance were not significant in the Indian context. This study took into consideration the errors of Palepu and took special cares to avoid them. The prediction model was also tested on an out-of-sample database of acquisitions that took place during 2005-06 and was found to yield prediction accuracies up to 91%<sup>27</sup>.

## Conclusions

Though the research in emerging markets is still in its infant stage, the number of acquisitions has been increasing every year. As seen in the review, most of the studies in the emerging markets seem to have adopted the theories and models from the west directly into their country. Few studies have found the significant characteristics of acquirers and targets to be insignificant in emerging economies. This brings in the necessity for testing the old theories of west and developing new models in developing economies. Emerging markets unlike developed economies in west have an unpredictable market conditions. Political conditions and the regulations may change overnight in emerging economies. Thus theories and models in the west may not be applicable in developing economies. Also the literatures as seen mostly concentrates on targets, little or no attention has been given to the characterization of the acquirers. This leaves room for further research in this area from emerging market perspective.

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