Chapter – 4

RESEARCH METHODOLOGY

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CHAPTER 4
RESEARCH METHODOLOGY

INTRODUCTION

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying the research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology[1]. This chapter highlights various aspects related to research methodology adopted to analyse the effect of acquisition on companies in long run as well as in short run. The chapter is divided into two sections: Section 1 deals with research methodology adopted to analyse the effect of acquisition on financial performance of the companies in long run. Section 2 deals with research methodology adopted to analyse the effect of acquisition announcement on share price of the companies.

SECTION: 1

RESEARCH METHODOLOGY ADOPTED TO ANALYSE EFFECT OF ACQUISITION ON FINANCIAL PERFORMANCE OF THE COMPANIES IN LONG RUN

4.1 DATA SOURCE, SAMPLE SELECTION AND STUDY PERIOD

4.1.1 DATA SOURCE

The data for this study is mainly extracted from secondary sources. The data for the study are collected from Prowess database of Centre for Monitoring Indian Economy (CMIE), Grant Thornton India Deal Tracker and Bombay Stock Exchange (BSE).

4.1.2 THE SAMPLE SELECTION

✸ OVERALL ANALYSIS

For the purpose of the study, the acquisitions which have taken place in the calendar year 2007 and 2008 are considered. The process of sample selection is carried out in following stages:

First Stage: All the companies which have undergone merger, acquisition and private equity deals in the calendar year 2007 and 2008 are taken as population. The total deals in the year 2007 are 1081[2] companies and in the year 2008 are 751[2] companies. These include domestic, inbound (where foreign company acquires Indian company), outbound (where Indian company acquires foreign company) and PE (Private Equity) deals. Out of the total, inbound deals are eliminated because of unavailability of data of acquirer company i.e. foreign company. The number of such inbound deals is 112 companies in 2007 and 81 companies in the year 2008. PE deals, the number of which is 405 in 2007 and 306 in 2008, are also eliminated from sample because they don't fall under the definition of Mergers and Acquisition. So the total companies after these eliminations are 564 for the year 2007, which includes 243 outbound deals and 321 domestic deals. For 2008, number of such deals are 364, which includes 193 outbound deals and 171 domestic deals. Here, the outbound deals are eliminated from the sample because here there may be fundamental difference in financial management policies of two different nations. Thus, the total domestic companies which have undergone merger and acquisitions, after these eliminations are 321 for the year 2007 and 171 for the year 2008.

Second Stage: In the second stage, out of total 492 (*i.e.* 321 in 2007 and 171 in 2008) companies, the companies which are listed in the Bombay Stock Exchange are segregated. The total number of listed companies which have undergone merger and acquisition in 2007 are 160 and in 2008 it is 116 in 2008. So the total listed companies are 276. Here the researcher has dropped 216 Companies as they are not listed and so the financial data would not be available for these companies.

Third Stage: The companies which have undergone merger are eliminated. The reason behind it is, Sundarsanam (2003)[3] defines a merger as a transaction by which two or more companies consolidated together to combine one entity or to form one

entity for specific purposes such as sharing resources to achieve common objectives. According to Khan (2007)[4] and Sherman and Hart (2006)[5], a merger is a combination of two or three firms in which the assets and liabilities of the selling firms are absorbed by the buying firm, the other firm ceases to exist henceforth. There is also a possibility that two companies merge to form an entirely new entity. In this study, both long term as well as short term performance of the companies are analysed before the event and after the event to compare the performances and to study the effect of event on it. So in case of merger, when both the entities cease to exist and new entity is formed, the financial data for the existing companies will not be available after the merger event as new entity is formed then. For this reason listed companies which have undergone merger are eliminated from the sample.

Table 4.1 Sample Selection Procedure

	2007	2008	
Total M&A Deals (Domestic, Inbound, Out bound and Private Equity Deals)	1081	751	-
Stages	Total number of companies dropped		Reason for Elimination
Stage I Inbound deals	112	81	Unavailability of data of Acquirer Foreign company.
Stage II Private Equity Deals (PE Deals)	405	306	Do not fall under the definition of Mergers and Acquisition.
Stage III Outbound Deals	243	193	There may be fundamental difference in financial management policies of two different nations.
Stage IV Unlisted Companies	161	55	Unavailability of Published Financial Statements
Stage V Mergers (Domestic Listed Companies)	87	46	Post event analysis becomes difficult as at least one merged (target) company loses the existence
Stage VI Unavailability of data	30	47	Data not available for entire study period

The Financial data availability of listed companies are checked and based on the data availability 43 companies which have undergone domestic deals in 2007 and 23 companies which have undergone domestic deals in 2008 are selected as sample. Thus,

total 66 companies are selected as sample. At this juncture 77 listed companies are dropped due to unavailability of data for entire period of study i.e. from 2002-03 to 2012-13 for 2007 and 2003-04 to 2013-14 for 2008. Therefore the final sample for the study would be 66 Domestic Acquisition deals, 43 domestic acquisition deals of 2007 and 23 domestic acquisition deals of 2008.

The target companies are not included in the present study because majority of the target companies are non listed. In the long term analysis financial ratios are used, the calculation of which requires data from balance sheet, profit and loss account and stock market. The published financial statements and stock market data are not available for non listed target companies. Therefore, they are excluded from the analysis.

✸ SECTORAL ANALYSIS

The present study also intended to examine the sectoral trends. For this purpose, the classification of the companies is first carried out on the basis of Grant Thornton deal trackers and CMIE. The classification of the companies based on both these databases, results in to 21 sectors. If one wants to carryout meaningful sectoral analysis, then, this classification will reduce the number of companies per sector. Therefore, to divide the sample companies in to sectors, Global Industry Classification Standard (GICS) is used[6]. Table 4.2 presents list of sample acquirer companies with their sectoral classification, as per Grant Thornton and the sector to which they belong as per GICS.

Table 4.2 Acquiring Companies and Their Respective Sectors

Sr No	Name of the Acquiring Companies	Sector as per Grant Thornton	Sector as per GICS
Acquisitions: 2007			
1.	ABG Shipyard Limited	Shipping & Ports	Industrial
2.	Accel Fortline Limited	IT & ITeS	Information Technology
3.	Advanta Limited	Agriculture and Agro Products	Consumer Staples
4.	Aegis Logistics Limited	IT & ITeS	Information Technology
5.	Aftek Limited	IT & ITeS	Information Technology
6.	Apollo Tyres Limited	Automobile Parts	Consumer Discretionary
7.	Aurobindo Pharma Limited	Pharma, Healthcare &Biotech	Healthcare
8.	Autoline Industries Limited	Automotive	Consumer Discretionary
9.	Bharat Heavy Electricals Limited	Electricals & Electronics	Industrial

Sr No	Name of the Acquiring Companies	Sector as per Grant Thornton	Sector as per GICS
10.	Bodal Chemicals Limited	Pharma, Healthcare &Biotech	Healthcare
11.	Bombay Burma Trading Corp. Limited	Automotive	Consumer Discretionary
12.	Carborundum Universal Limited	Plastics & Chemicals	Material
13.	Century Plyboards India Limited	Manufacturing	Consumer Discretionary
14.	Cranes Softwares International Limited	IT & ITeS	Information Technology
15.	Dollex Industries Limited	FMCG,Food& Beverages	Consumer Staples
16.	Epic Energy Limited	Power & Energy	Energy
17.	Exide Industries Limited	Power & Energy	Energy
18.	Fortis Healthcare Limited	Pharma, Healthcare &Biotech	Healthcare
19.	GMR Infrastructures Limited	Real Estate & Infrastructure Mgt.	Real Estate
20.	Godrej Properties Limited	Real Estate & Infrastructure Mgt.	Real Estate
21.	Heritage Foods India Limited	FMCG, Food & Beverages	Consumer Staples
22.	Indoco Remedies Limited	Pharma, Healthcare &Biotech	Healthcare
23.	Jet Airways (India) Limited	Aviation	Industrial
24.	Kirloskar Brothers Limited	Manufacturing	Industrial
25.	Kovai Medical Center & Hospital Limited	Pharma, Healthcare & Biotech	Healthcare
26.	Lupin Limited	Pharma, Healthcare & Biotech	Healthcare
27.	Modern India Limited	Real Estate & Infrastructure Mgt.	Real Estate
28.	Nexxoft Infotel Limited	IT & ITeS	Information Technology
29.	Nilkamal Limited	Manufacturing	Consumer Discretionary
30.	Pidilite Industries Limited	Plastics & Chemicals	Material
31.	Pioneer Embroideries Limited	Textile & Apparels	Consumer Discretionary
32.	Satra Properties India Limited	Real Estate & Infrastructure Mgt.	Real Estate
33.	S Kumars Nationwide Limited	Textile & Apparels	Consumer Discretionary
34.	Sona Koyo Steering Systems Limited	Automotive	Consumer Discretionary
35.	S P Apparels Limited	Textile & Apparels	Consumer Discretionary
36.	Speciality Papers Limited	Manufacturing	Consumer Staples
37.	Strides Acrolab Limited	Pharma, Healthcare & Biotech	Healthcare
38.	Sundram Fasteners Limited	Engineering	Industrials

Sr No	Name of the Acquiring Companies	Sector as per Grant Thornton	Sector as per GICS
39.	Systematix Corporate Services Limited	Banking & Financial Services	Financials
40.	Tata Power company Limited	Power & Energy	Energy
41.	Tata Steel Limited	Steel	Material
42.	United Credit Limited	IT & ITeS	Information Technology
43.	Videocon Industries Limited	Retail	Consumer Discretionary
Acquisitions: 2008			
44.	A C I Infocom Limited	IT & ITeS	Information Technology
45.	AIA Engineering Limited	Engineering	Industrials
46.	Allsec Technologies Limited	IT & ITeS	Information Technology
47.	Datamatics Global Services Ltd.	IT & ITeS	Information Technology
48.	Dr. Reddys Laboratories Limited	Pharma, Healthcare & Biotech	Healthcare
49.	Essar Securities Ltd	Banking & Financial Services	Financials
50.	Genus Power Infrastructure Ltd	Power & Energy	Energy
51.	Housing Development Infrastructure Limited	Real Estate & Infrastructure Mgt.	Real Estate
52.	Jayaswal Neco Inds. Limited	Steel	Material
53.	Jay Shree Tea Industries Limited	FMCG, Food & Beverages	Consumer Staples
54.	Joonktollee Tea Industries Limited	FMCG, Food & Beverages	Consumer Staples
55.	Mahindra and Mahindra Limited	Automobiles	Consumer Discretionary
56.	Orient Paper Industries Limited	Paper Industry	Materials
57.	Panama Petrochem Limited	Power & Energy	Energy
58.	Piramal Enterprises Limited	Pharma, Healthcare &Biotech	Healthcare
59.	Quest Softech (India) Limited	IT& ITes	Information technology
60.	R D B Realty & Infrastructure Limited	Real Estate	Real Estate
61.	SEL Manufacturing Company Limited	Textile & Apparels	Consumer Discretionary
62.	S R F Limited	Plastics & Chemicals	Materials
63.	SRM Energy Limited	Power & Energy	Energy
64.	Stone India Limited	Engineering	Industrials
65.	TCS Limited	IT& ITes	Information technology
66.	Zenith Birla (India) Limited	Engineering	Industrials

Source: Deals taken from Grant Thornton Deal tracker Annual Edition, 2007[2] and CMIE Prowess[7]

Table 4.3 describes the total number of companies in 11 sectors as per GICS Structure.

Table: 4.3 Sector Wise Acquisition Deals (GICS)

Sr No.	Sector (GICS)	No. of Companies
1.	Energy	6
2.	Materials	6
3.	Industrials	8
4.	Consumer Discretionary	12
5.	Consumer Staples	6
6.	Health Care	9
7.	Financials	2
8.	Information Technology	11
9.	Telecommunication Services	Nil
10.	Utilities	Nil
11.	Real Estate	6
	Total	66

Source: Standard & Poor's: Global Industry Classification Standard (GICS)[6]

4.1.3 THE STUDY PERIOD

In the majority researches which focus on studying the effect of M&A on long term performance of the companies, the study period used are 3 years pre and post M&A[8,9,10,11,12,13] , 4 years pre and post[14] M&A and very few studies have extended their study period beyond 4 years[15]. To analyse the effect of acquisition on financial performance of the companies in the long run, the study period is selected of 10 years i.e. 5 years before the acquisition event and 5 years after the acquisition event. The total period of study is 12 years as sample is selected from two calendar years 2007 and 2008 *i.e.* from 2003 to 2014. Mergers, acquisitions and private equity deals took place in the calendar year 2007 and 2008 are taken as population for the study. The acquisition year is base year and considered as '0' year in the timeframe. Therefore, the study period for the acquisitions during the calendar year 2007, would be from April, 2003 to March, 2013 i.e., pre acquisition period from 2002-03 to 2006-07 and post acquisition period from 2008-09 to 2012-13. For acquisitions during the calendar year 2008 it is from April, 2004 to March, 2014 i.e., pre acquisition period from 2003-04 to 2007-08; post acquisition period from 2009-10 to 2013-14.

4.2 FINANCIAL TOOLS USED FOR ANALYSIS

For the purpose of long term analysis, Ratio Analysis is used as basic financial analytical tool. The selection of these financial ratios is discussed in this paragraph. A ratio is an arithmetical relationship between two figures. Financial ratio analysis is a study of ratios between various items or groups of items in financial statements. Based on review of related researches it was observed that 54 ratios and 7 other measures are applied by various researchers to evaluate the effect of acquisition on financial performance of firms in long term.

Out of various 54 ratios and 7 other measures, 16 ratios are selected for analysis in this study, based on the frequency of their use and applicability in various researches. Due care is taken that these 16 ratios together represents liquidity, profitability, activity, leverage and valuation position of the firm. Thus, the overall performance of the firm can be studied. The details about the total 54 ratios and 7 measures and the selected ratios along with the details of the studies where they are used is presented in Table 4.4

Table: 4.4 Procedure for Selection of Ratios

Category Of Ratio	Ratios used by Researchers	Selected Ratio	References
I. Liquidity Ratios	1. Current Ratio (CR)	✓	8, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27,28
	2. Quick Ratio (QR)	✓	8, 13, 16, 17, 18, 19, 20, 21, 23, 25, 26, 28, 29
	3. Cash Ratio (CR)	-	18, 34
	4. Receivable To Current Asset Ratio (R/CAR)	-	16
	5. Inventories To Current Asset Ratio (I/CAR)	-	16
	6. Net WC To Sales Ratio (NWC/SR)	✓	8, 10, 18, 23, 25, 28
	7. Cash & Cash Equivalent To Total Assets (C&CE/TA)	-	34
	8. Investment To Total Assets (I/TA)	-	45
	9. Advances To Total Assets (A/TA)	-	20, 45
	10. Total Liabilities To Total Assets (TL/TA)	-	16, 45

Category Of Ratio	Ratios used by Researchers	Selected Ratio	References
II. Profitability Ratios	11. Return on Net Worth (RONW)	✓	9, 10, 11, 13, 16, 18, 19, 20, 22, 23, 24, 25, 26, 28, 30, 31, 32, 36, 37, 38, 39, 45, 46, 47, 48
	12. Return on Capital Employed (ROCE)	✓	9, 10, 11, 19, 22, 23, 24, 25, 26, 27, 28, 30, 31, 33, 37, 39, 42, 43, 51, 52
	13. Return on Total Assets (ROTA)	-	11, 19
	14. Return on Investment (ROI)	✓	12, 13, 14, 19, 32
	15. Return on Sales (ROS)	-	16, 45, 47, 50
	16. Return on Cash flows (ROCF)	-	16
	17. DuPont (ROA)	-	45
	18. Operating Profit Margin (OPM)	✓	9, 10, 11, 13, 14, 22, 25, 26, 30, 31, 32, 33, 37, 42, 43
	19. Gross Profit Margin (GPM)	✓	8, 10, 11, 18, 19, 21, 22, 24, 26, 30, 31, 32, 33, 37, 39, 42, 44, 51
	20. Net Profit Margin (Before Tax) (NPM)	-	18
	21. Net Profit Margin (After Tax) (NPM)	✓	8, 9, 10, 11, 13, 14, 18, 19, 20, 22, 26, 30, 31, 32, 33, 37, 42, 43, 44, 51
	22. Cash Profit Margin (CPM)	-	22, 39
	23. Profit Before Tax/Capital Employed (PBT/CE)	-	36
	24. EBIT/Capital Employed (EBIT/CE)	-	28
	25. EBDIT/ Total Asset (EBIT/TA)	✓	28, 29, 34, 40, 41
	26. Earning Power (EP)	-	40
	27. Non Interest Income/ Total Asset (NII/TA)	-	45, 46
III. Leverage & Financial Structure Ratios	28. Debt To Equity Ratio (D-ER)	✓	8, 10, 11, 12, 14, 16, 19, 20, 22, 24, 25, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38
	29. Total Debt To Total Asset Ratio (TD/TA)	-	16, 28, 40
	30. Total Debt & Equity To Total Asset (TD &E/TA)	-	13
	31. Total Debt & Equity To EBDIT(TD&E/EBDIT)	-	13

Category Of Ratio	Ratios used by Researchers	Selected Ratio	References
	32. Total Debt/ Net Worth or Total o/s Liabilities To Net Worth (TD/NW)	-	8, 16, 21, 53
	33. Total Debt/ Capital Employed (TD/CE)	-	19
	34. Net Worth To Total Assets or (NW/TA) Owners Equity To Total Assets or (OE/TA) Owners Equity To Total Liabilities (OE/TL)	-	18
	35. Net Fixed Assets To Net Worth (NFA/NW)	-	8
	36. Capital Employed/ Net Worth (CE/NW)	-	8, 13
	37. Net Assets/ Net Worth (NA/NW)	-	8
	38. Owners Equity To Fixed Assets (OE/FA)	-	18
	39. Interest Coverage Ratio (ICR)	✓	13, 19, 20, 22, 23, 24, 27, 28
IV. Turnover/ Activity Ratios	40. Debtors Turnover Ratio (DTR)	-	22, 26, 39
	41. Inventory Turnover Ratio (ITR)	✓	8, 16, 22, 26, 39
	42. Fixed Assets Turnover Ratio (FATR)	✓	8, 18, 22, 26, 39
	43. Net Working Capital Turnover Ratio or (NWCTR) Net Current Asset Turnover Ratio (NCATR)	-	8, 16, 18, 26
	44. Total Assets Turnover Ratio (TATR)	-	8, 18
	45. Receivable Turnover Ratio (RTR)	-	18
	46. Owners Equity Turnover Ratio (OETR)	-	18
V. Investment Ratios	47. Earning Per Share (EPS)	✓	9, 14, 18, 19, 20, 24, 26, 31, 37, 48, 51
	48. Dividend Per Share (DPS)	-	34, 36, 45
	49. Dividend Yield (DY)	-	18
	50. Dividend Yield To Equity Capital (DY/EC)	-	18
	51. Book Value Per Share (BV/Sh)	-	18
	52. Price To Book Value (P/BV)	-	18, 19
	53. PE Ratio (P/E)	✓	18, 19, 24, 31, 34, 37, 43, 48, 53

Category Of Ratio	Ratios used by Researchers	Selected Ratio	References
	54. Market Value To Book Value (MV/BV)	-	15
VI. Other Measures	55. Market Capitalization	-	19
	56. Dividend Payout Ratio	-	18, 22
	57. Retained Earnings as a % of PAT	-	18
	58. Net Worth	-	13, 22
	59. Capital Employed	-	22
	60. Operating Profit	-	13, 22
	61. Net Profit after Tax	-	13, 22, 27

The following lines discuss the selected ratios in detail, classifying the same in major groups:

4.2.1 LIQUIDITY RATIOS

Liquidity refers to the ability of a firm to meet its obligations in the short run, usually one year. Liquidity ratios[8,10,12,13,16,17,18,19,20,21,22,23,24,25,26,27,28,29] are generally based on the relationship between current assets (the sources for meeting short-term obligations) and current liabilities. The important liquidity ratios are current ratio and quick ratio / Acid test ratio which are used in this analysis.

- **Current Ratio :** A very popular liquidity ratio, the current ratio is defined as:

$$Current\ Ratio = \frac{Current\ \ Assets}{Current\ \ Liabilities} \quad \text{……. (1)}$$

Current assets include cash, marketable securities, debtors, inventories (stocks), loans and advances and prepaid expenses. For the sake of simplicity, they may be equated with the balance sheet item ‘current assets, loans and advances’, which does not include marketable securities. Current liabilities represent liabilities that are expected to mature in the next twelve months. For the sake of simplicity they may be equated with the item ‘current liabilities and provisions’ on the balance sheet. The current ratio measures the ability of the firm to meet its current liabilities – current assets get converted into cash during the operating cycle of the firm and provide the funds needed to pay current liabilities.

- **Quick Ratio :** Also called Acid-test ratio, the Quick ratio is defined as:

$$Quick\ Ratio = \frac{Quick\ \ Assets}{Current\ \ Liabilities} \quad \text{……. (2)}$$

Quick assets are defined as current assets excluding inventories. The quick ratio is a fairly stringent measure of liquidity. It is based on those current assets which are highly liquid. Inventories are excluded from the numerator of this ratio because inventories are deemed to be the least liquid component of current assets.

- **Net Working Capital to Sales Ratio :** Net working capital to sales ratio is another measure of liquidity and it is defined as:

$$Net\ Working\ Capital\ to\ Sales = \frac{Net\ Working\ \ Capital}{Sales} \quad \text{……. (3)}$$

Working capital is a measure of operating liquidity and refers to both cash on hand and assets a business can quickly convert to cash. Working capital provides the funds necessary to pay operational expenses and meet short-term debt obligations, such as a bank loan or line-of-credit set to mature within the next 12 months. Because liquidity relies in great part on cash flows from sales revenues, it determines whether a business can function in the short term without relying too much on external financing and it is one indication of financial health and fitness. In simple words, Working capital as a percentage of sales tells a business how much of every sales rupee must go toward meeting operational expenses and short-term debt obligations.

4.2.2 LEVERAGE RATIOS

Financial leverage refers to the use of debt finance. While debt capital is a cheaper source of finance, it is also a riskier source of finance. Leverage ratios[8,10,11,12,13,14,16,19,20,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38] help in assessing the risk arising from the use of debt capital. The ratios used for the analysis are debt equity ratios and interest coverage ratio.

- **Debt – Equity Ratio :** The Debt – Equity ratio shows the relative contributions of lenders and owners. It is defined as:

$$Debt - Equity\ Ratio = \frac{Debt}{Equity} \quad \text{……. (4)}$$

The numerator of this ratio consists of loan funds and the denominator represents shareholders' funds.

- **Interest Coverage Ratio :** Also called the Times interest earned, the interest coverage ratio is defined as:

$$Interest\ Coverage\ Ratio = \frac{Profit\ Before\ Interest\ and\ Tax}{Interest} \quad \text{..... (5)}$$

The Profit Before Interest and Taxes is used in the numerator of this ratio because the ability of the firm to pay interest is not affected by tax payments, as interest on debt funds is a tax – deductible expense. This ratio is widely used by lenders to assess a firm's debt capacity.

4.2.3 ACTIVITY RATIOS

Turnover ratios[8,16,18,22,26,39] also referred as activity ratios or asset management ratios, measure how efficiently the assets are employed by a firm. These ratios reflect the relationship between the level of activity, represented by sales or cost of goods sold and the levels of various assets. The important turnover ratios are inventory turnover, debtors turnover, fixed asset turnover and total asset turnover. The ratios which are used here in the analysis are Inventory Turnover ratio and Fixed Asset Turnover Ratio.

- **Inventory Turnover Ratio:** The inventory turnover or stock turnover measures how fast the inventory is moving through the firm and generating sales. It is defined as:

$$Inventory\ Turnover\ Ratio = \frac{Cost\ of\ Goods\ Sold}{Inventory} \quad \text{..... (6)}$$

The inventory turnover reflects the efficiency of inventory management. The higher the ratio, the more efficient is the management of inventories and *vice versa*. However, this may not always be true. A high inventory turnover may be caused by a low level of inventory which may result in frequent stock outs and loss of sales and customer goodwill.

- **Fixed Assets Turnover Ratio:** This ratio measures sales per rupee of investment in fixed assets. It is defined as:

$$Fixed\ Asset\ Turnover = \frac{Net\ Sales}{Net\ Fixed\ Assets} \quad \text{..... (7)}$$

This ratio is supposed to measure the efficiency with which fixed assets are employed, a high ratio indicates a high degree of efficiency in asset utilization and vice versa. However in interpreting this ratio, one caution should be borne in

mind. When the fixed assets of the firm are old and substantially depreciated, the fixed assets turnover ratio tends to be high because the denominator of the ratio is very low.

4.2.4 PROFITABILITY RATIOS

Profitability reflects the final result of business operations. There are two types of profitability ratios[8,9,10,11,12,13,14,18,19,21,24,25,26,28,29,30,31,32,33,34,37,39,40,41,42,43,44,45,46,47,48,51] Profit Margin Ratios and Rate of Return Ratios. For this study 7 ratios are selected. They are discussed in the following lines:

- **Gross Profit Margin Ratio:** The Gross Profit Margin ratio is defined as:

  $$Gross\ Profit\ margin = \frac{Gross\ Profit}{Net\ Sales} \quad \text{..... (8)}$$

  This ratio shows margin left after meeting manufacturing costs *i.e.* the spread between the cost of goods sold and the sales revenue. It reflects the efficiency with which management produces each unit of product. The ratio measures the efficiency of production as well as pricing.

- **Operating Profit Margin Ratio:** The Operating Profit Margin ratio indicates how much profit the organization is able to generate from its operations. It is measured as a percentage of sales and shows the effectiveness of cost control and business expenses related to the company. The operating profit margin ratio formula is calculated simply using:

  $$Operating\ Profit\ Marging = \frac{Profit\ Before\ Interest\ and\ Tax}{Net\ Sales} \quad \text{..... (9)}$$

- **Net Profit Margin Ratio:** The Net Profit Margin ratio is defined as:

  $$Net\ Profit\ Margin = \frac{Net\ Profit}{Net\ Sales} \quad \text{..... (10)}$$

  This ratio shows the earnings left for shareholders (both equity and preference) as a percentage of net sales. It measures the overall efficiency of production, administration, selling, financing, pricing and tax management. Jointly considered, the gross and net profit margin ratios provide a valuable understanding of the cost and profit structure of the firm and enable the analyst to identify the sources of business efficiency/ inefficiency.

- **PBDIT to Total Assets Ratio**: This ratio is comparison of profit with total assets. It shows how much profit the firm is earning by using its all the assets. It considers Profit before Depreciation Interest and Tax as numerator and Total assets as denominator.

$$PBDIT\ To\ Total\ Assets = \frac{Profit\ \ Before\ \ Depreciation\ \ \ Interest\ \ and\ \ Tax}{Total\ \ Assets} \ldots\ldots. (11)$$

- **Return on Capital Employed:** This is a very popular measure of profitability. It is defined as:

$$Return\ on\ Capital\ Employed = \frac{Profit\ \ Before\ \ Interest\ \ and\ \ Tax}{Total\ \ Assets} \quad \ldots\ldots\ldots (12)$$

It is a measure of business performance which is not affected by interest charges and tax burden. It abstracts away the effect of capital structure and tax factor and focuses on operating performance. Further, it is internally consistent. The numerator represents a measure of pre tax earning belonging to all sources of finance and the denominator represents total financing.

- **Return on Investment Ratio** : This ratio is post tax version of Earning Power *i.e.* Return on Capital Employed. It considers the effect of taxation but not the capital structure. It is internally consistent. Its merit is that it is defined in such a way that it can be compared directly with the post-tax weighted average cost of capital of the firm.

$$Return\ on\ Investment = \frac{Profit\ \ Before\ \ Interest\ \ and\ \ Tax\ (1-Tax\ \ Rate)}{Total\ \ Assets} \ldots\ldots. (13)$$

- **Return on Net Worth** : A measure of great interest to equity shareholders, the return on net worth is defined as:

$$Return\ on\ Net\ Worth = \frac{Equity\ \ Earnings}{Net\ Worth} \quad \ldots\ldots\ldots (14)$$

The numerator of the ratio is equal to profit after tax less preference dividends. The denominator includes the funds belonging to equity shareholders (Paid up capital + Reserve and Surplus). The return on net worth measures the profitability of equity funds invested in the firm. It is regarded as a very important measure because it reflects the profitability of the ownership (or risk) capital employed in the firm.

4.2.5 VALUATION RATIOS

Valuation ratios[9,14,19,20,24,31,34,37,43,48,51,53] indicate how the equity stock of the company is assessed in the capital market. Since the market value of equity reflects the combined influence of risk and return, valuation ratios are the most comprehensive measure of a firm's performance.

- **Price Earning Ratio:** This is very popular financial statistics used by capital market analysts. It is defined as:

  $$Price\ Earning = \frac{Market\ \ Price\ per\ Share}{Earning\ \ per\ Share} \quad \text{..... (15)}$$

  The price earning ratio (or the price earning multiple as it is commonly referred to) is a summary measure which primarily reflects the following factors: profitability growth prospects, risk characteristics, shareholder orientation, corporate image and degree of liquidity.

- **Earning Per Share (EPS):** The portion of a company's profit allocated to each outstanding share of common stock. Earnings per share serve as an indicator of a company's profitability. This ratio is calculated as:

  $$Earning\ per\ Share = \frac{PAT - Preference\ \ Dividends}{Number\ \ of\ Outstanding\ \ \ Equity\ \ Shares} \quad \text{..... (16)}$$

  The number of shares outstanding is taken at the end of the period.

4.3 HYPOTHESES

In this study an attempt is made to analyse the effect of acquisition on financial performance of the acquiring companies in long run. The analysis is carried out in two parts: Section-1 Overall Analysis and Section – 2 Sectoral Analysis. For this purpose the following hypotheses are framed for Overall Analysis:

H_{01}: There is no significant difference in liquidity performance of the selected acquirer firms before and after acquisition.

H_{02}: There is no significant difference in degree of leverage of the selected acquirer firms before and after acquisition.

H_{03}: There is no significant difference in activity of the selected acquirer firms before and after acquisition.

H_{04}: There is no significant difference in profitability position of the selected acquirer firms before and after acquisition.

H_{05}: There is no significant difference in Earning Per Share (EPS) of the selected acquirer firms before and after acquisition.

H_{06}: There is no significant difference in Price Earning ratio (PE) of the selected acquirer firms before and after acquisition.

For sectoral analysis, hypotheses are framed on similar line as of the overall analysis. Therefore, the hypotheses for all selected 9 sectors are as follows:

H_{07}: There is no significant difference in liquidity performance of the selected acquirer firms before and after acquisition for selected sectors.

H_{08}: There is no significant difference in degree of leverage of the selected acquirer firms before and after acquisition for selected sectors.

H_{09}: There is no significant difference in activity ratios of the selected acquirer firms before and after acquisition for selected sectors.

H_{010}: There is no significant difference in profitability position of the selected acquirer firms before and after acquisition for selected sectors.

H_{011}: There is no significant difference in Earning Per Share (EPS) of the selected acquirer firms before and after acquisition for selected sectors.

H_{012}: There is no significant difference in Price Earning ratio (PE) of the selected acquirer firms before and after acquisition for selected sectors.

4.4 METHODOLOGY ADOPTED

This part presents the methodology adopted for analyzing the effect of acquisition on financial performance of the companies in long run and the statistical tools applied.

4.4.1 METHODOLOGY ADOPTED FOR OVERALL AND SECTORAL ANALYSIS

The selected sixteen financial ratios are calculated for all 66 sample companies on the basis of financial data available in CMIE Prowess. The ratios are calculated for

duration of ten years, five year pre acquisition and five years post acquisition. So for the sample companies which have undergone acquisition during the year 2007, the pre acquisition duration is 2002-03 to 2006-07 and post acquisition duration is 2008-09 to 2012-13. Similarly, for the sample companies which have undergone acquisition during the year 2008, the pre acquisition duration is 2003-04 to 2007-08 and post acquisition duration is 2009-10 to 2013-14. For sectoral analysis, same exercise is carried out for companies pertaining to one sector.

Descriptive statistics like (i) mean, (ii) range, (iii) standard deviation and (iv) co efficient of Variation are applied on the ratios for pre and post acquisition period, both on all the sample companies together ratio wise *i.e.* overall analysis and by applying them sector wise *i.e.* sectoral analysis. To check whether the effect of acquisition on financial performance of the sample acquirer companies, is statistically significant or not the paired t test is applied.

4.4.2 STATISTICAL TOOLS

This part deals with statistical tools applied for analysis of research data. It is divided in to two sections. Section 1 deals with descriptive statistics and section 2 deals with inferential statistics. Descriptive statistics concern the development of certain indices from the raw data, whereas inferential statistics concern with the process of generalisation[1] through the testing of statistical hypotheses[1].

Descriptive Statistics

1. **Mean:** Mean, also known as arithmetic average, is the most common measure of central tendency and may be defined as the value which one gets by dividing the total of the values of various given items in a series by the total number of items. In the present study mean of 5 years pre and post acquisition is calculated for each ratio and for all the 66 sample companies. Again, for each individual ratio aggregate pre and post acquisition mean in calculated based on the 5 years pre and post acquisition means of each sample acquirer company. The similar exercise is also carried out for companies pertaining to single industry.

2. **Range:** Range is the simplest possible measure of dispersion and is defined as the difference between the values of the extreme items of a series.

$$Range = \begin{matrix} Highest\ value\ of\ an \\ item\ in\ a\ series \end{matrix} - \begin{matrix} Lowest\ value\ of\ an \\ item\ in\ a\ series \end{matrix} \quad \ldots\ldots\ldots (17)$$

In the present study, the range for each of the ratio is derived from pre and post acquisition period separately based on the mean of the respective ratio for each of the companies. The similar exercise is also carried out for companies pertaining to single industry.

3. **Standard Deviation:** Standard deviation is most widely used measure of dispersion of a series. Standard deviation is defined as the square-root of the average of squares of deviations, when such deviations for the values of individual items in a series are obtained from the arithmetic average. It is computed as under:

$$Standard\ Deviation\ (\sigma) = \sqrt{\frac{\Sigma(X_1 - \bar{X})}{n}} \quad \ldots\ldots\ldots (18)$$

The standard deviation is used mostly in research studies and is regarded as a very satisfactory measure of dispersion in a series. In the present study pre and post acquisition standard deviation is calculated on the basis of 5 years pre and post acquisition means of ratio. The similar exercise is also carried out for companies pertaining to single industry.

4. **Coefficient of Variation:** Coefficient of variation (COV) is a relative measure of variation and is expressed as percentage. It measures the scatter in the data relative to mean. It is calculated as:

$$COV = \frac{SD}{\bar{X}} \text{ x } 100 \quad \ldots\ldots\ldots (19)$$

Where SD is Standard Deviation and $\bar{X}$ is arithmetic mean of the sample.

In the present study pre and post acquisition coefficient of variation is calculated on the basis of 5 years pre and post acquisition means and standard deviation of the ratio. The similar exercise is also carried out for companies pertaining to single industry.

Inferential Statistics

Paired t-test[18,23,19,21,22,26,42,47,51,54,55,56] **Analysis**

A Paired t test is used to compare two population means where there are two samples in which observations in one sample can be paired with observation in the other

sample. As the present study intends to examine the impact of acquisition on acquirer company, the selection paired t-test turned out to be most appropriate.

To test the null hypothesis that the true mean difference is zero, the procedure is as follows:

1. Let x = observation before the event, y = observation after the event
2. Calculate the difference ($D_i = y_i - x_i$) between the two observation on each pair, the positive and negative differences should be distinguish properly.
3. Calculate the mean difference, $\overline{D}$
4. Calculate the standard deviation of the difference, S, and use this to calculate the standard error of the mean difference, $SE(d) = \frac{sd}{\sqrt{n}}$
5. Calculate the t statistic, which is given by $t = \frac{\overline{D}}{\sqrt{\frac{\sum D_i^2 - \overline{D}^2 \times n}{n-1}} / \sqrt{n}}$ ……. (20)

Where D_i= Differences ($D_i=Y_i-X_i$), $\overline{D}$ = Mean difference, Under the null hypothesis, this statistic follows a t-distribution with n-1 degree of freedom.

6. Table of the t-distribution is used to compare value for $t_{calculated}$ to the $t_{tabulated}$ distribution. This gives the p-value for the paired t-test.

In the present study paired t test is calculated for all 16 financial ratios. For each individual ratio, the paired t test is applied on sample companies' pre and post acquisition means. Similar to overall analysis, the paired t-test is also applied at sectoral analysis.

4.5 LIMITATION OF THE STUDY

1. The present study is restricted to acquisitions that took place in the calendar year 2007 and 2008 only. So the economic conditions at that time might have affected the outcome of the study.
2. As it is not possible to accommodate the possible difference in accounting methods by different companies included in the sample, to that extent there may be variations on the impact that would be measured.

SECTION: 2

RESEARCH METHODOLOGY ADOPTED TO ANALYSE THE EFFECT OF ACQUISITION ANNOUNCEMENT ON SHARE PRICE OF THE COMPANIES

Financial analysts and economists are frequently asked to measure the effect of various events like merger, acquisition, announcement of dividend *etc* on value of firm. This seems a difficult task but it can be attempted by using Event Study Methodology. Using the data of security prices from financial market, Event study measures the impact of a specific event on value of the firm. The usefulness of such a study comes from the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in security prices[57]. Thus, whenever researcher wants to measure the impact of event on short run it is done through Event studies by using security prices. Event study is used to analyse the price reactions to certain events such as dividend announcements[58], earnings announcements[59], stock splits[60], large block transactions[61], repurchase tender offers[62], and other public announcements[63]. In the present study event study methodology is used to analyse the effect of acquisition announcement on share price of the acquiring companies.

The most important assumption of the event study methodology is that it presumes market efficiency[64]. An efficient market in the market efficiency hypothesis is a market in which security prices at any time fully reflect all available information. There are three different forms of efficient market hypothesis; Strong, Semi-strong and Weak form[65]. The weak form of the efficient market hypothesis considers the information which contains in the past price history of the markets. The semi-strong form considers all information that is publicly available, including the past history of prices. The strong form of the market efficiency hypothesis considers all information. The strong form then implies that prices at any given time incorporate all information, whether public or private[66].

In the present study, to examine the impact of acquisition on the share price of the acquiring firm event study methodology is used under the semi-strong form of the

market efficiency hypothesis, which assumes that share price incorporates all publicly available information.

4.6 DATA SOURCE, SAMPLE SELECTION AND STUDY PERIOD

4.6.1 DATA SOURCE

The data for share price of all the sample domestic acquirer companies are collected from Bombay Stock Exchange, as the sample companies are listed on Bombay Stock Exchange.

4.6.2 SAMPLE SELECTION

For the study under consideration, all the companies which have undergone acquisition in the calendar year 2007 and 2008 are taken as population. As explained for the long term performance analysis, the sample selection is for 66 companies of which 43 is for the acquisition pertaining to year 2007 and 23 is for the acquisition during the year 2008. For event study analysis, the availability of stock market data of all the sample acquirer companies for ten months prior to acquisition is checked. Data availability for ten months is considered because the share price for 180 days is required for estimation window, starting one month prior to event date *i.e.* acquisition date. This data is available for 35 acquirer companies for the acquisition during the year 2007 and 16 acquirer companies for the acquisition during the year 2008. So the total sample acquirer companies considered for event study analysis are 51. The target companies are excluded from the study because majority of the target companies are private limited companies. The shares of private limited companies are not traded in the stock market and so the market reaction to the event could not be tested.

4.6.3 STUDY PERIOD

To analyse the effect of acquisition announcement on share price of the sample acquirer firms, the study period is based on the acquisition carried out during the calendar year 2007 and 2008. As the effect is to be examined on share prices around

the acquisition announcement, the exact study period for effect on share prices will be dependent on the acquisition announcement.

4.7 HYPOTHESES

In order to test the Semi-Strong form of Efficient Market Hypothesis in relation to the effect of announcement of acquisition on the share price of acquirer companies, three hypotheses are formulated:

H_{013}: The Abnormal Return (AR) from the share price of the sample acquirer firm announcing an acquisition is not significantly affected by this type of information on the announcement date and surrounding the announcement date.

H_{014}: The Average Abnormal Return (AAR) from the share price of the sample acquirer firms announcing an acquisition is not significantly affected by this type of information on the announcement date and surrounding the announcement date.

H_{015}: The Cumulative Average Abnormal Return (CAAR) from the share price of the sample acquirer firms announcing an acquisition is not significantly affected by this type of information for a given event window, as defined in the present research.

4.8 METHODOLOGY ADOPTED

To examine the impact of acquisition on share prices, event study methodology is applied. Campbell, Lo and MacKinlay (1997)[67] have outlined basic steps for conducting an event study, which do not form a unique structure but still are viewed as a comprehensive guideline.

Step 1: Event Definition. Identifying the event of interest and defining the period over which the prices are to be studied (event window) is the first task of an event study. The event window is generally taken as 2 – 3 days prior to the event and 2 – 3 post event. However, depending on the research and researcher, the period can be selected. It is customary to define the event window to be larger than the specific period of interest (MacKinlay, 1997)[57].

Step 2: Selection Criteria. Once the event is identified, a selection criteria needs to be set for a firm to be considered in the study. These criteria involve restrictions like listing on a stock exchange or size of transaction etc.

Step 3: Normal and Abnormal Returns. To assess the event's impact one needs to calculate the abnormal returns of the share price over the event window. Abnormal return is described as the returns generated by a given security over a period of time that is different from the expected rate of return. The abnormal returns are calculated as the excess over the normal returns. Normal returns are defined as returns that would have occurred if no event had taken place.

Step 4: Estimation procedure. To test the above parameters, a subset of data is required called that estimation window. This period is generally a period prior to the event like taking 180 days prior to the event.

Step 5: Testing Procedure. Once the abnormal returns are calculated, they need to be checked for statistical significance. This involves forming a null hypothesis and determining the correct method of testing.

Step 6: Empirical Results. The results of testing the hypothesis need to be accompanied by a diagnosis of results which may lead to interesting findings.

Step 7: Interpretation and Conclusions. The empirical results diagnosed above need to be interpreted in a way to prove the objective of the event study and finally make the concluding comments, wrapping up the study.

In this research similar procedure is followed with some alterations according to the requirement of the study and better understanding of procedure.

STAGE I **Event Definition - 'Acquisition':** The initial task of conducting an event study is to define the event of interest[57]. After identifying the event, it is necessary to determine the selection criteria for the inclusion of a given firm in the study. The criteria may involve restrictions imposed by data availability such as listing on the Stock Exchanges or may involve restrictions such as membership in a specific industry. In this study all the domestic companies which have undergone acquisition during the calendar year 2007 and 2008 are considered as 'Event of interest'. The date

on which scheme of acquisition is sanctioned by High Court is considered as date of acquisition.

STAGE II **Selection Criteria for Event:** As mentioned in paragraph 4.6.2 the final sample of 51 domestic acquirer companies is selected for the present study. The table 4.5 presents the event date of sample acquirer companies:

Table: 4.5 Event Dates of Sample Acquirer Companies

Sr. No.	Name of the Acquirer Company	Event Date
1.	ABG Shipyard Limited	25th May 2007
2.	Aegis Logistics Limited	28th March 2007
3.	Apollo Tyres Limited	17th August 2007
4.	Autoline Industries Limited	25th October 2007
5.	Bharat Heavy Electricals Limited	18th April 2007
6.	Bodal Chemicals Limited	18th June 2007
7.	Bombay Burma Trading Corp. Limited	12th February 2007
8.	Carborundum Universal Limited	1st April 2007
9.	Century Plyboards India Limited	2nd June 2007
10.	Cranes Softwares International Limited	19th June 2007
11.	Epic Energy Limited	12th June 2007
12.	Exide Industries Limited	31st October 2007
13.	GMR Infrastructures Limited	28th May 2007
14.	Godrej Properties Limited	23rd July 2007
15.	Heritage Foods India Limited	7th September 2007
16.	Indoco Remedies Limited	28th September 2007
17.	Jet Airways (India) Limited	20th April 2007
18.	Kirloskar Brothers Limited	11th September 2007
19.	Kovai Medical Center & Hospital Limited	22nd March 2007
20.	Lupin Limited	27th September 2007
21.	Modern India Limited	2nd July 2007
22.	Nilkamal Limited	27th June 2007
23.	Pidilite Industries Limited	12th December 2007
24.	Satra Properties India Limited	4th July 2007
25.	S Kumars Nationwide Limited	30th June 2007
26.	Sona Koyo Steering Systems Limited	30th October 2007
27.	S P Apparels Limited	25th December 2007
28.	Speciality Papers Limited	25th August 2007
29.	Strides Acrolab Limited	11th June 2007
30.	Sundram Fasteners Limited	2nd December 2007
31.	Systematix Corporate Services Limited	21st June 2007

Sr. No.	Name of the Acquirer Company	Event Date
32.	Tata Power Limited	23rd April 2007
33.	Tata Steel Limited	15th January 2007
34.	United Credit Limited	28th April 2007
35.	Videocon Industries Limited	6th November 2007
36.	A C I Infocom Limited	19th August 2008
37.	AIA Engineers Limited	22nd October 2008
38.	Allsec Technologies Limited	31st July 2008
39.	Dr. Reddy's Laboratories Limited	23rd October 2008
40.	Genus Power Infrastructures Limited	17th March 2008
41.	Jayaswal Neco Industries Limited	19th November 2008
42.	Jay Shree Tea Industries Limited	27th June 2008
43.	Mahindra and Mahindra Limited	30th July 2008
44.	Orient Paper Industries Limited	29th July 2008
45.	Panama Petrochem Limited	24th March 2008
46.	Piramal Enterprises Limited	15th April 2008
47.	S R F Limited	21st October 2008
48.	SRM Energy Limited	20th November 2008
49.	Stone India Limited	2nd April 2008
50.	TCS Limited	9th October 2008
51.	Zenith Birla (India) Limited	22nd October 2008

Source: CMIE Prowesss[7]

STAGE III Deciding Estimation Window and Event Window

1. **Estimation Window:** The return of a share is to some extent correlated with the return of the stock market which it is a part of, and the expected return of a share over a period is therefore the return on the market over that period. The returns of a stock that are expected to be observed if no event occurs are called expected or normal returns[68]. The research on the effect of acquisition on shareholders' value therefore needs an estimate of expected or normal returns for shares over some period of interest[69]. Normal returns are generally estimated over a time period other than the time period before the event date, called the estimation window[68].

   While studies argue about the proper length of estimation window, most agree that the standard estimation period should be between 100 and 300 trading days[68,69]. In present study, the Estimation window is selected of 180 days i.e. -210 to -30 days. Furthermore, consistent with MacKinley (1997)[57], the event window is excluded from the estimation period to avoid that the event itself influences the estimation

of the parameters. The selection of the length of the event and estimation periods is left to the researcher, and is often chosen on the basis of previous studies[68].

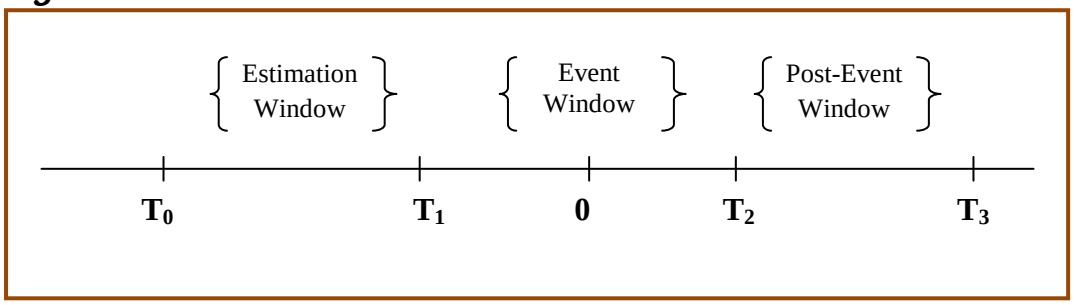
2. **Event Window:** After having defined the estimation window, the next task is to identify the period over which the security prices of the firms involved in this event will be examined; the event window (MacKinlay, 1997).[57] In a perfectly efficient market, the event window could be restrained to only include the day of announcement, but in order to capture market reactions of announcements when it is unclear if the market has received the information during trading hours or if it is available only after the stock market has closed, the event window is thus extended to couple of days. The dissemination of news about an acquisition may extend over more than one day. The corporation may release the news one day, but it may not be reported by the financial press until the day after. It is thus unclear when the information reaches the market since the market participants may not have the information during market trading hours the day the corporation makes the announcement[68]. In the present study the event day is taken as day on which the high court announces the acquisition. In addition, there is always a possibility of information leakage prior to the announcement day (MacKinlay, 1997)[57]. The present study analyses the effect of domestic acquisition on the short-term performance, an event window of 21 days will be chosen for each of the 51 stocks analysed. This choice is motivated by the length of the event window used in a short-term study by Vera Gronsund (2013)[70] and (Walker, 2000)[71]. The due care has taken that there should be no information other than the news of the acquisition in the short run. The observed returns during the event period are therefore entirely due to this news.

   The event window selected for the study is of 21days as mentioned earlier, because use of a very long event window implies that the researcher do not believe that the effect of an event is quickly incorporated into the stock price. This can be interpreted as a violation of the assumption of the event study methodology, the assumption of market efficiency. The use of a long event window may also imply that the researcher believes that the event was anticipated, which violates next assumption that the event was unanticipated[70]. In addition, the risk of experiencing confounding events during the event window increases with the length of the event window. If confounding events are experienced during the

event window, the last assumption of the event study methodology will be violated[64], which states that there were no cofounding effects during the event period. The event window is typically of the same length for each stock, but over different calendar dates[69].

The timing sequence can be illustrated by a timeline as in Figure 1, consistent with MacKinlay (1997)[57], where the event day (day of announcement) is 0, the estimation window and event window are depicted by (T1-T0) and (T2-T1) respectively:

Figure 4.1 Timeline



Source: MacKinlay (1997)[57]

Due care is taken in selection of estimation window and event window that they should not overlap. If the event and estimation windows were to overlap, this could lead to a situation where both the normal returns and the abnormal returns would capture the effect of the acquisition announcement[57].

STAGE IV **Measuring Normal Return:** The market model is one of the statistical models which relates the return of any given security to the return of the market portfolio. Following the methodology adopted by Mackinlay (1997)[57], W.D. op de Hoek (2010)[72], Stuart Locke, Geeta Rani Duppati & Stewart Lawrence (2011)[73], the study uses an Ordinary Least Squares (OLS) method for estimating the expected returns or normal returns. Ordinary least squares (OLS) is a consistent estimation procedure for the market model under the Gauss-Markov Assumptions for Simple Regression, which state that the model is linear in parameters, that there is a random sample of size *n*, that the sample outcomes on *r* are not all the same value, and that the error ε has an expected value of zero given any value of the explanatory variable (Wooldridge, 2009)[74]. The OLS estimators of the parameters in the market model are consistent with MacKinlay (1997)[57], and are as follows:

$$\hat{\beta}_i = \frac{\sum_{t=T_{0+1}}^{T_1} (R_{i,t} - \hat{\mu}_i)(R_{m,t} - \hat{\mu}_m)}{\sum_{t=T_{0+1}}^{T_1} (R_{m,t} - \hat{\mu}_m)^2} \quad \text{……. (21)}$$

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m \quad \text{……. (22)}$$

$$\hat{\sigma}^2_{\varepsilon_i} = \frac{1}{L_1 - 2} \sum_{T_{0+1}}^{T_1} (R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t})^2 \quad \text{……. (23)}$$

$$\hat{\mu}_i = \frac{1}{L_1} \sum_{t=T_{0+1}}^{T_1} R_{i,t} \quad \text{……. (24)}$$

$$\hat{\mu}_m = \frac{1}{L_1} \sum_{t=T_{0+1}}^{T_1} R_{m,t} \quad \text{……. (25)}$$

For any security *i* the market model is

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad \text{……. (26)}$$

$E(\varepsilon_{it} = 0)$ $\text{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon i}$

Where

$\hat{\alpha}_i$ = Alpha, intercept of the sample

$\hat{\beta}_i$ = Beta, Slope of the sample

R_{it} = Period-*t* returns on security *i*

R_{mt} = Period-*t* returns on the market portfolio

ε_{it} = The zero mean disturbance term

$\hat{\mu}_i$ = Mean of period-*t* returns on security *i*

$\hat{\mu}_m$ = Mean of period-*t* returns on the market portfolio

L_1 = $T_1 - T_0$ is the length of Estimation Window (which is 180 days in present study *i.e.* -210 to -30 days)

In applications a broad based stock index is used for the market portfolio. In the present study the Bombay Stock Exchange's benchmark index S&P BSE Sensex is used.

STAGE V **Measurement of Abnormal Return (AR):** The fifth step is the calculation of the abnormal return within the event window, where the abnormal

return is defined as the difference between the actual and estimated returns. This is denoted as:

$$AR_{i,t} = R_{i.t} - \bar{R}_i \quad \text{……. (27)}$$

Where t is from -10 to +10 days and i represents particular sample acquirer company. After calculating abnormal returns of all sample acquirer firms at one point of time *i.e.* one day in this study, the next step is measurement of cumulative abnormal return. Since the event window is an interval spanning over multiple days, aggregation must be made in order to find a single measurement of the abnormal return across shares, over the entire event window *i.e.* time series aggregation.

STAGE VI Measurement of Cumulative Abnormal Return (CAR) - Time Series Aggregation

The CAR is a function of time within the event window, which is the sum of all the daily abnormal gains, and represents the time-series aggregation of abnormal returns.

$$CAR_i(T_1; T_2) = \sum_{t=t_1}^{T_2} AR_i(t) \quad \text{……. (28)}$$

With the time-series aggregation being complete the next step is cross sectional aggregation. In order to test a sample for statistical evidence, which is the aim of an event study, an individual company's AR and CAR will not yield much of the answers, so implying a second aggregation is necessity. This involves a cross-sectional aggregation, the aim is to aggregate all the time-series aggregated individual returns.

STAGE VII Measurement of Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR)- Cross-Sectional Aggregation

This involves the average of individual day's abnormal return to get the Average Abnormal Return AAR_t, for the entire sample. This is also known as Mean Abnormal return *(MAR)*

$$\mathrm{AAR_T} = \frac{\sum_{i=1}^{N} AR_{i,t}}{\mathrm{N}} \quad \text{……. (29)}$$

Though abnormal returns give the impact of the acquisition on the share price of the company, still there is a need to test the persistence of the impact of the event during

small sub-periods in the event window. Thus a Cumulative Average Abnormal Return (CAAR) is calculated for a varied period in the event window defined as *CAAR(T1,T2)*. CAAR is calculated as

$$CAAR(T_1, T_2) = \sum_{t=t_1}^{t_2} AAR_t \quad \text{……. (30)}$$

4.8.1 STATISTICAL TOOLS

Application of t test [3,4,14,15,19,20,21,22,26,68,]

The relevant test statistic, is calculated from the sample data and then compared with its problem value based on t – distribution at a specified level of significance for concerning degrees of freedom for accepting or rejecting the Null Hypothesis.

In the present study independent t test is applied to examine three measures

- t test is applied on daily abnormal returns of entire event window *i.e.* (-10, +10) to find the significant change in price of the shares of the sample acquirer companies and to analyse the effect of acquisition announcement on them. The following formula is used

  $$t = \frac{\bar{x} - \mu_0}{\frac{\sigma}{\sqrt{n}}} \quad \text{……. (31)}$$

  Where $\bar{x}$ is the sample mean, μ_0 is population mean, σ is the standard deviation of the sample and *n* is the sample size. The degrees of freedom used in this test are $n - 1$.

- The t test is applied to examine the effect of acquisition announcement on average abnormal returns (AAR), which is average of abnormal returns of particular day of all sample acquirer companies, over entire event window. It is computed as:

  $$t_{(AAR)} = \frac{AAR_{i,t}}{\sigma_{(AAR)}} \quad \text{……. (32)}$$

  Where, $\sigma_{(AAR)}$ is the standard deviation of AAR.

- At last the t test is applied on Cumulative Average Abnormal Returns (CAAR) over 7 selected windows, which are part of the main event window.

$$t_{(CAAR)} = \frac{CAAR_t}{\frac{\sigma_{(AAR)}}{\sqrt{d}}} \quad \text{……. (33)}$$

Where, $\sigma_{(AAR)}$ is the standard deviation of AAR and d is the number of days for which CAAR is calculated.

4.9 LIMITATION OF THE STUDY

1. There are three main assumptions of event study analysis mention in stage III, part two of methodology. These assumptions may not be applicable in all circumstances. Due to market inefficiency observed stock prices may not fully and immediately reflect all information.
2. In the present study, the effect of acquisition announcement on share prices is analysed, assuming that acquisition is the only event in the event window. But some coexisting events could also have an effect on the sample stocks, which could lead to biased stock returns. So abnormal returns may not be entirely the result of market reaction to the specific event of interest.
3. Variations in estimation and test periods are commonly found in event studies. Precise estimation periods are not easy to determine. So for the same sample and study period the difference in estimation window may yield different results.
4. There are various models available to estimate expected or normal returns like, constant mean return model, market model, economic models *etc.* The choice of model to estimate expected returns will have a bearing on the results in the magnitude and the significance of abnormal returns.
5. Not all stocks trade every day. Thin trading over the estimation and test period is a problem in event studies. For example, stock and market returns might not be available on the selected days throughout the estimation period if researchers apply the market model, thus the sample size will reduce.

After discussing sample selection and research methodology for empirical analysis, the next chapter analyses the effect of acquisition on financial performance of the companies in long run, at both overall and sectoral levels.

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REFERENCES

1. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques.* Second Revised Edition. Kolkata, India: New Age International (P) Limited.
2. Grant Thornton. (2007). Deal Trackers, Retrieved from: https://www.google.co.in/?gfe_rd=cr&ei=QxNCV_umOMWM8QeInrSIDg #q=grant+thornton+dealtracker+2007, Last seen 21/6/2016, 6:15 a.m.
3. Sudarsanam S., & Mahate A. (2003). Glamour Acquirers, Method of payment and post acquisition performance: The U.K. Evidence. *Journal of Business Finance and Accounting,* 30(1) & (2), pp. 299-341.
4. Khan M. Y., & Jain, P. K. (2007). *Financial Management: Text, Problems and Cases.* Fifth Edition, New Delhi, India: Tata McGraw-Hill Publishing Company Limited
5. Sherman, A. and Hart, M. (2006). *Mergers & Acquisitions from A TO Z,* Second edition, New York: Amacom publishing.
6. www.nasscom.in
7. www.cmie.com
8. Azhagaiah, R., & Kumar, S. T. (2011). Corporate Restructuring & Firms' Performance: An Empirical Analysis of Selected Firms of Across Corporate Sectors in India. *Interdisciplinary Journal of Research in Business,* 1(4), pp.58-82.
9. Dhiman, B., & Parray, B. (2011). Impact of acquisition on corporate performance in Indian manufacturing sector. *International journal of Multidisciplinary research,* 1(3), pp.61-81.
10. Kouser, R., & Saba, I. (2011). Effects of business combination on financial performance: evidence from Pakistan's banking sector. *Australian journal of business and management research,* 8, pp.54-65.

11. Mantravadi, P., & Reddy, A. V. (2008). Post-Merger Performance of Acquiring Firms from Different Industries in India. *International Research Journal of Finance and Economics,* pp.192-204.

12. Sinha, N., & Dr. Kaushik, K. P. (2010). Measuring Post Merger and Acquisition Performance: An Investigation of Select Financial Sector Organizations in India. *International Journal of Economics and Finance,* 2(4), pp.190-200.

13. Vanitha, S., & Selvam, M. (2007). Financial performance of Indian manufacturing companies during pre and post-merger. *International journal of finance and economics,* pp.7-3.

14. Nalwaya, N., & Vyas, R. (2012). Post Merger Financial Analysis of ICICI bank and Erstwhile Bank of Rajasthan. *Pacific Business Review International, 5(6),* pp. 64-72.

15. Francoeur, C. (2006). The long-run performance of cross-border mergers and acquisitions: evidence to support the Internalization theory. *Corporate Ownership & Control,* 4(2), pp.312-323.

16. Balogh, C. (2006). Analysis Of Factors Determining Success Of Cross-Border Mergers & Acquisitions", Ph.D. Thesis, Retrieved from: phd.lib.uni-corvinus.hu/153/2/balogh_csaba_en.pdf, Last seen 3/5/2016, 4:15 p.m.

17. Indhumathi, G., Selvam, M., & Bennet, E. (2001). The Effect of Mergers On Corporate Performance Of Acquirer And Target Companies In India. Retieved from: http://192.248.17.88/mgt/images/stories/research/ircmf/2009/Finance%20&%20Finacial%20Markets/47THE%20EFFECT%20OF%20MERGERS%20FIN%2006.pdf, Last seen: 4/5/2016, 2:15 p.m.

18. Agorastos, K., Pazarskis, M., & Karagiorgos, T. (2012). The Post-Merger Performance of Acquiring Listed Firms among Different Industries in Greece. Retrieved from http://mibes.teilar.gr/proceedings/2012/oral/Agorastos-Pazarskis-Karagiorgos.pdf, last seen 4/5/2015, 10:30 a.m.

19. Mahesh, R. & Daddikar, P. (2012). Post Merger And Acquisition Financial Performance Analysis : A Case Study Of Select Indian Airline Companies. *International Journal of Engineering and Management Science,* 3, pp.362-369.

20. Alkhathlan, K. A., & Ravichandran, K. (2009). Market Based Mergers-Study on Indian & Saudi Arabian Banks. *International Research Journal of Finance and Economics,* 18, pp.242-251.

21. Pazarskis, M., Vogiazogloy, M., Christodoulou, P., Drogalas, G. (2006). Exploring the Improvement of Corporate Performance after Mergers – the Case of Greece. *International Research Journal of Finance and Economics,* pp.184-192.

22. Saboo, S. & Gopi, S. (2009). Comparison of Post-Merger performance of Acquiring Firms (India) involved in Domestic and Cross-border acquisitions. MPRA Paper No. 19274, Retrieved from: http://mpra.ub.uni-muenchen.de/19274, Last seen: 9/4/2016, 8:10 a.m.

23. 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, pp.6-17.

24. Vyas, V. (2008). An effect of merger on financial performance of corporate sector in India. (Doctoral thesis, Saurashtra Univesity). Retrieved April 2,2016 http://etheses.saurashtrauniversity.edu (Publication No. http://etheses.saurashtrauniversity.edu /id/eprint/109).

25. Jain, N., & Raorane, S. (2011). Merger and acquisitions – "A change paradigm in performance of Indian company". *International Journal of Business economics and Management research,* 2(3), pp. 1-17.

26. Ransariya, S. (2010). Financial Growth indicator of Merger & Acquisition in Indian corporate sector. (Doctoral thesis, Saurashtra Univesity). Retrieved May 21,2016 http://etheses.saurashtrauniversity.edu (Publication No. http://etheses.saurashtrauniversity.edu /id/eprint/1023).

27. Sinha, P., & Gupta, S. (2011). Mergers and acquisitions: A pre-post analysis for the Indian financial services sector. Retrieved from: http:// mpra. Up.uni-muenchen.de/31253/ MPRA paper no. 31253, last seen: 1/1/2016, 6:10 p.m.

28. Leepsa, N., & Misra, C. (2012). Post Acquisition Performance of Indian Manufacturing Companies: An Empirical Analysis. *Asia-Pacific Finance and Accounting Review*, 1(1), pp.17-33.

29. Pawaskar, V. (2001). Effect of Mergers on Corporate Performance in India. *Vikalpa,* 26 (1), pp.19-32.

30. Dewan, A. (2002). Effect of Mergers and Acquisitions on Operating Performance: A Study of Acquiring Firms in India. Retrieved from: http://www.academia.edu/1902085/Effect_of_Mergers_and_Acquisitions_on_Operating_Performance_A_Study_of_Acquiring_Firms_in_India, Last seen: 2/3/2016, 11:10 a.m.

31. Trivedi, A., Desai, J., & Joshi, N. (2013). A Study on Mergers & Acquisitions in Oil & gas Sector in India and Their Impact on the Operating Performance and Shareholders' Wealth. Shri Chimanbhai Patel Institutes Working Paper No. CPI/MBA/2013/0002, Retrieved from: http://ssrn.com/abstract=2202333, last seem: 1/7/2016, 2:45 p.m.

32. Gupta, S. S., Ahuja, A., & Kumar P. (2012). Post Merger Performance Analysis of Selected Indian Companies, *IIM Journal*, 1(1), pp. 126-135.

33. Khan, A. A. (2011). Merger and Acquisitions (M&As) in the Indian Banking Sector in Post Liberalization Regime. *International Journal of Contemporary Business Studies,* 2(11), pp. 31-45.

34. Krishnakumar, D. (2012). A Phase Wise Study of Cross Border Acquisitions by Firms in Emerging Markets - Evidence from India. Retrieved from shodh.inflibnet.ac.in/bitstream/123456789/1433/1/synopsis.pdf, Last seen: 11/7/2016, 5:26 p.m.

35. Agrawal, S. (2007). Merger & Acquisition in Tea Industry: A case study. Retrieved from: http://edissertations.nottingham.ac.uk/1579/Mergers_and _acquisitions_in_tea_ industry.pdf, Last seen 11/7/2016, 5:30 p.m.

36. Beena, P. L. (2004). Towards understanding merger wave in the Indian corporate sector: A comparative perspective. Retrieved from: ideas.repec.org/p/ind/cdswpp/301.html, Last seen 2/7/2016, 3:25 p.m.

37. Pandey, R. (2009). A Study of recent Mergers & Acquisitions in Indian and their impact on operating performance and shareholders wealth. Retrieved from: www.dissertationserviceuk.net/.../Sample%20MBA%20Dissertation %20, last seen: 4/3/2016, 12:10 p.m.

38. Misra, S. (2009). Determinants of Target Firms in a Takeover. *International Research Journal of Finance and Economics*, 29, pp.172-178.

39. Chari, L. (2006). Inorganic growth strategies: An empirical analysis of who benefits from them? Retrieved from: www.iitk.ac.in/infocell/announce/ .../Strategy-04-Latha%20Chari.pdf, pp.1-20, Last seen 1/09/15, 3:30p.m.

40. Julan, Du., Oliver, M. Rui, Sonia, M. L. & Wong, (2008). Financing-Motivated Mergers and Acquisitions: Evidence from Corporate China. Retrieved from: http://apps.olin.wustl.edu/FIRS/PDF/2008/195.pdf,pp.1-15. Last seen 25/02/2015, 2:45p.m.

41. Bhaumik, S., & Selarka, E. (2012). Does ownership concentration improve M&A outcomes in emerging markets? : Evidence from India. *Journal of Corporate Finance*, *18*(4), pp. 717-726.

42. Devarajappa, S. (2012). Mergers in Indian Banks: A Study on Mergers of HDFC Bank Ltd and Centurion Bank of Punjab Ltd. *International Journal of Marketing, Financial Services & Management Research* , 1(9), pp.33-42.

43. Tambi, M. K. (2004). Impact of Mergers and Amalgamation on the performance of Indian companies. *Ph.D. Thesis,* IIMT, pp.1-13, Retrieved from https://core.ac.uk/download/files/153/9315408.pdf.

44. Mishra, P., & Chandra, T. (2010). Mergers, acquisition and firms' performance: Experience of Indian pharmaceutical industry. *Eurasian Journal of Business and Economics,* 3(5), pp.111-126.

45. Arshad, A. (2012). Post Merger Performance Analysis of Standard Chartered Bank Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 6, pp.164-173.

46. Dr. Chellasamy P., & Udhayakumar, J. (2007). A case study on financial performance of Centurion bank and Bank of Punjab-in pre and post-merger period. unpublished, , pp.1-14.

47. E Akben-Selcuk, & A. Altiok-Yilmaz. (2011). The Impact of Mergers and Acquisitions on Acquirer Performance: Evidence from Turkey. *Business and Economics Journal*, 22, pp.1-8.

48. Nagar, P. (2007). Announcement effect of Cross border M&As on acquiring firms. Retrieved from: edissertations.nottingham.ac.uk/1914/1/08MAlixpn5.pdf, last seen: 19/4/2016, 8:10 a.m.

49. Fraser, D. R., Zhang, H. (2009). Mergers and Long-Term Corporate Performance: Evidence from Cross-Border Bank Acquisitions. *Journal of Money, Credit and Banking*, pp.1503-1513.

50. Hoorn F.,Hoorn N. (2009). Merger & Acquisition: Firm Performance and Corporate Governance. (Master Thesis). Retrieved from: essay.utwente.nl/61433/1/MSc_van_Hoorn.pdf, Last seen 9/6/2016, 1:40 p.m.

51. Menapara M., Pithadia V. (2010). A Study on Financial Performance of Selected Companies During Pre-Post Merger And Acquisition. *Abhinav - National Monthly Refereed Journal of Research in Commerce & Management*, Volume No.1, Issue No.11. Pp.192-198.

52. Ndayawo, & Shakur M. (2008). Impact Of Mergers And Acquisitions In Nigeria Banking Industry: Case Study Uba Plc. Retrieved from: kubanni.abu.edu.ng:8080/../impact%20of%20mergers%20and%20acquisition, Last seen: 28/4/2016, 7:35 a.m.

53. Weston J F., & Mansinghk S. (1971). Tests of the Efficiency Performance of Conglomerate Firms. *The Journal of Finance*, 26(4), pp.919-936.

54. Singh, K. B. (2013). The impact of Merger and Acquisition on Corporate Financial Performance of India. *Indian Journal of Research in Management, Business and Social Sciences*, 1(2), pp. 13-16.

55. Ashfaq, K. (2014). Investigating the Impact of Merger & Acquisition on Post Merger Financial Performance (Relative & Absolute) of Companies (Evidence from Non-Financial Sector of Pakistan). *Research Journal of Finance and Accounting*, 5(13), pp.88-102

56. Aggrawal, M. & Singh, S. (2015). Effect of Merger on Financial Performance: A case study of Kingfisher Airlines. XVI Annual conference proceedings, Retrieved from: http://www.internationalconference.in/XVI_AIC/INDEX.HTM, pp. 339-413, Last seen 8/7/2016, 5:39 a.m.

57. MacKinlay, A. C. (1997). Event studies in Economics and Finance. *Journal of Economic Literature*, 35 (1), pp.13-39.

58. Bajaj. M., & A., Vijh. (1990). Dividend Clienteles and the Information Content of Dividend Changes. *Journal of Financial Economics*. pp. 193-219.

59. Bamber, L. (1987). Unexpected Earnings, Firm Size, and Trading Volume Around Quarterly Earnings Announcements. *The Accounting Review*, pp. 510-532.

60. Copeland, T. (1979). Liquidity Changes Following Stock Splits. *Journal of Finance*, pp. 115-141.

61. Holthausen, R., R. Leftwich, & D. Mayers (1987). The Effect of Large Block Transactions on Security Prices: A Cross- Sectional Analysis. *Journal of Financial Economics*, pp. 47-73.

62. Lakonishok J., & T. Vermaelen. (1990). Anomalous Price Behavior Around Repurchase Tender Offers. *Journal of Finance*, pp. 455-478.

63. Kim, O., & Verrecchia, R. (1991). Trading Volume and Price Reactions to Public Announcements. *Journal of Accounting Research*, pp. 302-321.

64. McWilliams, A. & Siegel, D. (1997). Event Studies in Management Research: Theoretical and Empirical Issues. *The Academy of Management Journal*, 40 (3), pp.626-657.

65. Jensen, M. C. (1978). Some anomalous evidence regarding market efficiency. *Journal of Financial Economics*, 6 (2-3), pp. 95-101.

66. Frankfurter, G. M. & McGoun, E. G. (2002). Resistance is futile: the assimilation of behavioral finance. *Journal of Economic Behavior & Organization*, 48 (4), pp. 375–389.

67. Campbell J. Y., Lo A. W. and MacKinlay A. C. (1997), 'The Econometrics of Financial Markets', Retrieved from: http://press.princeton.edu/titles/5904.html, Last seen: 11/7/2016, 5:45 p.m.

68. Peterson, P. (1989). Event Studies: A Review of Issues and Methodology. *Quarterly Journal of Business and Economics*, 28 (3), pp. 36-66.

69. Armitage, S. (2006). Event study methods and evidence on their performance. *Journal of Economic Surveys*, 9 (1), pp.25-52.

70. Vera Gronsund. (2013).The announcement effect of cross border M&A on shareholder's value: An event study of Sandinavian target companies. Thesis for Degree of Master of Economics & Econometrics, Retrieved from: https://www.duo.uio.no/handle/10852/34589, Last seen 11/72016, 5:50 p.m.

71. Walker, M. M. (2000). Corporate Takeovers, Strategic Objectives, and Acquiring-Firm Shareholder. *Journal of Financial Management*, 29 (1), pp. 53-66.

72. W.D. op de Hoek. (2010). M&A and Shareholder wealth in financial institutions in the Asia –Pacific region: An event study. Retrieved from http://oaithesis.eur.nl/ir/repub/asset/ 6975/280265hoekma0410.pdf, Last seen 25/4/2015, 1:15 a.m.

73. Locke, S., Duppati, G., & Lawrence, S. (2011). Market Reactions to Foreign Investments in Mergers and Acquisitions: An empirical study of Indian Corporate. *International Conference on Economics and Finance Research*, 4, 185-193.

74. Wooldridge, J. (2009). *Introductory Econometrics* (4th edition). Canada: South-Western Publishing.