ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics

Bachelor Thesis [IBEB]

The effect of mergers on the solvency of acquirer firms in India

Name student: Shivam Sareen
Student ID number: 492580

Supervisor: Gianluca Antonecchia
Second Assessor: Dr. Frank Van Oort

Date final version: 09/08/2022

Abstract

Companies around the world are using mergers and acquisitions (M&A) as corporate restructuring strategies to tackle the competitive environment around them due to globalization. M&A provide an opportunity for companies to explore new markets and products, increase its customer base, improve internal technology, and increase profits. The aim of my study is to focus on how mergers affect the financial health and sustainability of the firm. I do this by analyzing the effects of mergers on the solvency of the acquirer firms in India. Only a limited amount of studies in India focus on the financial health of the acquirers. I use the Compustat Global database to find the financial information of the firms. I use the BSE India website and financial newspapers to find information about the merger deals in India from 2003-2018. After all data modifications and consolidation, I create a sample of 83 acquirer firms and 2186 non-acquirer firms. I use Total Debt Ratio and Interest Coverage Ratio as solvency indicators of the firm. For my data analysis, first, I compare the mean of pre-merger and the mean of post-merger solvency indicators and observe that they do not differ. Second, I run a Two-Way fixed effects model in Stata with the acquirers as treatment group, non-acquirers as control group and merger as treatmnet. I observe that mergers have positively impact solvency (decrease TDR and increase ICR) of acquirers. However, these results are not significant at any level. Therefore, the result of my study is that mergers (amalgamations) do not have any impact on the solvency of acquirer firms in my sample.

Table of Contents

Chapter 1: Introduction

Globalization, facilitated by the reduction of trade barriers, the introduction of trade reforms, and the integration of global markets have resulted in a significant increase in competition in different industries. These changing economic conditions influence the corporate strategies of firms (Wiersema & Bowen, 2008). So, how do companies compete and grow in this rapidly changing environment? Mergers and acquisitions (M&A) are a popular method companies use to achieve inorganic growth. This allows companies to capture and explore new markets, improve technology and increase profits in order to survive in competitive industries and markets (Oduro & Agyei, 2013; Götz & Gugler, 2006; Rodrigues, 2001).

Over the past two decades, India, like other developing countries has witnessed globalization. This has resulted in an influx of foreign direct investments, access to (consumer) products from across the globe, increase in employment opportunities, and access to foreign technology. Although globalization has a positive impact, it has caused an increase in competition for the Indian firms. In order to stay competitive and keep up with the market, Indian firms are aggressively pursuing M&A opportunities both domestically and abroad (Goyal & Joshi, 2011; Nayyar, 2008; Gorodnichenko, Svejnar, & Terrell, 2010). Market reform policies in India additionally played a part in promoting M&A activities. The amendment of Monopolistic and Restrictive Trade Practices (MRTP) Act in 1990, the formation of Securities and Exchange Board of India (SEBI) in 1992, the introduction of the Foreign Exchange Management Act (FEMA) in 2000, and the Competition Policy Act (CPA) of 2002 increased the firms' ability to acquire shares and takeover other companies while ensuring market sanctity and curbing market power misuse (Bhoi, 2000; Basant, 2000; Kapil & Dhingra, 2021).

Several theories are developed which explain the in-depth rationale behind M&As and why firms participate in such arrangements. Tamosiuniene and Duksaite (2009) identify three main reasons: (1) Growth. M&A allows firms to gain a new customer base, expand into a new geographic region, and explore new products with relatively less risk and time. (2) Intangible Assets. Upon entering M&A transactions, companies can easily gain access to the knowledge base of the target company. This knowledge base includes the firm's human, customer, and structural capital. (3) Synergies. This refers to the ability of the newly formed entity to create gains that would not have been possible if the two entities did not merge or combine (example: economies of scale, economies of scope, and combined finances). In addition to these, Nguyen, Yung, and Sun (2012) add that M&A is also motivated by shocks to the industry. They explain this by giving an example

of failures in supply chains. If an actor fails to fulfill their obligation in a supply chain, the owner/other parties in that supply chain will look for new partners who can replace the under-performing actor. Studies by Letto-Gillies and Meschi (1999) and Hopkins, Chaganti, and Kotabe (1999) observe another reason for M&A activities: the personal motives of the managers. Managers tend to undertake ventures that will add to their prestige and power even if they harm their firm in the long run. Managers also tend to overestimate their capabilities.

It is important that we study how mergers, apart from increasing market power and competitiveness, affect other important areas of the firm. My study will analyze the effect of mergers (amalgamations) on the acquirer firms' solvency in India. Solvency refers to a firm's ability to meet and fulfill its long-term obligations. It shows whether the business is sustainable in terms of health and survival. Using my study, I will try to answer the following research question.

RQ: How do domestic mergers (amalgamations) affect the solvency of the acquirer firm in India?

The topic is relatively less researched as compared to profitability and liquidity. Only a few studies in India discuss and analyze the effects of M&A on the solvency of the acquirer firm (Kumar & Bansal, 2008; Leepsa & Mishra, 2013; Rani, Yadav, & Jain, 2015; Aggarwal & Garg, 2019). In my study, I first compare the solvency of the acquirer before and after the merger. Then, I include a group of non-acquirer firms and compare the effects of merger for the whole sample. I observe that the solvency indicators of the acquirers do not change when I compare the pre-merger values with the post-merger values. When I analyze the effect of merger for the whole sample, I observe that mergers have no impact of on the solvency indicators of acquires as compared to the control group of non-acquirers.

After introducing my topic of research, I will continue to Chapter 2 where I will discuss the past literature written on mergers, research gap I fill through my study, and the hypotheses statement of my study. In Chapter 3, I will describe the data and the modifications I perform it. Chapter 4 explains the tests I will perform on my dataset. I will discuss the results of my data analyses in Chapter 5. Lastly, Chapter 6 will contain the conclusion of my study, its limitations, and suggestions for future research.

Chapter 2: Theoretical framework

2.1 Literature survey

Only a limited amount of studies have been conducted in India which study the effect of mergers. Most of them focus on post-effects on profitability and financial performance of the firms involved and only a limited focus on the post-health of the firms involved.

2.1.1: Effect of mergers on the profitability of the acquirer firm in India

Pawaskar (2001) analyzes mergers deals in India from 1992-1995. She compares the financial performance of 36 acquirer firms with a sample of 36 firms that did not participate in any merger deals. She measures profitability using operating cash flows. She observes that mergers have a negative impact on the profitability of the acquirer firm.

Ramakrishnan (2010) collects data on 87 domestic mergers in India between 1996-2002. He uses profit margin rate and sales turnover as indicators of the financial performance of the firms.
He compares the average 3-year post-merger performance of the acquirer firms with the average 3-year pre-merger performance of the acquirer firms. He observes higher profit margin rates and higher sales turnover for the post-merger periods and attributes this increase to the merger deal. Therefore, concluding that mergers have a positive impact on the financial performance of the firms.

Kumar and Bansal (2008) analyze merger deals in India which occurred in 2003. They collect data for 3 periods before the merger and 3 periods after the merger. They conduct a full study that covers parameters representing the three main areas of a firm: profitability, liquidity, and solvency. They use operating profit, return on shareholder equity, and after-tax profit as indicators of profitability. They observe a positive impact of mergers on the operating profit and after-tax profit. However, they find a mixed impact on return on shareholder equity. Therefore, they find no clear effect of mergers on the profitability of the acquirer firms.

Leepsa and Mishra (2013) conduct a study to analyze mergers and acquisitions deals that occurred in the Indian manufacturing industries between 2003-2007. They choose indicators representing the acquirer firms' profitability, liquidity, and solvency. They include data for 3-years prior to the merger and the 3-years after the merger in their analysis. They use the return on capital employed ratio (ROCE) and the return on net worth ratio (RONW) as indicators of

profitability. They observe that ROCE does not improve in the post-merger period. But for RONW they observe a positive change in the post-merger period. Therefore, they find mixed results of the merger on profitability.

Kar, Soni, and Singh (2014) analyze data on turnover, after-tax profit, and the book value of 15 firms that participated in a merger deal between 1990-2000. They observe that mergers have a positive impact on all three indicators. Additionally, they observe that the positive impact of mergers erodes with time.

Rani, Yadav, and Jain (2015) conduct an analysis of the performance of acquirer firms that participated in an M&A deal between 2003-2008. They include 14 different ratios in their study representing the profitability, liquidity, efficiency, and solvency of the firms. They use return on equity, return on capital employed, operating profit margin, and net profit margin to represent the financial performance. They observe a positive and significant impact for all the ratios in the post-periods. Therefore, they conclude that M&A deals are beneficial for the financial performance of the acquirer firms.

Aggarwal and Garg (2019) collect and analyze data for merger deals that occurred between 2007-2012. They include 7 ratios in their analysis covering three areas of the firms: profitability, liquidity, and solvency. They compare the average values of the ratios for 3-5 years prior to the merger and after the merger. They use return on equity, return on capital employed, and return on assets as profitability indicators. They observe a positive impact on the profitability indicators. However, this impact is more prominent/positive in the long run than in the short run. They conclude that mergers positively impact the financial performance of the acquirers in the long run.

2.1.2: Effect of mergers on the liquidity of the acquirer firm in India

In the study by Kumar and Bansal (2008), they choose working capital as an indicator for the liquidity position of the firms. They observe that most firms working capital increase after the merger. Therefore, they conclude that mergers reduce the liquidity risk of the acquirer firm.

The paper by Leepsa and Mishra (2013) also focuses on the liquidity of the acquirer firms. They use the current, quick, and net working capital by sales ratios as indicators of the firm’s liquidity. They observe that all three liquidity ratios significantly improve after the merger occurs. This effect is more prominent for periods immediately after the merger.

The analysis by Rani, Yadav, and Jain (2015) also examines the effect of mergers and acquisitions on the liquidity of the firms. They use current ratio as an indicator for liquidity. They observe that liquidity risk decreases as the ratio significantly improves in the periods after the M&A occurs.

Aggarwal and Garg (2019) include two liquidity ratios in their analysis: quick and current ratios. They observe a significant positive impact on the two liquidity ratios. Like the profitability ratios, liquidity ratios also see more improvement in the long i.e. 3 years after the merger. They conclude that mergers positively affect the liquidity position of the acquirer firms.

2.1.3: Effect of mergers on the solvency of the acquirer firms in India

To represent the solvency of the firms, Kumar and Bansal (2008) use debt-to-equity ratio as an indicator. They observe an increase in the ratio in the periods after the merger for most of the acquirer firms. Therefore, they conclude that mergers worsen the financial health of the acquirers.

Leepsa and Mishra (2013) also study solvency in their analysis. They choose the total debt ratio and interest coverage ratio as solvency indicators. They observe that the merger significantly impacts the two ratios but in different directions. The total debt ratio significantly worsens and the interest coverage ratio significantly improves after the merger. Therefore, they also find mixed results for the solvency of the acquirer firms after the merger.

Rani, Yadav, and Jain (2015) also cover one solvency indicator in their M&A analysis. They use the debt-to-asset ratio. They observe no changes in the ratio when they compare the pre-M&A values with the post-M&A values of the acquirer firms. They conclude that M&As do not impact the solvency of the acquirer firms.

The article by Aggarwal and Garg (2019) also studies the solvency of the acquirer firms. They calculate two indicators: debt-equity ratio and interest coverage ratio. They do not observe any change in the values of the indicators when they compare the pre-merger period to the post-merger period. Therefore, they conclude that mergers do not affect the solvency of the acquirer firms.

2.1.4: Research Gap

In India, only a few studies cover and discuss the effects of M&A on solvency (Kumar & Bansal, 2008; Leepsa & Mishra, 2013; Rani, Yadav, & Jain, 2015; Aggarwal & Garg, 2019). These studies only compare the performance of acquirer firms before and after the M&A using t-tests. They do not create a treatment and control group with acquirers and non-acquirers and analyze how M&As affect the acquirers when both groups are compared. Only Pawaskar (2001) does this but just studies profitability indicators. These studies also generalize and combine the results of mergers and acquisitions, which are two different types of deals. When two companies merge, the target company gets dissolved completely and combines with the acquirer. On the other hand, when an acquisition takes place, the acquirer firm acquires a stake in the target and target still retains its identify and continue its operations. The results in these studies are also inconsistent with each other and only cover deals over a short span. The aim of my research study is to only focus on the solvency of the acquirer firms that participated in a merger. I will do this by collecting data on acquirer firms that went through a merger between 2003-2018. For the data analysis part, firstly, I will compare the solvency of the acquirer firms before and after the merger. Secondly, I will make a control group of non-acquirer firms and analyze how mergers affect the sample. This will provide insight into whether the mergers are beneficial or not for the acquirer firms when compared with other firms in the industry over similar years that did not go through a merger.

2.2 Mechanisms and Hypothesis statement

In the face of globalization, several companies are opting for mergers and acquisitions as new corporate arrangements to achieve growth and stay competitive. Many theories have been introduced that attempt to explain the rationale behind M&A in depth. Three main reasons to engage in M&A arrangements are (1) To achieve growth; in terms of new consumers, new geographical regions, and new products (2) To gain access to intangible assets such as human and customer capital of the target firm and (3) To create synergies by creating gains that would not have been possible in the absence of mergers or acquisitions (Tamosiuniene & Duksaite, 2009). Studies by Hopkins et al. (1999), Letto-Gillies and Meschi (1999), and Nguyen et al. (2012) identify industry shocks and personal motives of the managers additionally as drivers of M&A.

It is important that we study how such arrangements affect different performance areas of the firms involved. A lot of empirical research has been conducted to study the effects of M&A on the profitability and the liquidity of the acquirer firm. However, only a few papers discuss its effects on solvency (refer Section 2.1.4). The research question of my study is how domestic mergers

(amalgamations) affect the solvency of the acquirer firm in India. To answer this, I construct 4 hypotheses. I base my hypotheses on the assumption that mergers have no impact on the solvency of the acquirer firms (Aggarwal & Garg, 2019), (Rani, Yadav, & Jain, 2015).

*H*a1: Post-merger ICR is the same as the pre-merger ICR for the acquirer firms*

*H*b1: The merger does not affect the ICR of the acquirer firms as compared to non-acquirer firms in the periods after the merger*

*H*a2: Post-merger TDR is the same as the pre-merger TDR for the acquirer firms*

*H*b2: The merger does not affect the TDR of the acquirer firms as compared to non-acquirer firms in the periods after the merger*

Chapter 3: Data

3.1: Data collection

I collect data for Indian firms that acquired another domestic firm through an amalgamation merger deal. Amalgamations result in the consolidation of assets and liabilities of the two companies involved under a single entity, the acquirer firm. I consider deals between 2003-2018. I only include firms in this time frame because I require data for 3 years before and 3 years after the merger. In most databases, data for the years before 2000 is not present or is unreliable. I also collect data to form a control group consisting of firms of the same industry as the acquirer firms but did not participate in any merger deal. Only firms listed on the Bombay Stock Exchange India (BSE) and National Stock Exchange India (NSE) are considered for the analysis as the data is easily available for them. I use the Compustat Global database (Wharton Research Data Services) to collect firm-level data. Compustat Global contains fundamental balance sheet data of firms with a focus on Non-American and Non-Canadian firms. I download the full database of Indian firms from 2000-2021. To identify the acquirer firms, I use the BSE website. BSE website contains all the Indian firms that underwent a merger (amalgamation) from 1990 onwards. After identifying the acquirer firms, I cross-check the merger deals using the Securities and Exchange Board of India (SEBI) website and the public announcements of the merger in Financial Times India, The Economic Times India, and The Times of India.

3.2: Data description and modification

I identify 114 acquirer firms and 2327 non-acquirer firms by combining the BSE merger list and the Compustat Global firm-level dataset. I use Microsoft Excel to modify and consolidate the data from the two datasets. Table 3.1 (see appendix) represents the list of variables along with their definitions that I use in my analysis from the Compustat Global dataset. These firms also belong to different industries; hence my results are not restricted to one industry. Table 3.2 (see appendix) describes the different industries covered in the analysis.

For each firm, I require 7 periods (years) of data: the year of the merger, 3 years prior to the merger, and 3 years after the merger. Apart from the standard Compustat variables, I additionally create three new dummy variables: (1) PM: takes the value 1 for the year of merger and the subsequent periods, and 0 otherwise. It remains 0 non-acquirers for all the periods, remains 0 for acquirers in periods before the merger and takes the value 1 in the merger and its following periods. (2) Acquirer: takes the value 1 if the firm is an acquirer and 0 otherwise. (3) Audit: takes the value 1 if the firm uses an auditing firm and 0 otherwise. As the year of merger is different for each firm, I create a "standardized" time frame variable, t, with a value range of [-3,3]. It takes the value 0 for the year of the merger, -1 to -3 for the years before the merger, and 1 to 3 for the years after the merger. I assign the values of t to each firm. However, for many firms, I cannot assign some values of t due to missing year and variable data. I delete all these firms so that I get a strongly balanced dataset. The final dataset contains 83 acquirers and 2186 non-acquirers.

3.3: Solvency indicators

To represent the solvency of the firms, I calculate two indicators: (1) Total Debt Ratio; (2) Interest Coverage Ratio.

Total Debt Ratio (TDR) represents the percentage of a firm's assets that are funded by debt. Higher TDR indicates higher leverage and higher financial risk. The ratio is calculated by dividing the total liabilities of a firm (short- and long-term) by its total assets. When the ratio is higher than 1, a large portion of the company's assets is funded by debt. This shows a higher risk. Therefore, a value less than 1 is considered healthier for firms.

Interest Coverage Ratio (ICR) represents the ability of a firm to pay off the interest accrued on its outstanding debt. This ratio is mostly used by lenders and financers to determine how much risky

it is to lend capital to a company. It is calculated by dividing the earnings before income and taxes (EBIT) by the interest expense of the company. Higher the ratio, the better the financial health of the company (less possibility of bankruptcy), and the company is capable of paying its interest obligations.

Chapter 4: Methods

To test Hypotheses H*a1 and H*a2, I use t-tests. First, I load the dataset into Stata and declare that the dataset is in the form of panel data. Then I delete all observations for which the variable Acquirer equals 0. Only acquirers remain in the dataset after doing this. I additionally delete the observations for the period t=0. Then, I compare the mean value of the indicators from periods -3, -2, -1 with the mean value of the indicators from periods 3, 2, 1 using t-tests.

Before testing Hypotheses H*b1 and H*b2, I will compare the characteristics of the acquirers and non-acquirers before the mergers (treatment) occurs. I do this using t-tests with unequal variances as the number of observations differ in the treatment and the control group. This will show whether the sample contains selection bias due to difference in pre-treatment characteristics.

To test Hypotheses H*b1 and H*b2, I will use a Two-Way Fixed Effects Model (TWFE). In this model, the counterfactual observations consist of all the firms (both acquirers and non-acquirers) for which PM equals 0. Counterfactual observations represent what would have happened in absence of treatment. This model allows to control for 2 types of variations. First, it captures all the firm-specific time-invariant characteristics/variables (individual firm fixed-effects). We don't have to measure or even include information about them. Second, it controls for variables that affect all the firms equally in each period but changes over time (time fixed-effects). There are i individual firms and t periods in this model and the treatment takes place only once. Using the xtreg command in Stata, I regress the dependent variable (solvency indicator), Y_{it}, on the treatment (merger) variable, PM_{it}. This allows me to observe the treatment effect of merger (coefficient of PM_{it}) and the firm fixed-effects (alpha/constant term). To observe the time-fixed effects there is no direct command in Stata, so I add t as a categorical variable in the below-mentioned regression. This allows me to see the effect of each time period. I will use 5 control variables in the regression: current liabilities, current assets, revenues, cost of goods sold, and audit. Since the first 4 control variables are continuous, I will use their natural log values instead in the regression.

Two-Way Fixed Effects regression equation:

$$Y_{it} = \alpha_i + \beta 1 * PM_{it} + \beta 2 * Acquirer_{it} + \beta 3 * (t = -2) + \beta 4 * (t = -1) + \beta 5 * (t = 0) + \beta 6 * (t = 1) + \beta 7 * (t = 2) + \beta 8 * (t = 3) + \beta 9 * Ln(Current\ Liabilities)_{it} + \beta 10 * Ln(Current\ Assets)_{it} + \beta 11 * Ln(Revenues)_{it} + \beta 12 * Audit_{it} + \beta 13 * Ln(CostOfGoodsSold)_{it} + \epsilon\_it$$

Where i represents a firm and t represents the standardized time period:

α_i represents the time-invariant coefficient which captures the firm fixed-effects

Y_{it} represents the solvency indicator for firm i at time t

PM_{it} represents that the merger has occurred for an acquirer firm

$Acquirer_{it}$ represents whether the firm i is an acquirer

t is a categorical variable with values -2/-1/0/1/2/3 capturing the year fixed-effects (time-fixed effects). Time t = -3 is considered as base year.

$Ln(Current\ Liabilities)_{it}$ represents the natural log of current liabilities of firm i in period t

$Ln(CurrentAssets)_{it}$ represents the natural log of current assets of firm i in period t

$Ln(Revenues)_{it}$ represents the natural log of revenues of firm i in period t

$Audit_{it}$ represents whether a firm i uses an auditor in period t

$Ln(Cost\ of\ Goods\ Sold)_{it}$ represents the natural log of cost of goods sold of firm i in period t

ε_{it} represents the error term

Chapter 5: Results

5.1: Hypotheses H*a

Table 5.1 displays the results of t-tests for Hypotheses H*a1 and H*a2. The t-statics for both solvency indicators are not significant. This suggests that the acquirer firm's interest-paying capability (ICR) does not change after the merger. Similarly, the merger does not affect the acquirer firm’s percentage of assets funded by debt (TDR). Therefore, I find positive evidence for both Hypotheses H*a1 and H*a2. Mergers does not affect the solvency of the acquirer firms in the periods after the merger.

Table 5.1: T-test results comparing solvency indicators before and after the merger

Solvency Indicator	**t-static**
Interest Coverage Ratio	-0.9467
Total Debt Ratio	-0.1703

Note. ***p < 0.01, **p < 0.05, *p < 0.1

5.2: Hypotheses H*b

Before running the TWFE models, I compare the characteristics of the non-acquirers and acquirers before the merger. I use t-tests with unequal variances because the number of observations differs for both groups. Table 5.2 displays the t-statics of the tests. All the statics are significant. This shows that both groups differ in their characteristics. This implies that my sample contains selection bias and the results of the Two-Way Fixed Effects regressions will not be causal.

Table 5.2: T-test results comparing characteristics of acquirers and non-acquirers before the merger

Firm characteristics	**t-static**
Current Assets - Total	-4.1596***
Assets - Total	-4.0950***
Earnings before Interest and Taxes	-4.3587***
Current Liabilities - Total	-3.6546***
Liabilities - Total	-4.2125***
Revenues - Total	-3.3897***
Pretax Income	-4.0772***
Cash and Short-Term Investments	-3.5648***
Cost of Goods Sold	-2.0681**

Note. ***p < 0.01, **p < 0.05, *p < 0.1

Figure 5.1 and Figure 5.2 show the mean TDR and mean ICR respectively of the treatment group (acquirers) and the control group (non-acquirers). The vertical line at t=0 indicate the period in which the treatment (merger) takes place. In Figure 5.1, I observe that the mean TDR is higher for the acquirers as compared to the non-acquirers for all periods. This shows that the acquirer firms in my sample have more amount of assets funded by debt as compared to the non-acquirers.

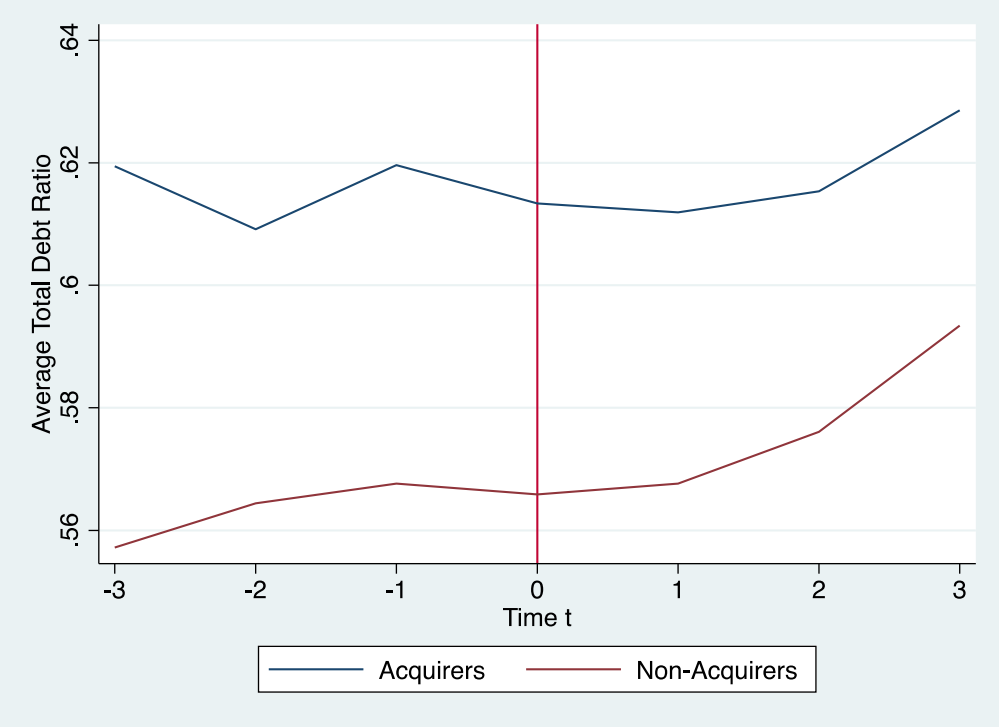

Figure 5.1: Average Total Debt Ratio of treatment and control groups over t with merger at t=0

In Figure 5.2, we observe that before the merger period (t=0), the mean ICR of the non-acquirer group is higher than the acquirer group. After t=0, we observe that the mean of the acquirers increases but decreases for the non-acquirers (till t=2). This shows that before t=0, non-acquirers are better capable of making payments on their outstanding debt as compared to acquirers. After t=0, debt-paying ability of the acquirers increase and that of the non-acquirers decrease.

We can also correlate the findings of Figures 5.1 and 5.2. Before the merger, when the TDR (amount of debt) of the acquirers is higher than of non-acquirers, acquirers have a lower debt-paying capability (ICR) as compared to non-acquirers. Both figures indicate that the financial health of acquirers is slightly lower as compared to non-acquirers. When the TDR lowers for

acquirers after t=0, their debt-paying capability also improves. The trend is opposite for non-acquirers. Their level of debt increases after t=0 which reduces their debt-paying ability.

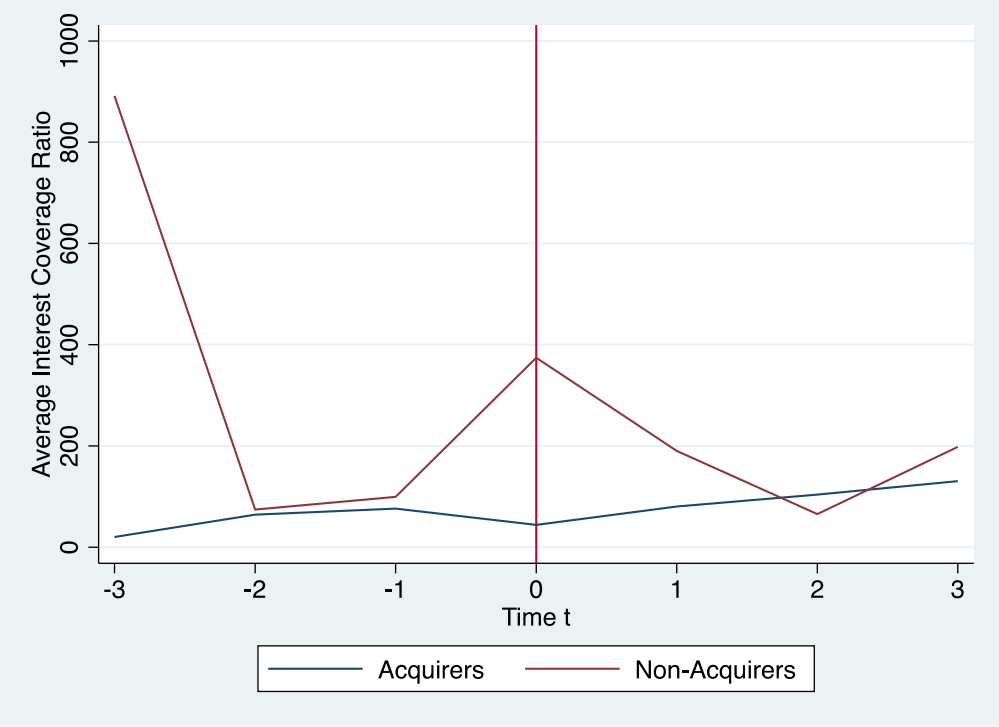

Figure 5.2: Average Interest Coverage Ratio of treatment and control groups over t with merger at t=0

Now I will discuss the results of Hypotheses H*b1 and H*b2. Table 5.3 and Table 5.4 shows the results of the Two-Way Fixed Effects regression model for Interest Coverage Ratio and Total Debt Ratio respectively. In both tables, there are 2 columns. Column 1 represents the results of the regression mentioned in Chapter 4 but without the control variables. Column 2 represents the results of the exact equation mentioned in Chapter 4. So, Column 1 only shows the effect of treatment, time-fixed effects and individual firm fixed-effects. Column 2, apart from these 3 effects, additionally account for control variables that might produce bias in the effects of Column 1.

In both columns of Table 5.3, the coefficient of the treatment variable (PM) is positive. This indicates merger increases the ICR of the acquirer firms. But on examining the p-values of the coefficient, I observe that these coefficients are not significant. This shows that merger have no effect on the ICR of the acquirers in our sample. Therefore, I find positive evidence for my Hypothesis H*b1. The coefficient of Acquirer is omitted in both regressions as it stays 1 and 0 for acquirers and non-acquirers respectively for all the periods. It remains fixed, so we cannot

measure its effect. I additionally observe in Column 2 that the coefficients of the natural log of current liabilities, revenues and cost of goods sold are significant at different levels. Revenues increase the debt-paying ability of the firms, current liabilities and cost of goods sold decrease it. The coefficients of the categorical variables of t and the constant term are also not significant. This shows that the time and firm fixed-effects do not impact this solvency indicator.

Table 5.3: Results of Two-Way fixed effects regression of Interest Coverage Ratio on PM (merger/treatment) and 5 control variables

	Interest Coverage Ratio (1)	**Interest Coverage Ratio (2)**
PM	184.098	191.915
	(248.656)	(233.191)
Acquirer	0	0
	(omitted)	(omitted)
t		
-2	-785.690	-839.377
	(686.430)	(725.442)
-1	-761.016	-818.371
	(687.475)	(738.940)
0	-504.288	-559.682
	(721.297)	(794.895)
1	-680.142	-745.446
	(696.017)	(772.250)
2	-799.515	-868.704
	(696.542)	(782.325)
3	-670.429	-741.954
	(708.489)	(805.705)
Ln(Current Liabilities)		-127.116*
		(71.675)
Ln(Current Assets)		137.842
		(227.464)
Ln(Revenues)		400.163***
		(122.920)
Audit		-664.303
		(711.604)
Ln(Cost of Goods Sold)		-372.303**
		(182.304)
Constant	859.6473	1116.727
	(589.0919)	(1169.403)
Number of Observations	15883	15520
R-squared	0.001	0.001

Note. ***p < 0.01, **p < 0.05, *p < 0.1

In Table 5.4, I observe that the coefficient of PM is negative in both columns. This shows that mergers decrease the TDR of the acquirer firms which improves their financial health. But like Table 5.3, these coefficients are not significant at any level. This indicates positive evidence for my Hypothesis H*b2 that mergers do not affect the ICR of the acquirer firms as compared to non-

acquirer firms in my sample. The coefficient of Acquirer is again omitted like in Table 5.3 due to the fact that it remains constant over all periods. Apart from this, in Column 1, I observe that the coefficients of time-fixed effects variables are significant and impact the TDR of the firms. The constant term (firm fixed-effects) are positive and strongly significant in both columns. I additionally observe that the coefficients of natural log of current liabilities (positive), current assets (negative), and revenues (negative) are also strongly significant. Current liabilities worsen the long-term financial health of the firms. Current assets and revenues improve it.

Table 5.4: Results of Two-Way fixed effects regression of Total Debt Ratio on PM (merger/treatment) and 5 control variables

	Total Debt Ratio (1)	**Total Debt Ratio (2)**
PM	-0.011	-0.007
	(0.012)	(0.012)
Acquirer	0	0
	(omitted)	(omitted)
t		
-2	0.006**	0.000
	(0.003)	(0.003)
-1	0.010***	0.001
	(0.004)	(0.005)
0	0.008**	-0.002
	(0.004)	(0.005)
1	0.010**	-0.005
	(0.005)	(0.007)
2	0.018***	-0.004
	(0.006)	(0.008)
3	0.036***	0.005
	(0.008)	(0.011)
Ln(Current Liabilities)		0.146***
		(0.009)
Ln(Current Assets)		-0.115***
		(0.012)
Ln(Revenues)		-0.024**
		(0.012)
Audit		-0.094
		(0.005)
Ln(Cost of Goods Sold)		0.003
		(0.009)
Constant	0.559***	0.669***
	(0.003)	(0.050)
Number of Observations	15883	15520
R-squared	0.001	0.342

Note. ***p < 0.01, **p < 0.05, *p < 0.1

Chapter 6: Conclusion & Discussion

Globalization has a lot of positive impacts on developing countries. It brings in foreign investments, employment opportunities, developed technologies, and global consumer products. This brings in a lot change in economic and market conditions of these countries. This results in high competition for domestic firms. Firms are under pressure to grow, capture market share and remain competitive. Corporations have found a solution for this, mergers and acquisitions. It is important that we study how M&A affect the performance areas for the acquirer firms apart from helping them achieve inorganic growth. The research question of my study is how domestic mergers (amalgamations) affect the solvency of the acquirer firms in India. I choose Total Debt Ratio and Interest Coverage Ratio as my solvency indicators.

First, I compare the mean values of the indicators in the pre-merger periods with in the post-merger periods for the acquirer firms. I observe that the mean values do not differ. Second, I perform a Two-Way fixed effects regression on the solvency indicators. I observe that mergers increase the ICR and decrease the TDR of the acquirer firms as compared to non-acquirers. However, both these effects are insignificant for my sample. This indicates that mergers have no impact on the solvency of the acquirer firms in my sample. Therefore, I answer my research question by saying that mergers (amalgamations) neither worsen nor improve the solvency of the acquirer firms in India.

However, there are some limitations to my research. First, since the treatment and control group differ in pre-treatment characteristics, there is selection bias in my sample. This will bias my results and make its effect non-causal. Second, my model provides no information about the effect of (un)observable time-invariant characteristics on the solvency of the firms. Third, I had to delete many acquirer firms from my sample as some data was missing for them. This additionally reduces the external validity of my results.

There is no doubt that more research is to be done on this topic. Most studies till now only focus on the impact of M&As. They lack information about the characteristics and reasons behind the merger. Future researchers should focus on gathering information about the mergers by sending surveys to the acquirer firms. The survey should cover topics like corporate strategy behind merger (like by Tamosiuniene & Duksaite, 2009), decision-making which led to the merger (internally by board or externally by auditiors/advisors), whether the merger was done with a target of the same industry (industry relatedness), method of payment of the merger (cash payment,

share swap, or mixed). Questions can also be added which covers information about the macro-economic conditions surrounding the industry (reforms in market policies or competition policies) and whether they affect the decision to merge. All these questions will provide more in-depth information about the effects of merger and how it changes under different conditions.

Appendix

Table 3.1: Compustat Global variables and definitions

Variable	Definition
Current Assets - Total	Represents cash and assets expected to be realized in cash and used in the production of revenue during the next 1-year operating cycle
Assets - Total	Represents the total value of assets reported on the balance sheet
Cash and Short-Term Investments	Represents any immediately negotiable medium of exchange and funds convertible into cash within a short period of time
Cost of Goods Sold	Represents aggregate expenses directly related to purchasing merchandise or manufacturing goods subsequently withdrawn from finished goods inventory and sold to customers
Earnings Before Interest and Taxes	Represents the sum of Pretax Income and Interest Expense
Income Before Extraordinary Items	Represents income after the deduction of all expenses, including allocations to untaxed balance sheet reserves, income taxes, minority interest, and net items, but before extraordinary items and provisions for dividends
Current Liabilities - Total	Represents debt and other liabilities due within one year
Liabilities - Total	Represents the total value of liabilities reported on the balance sheet
Pretax Income	Represents net operating and non-operating income, reported before appropriations to untaxed reserves, income taxes, minority interests, net items, and extraordinary items
Sales/Turnover (Net) / Revenues	Represents gross sales reduced by cash discounts, trade discounts, returned sales, excise sales, and value-added taxes and allowances for which credit is given to customers
Shareholders Equity - Total	Represents common and preferred shareholder's interest in the company and any reserves reported
Interest Expense - Total	Represents a company's gross periodic expense

	in securing long- and short-term debt
Auditor	Identifies the firm auditing a company's financial statements

Adapted source: Compustat (Global) Data Guide by Standard & Poor's

Table 3.2: Firm industries - Compustat Global

GICS Industry Code	**Industry Name**
1010	Energy
1510	Materials
2010	Capital Goods
2020	Commercial Services & Supplies
2030	Transportation
2510	Automobiles & Components
2520	Consumer Durables & Apparel
2530	Hotels Restaurants & Leisure
2540	Media
2550	Retailing
3010	Food & Drug Retailing
3020	Food Beverage & Tobacco
3030	Household & Personal Products
3510	Health Care Equipment & Services
3520	Pharmaceuticals & Biotechnology
4010	Banks
4020	Diversified Financials
4030	Insurance
4040	Real Estate
4510	Software & Services
4520	Technology Hardware & Equipment
5010	Telecommunication Services
5510	Utilities
6010	Real Estate

Adapted source: Compustat (Global) Data Guide by Standard & Poor's

References

Aggarwal, P., & Garg, S. (2019). Impact of mergers and acquisitions on accounting-based performance of acquiring firms in India. *Global Business Review*, 23(1), 218-236.

Basant, R. (2000). Corporate response to economic reforms. *Economic and Political Weekly*, 35(10), 813-822.

Bhoi, B. K. (2000). An Indian Experience. *Mergers and Acquisitions*. *Reserve Bank of India Occasional Papers, 21*(1), 1-34.

Standard & Poor's (n.d.) *Compustat Global daily updates – fundaments annual* [all variables for Indian firms, 2000-2021] [Data set]. Capital IQ. Retrieved May 05, 2022, from Wharton Research Data Services. https://wrds-www-wharton-upenn-edu.eur.idm.oclc.org/pages/get-data/compustat-capital-iq-standard-poors/compustat/global-daily/

Gorodnichenko, Y., Svejnar, J., & Terrell, K. (2010). Globalization and innovation in emerging markets. *American Economic Journal: Macroeconomics*, *2*(2), 194-226.

Götz, G., & Gugler, K. (2006). Market concentration and product variety under spatial competition: Evidence from retail gasoline. *Journal of Industry, Competition, and Trade*, *6*(3), 225-234.

Goyal, K. A., & Joshi, V. (2011). Mergers in banking industry of India: some emerging issues. *Asian Journal of Business and Management Sciences*, *1*(2), 157-165.

Hill, T. D., Davis, A. P., Roos, J. M., & French, M. T. (2020). Limitations of fixed-effects models for panel data. *Sociological Perspectives*, *63*(3), 357-369.

Hopkins, H. D., Chaganti, R., & Kotabe, M. (1999). Cross-border mergers and acquisitions: Global and regional perspectives. *Journal of International Management*, *5*(3), 207-239.

Imai, K., & Kim, I. S. (2021). On the use of two-way fixed effects regression models for causal inference with panel data. *Political Analysis*, *29*(3), 405-415.

Ismail, T. H., Abdou, A. A., & Annis, R. M. (2011). Review of literature linking corporate performance to mergers and acquisitions. *The Review of Financial and Accounting Studies*, *1*(1), 89-104.

Kapil, S., & Dhingra, K. (2021). Understanding Determinants Of Domestic Mergers And Acquisitions Through Literature Review. *Indian Journal of Finance and Banking*, *6*(1), 31-57.

Kar, R. N., Soni, A., & Singh, C. K. (2014). Assessing the impact of mergers and acquisitions on firm performance: Evidence from India. *FOCUS: Journal of International Business*, *1*(1), 39-67.

Kinateder, H., Fabich, M., & Wagner, N. (2017). Domestic mergers and acquisitions in BRICS countries: Acquirers and targets. *Emerging Markets Review*, *32*, 190-199.

Kumar, S., & Bansal, L. K. (2008). The impact of mergers and acquisitions on corporate performance in India. *Management Decision*, 46(10), 1531-1543.

Leepsa, N. M., & Mishra, C. S. (2013). Do mergers & Acquisitions pay off immediately? Evidence from mergers & Acquisitions in India. *South Asian Journal of Management*, *20*(3), 39-57.

Ietto-Gillies, G., & Meschi, M. (1999). The Characteristics, Performance and Strategic Behaviour of Merged Versus Non-Merged Establishments in Britain. *Review of Industrial Organization*, *15*(1), 1-24.

Mantravadi, D. P., & Reddy, A. V. (2008). Post-merger performance of acquiring firms from different industries in India. *International Research Journal of Finance and Economics*, 22(1), 192-204.

Nayyar, D. (2008). The internationalization of firms from India: Investment, mergers and acquisitions. *Oxford Development Studies*, *36*(1), 111-131.

Nguyen, H. T., Yung, K., & Sun, Q. (2012). Motives for mergers and acquisitions: Ex-post market evidence from the US. *Journal of Business Finance & Accounting*, *39*(10), 1357-1375.

Oduro, I. M., & Agyei, S. K. (2013). Mergers & acquisition and firm performance: Evidence from the Ghana Stock Exchange. *Research Journal of Finance and Accounting*, *4*(7), 99-107.

Pawaskar, V. (2001). Effect of mergers on corporate performance in India. *Vikalpa*, *26*(1), 19-32.

Ramakrishnan, K. (2008). Long-term post-merger performance of firms in India. *Vikalpa*, *33*(2), 47-64.

Ramakrishnan, K. (2010). Mergers in Indian industry: performance and impacting factors. *Business Strategy Series*, 11(4), 261-268.

Rani, N., Yadav, S. S., & Jain, P. K. (2015). Financial performance analysis of mergers and acquisitions: evidence from India. *International Journal of Commerce and Management*, 25(4), 402-423.

Rodrigues, V. (2001). Endogenous mergers and market structure. *International Journal of Industrial Organization*, *19*(8), 1245-1261.

Standard & Poor's Compustat Services (1999). *Compustat (global) Guide.* Standard & Poor's Compustat.

Tamosiuniene, R., & Duksaite, E. (2009). The importance of mergers and acquisitions in today's economy. *KSI Transactions on Knowledge Society*, *2*(4), 11-15.

Tang, A. C. (2015, March). Mergers and Acquisitions and its effects on firm Performance: A New Look. In *Proceedings of the DLSU Research Congress, 3(1),* 1-7.

Wiersema, M. F., & Bowen, H. P. (2008). Corporate diversification: The impact of foreign competition, industry globalization, and product diversification. *Strategic Management Journal*, *29*(2), 115-132.