

The Impact of Mergers and Acquisitions on Acquirers' Stock Returns: Evidence from Türkiye

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Birleşme ve Satın Almaların Satın Alan Şirketlerin Hisse Senedi Getirilerine Etkisi: Türkiye'den Kanıtlar

Abstract

This study investigates investors' reactions to domestic merger and acquisition (M&A) announcements in Türkiye between 2016 and 2023. The study analyses investor reactions using the event study method. The analysis encompasses 91 domestic acquisition announcements. The acquirers' abnormal returns are calculated using the market model and evaluated using a comprehensive set of test statistics. The analysis results indicate that abnormal returns are generally positive and significant before the M&A announcement date. Nevertheless, this effect does not persist after the first announcement date. These findings provide evidence for the hypothesis that the markets are not semi-efficient.

Keywords : Mergers and Acquisitions (M&A), Event Study, Investor Reaction.

JEL Classification Codes : G14, G34.

Öz

Bu çalışmanın amacı, 2016-2023 yılları arasında Türkiye'de yurt içi birleşme ve satın alma (M&A) duyurularına yatırımcıların verdiği tepkileri olay çalışması yöntemini kullanarak incelemektir. Bu amaçla analize 91 yurtiçi satın alma duyurusu dâhil edilmiştir. Anormal getiriler piyasa modeli kullanılarak çeşitli pencerelerde hesaplanmış ve kapsamlı bir test istatistik seti kullanılarak değerlendirilmiştir. Analiz sonuçları, birleşme ve devralmaların duyurulduğu tarihten önce anormal getirilerin genellikle pozitif ve anlamlı olduğunu göstermektedir. Ancak, bu etki duyuru tarihinden sonra devam etmemektedir. Bu bulgular, piyasaların yarı etkin formda etkin olmadığı hipotezini desteklemektedir.

Anahtar Sözcükler : Birleşme ve Satın Alma, Olay Çalışması, Yatırımcı Tepkisi.

1. Introduction

Companies must identify and utilise new resources to maintain operational sustainability in the current economic environment, which is marked by increasing rivalry. With the rise of globalisation, companies must expand to stay competitive in a rapidly changing business environment. Mergers and acquisitions (hereinafter referred to as M&A) provide organisations with a crucial opportunity to acquire new resources. Several factors motivate firms to engage in M&A activities. These factors encompass the drive to gain a competitive edge, achieve cost savings using economies of scale, capitalise on synergies, increase market share, and diversify the portfolio (Dilshad, 2013). The primary objective of a firm engaged in M&A activities is to generate higher future profits and enhance its returns. Prior research has investigated the impact of M&A announcements on investor value and the presence of abnormal returns (hereinafter referred to as AR) in the stocks of associated companies during the period surrounding the M&A announcement. Hence, when a listed firm participates in an M&A, it creates a sense of expectation among investors regarding the corporation's future profitability. Empirical evidence suggests that this expectation has a positive impact on stock values (Rani et al., 2015).

This study examines investors' reactions to domestic M&A announcements in Türkiye between 2016 and 2023, considering both short-term and long-term effects. This study employs an event study approach to calculate abnormal returns. The current research calculates various metrics, such as average abnormal returns (hereinafter AAR), cumulative average abnormal returns (hereinafter CAAR), precision-weighted cumulative average abnormal returns (hereinafter PWCAAR), and average buy and hold returns (hereinafter ABHAR), to determine the investors' reactions during the days around the announcement date. The analysis examines three specific dates of announcements: the first M&A announcement, the announcement by the Capital Markets Board (CMB), and the announcement of M&A registration. The sample comprises 91 companies engaged in domestic acquisitions, all of which are listed on Borsa Istanbul. The current study focuses on investors' reactions to the acquirers' stocks rather than the target companies, as the latter are not publicly traded.

The findings of the current study indicate that there are positive and significant ARs in the first M&A pre-announcement event windows. Conversely, in the post-announcement event windows, although there are positive ARs, no considerable relationships are observed. Furthermore, the significant and positive abnormal returns observed around the first M&A announcement do not persist around the second (CMB announcement) and third (M&A completion) announcement dates. These findings provide strong evidence of insider trading around M&A announcements.

This study makes a significant contribution to the existing literature in several ways. Firstly, the study analyses investor reactions to M&A announcements, considering three various event dates. Most studies in the literature focus on the date of the announcement of M&A completion. This study, however, differs from the literature in that it analyses investor

reactions around three different announcement dates. This allows for determining whether there are any differences in the returns of the acquiring companies. Secondly, this study calculates CAAR, AAR, PWCAAR, and BHAR. Consequently, standard AR, AAR, and CAAR are controlled by the precision-weighted CAR and ABHAR methodologies. Thirdly, using a comprehensive set of test statistics, including both parametric and non-parametric tests, ensures that the reliability and robustness of the findings extend beyond the conventional statistical tests typically applied in previous M&A event studies.

The subsequent sections of the paper are structured as follows: The second section provides an overview of the literature concerning M&A. The third section elucidates the data collection process and methodology employed. The fourth section assesses the outcomes derived from the event study analyses. Finally, the fifth section encapsulates the findings in the conclusion.

2. Literature Review

Most studies on M&A activities aim to determine whether companies' stock values increase before and after the M&A process and whether shareholders benefit accordingly. In these studies, the hypothesis is tested to determine whether abnormal returns are generated through M&A transactions. While some studies in this framework investigate the impact on stock prices in the short term, which encompasses the period immediately preceding and following M&A announcements, other studies examine the long-term performance of companies. Some studies have demonstrated significant changes in the stocks of companies before and after M&A announcements (Andrade et al., 2001; Antoniadis et al., 2014; Rani et al., 2015; Dilshad, 2013; Liargovas & Repousis, 2011). Furthermore, some studies have indicated that M&A announcements result in positive AR, CARs, and CAAR (Seth et al., 2000; Wilcox et al., 2001; Lepetit et al., 2004; Scholtens & Wit, 2004; Vergos & Christopoulos, 2008; Anand & Singh, 2008; Rheaume & Bhabra, 2008; Zhu & Malhotra, 2008; Kumar & Panneerselvam, 2009; Laabs & Schiereck, 2010; Hekimoğlu & Tanyeri, 2011; Liargovas & Repousis, 2011; Kashiramka & Rao, 2013; Dilshad, 2013; Genç & Coşkun, 2013; Rani et al., 2013; Mallikarjunappa & Nayak, 2013; Rani et al., 2015; Akben-Selcuk, 2015; Şahin & Doğanlı, 2015; Adnan & Hossain, 2016; Upadhyay & Kurmi, 2020; Ahmed et al., 2023), whereas others have reported negative AR, CAR, and CAAR (Capron & Pistre, 2002; DeLong, 2003; Sachdeva et al., 2017; Pandey & Kumari, 2020). A small number of studies have not identified any impact (Rosen, 2006; Hassan et al., 2007; Barai & Mohanty, 2010; Mall & Gupta, 2019; Yang & Chen, 2021). The findings of the studies in the literature are inconsistent. The majority of these studies use the event study method.

In the context of M&A announcements in the literature, some studies have investigated whether there are abnormal returns in the stock prices of target companies. In their 2011 study, Hekimoğlu and Tanyeri analysed the impact of M&A announcements by 125 Turkish companies on the stock returns of target companies between 1991 and 2009. The calculation of abnormal returns relies on the date of the first official public

announcement. The results indicate that the CAARs are 8.93%, 10.96%, and 10.87% for event windows of 3, 7, and 11 days, respectively. The AARs are positive and statistically significant from one day before the M&A announcement until two days following the announcement date. Akben-Selcuk (2015) examines the effect of M&A announcements by 67 Turkish companies on the performance of the target companies' stocks. The results indicate that M&A announcements have positive and significant CAAR values for the stocks of target companies within short-term windows.

Furthermore, some studies have investigated the effect of M&A announcements on the stock performance of the acquiring company. Vergos and Christopoulos (2008) examined the impact on the stocks of 11 Greek banks after M&A announcements between 1998 and 2007. The study focuses on acquiring banks. The M&A announcement date is considered the completion date of the acquisition. The acquisition of domestic Greek banks generates 6% ARs in the event window (0...+20). On the other hand, foreign acquisitions (0...+20) generate abnormal returns of -1.4 % in the event window. Zhu and Malhotra (2008) examined the impact of 114 M&A announcements on stock prices between 1999 and 2005. The study analysed 114 foreign acquisitions of Indian companies, with the first announcement date considered the M&A announcement date. The results indicate that the acquisition of Indian firms generates positive CARs of 2.4% and 3.2% in the (-1...+1) and (-2...+2) event windows, respectively, and negative CARs of 6.8% in the post-event window (+3...+20). In their 2010 study, Laabs and Schiereck examined the long-term effects of 230 M&A announcements in the automotive industry on the stock prices of acquiring companies. The announcement date is considered to be the M&A deal date. Although positive and significant CAAR values are observed in short-term event windows, BHAR values exhibit a negative trend in the long term. Kashiramka and Rao (2013) examine the impact of 101 M&A announcements on shareholders' wealth in the Indian information technology and information technology-based services (IT&ITeS) sectors. The study considers the first media announcement to be the date of the M&A announcement. The findings reveal positive returns on the stocks of the acquiring companies. Rani et al. (2013) examine the stock performance of M&A announcements in 623 Indian companies. The event date is defined as the date of the first public announcement in a newspaper. The findings indicate that acquiring Indian companies' stocks generates positive and significant CARs before the announcement date, whereas CARs exhibit a negative trend after the announcement date. A recent study by Ahmed et al. (2023) examines the impact of M&A announcements on the stock performance of 568 companies in China and Hong Kong. The (-26...+26) window findings indicate a positive and significant CAAR of 3.39%. Furthermore, although there is a positive CAAR in the windows before the announcement date, it later turns into a negative CAAR.

Some researchers have investigated the effect of M&A announcements on the stock performance of acquirers and target firms. In their study, Seth et al. (2000) examine the impact of M&A announcements in the United States on the stock prices of 100 firms, both those acquiring and those being acquired. Their findings indicate that the stocks of target companies generate abnormal returns around M&A announcements, whereas there is no

effect on the stocks of acquiring companies. Scholtens and Wit (2004) compare bank mergers between the United States and Europe, examining the differences in shareholder returns for large bank mergers during the announcement period. The study revealed differences in the CARs of European and American target and acquiring companies. At the time of the M&A announcement, target banks in Europe and the US exhibited positive ARs. Furthermore, the returns of US target banks were higher than those of European targets. Anand and Singh (2008) analyse five major bank mergers in India using the event study method. In the study, the ARs are calculated regarding a single event date. This date refers to the announcement of the M&A in the media. The study indicates that acquiring and target banks exhibit positive and significant CARs. Furthermore, the entire sample exhibits positive and statistically substantial CAR values of 4.29% and 11.13% in the (-1...+1) and (-10...+10) event windows, respectively. In their 2011 study, Liargovas and Repousis examine the impact of M&A announcements on stock prices in the Greek banking sector. The study's dataset consists of 9 acquirers and target banks. The M&A completion date is considered the event date. The study's findings indicate a positive and significant impact on stock prices in the windows before M&A announcements but a negative impact after the announcement. In their 2013 research, Dilshad examined the effect of M&A announcements on the stocks of 18 acquiring and target banks in the European region. The announcement date represents the first trading day on which M&A news reaches the market. The findings revealed that, in the short term, acquiring banks exhibited positive CAR values. However, the long-term showed no effects.

Furthermore, most studies estimate abnormal returns based on only one M&A announcement. In contrast, few studies have calculated abnormal returns around the date of the first M&A announcement or the date of the M&A completion announcement. In their 2013 study, Genç and Çoşkun analysed the stock performance of M&A announcements by 214 Turkish companies. The study calculates ARs based on the M&A announcement date and the M&A completion date. The findings indicate that acquiring and target companies generate positive and significant cumulative abnormal returns (CARs) in the event windows preceding the first M&A announcement date. The results indicate no significant impact on the stocks of the acquiring companies before the M&A completion announcement. Conversely, there is evidence of positive and significant CARs in the stocks of target companies. In their 2015 study, Şahin and Doğukanlı analysed the impact of M&A announcements on the stock performance of 13 Turkish banks. The M&A announcement date, the first negotiation date, and the contract date are all considered. The study analyses only target banks. The findings indicate that positive CAR values emerged before the M&A announcement date. However, CAR values show a negative trend after the announcement date.

In financial markets, it is paramount to ascertain which M&A announcements are perceived as more significant by market participants. Consequently, this study examines investor responses to different M&A announcement dates.

Table: 1
A Brief Overview of the Results of Studies on the Return to Shareholders in the Context of M&A

Study	CAARs (%)	Event window (days)	Sample size	Sample Period	Findings
Seth, Song and Pettit (2000)	7.57***	(-10...+10)	100	1981-1990 USA	In the United States, ARs have been identified in the share price of the acquirers.
Wilcox, Chang and Grover (2001)	33.5****	(-2...0)	88	1996-98 USA	The M&A announcements have been noted to exert a positive impact on the ARs of telecommunications firms in the United States.
Lepetit, Patry and Rous (2004)	2.412**** 2.624****	(-7...+7) (-15...+15)	180	1991-2001 13 European markets	The announcement of the M&A agreement results in a statistically significant and positive increase in the share prices of the target corporations.
Scholten and Wit (2004)	12.65**** 9.28****	(-3...+31)	81 20	1990-2000 USA, Europe	Target banks produce notably higher returns than acquiring banks.
Vergos and Christopoulos (2008)	6*** -1.4**	(0...+20) (0...+5)	11	1998-2007 Greek banks	The study’s results suggest that acquisitions by Greek banks have a positive and statistically significant influence, whereas those conducted by foreign banks have a negative and statistically significant impact.
Anand and Singh (2008)	4.29**** 5.39*** 9.71*** 11.13**	(-1...+1) (-2...+2) (-5...+5) (-10...+10)	5	1999-2005 Indian private-sector banks	The study’s findings indicate a positive and statistically significant reaction to M&A announcements in the short term. However, this situation cannot be sustained in the long term.
Rheame and Bhabra, (2008)	-0.44, 1.08, 1.15**, 0.34, 1.76, 0.56, 0.54, -0.18	(-1...+1)	2421	1993-2005 USA, A diversity of knowledge-based industries	There have been mixed reactions to M&A announcements in the short term, and the study’s results are inconsistent.
Zhu and Malhotra (2008)	2.4**** 3.2**** -6.8****	(-1...+1) (-2...+2) (+3...+20)	74	1999-2005 Indian firms acquiring U.S firms	Although there is a positive and significant investor reaction to M&A announcements in short event windows, this reaction reverses in longer event windows.
Kumar and Panneerselvam (2009)	3.24** 1.59	(-60...+60) (-40...+40)	493	1998-2006 Indian firms	The effect on the acquirer firms is significantly negative, whereas the impact on the target firms is positive.
Laabs and Schiereck, (2010)	2.23**** 2.03**** 1.84**** 2.05**** 1.46****	(-20...+20) (-20...+10) (-10...+10) (0...+5) (0...20)	230	1981-2007 Automotive supply industry	The results indicate a positive and statistically significant investor reaction in both the long and short event windows.
Hekimoglu and Tanyeri (2011)	8.93**** 10.96**** 10.87****	(-1...+1) (-3...+3) (-5...+5)	172	1991-2009 Türkiye	The results of the study indicate that there are significant and positive ARs in short-term event windows.
Liargovas and Repousis (2011)	11**** 4*** 6*** 4***	(-50...+1) (0...+1) (-10...0) (-1...+1)	9	1996-2009 Greek Banking Sector	The findings demonstrate that during the periods preceding M&A announcements, observable positive cumulative abnormal returns (CAARs) were evident in stock prices.
Kashiranka and Rao (2013)	28.12**** 15.15**** 4.94****	(-60...+60) (-35...+35) (-1...+1)	101	1999-2009 Indian IT sector	For acquiring firms, the announcement of an acquisition has positive and significant returns.
Dilshad (2013)	>0 =0	(-5...+5) (-30...+30)	18	2001-2010 European Bank M&A	The acquiring companies achieved positive ARs.
Genç and Coşkun (2013)	5.37**** 2.45**** 1.54**** 0.03	(-40...+40) (-10...+10) (-1...+1) (+2...+10)	214	2001-2011 Türkiye	A statistically significant positive return was observed before M&A announcements. However, this effect was not observed in post-announcement windows.
Rani, Yadav, and Jain (2013)	1.20**** 2**** -2.62****	(-20...-2) (-5...+5) (+2...+20)	623	2003-2008 Indian	Despite the positive, statistically significant returns observed before the M&A announcement, this reaction reverses in long-term post-announcement windows.
Malikarjunappa and Nayak (2013)	36.68****	(-30...+30)	227	1998-2007 Indian	The findings of the study indicate that there are positive and significant ARs in the event windows preceding M&A announcements, whereas there are negative ARs in the long-term event windows following the announcement.
Rani, Yadav, and Jain (2015)	1.79**** -3.09**** 2.60**** 0.55**	(-20...-2) (+2...+20) (-5...0) (0...+5)	522	2003-2008 Indian	The results of the study indicate that there are positive and significant ARs in the windows preceding M&A announcements. However, following the announcement, this trend reverses.
Akben-Selcuk (2015)	5.25**** 5.93**** 6.02*** 8.53***	(-1...+1) (-2...+2) (-5...+5) (-10...+10)	67	2000-2014 Türkiye	The results indicate a positive and statistically significant investor reaction to M&A announcements.
Şahin and Doğanaklı (2015)	7.69**** 4.56**** 5.99**** -4.93*** -2.21***	(-1...+1) (-2...0) (-5...0) (0...+5) (0...+10)	13	2002-2021 Turkish Banking Sector	The analysis’s results indicate that stock prices exhibited an upward trend before the announcement date, while returns subsequently became negative after that date.
Upadhyay and Kurmi (2020)	-21.98***	(-20...+20)	10	2020 Banking Sector in India	The findings show statistically significant and negative CAARs for all event windows.
Ahmed et al. (2023)	2.35 3.39**	(-26...+26)	568	2012-16 Hong Kong and China	The study’s findings indicate that there are positive and significant ARs in event windows around M&A announcements.
Capron and Pistre (2002)	-34.00	(-20...+1)	101	1988-92 US and Europe	Zero or negative returns for acquirers
DeLong (2003)	-2.51**** 14.70****	(-7...+7) (-15...+15)	54	1991-95 US Banking Industry	The findings indicate that investors tend to react negatively to the stocks of acquiring companies. Conversely, positive ARs are observed in the stocks of the acquired companies.

Adnan and Hossain (2016)	1.01 0.72	(-5...+5)	100	2015 USA markets	The findings demonstrate a positive ARs before M&A announcements. This suggests that there is information leakage regarding positive news.
Sachdeva, Sinha, and Kaushik (2017)	-0.98 -0.89	(+1...+5) (+1...+10)	85	1991-2010 Indian	The results indicate negative ARs that are not strong in short-term event windows following M&A announcements.
Pandey and Kumari (2020)	-3.87**** -9.43	(-30...0) (0...+30)	14	2010-2020 India and the United States Banking Sector	Investors tend to exhibit an adverse reaction before the announcement of an M&A transaction.
Rosen (2006)	1.86	(-2...+2)	500	1982-2001 US	The periods after the M&A announcement do not exhibit any significant effect.
Hassan et al. (2007)	1.81	(-1...+1)	405	1981-2004 US pharmaceutical industry	The results demonstrate that ARs are not observed in event windows around M&A announcements.
Barai and Mohanty (2010)	1.166 1.096 -0.023	(-1...+1) (-5...+5) (-10...+10)	1177	1996-2008 India	Acquirers do not generate significant ARs in India
Mall and Gupta (2019)	3.96	(-8...+8)	428	2008-2015 India	The findings demonstrate that abnormal changes in stock returns are not observed around M&A announcements.
Yang and Chen (2021)	-2.473	(-20...+20)	118	2004-2014 China	The results indicate that there are no ARs on target firms’ stocks in the event windows around M&A rumours.

*, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Table 1 provides a concise overview of the research results using the event study approach to evaluate how firms' stock prices behave before and after M&A announcements. Many studies indicate that investors react positively and significantly to M&A announcements in the stocks of both acquiring and target companies. A review of the existing literature on mergers and acquisitions (M&A) in finance reveals that numerous studies have employed event studies to examine the performance of stocks before and after acquisitions. However, the findings have been inconclusive.

The results of the current study are consistent with those of Seth, Song, and Pettit (2000), Wilcox, Chang, and Grover (2001), Lepetit, Patry, and Rous (2004), Scholtens and Wit (2004), Kumar and Panneerselvam (2009), Hekimoğlu and Tanyeri (2011), Liargovas and Repousis (2011), Kashiramka and Rao (2013), Genç and Coşkun (2013), and Ahmed et al. (2017), but not consistent with the results of Capron and Pistre (2002), DeLong (2003), Sachdeva, Sinha, and Kaushik (2017), Upadhyay and Kurmi (2020), and Pandey and Kumari (2020).

3. Data and Methodology

The dataset consists of companies listed on Borsa Istanbul (BIST) that submitted M&A applications to the Capital Markets Board (CMB) between 2016 and 2023. Specifically, 98 companies that filed merger applications via the Public Disclosure Platform (PDP) with the CMB during this period were manually identified. Of these 98 companies, 91 had their merger applications approved by the CMB, while 7 were rejected. Table 2 illustrates the distribution of companies that filed M&A applications by year and sector.

This study employs an event study method to analyse the M&A announcements of 91 companies. The stock closing prices for these companies were sourced from the Finnet database. The M&A announcement dates of the companies were manually obtained from the Public Disclosure Platform (PDP) website. Subsequently, abnormal returns were computed based on three announcement dates. These are as follows:

- The initial announcement date for M&A (first announcement)
- The date of the announcement of the CMB approval (second announcement)

- The date of the announcement of the registration of the M&A (third announcement)

Table: 2
A Distribution of M&A Announcements by Years and Sectors (2016-2023)

Year	Total Announcements of M&A	M&A Completed	Percentage	Sectors	N	Percentage
2016	7	7	7.69	Financial	36	40%
2017	11	9	9.89	Manufacturing	29	32%
2018	13	12	13.19	Wholesale and Retail Trade	7	8%
2019	15	13	14.29	Technology	6	7%
2020	9	9	9.89	Energy	5	5%
2021	11	11	12.09	Construction and Public Works	3	3%
2022	15	13	14.29	Transportation and Storage	2	2%
2023	17	17	18.68	Real Estate Activities	1	1%
Total	98	91	100.00	Administrative and Support Service Activities	1	1%
				Education, Health, Sports and Other Social Services	1	1%

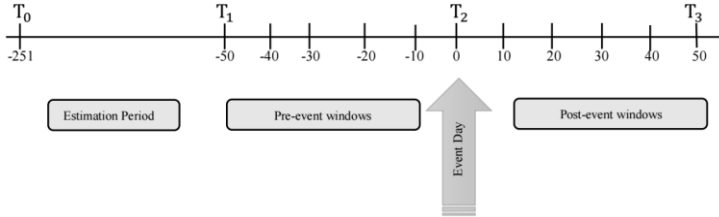
Source: KAP (Public Disclosure Platform).

An event study is a methodology employed in finance to assess the impact of an unexpected economic, political, or social event on a company's stock returns (MacKinlay, 1997; Campbell et al., 2010; Benninga, 2014). It is crucial to establish that three fundamental assumptions are satisfied to confirm the validity of an event study's findings. The first assumption is related to the efficient markets hypothesis, which is one of the most important foundations of the event study. The efficient markets hypothesis is based on the assumption that securities reflect all information in the market (Fama, 1991: 1575). Fama (1970: 383) divided market efficiency into three categories: weakly efficient, semi-strongly efficient, and strongly efficient. The Event study method assumes that markets are efficient in a semi-strong form (McWilliams & Siegel, 1997). The second assumption concerns that the relevant event is unexpected by market participants and represents new information for investors. In the event study, ARs are assumed to be a response to new information in the market (McWilliams & Siegel, 1997). The third assumption is based on the claim that a researcher can isolate the effect of one event from the impact of other events. To eliminate the confounding effects of different events, researchers typically conduct their analyses by considering short event windows (Konchitchki & O’Leary, 2011).

An event study typically comprises seven stages (Campbell et al., 1997). The first stage is to define the event. The second stage involves selecting the enterprises to be included in the analysis. The third stage consists of calculating both normal and abnormal returns. The fourth stage is to choose an estimation method. The fifth stage involves testing the technique. The sixth stage consists of interpreting the experimental results and findings. The seventh and final stage is to conclude.

Figure 1 illustrates the timeline of the event study. The length of the estimation window is represented by the period from T_0 to T_1 . When the event occurs (the M&A announcement) at time 0, the event window is represented by the period from T_1 to T_2 . The length of the post-event window covers the period from T_2 to T_3 .

Figure: 1
Event Study Timeline



The estimation window is utilised to establish the typical behaviour of a stock relative to a market or sector index. As a result, to estimate a stock’s return within the estimation window, a model representing normal behaviour is required. Typically, a regression model is utilised for this objective. A typical estimation window of 250 trading days is crucial for achieving reliable results. A 250-day estimation window is commonly considered reasonable for producing reliable results. Nevertheless, the selected samples may not represent a sufficiently large number of days, or the study design may not be optimal. In this case, a minimum of 126 observation days is required to ensure the reliability of the observations. Suppose fewer than 126 observations are present within the estimation window. In that case, it is possible that the market model’s parameters may not accurately reflect the actual stock price movements, thereby affecting the relationship between stock returns and market returns (Benninga, 2014). By the methodology employed in this study, the estimation window is defined as 200 days. In this study, AARs are calculated in 61 different windows spanning 30 days before and 30 days after the announcement date. Furthermore, CAAR, PWCAAR, and ABHAR are computed for 62 windows over 50 days before and 50 days after the merger announcement date. Moreover, the CAAR and PWCAAR for the entire sample are calculated for seven various windows: $(-30...+30)$, $(-20...+20)$, $(-15...+15)$, $(-10...+10)$, $(-5...+5)$, $(-3...+3)$, and $(-1...+1)$. Additionally, CAAR and PWCAAR are estimated in six distinct event windows across 10 sub-sectors to identify investor reactions to M&A announcements specific to each industry. Consequently, investors' reaction to M&A announcements in short- and long-term event windows is analysed.

There are numerous ways to apply the event study method. The literature contains a variety of methodologies for calculating ARs. Dyckman et al. (1984) conducted studies utilising several models, concluding that the least squares (LS) market model yielded superior results. Consequently, this study has chosen the least squares (LSM) market model as the estimation method. The expected returns in the LSM market model are calculated using the following formula:

$$ER_{it} = \alpha + \beta RM_{mt} + \varepsilon_{i,t} \quad (1)$$

where α and β are the constant and slope coefficients of the LSM regression model. RM_{mt} represents the rate of return of the benchmark index (BIST 100) on day t. The coefficients α

and β are calculated using 200 days estimation data at t_{-251} and t_{-50} . Accordingly, ARs are calculated according to the following formula:

$$AR_{it} = R_{it} - ER_{it} \quad (2)$$

where AR_{it} represents the AR of index i on day t . R_{it} represents the actual return of index i on day t , while ER_{it} represents the expected return of index i on day t .

The logarithmic method is used to calculate the actual daily return of the benchmark index and all company stocks. Consequently, the R_{it} is calculated as follows:

$$R_{it} = \ln\left(\frac{P_{it}}{P_{it-1}}\right) \times 100 \quad (3)$$

where P_{it} represents the price of index i on day t and P_{it-1} represents the price of index i before day t . The AAR for each day during the event window period is calculated as follows:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \quad (4)$$

where AAR_t represents the AAR on day t and N is the total number of companies. The CAAR for the event window period is calculated as follows:

$$CAAR_{(\tau_1, \tau_2)} = \frac{1}{n} \sum_{i=1}^n AAR_{(\tau_1, \tau_2)} \quad (5)$$

where CAAR is the cumulative average abnormal returns, τ_1 is the start of the event window and τ_2 is the end of the event window. This implies that the CAAR is the sum of all abnormal returns that occur during the event window.

The study also calculates the standard CAAR, as well as the PWCAAR. The PWCAAR is obtained using the relative weights of each stock. The PWCAAR is weighted inversely proportional to the standard deviation of each stock. The PWCAAR (as a weighted average of the original CAR) preserves the sample interpretation of the standardised CAAR (Cowan, 2007). The PWCAAR is superior to the CAAR and the average standardised CAR. The PWCAAR is calculated according to the following equation:

$$PWCAAR_{T_1 T_2} = \sum_{j=1}^N \sum_{t=T_1}^{T_2} \omega_j AR_{jt} \quad (6)$$

$$\omega_j = \frac{\left(\sum_{t=T_1}^{T_2} \delta_{AR_{jt}}^2\right)^{-\frac{1}{2}}}{\sum_{i=1}^N \left(\sum_{t=T_1}^{T_2} \delta_{AR_{it}}^2\right)^{-\frac{1}{2}}} \quad (7)$$

$$\delta_{AR_{jt}}^2 = \frac{\sum_{k=T_{D_b}}^{T_{D_e}} (AR_{jk})^2}{D_j - 2} \left[1 + \frac{1}{D_j} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{k=T_{D_b}}^{T_{D_e}} (R_{mk} - \bar{R}_m)^2} \right] \quad (8)$$

where D_j , denotes the number of non-missing estimation window returns for company j . R_{mt} represents the returns of the benchmark indices on day t in the event window, while R_{mk} represents the return of the benchmark index on day k in the estimation window. \bar{R}_m represents the average benchmark (BIST 100) returns over the estimation period, while k denotes the trading day within that period.

To ensure the robustness and reliability of the findings, the BHAR method is employed as an alternative to the standard CAR. In their 1997 and 1999 publications, Barber and Lyon, as well as Lyon et al., argue that tests based on standard CAR are not suitable for event studies in long-term windows. Instead, they demonstrate that the BHAR approach is more robust for evaluating AR in longer event windows. In the current study, ABHAR for returns in longer event windows are calculated by the following equation:

$$BHAR_{i[\tau_1\tau_2]} = \prod_{\tau_2}^{\tau_1}(1 + R_{i,t}) - \prod_{\tau_2}^{\tau_1}(1 + R_{m,t}) \quad (9)$$

where $R_{i,t}$ represents the returns of company i on day t and $R_{m,t}$ represents the return of the benchmark index (BIST 100) on day t .

4. Statistical Significance of Abnormal Returns

All parametric test statistics assume that stock returns follow a normal distribution, except for the Skewness-Corrected T-test. Unlike parametric tests, non-parametric tests do not rely on normality assumptions regarding stock returns and can be used with smaller sample sizes. Consequently, four parametric test statistics and three non-parametric test statistics are employed to assess the robustness and reliability of the results.

The first parametric test is the Patell Z test, developed by Patell (1976). The Patell Z-test is a robust test for CAR distribution across the event window and variance in event window AR. Standardising the AR before portfolio construction assigns a lower weight to the AR of securities with significant variances than the simple time series t-test. However, it is sensitive to cross-sectional dependence and event-induced volatility. The test statistic for the null hypothesis, with CAAR ($H_0: CAAR = 0$) equal to zero, is as follows:

$$Patell_z = \frac{1}{\sqrt{N}} \sum_{i=1}^N \frac{CSAR_i(\tau_1, \tau_2)}{S(CSAR_i)} \quad (10)$$

where $CSAR_i$ represents the cumulative standard abnormal return of company i .

The second parametric test is the cross-sectional t-test. Brown and Warner (1980) demonstrated that it is robust against high event-induced variance. Similarly, Boehmer, Musumeci, and Poulson (1991) showed that standard cross-sectional tests are comparable in size but more robust. The test statistic for the null hypothesis is the cross-sectional t-test (Cross-Sectional Test, abbr.: Csect T) with CAAR ($H_0: CAAR = 0$) equal to zero, formulated as follows:

$$T_{\text{cross}} = \frac{CAAR_{(t_1, t_2)}}{\hat{\sigma}_{CAAR_{(t_1, t_2)}}} \quad (11)$$

Under the null hypothesis, $CAAR$ ($H_0: CAAR = 0$) are equal to zero. The variance estimator of this test statistic is based on the cross-section of ARs.

$$\hat{\sigma}_{CAAR_{(t_1, t_2)}} = \frac{1}{N(N-d)} \sum_{i=1}^N [CAR_i(t_1, t_2) - CAAR_{(t_1, t_2)}]^2 \quad (12)$$

The third parametric test is the standardised cross-sectional t-test, also known as the BMP test (abbr.: StdCSect T). The standardised t-test developed by Boehmer et al. (1991) is a robust test against the distribution of ARs over the CAAR. The standardised cross-sectional t-test is also robust against event-induced volatility and serial correlation. However, it is sensitive to cross-sectional correlation. The test statistic for the null hypothesis, with $CAAR$ ($H_0: CAAR = 0$) equal to zero, is as follows:

$$t = \sqrt{N} \frac{\overline{SCAR}}{S_{(\overline{SCAR})}} \quad (13)$$

where, $\overline{SCAR}_i(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^N SCAR_i(\tau_1, \tau_2)$ and

$$S^2_{\overline{SCAR}} = \frac{1}{(N-1)} \sum_{i=1}^N [SCAR_i(\tau_1, \tau_2) - \overline{SCAR}(\tau_1, \tau_2)]^2 \quad (14)$$

The fourth parametric test, the skewness-corrected test (abbreviated T), was developed by Hall (1992) and corrects the test statistics for potential skewness in the distribution of returns. The test statistic for the null hypothesis, with $CAAR$ ($H_0: CAAR = 0$) equal to zero, is as follows:

$$t = \sqrt{N} \left(S + \frac{1}{3} \gamma S^2 + \frac{1}{27} \gamma^2 S^3 + \frac{1}{6N} \gamma \right) \quad (15)$$

As far as the ingredients are concerned, first recall the cross-sectional sample variance,

$$S^2_{\overline{SCAR}} = \frac{1}{(N-1)} \sum_{i=1}^N [CAR_i(\tau_1, \tau_2) - CAAR(\tau_1, \tau_2)]^2 \quad (16)$$

Next, the corresponding sample skewness is given by,

$$\gamma = \frac{N}{(N-2)(N-1)} \sum_{i=1}^N \frac{[CAR_i(\tau_1, \tau_2) - CAAR(\tau_1, \tau_2)]^3}{S^3_{\overline{SCAR}}}, \quad (17)$$

$$S = \frac{CAAR}{S_{CAAR}} \quad (18)$$

The first non-parametric test, the Generalized Sign Test (abbr.: Generalized Sign Z), proposed by Cowan (1992), is based on the ratio of positive CAR over the event window p_0^+ . Under the null hypothesis, this ratio should not systematically deviate from the ratio of

positive CARs over the estimation window p_{est}^+ . Given that the proportion of positive CARs is a binomial random variable, the following test statistic is employed:

$$Z = \frac{\omega - N\hat{p}}{\sqrt{N\hat{p}(1-\hat{p})}} \quad (19)$$

where ω denotes the number of the CAR_i during the event window that are positive. \hat{p} denotes the fraction of the $(AR_{i,t})$ during the estimation window (across both i and t) that are positive.

The second non-parametric test, the Generalized Rank Z Test (Abbr.: G-Rank Z) developed by Kolari and Pynnonen (2011), works with standardised ARs instead of simple ARs and, in practice, is a robust test against high event-induced variance. Additionally, Monte Carlo studies have demonstrated that this test is robust to serial return correlations that may arise in specific stocks. The test statistic for the null hypothesis, with CAAR ($H_0: CAAR = 0$) equal to zero, is as follows:

$$Z = \frac{\bar{U}_{L_1+1}}{S_{\bar{U}_{L_1+1}}}, \quad (20)$$

$$S_{\bar{U}_{L_1+1}}^2 = \frac{L_1}{12N(L_1+2)} \quad (21)$$

The third non-parametric test, the Generalized Rank T Test (abbreviated as Generalized Rank T), developed by Kolari and Pynnonen (2011), is robust against cross-sectional and serial correlation of returns, as well as the event-induced volatility problem. The test statistic for the null hypothesis, with CAAR ($H_0: CAAR = 0$) equal to zero, is as follows:

$$t = Z \cdot \left(\frac{L_1-1}{L_1-Z^2} \right) \text{ with } Z = \frac{\bar{U}_{L_1+1}}{S_{\bar{U}}} \quad (22)$$

i company's standardized CAR ($SCAR_i$),

$$SCAR_i^* = \frac{SCAR_i}{S_{SCAR}}, \quad (23)$$

$$S_{SCAR}^2 = \frac{1}{(N-1)} \sum_{i=1}^N [SCAR_i(\tau_1, \tau_2) - \overline{SCAR}(\tau_1, \tau_2)]^2 \text{ ve } \overline{SCAR} = \frac{1}{N} \sum_{i=1}^N SCAR_i \quad (24)$$

This, for any i company, gives a time series of length $L_1 + 1$:

$$\{GSAR_{i,1}, \dots, GSAR_{i,L_1}, GSAR_{i,L_1+1}\} = \{SAR_{i,T_0}, \dots, SAR_{i,T_1}, SCAR_i^*\} \quad (25)$$

Subsequently, for any i company's,

$$U_{i,t} = \frac{rank(GSAR_{i,t})}{L_1+2} - 0.5 \quad (26)$$

5. Empirical Findings

This study section presents the AAR, CAAR, PWCAAR, and ABHAR calculated around the M&A initial announcement date, CMB approval announcement date, and M&A registration announcement date. However, the tables do not include CAAR, PWCAAR, and ABHAR values that are not statistically significant around the announcement dates.

Table: 3
AAR and Test Statistics on and Around First M&A Announcements (N = 91)

AARs			Parametric Tests				Non-Parametric Tests		
Day	AAR (%)	Pos:Neg	Patell Z	Csect T	StdCsect T	Skewness-Corrected T	GenSign Z	Gen Rank Z	Gen Rank T
-30	0.30	43:48	1.583	0.878	1.434	0.922	0.303	0.488	0.499
-29	-0.30	37:54	-1.204	-1.11	-1.263	-1.034	-0.968	-1.3	-1.33
-28	-0.30	35:56	-1.354	-0.928	-1.388	-0.882	-1.392	-1.411	-1.444
-27	0.30	46:45	0.902	1.298	1.054	1.38	0.939	0.835	0.855
-26	0.10	43:48	0.706	0.308	0.74	0.33	0.303	0.129	0.132
-25	-0.30	32:59	-0.587	-1.551	-0.766	-1.481	-2.027**	-1.635	-1.673*
-24	-0.20	37:54	-0.091	-0.768	-0.106	-0.728	-0.968	-1.012	-1.035
-23	-0.40	32:59	-1.517	-1.4	-1.603	-1.334	-2.027**	-1.964**	-2.008**
-22	0.20	42:49	0.997	0.76	0.894	0.821	0.091	0.277	0.283
-21	-0.30	35:56	-1.169	-0.848	-1.257	-0.823	-1.392	-1.289	-1.321
-20	0.60	43:48	1.744*	1.899*	1.561	2.196**	0.303	0.694	0.71
-19	0.10	42:49	0.383	0.312	0.398	0.341	0.091	0.1	0.102
-18	0.60	49:42	2.110**	1.993**	1.916*	2.261**	1.574	1.624	1.662*
-17	0.50	49:42	2.264**	1.829*	2.435**	1.733*	1.574	2.470**	2.527**
-16	0.10	41:50	-0.041	0.418	-0.04	0.443	-0.12	-0.853	-0.873
-15	0.00	40:51	0.348	0.069	0.35	0.059	-0.332	0.052	0.053
-14	0.00	35:56	-0.155	-0.105	-0.109	-0.11	-1.392	0.17	0.174
-13	-0.40	39:52	-1.516	-1.355	-1.47	-1.55	-0.544	-0.794	-0.812
-12	0.40	47:44	1.158	0.943	0.747	0.928	1.151	1.286	1.315
-11	0.30	45:46	0.514	0.704	0.361	0.738	0.727	0.413	0.422
-10	-0.10	37:54	-0.571	-0.344	-0.58	-0.328	-0.968	-0.959	-0.982
-9	0.10	46:45	0.76	0.312	0.573	0.352	0.939	0.733	0.75
-8	-0.20	38:53	0.041	-0.426	0.034	-0.43	-0.756	-0.154	-0.158
-7	0.30	47:44	1.162	0.816	1.005	0.811	1.151	1.15	1.177
-6	-0.10	35:56	-0.875	-0.198	-0.69	-0.161	-1.392	-1.2	-1.228
-5	0.30	51:40	0.516	0.969	0.53	0.979	1.998**	0.959	0.983
-4	0.70	52:39	2.516**	2.241**	2.287**	2.357**	2.210**	2.096**	2.144**
-3	0.30	46:45	1.392	1.17	1.317	1.232	0.939	0.819	0.838
-2	0.00	39:52	0.72	0	0.649	0.007	-0.544	0.041	0.042
-1	0.80	51:40	3.128***	2.305**	2.413**	2.591**	1.998**	2.114**	2.161**
0	0.30	45:46	1.850*	0.662	1.379	0.682	0.727	1.134	1.159
1	-0.20	39:52	-0.126	-0.663	-0.094	-0.667	-0.544	-0.24	-0.246
2	0.10	47:44	-0.171	0.441	-0.165	0.457	1.151	-0.615	-0.629
3	0.00	42:49	-0.237	-0.115	-0.223	-0.097	0.091	-0.812	-0.831
4	-0.40	37:54	-1.019	-1.686*	-1.236	-1.737*	-0.968	-1.923*	-1.968*
5	0.00	39:52	0.415	0.07	0.433	0.084	-0.544	-0.263	-0.269
6	0.30	46:45	2.094**	1.004	1.722*	1.017	0.939	1.254	1.283
7	-0.40	40:51	-1.379	-1.218	-1.257	-1.26	-0.332	-1.327	-1.358
8	-0.30	36:55	-1.034	-0.948	-1.144	-0.95	-1.18	-1.266	-1.296
9	0.60	53:38	1.497	1.956*	1.493	1.911*	2.422**	2.357**	2.409**
10	0.10	38:53	-0.21	0.388	-0.186	0.431	-0.756	-0.123	-0.125
11	0.50	48:43	1.311	1.241	0.851	1.347	1.363	0.882	0.902
12	0.40	50:41	1.026	1.248	0.909	1.287	1.786*	1.05	1.074
13	0.00	37:54	-0.019	0.036	-0.019	0.067	-0.968	-0.336	-0.343
14	0.00	43:48	0.023	0.142	0.022	0.133	0.303	-0.311	-0.318
15	-0.60	36:55	-2.128**	-2.116**	-2.221**	-2.147**	-1.18	-1.941*	-1.986**
16	0.50	44:47	1.543	1.526	1.298	1.673*	0.515	0.583	0.596
17	-0.20	39:52	-1.117	-0.651	-1.166	-0.639	-0.544	-1.517	-1.553
18	0.10	41:50	0.339	0.555	0.336	0.591	-0.12	-0.136	-0.139
19	0.40	38:53	0.908	1.113	0.764	1.218	-0.756	-0.039	-0.039
20	0.20	40:51	-0.005	0.592	-0.005	0.617	-0.332	-0.302	-0.309
21	0.50	52:39	1.852*	1.757*	1.729*	1.814*	2.210**	1.8805	1.9245
22	-0.70	28:62	-2.729**	-2.670***	-3.306***	-2.593**	-2.663***	-3.534***	-3.618***
23	-0.10	43:48	0.275	-0.274	0.352	-0.272	0.303	-0.17	-0.174
24	0.50	40:51	1.127	1.760*	1.168	1.948*	-0.332	0.535	0.547
25	0.90	43:48	2.597***	2.350**	2.001**	2.922***	0.303	1.381	1.414
26	-0.30	35:56	-1.31	-1.191	-1.453	-1.182	-1.392	-1.817*	-1.859*
27	0.70	54:37	2.343**	2.050**	2.216**	2.146**	2.634***	2.243**	2.296**
28	0.60	41:50	1.304	1.717*	1.145	1.950*	-0.12	0.925	0.946
29	-0.20	38:53	-0.353	-0.53	-0.378	-0.499	-0.756	-0.288	-0.295
30	0.50	46:45	1.905*	1.168	1.378	1.281	0.939	1.35	1.381

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Table 3 reports the results of the AAR 30 days before and 30 days after the date of the first M&A announcement. Additionally, the AAR values corresponding to each day of the event window are graphically depicted in Figure 2.

As illustrated in Table 3, the AAR values remain stable and positive in the pre-announcement windows, starting 5 days before and continuing until the announcement date (0). The positive AAR value reached its maximum (0.80%) on the day before the announcement day. Among these values, AAR values 4 and 1 days before the announcement date are significant according to parametric and non-parametric test statistics. Additionally, in 61-day AAR windows, 41-day AAR values are positive, while 20-day AAR values are negative. The positive and significant AAR values on days 4 and 1 before the announcements indicate that investors perceived the M&A announcement as beneficial for them. Furthermore, 52 and 51 AARs of 91 companies were positive on the 4th and 1st days before the announcement. However, it is observed that the positive AAR values, which had started 5 days before the announcement, turned into an adverse reaction in the days following the announcement. This adverse reaction becomes significant on the 4th, 15th, and 22nd days after administration. Positive and significant AAR values are observed on the 9th and 27th days after the announcement.

Figure: 2
-30...+30 AAR (%) (First M&A Announcements)

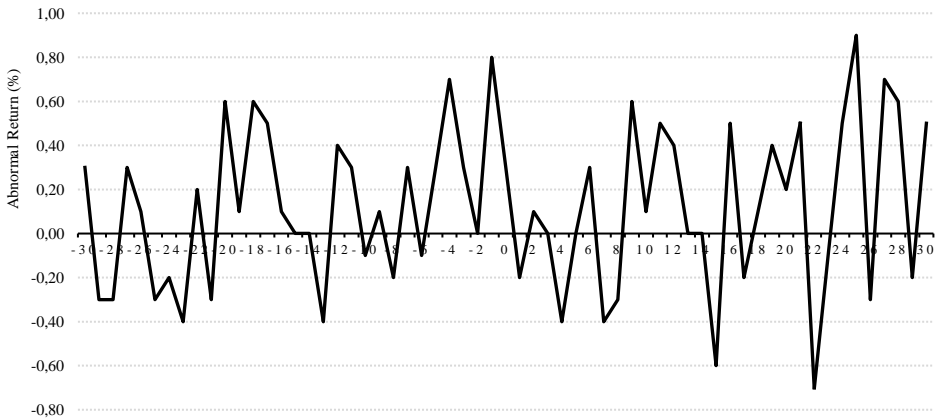


Table 4 reports the CAAR and the PWCAAR for 64 windows before the M&A announcement dates. Figure 3 graphically depicts the CAAR and PWCAAR corresponding to 64 event windows. Notably, all CAAR and PWCAAR values within the 27-event window ranging from (-27...0) to (-1...0) exhibit positive and statistical significance based on both parametric and non-parametric tests. It can be observed that the values of CAAR and PWCAAR exhibit a gradual decline from the 50th day before the event to the day of the

announcement. The CAAR values start at 3.60% on day -50, peak at 4.70% in windows (-22...0) and (-20...0), and remain positive in all windows until the day before the event (-1...0), reaching 1.10%. The highest CAAR values, at 4.70%, are observed in the (-22...0) and (-20...0) event windows. The highest PWCAAR value, at 3.90%, is observed at (-20...0). Both parametric and non-parametric test statistics indicate the presence of statistically significant CAAR and PWCAAR values at the 0.01 and 0.001 levels in the (-5...0) and (-4...0) windows. In the post-announcement event windows, the highest CAAR and PWCAAR values (5.40% and 2.50%) are significant in the (0...+50) window according to parametric and nonparametric tests.

Table: 4
CAAR, PWCAAR, and Test Statistics on and around First M&A Announcements
(N = 91)

Cumulative Average Abnormal Return (%)			Parametric Tests				Non-Parametric Tests			
Event Window	CAARs (%)	PWCAARs (%)	Pos:Neg	Patell Z	Csect T	StdCsect T	Skewness-Corrected T	GenSign Z	Gen Rank Z	Gen Rank T
(-50...0)	3.60	2.70	53:38	1.890*	1.317	1.440	1.453	-0.134	0.882	0.884
(-40...0)	3.60	3.80	51:40	2.481**	1.518	1.809*	1.668*	1.132	1.601	1.628
(-30...0)	3.90	3.60	47:44	2.823***	1.779*	2.094**	1.877*	1.151	2.059**	2.106**
(-29...0)	3.60	3.10	47:44	2.581***	1.725*	1.957*	1.807*	1.151	1.996**	2.041**
(-28...0)	3.90	3.40	46:45	2.848***	1.898*	2.137**	1.972*	0.939	2.291**	2.343**
(-27...0)	4.20	3.80	50:41	3.154***	1.983*	2.296**	2.053**	1.786*	2.352**	2.406**
(-26...0)	3.90	3.70	47:44	3.039***	1.869*	2.233**	1.928*	1.151	2.236**	2.287**
(-25...0)	3.80	3.40	52:39	2.958***	1.833*	2.136**	1.906*	2.210**	2.347**	2.402**
(-24...0)	4.10	3.40	50:41	3.134***	2.014**	2.244**	2.096**	1.786*	2.497**	2.555**
(-23...0)	4.30	3.30	51:40	3.217***	2.222**	2.364**	2.280**	1.998**	2.681***	2.742***
(-22...0)	4.70	3.70	53:38	3.603***	2.546**	2.667***	2.548**	2.422**	3.014***	3.083***
(-21...0)	4.50	3.50	55:36	3.471***	2.532**	2.657***	2.447**	2.845***	3.039***	3.109***
(-20...0)	4.70	3.90	57:34	3.808***	2.783***	2.954***	2.558**	3.269***	3.488***	3.569***
(-19...0)	4.10	3.70	61:30	3.512***	2.516**	2.741***	2.30**	4.117***	3.413***	3.491***
(-18...0)	4.00	3.60	61:30	3.515***	2.478**	2.693***	2.155**	4.117***	3.416***	3.493***
(-17...0)	3.40	3.10	56:35	3.114***	2.119**	2.359**	1.863*	3.057***	3.060***	3.130***
(-16...0)	2.90	2.60	53:38	2.655***	1.779*	1.964*	1.569	2.422**	2.567**	2.627**
(-15...0)	2.70	2.70	54:37	2.747***	1.716*	2.0**	1.488	2.634***	2.660**	2.722**
(-14...0)	2.70	2.60	53:38	2.747***	1.799*	2.024**	1.551	2.422**	2.663**	2.725**
(-13...0)	2.70	2.60	52:39	2.885***	2.010**	2.205**	1.840*	2.210**	2.658***	2.720***
(-12...0)	3.20	2.90	52:39	3.414***	2.558**	2.637***	2.50**	2.210**	2.883**	2.949**
(-11...0)	2.80	2.60	51:40	3.219***	2.529**	2.741***	2.572**	1.998**	2.597**	2.656**
(-10...0)	2.50	2.60	53:38	3.207***	2.596**	2.947***	2.674***	2.422**	2.930***	2.998**
(-9...0)	2.60	2.80	54:37	3.545***	2.622**	3.203***	2.724***	2.634***	3.166***	3.238**
(-8...0)	2.40	2.60	55:36	3.483***	2.556**	3.134***	2.662***	2.845***	3.123***	3.195**
(-7...0)	2.60	2.50	56:35	3.680***	3.172***	3.327***	3.477***	3.057***	3.166***	3.239**
(-6...0)	2.40	2.10	55:36	3.495***	3.201***	3.382***	3.621***	2.845***	3.137***	3.210**
(-5...0)	2.40	2.50	56:35	4.133***	3.627***	4.117***	4.174***	3.057***	4.003***	4.096***
(-4...0)	2.20	2.40	54:37	4.297***	3.234***	4.021***	3.876***	2.634***	3.919***	4.010***
(-3...0)	1.40	1.80	54:37	3.546***	2.144**	3.065***	2.533**	2.634***	2.971**	3.040**
(-2...0)	1.10	1.50	54:37	3.291***	1.999**	2.980***	2.237**	2.634***	2.917**	2.983**
(-1...0)	1.10	1.30	55:36	3.521***	2.164**	2.801***	2.525**	2.845***	2.769**	2.831**
(0...+1)	0.20	0.90	47:45	1.692*	0.458	1.490	0.457	0.928	0.992	0.977
(...)
(0...+28)	3.50	1.40	47:44	1.675*	1.455	1.145	1.517	1.151	1.504	1.538
(0...+29)	3.40	1.40	47:44	1.582	1.388	1.092	1.422	1.151	1.551	1.587
(0...+30)	3.80	1.80	49:42	1.899*	1.601	1.333	1.641	1.574	1.917*	1.960*
(0...+40)	4.40	1.90	55:36	1.882*	1.718*	1.403	1.816*	1.998**	1.809*	1.850*
(0...+50)	5.40	2.50	62:29	2.141**	2.101**	1.717*	2.143**	2.421**	2.408**	2.464***

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

The findings indicate that investors perceive M&A announcements as beneficial and exhibit a positive reaction one month before the announcement dates. In contrast, although there is evidence of positive CAAR and PWCAAR in the event windows after the announcement date, these observations are not statistically significant. Investors’ positive and significant reactions before M&A announcements, but their insignificant reactions afterwards, suggest the possibility of leaked information about M&A deals. In the post-event

period, positive and significant CAAR, PWCAAR, and ABHAR values are observed within the long-term event windows (0...+40) and (0...+50).

Figure: 3
-50...+50 CAAR and PWCAAR First M&A Announcements

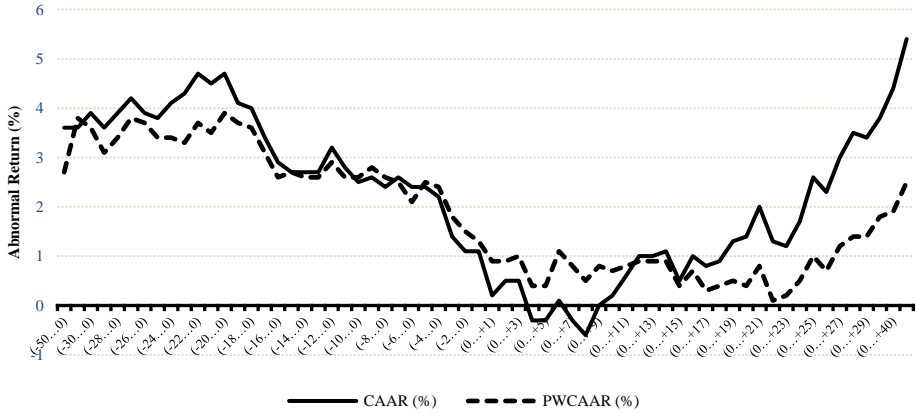


Table: 5
ABHARs and Test Statistics on and around First M&A Announcements (N = 91)

Average Buy-and-Hold Abnormal Returns			Parametric Tests	
Event Window	(ABHARs) (%)	Pos:Neg	Csct T	Skewness-Corrected T
(-50...0)	5.96	53:38	1.3607	1.7078*
(-40...0)	6.78	51:40	1.8671*	2.4318**
(-30...0)	5.39	47:44	1.8047*	2.2594**
(-29...0)	4.95	47:44	1.7499*	2.1697**
(-28...0)	5.15	46:45	1.9153*	2.3491**
(-27...0)	5.66	50:41	2.03**	2.500**
(-26...0)	5.12	47:44	1.9396**	2.3282**
(-25...0)	5.05	52:39	1.892*	2.3078**
(-24...0)	5.36	50:41	2.0298**	2.5243***
(-23...0)	5.36	51:40	2.2311***	2.7061***
(-22...0)	5.56	53:38	2.5492***	3.0077***
(-21...0)	5.07	55:36	2.5535***	2.8411***
(-20...0)	5.27	57:34	2.8216***	3.0909***
(-19...0)	4.56	61:30	2.544***	2.8115***
(-18...0)	4.39	61:30	2.5769***	2.6925***
(-17...0)	3.72	56:35	2.2366***	2.3039***
(-16...0)	3.17	53:38	1.9287**	1.9715**
(-15...0)	3.01	54:37	1.8894*	1.8652*
(-14...0)	2.91	53:38	1.9492*	1.8818*
(-13...0)	2.82	52:39	2.0113**	1.9619**
(-12...0)	3.18	52:39	2.4294**	2.4457**
(-11...0)	2.73	51:40	2.3524**	2.4103**
(-10...0)	2.34	53:38	2.3261**	2.4241**
(-9...0)	2.46	54:37	2.3852**	2.5078***
(-8...0)	2.41	55:36	2.3956**	2.5389***
(-7...0)	2.54	56:35	2.9474***	3.28****
(-6...0)	2.25	55:36	2.9436***	3.3946***
(-5...0)	2.33	56:35	3.381****	3.9574****
(-4...0)	2.10	54:37	3.0006***	3.6715****
(-3...0)	1.40	54:37	1.9873**	2.415***
(-2...0)	1.05	54:37	1.8588*	2.1101**
(-1...0)	1.07	55:36	2.086**	2.4615**
⋮	⋮	⋮	⋮	⋮
(0...+25)	4.05	48:43	1.5643	1.88785
(0...+26)	3.87	44:47	1.3755	1.6976
(0...+27)	4.85	46:45	1.5539	2.0097**

(0...+28)	5.69	47:44	1.661	2.2541***
(0...+29)	5.42	47:44	1.6456	2.169**
(0...+30)	5.71	49:42	1.8085	2.3583***
(0...+40)	6.78	55:36	1.8671*	2.4318***
(0...+50)	7.24	62:29	2.1685***	2.5347***

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Table 5 presents the ABHARs and the corresponding test statistics across 64 windows, with 32 before and 32 after M&A announcements. Additionally, the ABHARs in various windows between -50 and +50 are illustrated in Figure 4. The results of the ABHARs analysis are consistent with those of the CAARs and PWCAARs in Table 4. The results of ABHARs analyses are evaluated using two parametric test statistics. Table 5 illustrates that the highest ABHARs are observed in the 50 days preceding the announcement date (7.24 %), a statistically significant value. ABHARs values 4 and 5 days before the announcement are significant at the 1%. Similar to the findings observed with CAARs and PWCAARs, ABHARs results are significant in both the pre-announcement and 40th and 50th-day post-announcement windows. The results indicate that the longer investors wait to sell their holdings in the period surrounding M&A announcements, the greater the profit they will make.

Figure: 4
-50...+50 ABHARs (%) First M&A Announcements

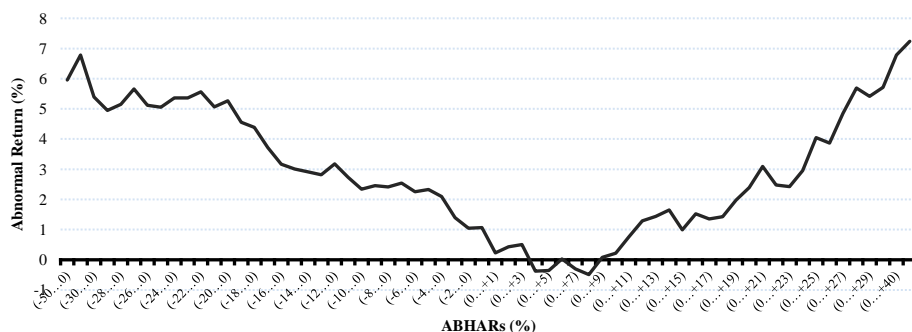


Table 6 reports the CAAR and PWCAAR values in 64 windows, calculated around the second announcement date. However, Table 6 excludes the CAAR and PWCAAR values due to their lack of statistical significance. Table 6 and Figure 5 show an upward trend in CAARs and PWCAARs, starting 50 days before the announcement and reaching a minimum point 15 days before the announcement. A positive trend starts 8 days before the announcement date. However, investors’ reaction to the second M&A announcement was not stronger than the first M&A announcement. At the same time, there is a noticeable decrease in the statistical significance of CAARs and PWCAARs. Parametric and nonparametric test statistics show that the most significant CAAR and PWCAAR are observed in the (-5...0) and (-4...0) time windows. On the third day after the second M&A announcement, the values of CAAR and PWCAAR were not statistically significant.

Table: 6
CAAR, PWCAAR, and Test Statistics on and around Second M&A Announcements
(N = 91)

Cumulative Average Abnormal Return (%)				Parametric Tests				Non-parametric Tests		
Event Window	CAARs (%)	PWCAARs (%)	Pos:Neg	Patell Z	Csect T	StdCsect T	Skewness-Corrected T	GenSign Z	Gen Rank Z	Gen Rank T
(-50...0)	4.40	2.30	50:41	1.831*	1.804*	1.730*	1.977*	1.818*	1.678*	1.503
(-40...0)	4.50	2.30	52:39	2.041**	2.034**	1.950*	2.262**	1.607	1.883*	1.688*
(-30...0)	4.00	1.50	53:38	1.894*	1.943*	1.725*	2.186**	2.519**	1.949*	1.724*
(-29...0)	4.00	1.70	54:37	2.006**	1.985*	1.816*	2.217**	2.729***	2.127**	1.882*
(-28...0)	3.90	1.60	51:40	1.957*	1.933*	1.749*	2.154**	2.097**	1.996**	1.765*
(-27...0)	3.50	1.50	50:41	1.788*	1.739*	1.575	1.90*	1.887*	1.859*	1.644
(-26...0)	3.10	1.00	49:42	1.477	1.586	1.312	1.70*	1.676*	1.597	1.412
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(-8...0)	1.20	1.70	51:40	1.973**	1.378	1.896*	1.549	2.374**	2.102**	1.864*
(-7...0)	0.90	1.30	47:44	1.598	1.145	1.618	1.276	1.529	1.592	1.413
(-6...0)	0.70	1.10	54:37	1.483	0.914	1.522	0.969	3.008***	2.138**	1.897*
(-5...0)	1.00	1.40	52:39	1.911*	1.220	1.858*	1.289	2.586***	2.348**	2.083**
(-4...0)	1.40	1.30	55:36	2.449**	1.877*	2.292**	2.080**	3.220***	2.774***	2.461**
(-3...0)	1.20	0.90	53:38	2.046**	1.757*	1.904*	1.926*	2.797***	2.059**	1.827*
(-2...0)	0.60	0.60	49:42	1.261	1.063	1.217	1.084	1.952*	1.717*	1.524
(-1...0)	0.80	0.70	54:37	1.929*	1.699*	1.824*	1.778*	3.008***	2.517**	2.235**
(0...+1)	0.80	0.40	48:43	1.693*	1.440	1.261	1.531	1.740*	2.192**	1.945*
(0...+2)	0.30	0.60	49:42	0.821	0.599	0.692	0.609	1.952*	1.480	1.312
(0...+3)	0.20	0.20	48:43	0.378	0.236	0.324	0.240	1.740*	1.335	1.184
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(0...+50)	2.20	1.40	41:46	1.047	0.784	0.817	0.775	0.313	1.457	1.306

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Figure: 5
-50...+50 CAAR and PWCAAR (%) Second M&A Announcements

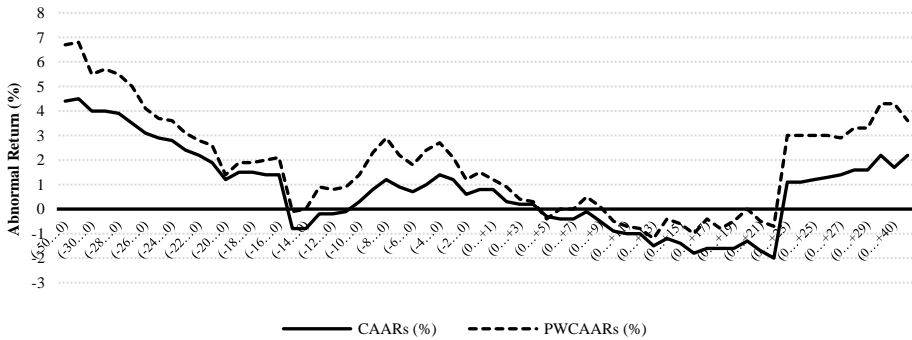


Table 7 and Figure 6 illustrate the ABHAR values within the (-50...+50) event window. Before the second M&A announcement, the (-50...0) and (-40...0) event windows exhibited maximum ABHAR values of 6.15% and 6.03%, respectively. These values are statistically significant at the 0.05 and 0.01 levels, respectively. However, the period from the 23rd to the fourth day before the announcement date shows no significant ABHAR. In addition, significant ABHAR is observed in the short-term windows before the announcement. In the event windows after the second M&A announcement, no statistically significant ABHAR are observed. The ABHAR results calculated around the second announcement date are similar to those of the CAAR and PWCAAR. Figure 6 illustrates a positive, decreasing trend in the value of ABHAR from the 50th day before the second M&A

announcement until the 15th day. It follows a horizontal trend in the following event windows.

Table: 7
ABHAR and Test Statistics on and around Second M&A Announcements (N = 91)

Average Buy-and-Hold Abnormal Return			Parametric Tests	
Event Window	(ABHAR) (%)	Pos:Neg	Csect T	Skewness-Corrected T
(-50...0)	6.15	50:41	1.8247*	2.2549**
(-40...0)	6.03	52:39	2.0167***	2.6307***
(-30...0)	5.31	53:38	1.9489*	2.6035***
(-29...0)	5.27	54:37	1.9948*	2.643***
(-28...0)	5.03	51:40	1.9384*	2.558***
(-27...0)	4.60	50:41	1.8015*	2.3147**
(-26...0)	4.01	49:42	1.6995*	2.0996**
(-25...0)	3.75	51:40	1.7305*	2.0602**
(-24...0)	3.49	52:39	1.6738*	1.9671**
(-23...0)	3.04	50:41	1.5568	1.7585*
⋮	⋮	⋮	⋮	⋮
(-4...0)	1.41	55:36	1.8486*	2.1414**
(-3...0)	1.20	53:38	1.7806*	1.9935**
(-2...0)	0.61	49:42	1.1026	1.1365
(-1...0)	0.83	54:37	1.7176*	1.8191*
⋮	⋮	⋮	⋮	⋮
(0...+50)	2.67	41:46	0.8254	0.8795

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Figure: 6
-50...+50 ABHAR (%) Second M&A Announcements

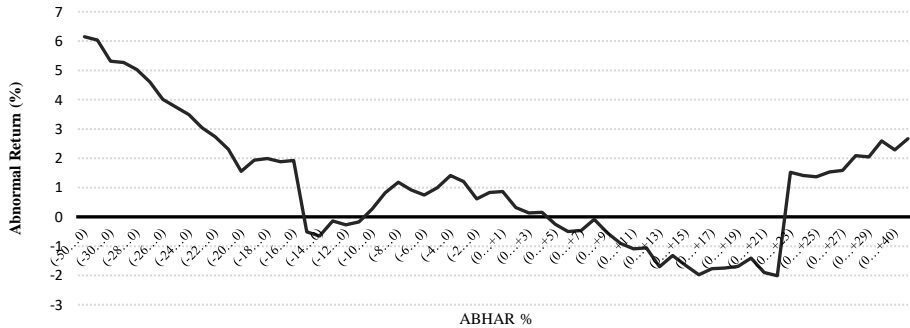


Table 8 and Figure 7 illustrate the CAAR and PWCAAR surrounding the third announcement date. In Table 8, statistically insignificant values have been excluded. Except for the (-50...0) window, there are no positive and significant CAAR and PWCAAR in the period surrounding the M&A completion announcement. Figure 5 illustrates that the values of CAAR and PWCAAR around the announcement exhibit a horizontal trend. The event windows around the M&A completion announcement show no significant CAAR or PWCAAR. This suggests that equity market participants may have already factored M&A announcements into their pricing.

Table: 8
CAAR, PWCAAR, and Test Statistics on and around Third M&A Announcements (N = 91)

Cumulative Average Abnormal Return (%)				Parametric Tests				Non-Parametric Tests		
Event Window	CAAR (%)	PWCAAR (%)	Pos:Neg	Patell Z	Csect T	StdCsect T	Skewness-Corrected T	GenSign Z	Gen Rank Z	Gen Rank T
(-50...0)	4.90	3.30	55:36	2.112**	2.107**	1.976*	2.254**	2.701***	2.280**	2.101**
(-40...0)	3.40	2.20	54:37	1.679*	1.744*	1.518	1.815*	1.438	1.642	1.516
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(-2...0)	-0.70	-0.80	36:55	-1.599	-1.358	-1.60	-1.276	-1.064	-1.940*	-1.857*
(-1...0)	-0.70	-0.80	37:54	-2.010**	-1.362	-1.702*	-1.318	-0.854	-1.624	-1.556
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
(0...+50)	2.10	2.40	52:39	1.489	0.718	0.851	0.965	0.118	1.565	1.443

Figure: 7
-50...+50 CAAR and PWCAAR (%) Third M&A Announcements

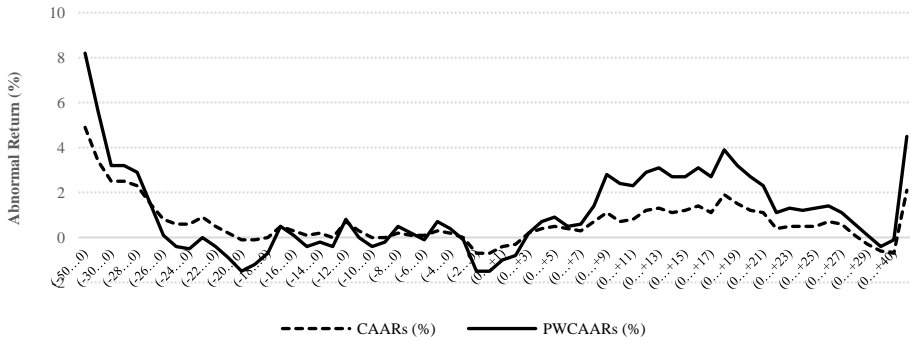


Table 9 and Figure 8 illustrate the ABHAR surrounding the third M&A announcement date. There are no statistically significant ABHAR values around the third M&A announcement date, except the (-50...0) event window. These findings suggest that equity market participants may have already factored M&A announcements into their pricing. Figure 8 illustrates a downward trend in ABHAR values from day 50 to day 21, followed by a horizontal trend in post-event windows. These findings are consistent with the CAAR and PWCAAR values.

Table: 9
ABHAR and Test Statistics on and around Third M&A Announcements (N = 91)

Event Window	Average Buy-and-Hold Abnormal Return (ABHAR) (%)	Pos:Neg	Csect T	Parametric Tests Skewness-Corrected T
(-50...0)	0.0604	55:36	2.1649**	2.4951**
⋮	⋮	⋮	⋮	⋮
(0...+50)	0.0373	52:39	1.09	1.1972

Figure: 8
-50...+50 ABHAR (%) Third M&A Announcements

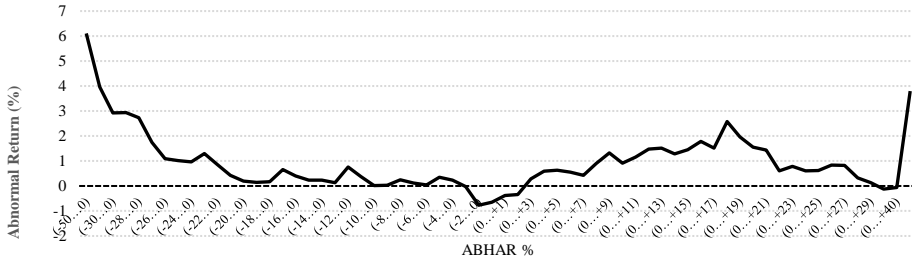


Table: 10
Various Windows CAAR, PWCAAR, and Test Statistics
(First M&A Announcements)

Event Window	CAARs (%)	PWCAARs (%)	N	Parametric Tests				Non-parametric Tests		
				Patell Z	Csect T	StdCsect T	Skewness-Corrected T	GenSign Z	Gen Rank Z	Gen Rank T
(-30...+30)	7.50	4.80	91	3.129***	2.671***	2.548**	3.083***	3.269***	2.511**	2.570**
(-20...+20)	5.90	3.40	91	2.920***	2.355**	2.048**	2.475**	3.114***	2.239**	2.308**
(-15...+15)	2.90	2.30	91	1.917*	1.385	1.430	1.321	2.021**	1.873*	1.928*
(-10...+10)	2.40	2.60	91	2.240**	1.704*	2.065**	1.725*	2.021**	1.658*	1.706*
(-5...+5)	1.90	2.30	91	2.668***	2.298**	2.778***	2.337**	2.021**	2.361**	2.427**
(-3...+3)	1.30	1.70	91	2.444**	2.001**	2.634***	2.091**	2.021**	2.069**	2.131**
(-1...+1)	0.90	1.40	91	2.798***	1.637	2.657***	1.677*	1.809*	2.642***	2.718***

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

Table 10 presents the CAAR and PWCAAR calculation results in various event windows. Both the short-term and long-term windows exhibit positive and significant CAAR and PWCAAR. The findings reveal a stronger positive investor reaction to M&A announcements in the long term than short-term events. This indicates that the later the investors sell their stocks around M&A announcements, the more gains they will realise.

Table 11 reports CAAR and PWCAAR values in 10 sectors and six event windows. CAAR and PWCAAR values are evaluated using two parametric and two non-parametric test statistics. In the (-20...0) event window, it is observed that positive and significant CAAR and PWCAAR are present in the financial institutions (4.9% and 4%) and technology (9.8% and 10.5%) sectors, respectively. Similarly, positive and significant CAAR and PWCAAR are observed in the financial institutions (2.8% and 1.9%) and technology (6.9% and 7.3%) sectors, respectively, within the (-10...0) event window. In the (-5...0) event window, positive and significant CAAR and PWCAAR are observed in financial institutions (3% and 2.4%), manufacturing (2.4% and 3.1%), technology (4.4% and 4.3%), and transportation and storage (5.5% and 5.5%) sectors. It can be observed that positive and significant CAAR and PWCAAR occur in the technology, transportation and storage, construction, and public works sectors following announcements at (0...5), (0...10), and (0...20). In general, sectoral results indicate that investors tend to react positively and significantly five days before M&A announcements. This means that the (-5...0) event window is the most profitable period for investors.

Table: 11
Sectoral CAAR, PWCAAR, and Test Statistics (First M&A Announcements)

Sectors	Cumulative Average Abnormal Return				Parametric Tests		Non-Parametric Tests	
	Event Window	CAAR (%)	PWCAAR (%)	N	Csect T	Skewness-Corrected T	Gen Sign Z	Gen Rank T
Financial	(-20...0)	4.90	4.00	36	1.369	1.243	1.634	2.280**
Manufacturing		1.40	2.00	29	0.795	0.786	1.945*	1.422
Wholesale and Retail Trade		-0.10	0.60	7	-0.022	-0.005	-0.277	-0.375
Technology		9.80	10.50	6	3.405**	2.769**	2.023**	2.465**
Energy		18.60	10.60	5	2.697**	1.831	1.438	1.474
Construction and Public Works		-1.30	-1.40	2	-0.137	1.0	0.095	-0.168
Transportation and Storage		4.80	6.70	2	0.384	1.0	0.062	0.447
Real Estate Activities		19.18	-	1	-	-	-	1.1014
Administrative and Support Service Activities		23.96	-	1	-	-	-	0.7815
Education, Health, Sports and Other Social Services		7.67	-	1	-	-	-	0.6364
Financial	(-10...0)	2.80	1.90	36	1.510	1.584	0.628	1.8505
Manufacturing		1.40	2.30	29	0.960	0.967	1.197	1.226
Wholesale and Retail Trade		0.40	2.80	7	0.154	0.144	0.479	-0.026
Technology		6.90	7.30	6	4.409***	4.662***	2.849***	3.008***
Energy		3.80	5.10	5	0.807	0.587	1.438	1.493
Construction and Public Works		2.90	3.00	2	0.548	1.0	0.095	-0.182
Transportation and Storage		1.40	2.30	2	0.243	1.0	0.062	0.239
Real Estate Activities		9.60	-	1	-	-	-	0.7617
Administrative and Support Service Activities		-6.18	-	1	-	-	-	-0.2785
Education, Health, Sports and Other Social Services		6.08	-	1	-	-	-	0.697
Financial	(-5...0)	3.00	2.40	36	2.251**	2.628**	2.304**	2.892***
Manufacturing		2.40	3.10	29	2.40**	2.728**	1.945*	2.558**
Wholesale and Retail Trade		0.90	1.30	7	0.511	0.524	0.479	0.239
Technology		4.40	4.30	6	3.048**	2.224*	2.023**	2.354**
Energy		-1.60	-1.50	5	-0.572	-0.428	-1.248	-1.331
Construction and Public Works		-0.70	-0.70	2	-2.152**	1.0	-1.323	-2.219**
Transportation and Storage		5.50	5.50	2	14.169**	1.0	1.478	2.40**
Real Estate Activities		8.32	-	1	-	-	-	0.8938
Administrative and Support Service Activities		2.47	-	1	-	-	-	0.1507
Education, Health, Sports and Other Social Services		-2.88	-	1	-	-	-	-0.4471
Financial	(0...+5)	0.00	0.60	36	-0.044	-0.019	-0.712	0.058
Manufacturing		-1.50	-0.40	29	-1.753*	-1.640	-0.673	-1.762*
Wholesale and Retail Trade		2.30	0.70	7	0.804	0.774	0.479	0.401
Technology		2.00	1.50	6	1.173	1.303	1.198	1.046
Energy		-4.90	-3.50	5	-1.080	-1.270	0.543	-0.622
Construction and Public Works		0.10	0.10	2	0.041	1.0	0.095	-0.015
Transportation and Storage		6.90	7.10	2	6.282****	0.0	1.478	2.339***
Real Estate Activities		-3.17	-	1	-	-	-	-0.3406
Administrative and Support Service Activities		2.99	-	1	-	-	-	0.1825
Education, Health, Sports and Other Social Services		5.11	-	1	-	-	-	0.7932
Financial	(0...+10)	-1.10	-0.20	36	-0.605	-0.662	-0.377	0.026
Manufacturing		-0.50	0.00	29	-0.317	-0.282	0.075	-0.886
Wholesale and Retail Trade		6.30	3.60	7	1.429	1.881	1.236	1.536
Technology		5.40	5.20	6	2.901**	1.307	2.023**	2.330**
Energy		-8.50	-7.30	5	-1.413	-1.985	-1.248	-1.176
Construction and Public Works		7.20	7.20	2	19.917**	1.0	1.512	1.710*
Transportation and Storage		10.30	11.40	2	1.508	1.0	1.478	1.433
Real Estate Activities		-8.67	-	1	-	-	-	-0.6879
Administrative and Support Service Activities		7.09	-	1	-	-	-	0.3195
Education, Health, Sports and Other Social Services		-1.27	-	1	-	-	-	-0.1456
Financial	(0...+20)	-1.20	-1.60	36	-0.322	-0.40	0.293	0.459
Manufacturing		-0.70	-0.10	29	-0.294	-0.249	-0.299	-0.696
Wholesale and Retail Trade		15.00	-2.20	7	1.590	1.9915	0.479	0.418
Technology		9.80	12.40	6	3.011**	1.925	2.023**	2.311**
Energy		-1.10	2.50	5	-0.094	-0.079	-0.353	0.068
Construction and Public Works		10.50	10.60	2	2.728	1.0	1.512	1.432
Transportation and Storage		10.40	12.60	2	0.741	1.0	0.062	0.790
Real Estate Activities		-10.50	-	1	-	-	-	-0.603
Administrative and Support Service Activities		12.56	-	1	-	-	-	0.4097
Education, Health, Sports and Other Social Services		-11.76	-	1	-	-	-	-0.9758

Note: *, **, ***, and **** indicate the statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

6. Conclusions and Implications

Using an event study methodology, this study examines the stock price performance of 91 Turkish companies involved in domestic mergers and acquisitions (M&A) between 2016 and 2023. Explicitly analysing the stock performance of acquiring companies, the study calculates abnormal returns around three key M&A announcement dates: the initial M&A announcement, the Capital Markets Board (CMB), and the M&A registration announcement.

In addition to estimating standard AR, PWCAAR and ABHAR are assessed in this study. Furthermore, abnormal returns are evaluated according to parametric and non-parametric test statistics. Consequently, the reliability and robustness of the findings are analysed. Firstly, AAR is calculated in 61 windows, 30 days before and 30 days after the first announcement. Subsequently, around the three announcement dates, CAAR, PWCAAR, and ABHAR are reported in 64 different windows, 50 days before and 50 days after the announcement. Finally, around the first announcement, CAAR and PWCAAR are reported in eight windows.

The results of the AAR, calculated in 61 different windows, indicate that investors' reactions were positive, spanning from 5 days before the first announcement date to the announcement day. However, only the -4th and -1st day AARs are significant. After the first announcement date, the values of AARs were observed to fluctuate. Around the first M&A announcement date, CAARs and PWCAARs values are consistently positive from day -27th to day -1st, and all of these values are statistically significant, according to both parametric and non-parametric statistical tests. During the event window (-22 to 0), the CAAR value reaches its maximum, with a value of 4.70%. The PWCAAR value reaches its maximum during the event window (-20 to 0), with a value of 3.90%. According to parametric and non-parametric test statistics, both values are statistically significant. Nevertheless, while the CAAR and PWCAAR values are positive in the post-announcement event windows, they are not statistically significant, except for the (0...+40) and (0...+50) event windows. Furthermore, the results of the ABHAR are consistent with those of the CAAR and PWCAAR. Table 10 demonstrates that the CAAR and PWCAAR values for the eight different event windows are positive and statistically significant. It also appears that the CAAR and PWCAAR values in the long-term event windows are higher than in the short-term event windows. The analysis results indicate that investors reacted positively to the first M&A announcements in the event windows before the announcement. These findings suggest that when merger and acquisition (M&A) information is disclosed, investors attempt to assess it within a relatively brief period. This evidence supports the hypothesis that the market is inefficient in its semi-strong form, thereby confirming the notion that information about mergers and acquisitions (M&A) is leaked to investors. The AR observed before the announcement can be explained by insider trading. Furthermore, investors may realise a significant return if they purchase shares in the acquiring company twenty-two days before the announcement date and sell them on the announcement date. In addition, the longer investors hold shares of acquiring companies within the (-50...+50) event window, the

greater the profit potential. It can be observed that investors tend to react positively to M&A announcements in a sectoral context in the pre-event windows. However, this reaction appears to decrease in the post-announcement windows. Investors demonstrated a positive and significant response in the financial institutions, manufacturing, technology, transportation, and storage sectors, particularly within the event window of (-5...0). Additionally, investors reacted positively and significantly to M&A announcements in the technology sector, especially in the pre-and post-announcement windows.

The findings generally indicate that investors tend to react strongly and positively to M&A announcements in event windows preceding the first announcement date. However, investors' reactions gradually weakened in the event windows surrounding the second and third M&A announcements. This suggests that information about M&A may have leaked to the financial markets before the announcement. In this case, market participants have already factored the news about M&A announcements into their pricing, indicating that markets are not semi-strong-form efficient.

The results of the current study are consistent with those of Seth, Song, and Pettit (2000), Wilcox, Chang, and Grover (2001), Lepetit, Patry, and Rous (2004), Scholtens and Wit (2004), Kumar and Panneerselvam (2009), Hekimoğlu and Tanyeri (2011), Liargovas and Repousis (2011), Kashiramka and Rao (2013), Genç and Coşkun (2013), and Ahmed et al. (2017), but not consistent with the results of Capron and Pistre (2002), DeLong (2003), Sachdeva, Sinha, and Kaushik (2017), Upadhyay and Kurmi (2020), and Pandey and Kumari (2020).

The findings of this study are specific to Türkiye and cannot be generalised to other countries or regions. It would be beneficial to employ a range of analytical techniques to enhance the study. In particular, the impact of M&A announcements on stocks in different sectors could be analysed.

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