



Motives of Enterprise Mergers and Acquisitions and Short-term Market Effects: An Empirical Analysis of Siemens Healthineers' Case

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Abstract. Mergers and acquisitions (M&A) play an important role in promoting the strategic transformation and market expansion of enterprises. However, judging from the results, the performance of many enterprises after M&A fails to meet expectations, and even brings certain losses. Firstly, this paper explores the reasons why enterprises choose M&A from the perspective of acquirer and target, and finds that the acquirer mainly wants to expand its advantages, while the target is relatively passive in the face of difficulties. Additionally, this paper selects the specific case of Siemens Healthineers' acquisition of Varian, uses the Abnormal Return (AR) and Cumulative Abnormal Return (CAR) as measurement criteria to determine whether the impact of mergers and acquisitions is significant and whether the mergers and acquisitions are successful. The results show that for Siemens Healthineers, the p-value was less than 0.05, and the CAR turned from positive to negative around the announcement date, indicating that the M&A event had a significant impact on Siemens Healthineers, though the transaction was not entirely successful. Conversely, for Varian, the t-test yielded a p-value greater than 0.05, but the CAR shifted from negative to positive, suggesting that the event had no significant statistical impact on Varian. However, the market's positive reaction indicated that the acquisition was fully successful for Varian.

Keywords: M&A, M&A performance, M&A motivation, cumulative abnormal return

1 Introduction

Mergers and acquisitions (M&A) serve as crucial means for enterprises to expand and achieve global development, and their importance has been increasingly recognized [1]. While M&A transactions are pervasive, from the results, they often fail to achieve desired outcomes, and post-acquisition performance frequently falls short of firms' strategic objectives [2]. This phenomenon raises two key questions: what motivations or resources drive firms to pursue M&A? How can more scientific methods be adopted to evaluate the success of specific M&A cases?

Studies have shown that successful M&A can enhance a firm's operating performance and competitiveness, facilitating potential growth, expanding market share, and

increasing business volume [3]. For instance, after Microsoft's acquisition of Activision Blizzard in 2023, its gaming business competitiveness significantly improved, surpassing Sony for the first time in 2024 to become the world's second-largest gaming company. Conversely, failed M&A may inflict severe losses on firms. For example, after Discovery Inc. merged with WarnerMedia to form Warner Bros. Discovery (WBD) in April 2022, the company's stock price fell approximately 62% for the year, with its market value evaporating by over \$37 billion, affected by high debt, streaming business losses, and declining traditional TV revenue. This demonstrates that M&A can impact the future development of both firms to a certain extent. Therefore, it is essential to rationally analyze past M&A cases, study the reasons for their success or failure, and draw experience and lessons from them.

Existing studies often remain at the superficial level of M&A events, such as evaluating firm value through news reports. While such approaches can indeed capture short-term market reactions, results not derived from data-based measurement are highly likely to contain errors, undermining the accuracy of the research.

To solve the above problems, this paper first conducts a detailed analysis of the motivations behind corporate M&A from the perspectives of both the acquirer and the target. Then select the case of Siemens Healthineers' acquisition of Varian, constructs a model to calculate the CAR of the relevant firms, verify whether M&A has a significant impact on corporate performance, and determines the success of the acquisition by analyzing and observing CAR fluctuations.

2 Reasons for M&A

2.1 The Perspective of Acquirer

Expand the Market. Expanding market, as one of the most critical motivations for acquirers, enhances competitive advantages through integrating external resources. Stigler pointed out that M&A serves as an effective means for firms to rapidly increase market share [4]. For enterprises aiming to extend product categories and boost market share, horizontal M&A with peer companies is typically chosen to occupy a larger market and strengthen competitiveness [5]. Furthermore, firms seeking vertical expansion mostly intend to integrate upstream and downstream industrial chains to reduce costs, thus primarily opting for vertical M&A [6]. Coase's transaction cost theory states that when market transaction costs exceed internal costs, M&A becomes the optimal choice for enterprises [7]. Specifically, acquirers can secure stable upstream raw material supply and access more downstream consumer resources through M&A of upstream and downstream firms. Meanwhile, integrating supply chains can significantly reduce production and transaction costs to a certain extent. For example, Amazon's 2012 acquisition of logistics firm Kiva Systems reduced operating expenses by approximately 20% and improved supply chain efficiency by optimizing internal logistics processes. Thus,

whether through horizontal market share expansion or vertical industrial chain optimization, market expansion can be significantly achieved, which remains the primary objective for acquirers to pursue M&A.

Access the Resources of the Target. Some acquirers are attracted by some high-quality resources of the target company. Therefore, they hope to obtain resources through M&A to address their own capability gaps and achieve rapid development. In technology-related industries, patents and technologies play a crucial role in product research and development (R&D), they have a significant impact on the valuation of the company [8]. By acquiring the target's R&D capabilities or core technical teams, acquirers can shorten the in-house R&D cycle and effectively catch up with or outperform competitors. For instance, many large pharmaceutical companies acquire biotech firms to obtain new drug patents and enhance technological capabilities. Second, brand and customer resources are also vital in competition. For retail and e-commerce enterprises, M&A can significantly boost brand awareness and market influence by acquiring more customer resources. For example, ByteDance acquired the U.S. short-video app Musical.ly and merged it with TikTok, inheriting teenage user base in North America to lay a foundation for TikTok's global expansion. Additionally, some acquirers value the target's talent teams [9]. For example, core management with unique resources or R&D teams with advanced technologies, aiming to directly acquire skilled personnel and improve management and R&D capabilities. Google's acquisition of DeepMind, for example, integrated Demis Hassabis' top AI scientist team to strengthen Google's AI strategy. Evidently, M&A enables acquirers to directly utilize the target's resources, including patents, technologies, customers, and talents, which plays a significant role in resource expansion for acquirers.

Create Value through Synergy. Synergy refers to the phenomenon where the post-merger value of a combined firm exceeds the sum of the values of the individual pre-merger firms, often described as " $1+1>2$ " [10]. This paper analyzes the impacts of post-M&A synergy on enterprises from two dimensions: cost reduction and efficiency enhancement. First, M&A can significantly lower corporate costs. Upstream, the enlarged procurement scale strengthens bargaining power with suppliers, reducing raw material expenses. In production, merging production lines alleviates overcapacity and improves equipment utilization, thereby cutting production costs. In sales, sharing distribution channels and streamlining positions reduce selling expenses. Additionally, M&A can boost operational efficiency, and profitability. Acquirers directly gain access to the target's patents, customers, and other resources, drastically shortening R&D cycles and reducing sales investments, enabling more efficient technological breakthroughs and market expansion. Some firms reorganize their industrial chains post-M&A, eliminating redundancies and strengthening interdepartmental connections, which enhances collaboration efficiency and creates additional value.

2.2 The Perspective of Acquiree

Financial Crisis. When target firms seek M&A due to financial crises, it often represents a passive choice under survival pressure. Many enterprises experience deteriorating financial conditions due to operational and managerial issues before being acquired. Thus, when a firm cannot repay debts or faces cash flow disruption, it may face bankruptcy petitions from creditors. To avoid bankruptcy liquidation, being acquired can become one of the viable options for survival. Additionally, some firms fail to properly respond to industry transformations—such as technological iteration, policy changes, or declining demand—thereby losing competitiveness and profitability, leading to acquisition by other companies. For example, Nokia’s mobile phone business, which failed to adapt to the smartphone innovation trend, was sold to Microsoft for \$7.2 billion in 2013.

Leveraging for Upgrading. Unlike passive M&A driven by financial crises, “Leveraging for Upgrading” represents a proactive choice based on firms’ long-term strategies, primarily driven by three factors. First, target firm aims to access resources from large enterprises to break through development bottlenecks. Small and medium-sized enterprises or startups often face challenges such as funding shortages, high R&D needs, insufficient customer resources, and unclear technological advantages. Thus, these firms seek to be acquired by large companies to rapidly obtain resources like capital, technology, and distribution channels for leapfrog development. Second, firms with obvious weaknesses pursue M&A to achieve balanced growth. For example, some long-standing traditional enterprises lacking contemporary brand marketing can leverage the acquirer’s brand influence to enhance visibility after being acquired by renowned firms. Third, external industry trends play a role. With rapid technological advancement, industry hotspots, trends, and technical standards are constantly evolving. Some firms choose to integrate with sectors driven by emerging technologies or booming industries to seize future trends. In recent years, for instance, numerous enterprises have sought integration with AI to enhance technological capabilities while making products more appealing to young users.

Strategic Transformation. Strategic transformation, while also a proactive corporate choice, differs from “Leveraging for Upgrading” in that firms reinvent post-merger operations through M&A, rather than making incremental optimizations [11]. Most enterprises pursuing strategic transformation typically focus on business shift, R&D direction adjustment, business model transformation, and market positioning changes.

In terms of business transition, when an enterprise’s industry is in gradual decline and its current business can no longer adapt to market trends, M&A can be used to acquire resources from the acquirer in emerging fields. Thereby shifting core operations from a declining industry to a promising one. For technology firms, some face the risk of being replaced due to R&D capabilities failing to keep up with industry frontiers or choosing R&D directions divergent from emerging trends. Thus, they opt to merge with industry leaders or firms mastering cutting-edge technologies to realign R&D priorities

and accelerate technological breakthroughs. The business models of some traditional enterprises, such as manufacturing firms struggling to profit in the current market, can no longer meet market demands. M&A with e-commerce enterprises, for example, can transform their business models to expand profitability. From a market positioning perspective, with global economic integration, many firms previously focused on domestic markets now seek global expansion through M&A with multinational enterprises to achieve target market repositioning [12].

3 Case Analysis

To specifically evaluate the impact of M&A on corporate value, this paper selects the case of Siemens Healthineers' announcement to acquire Varian on August 2, 2020. By constructing a model and conducting regression analysis, it investigates the effect of M&A on corporate performance and further determines the acquisition's success.

Before analyzing the M&A case, this paper first introduces the background information of Siemens Healthineers and Varian to explore the motivations behind the merger. Siemens Healthineers, a subsidiary of the German industrial conglomerate Siemens AG, was spun off and listed independently on the Frankfurt Stock Exchange in 2018. The company's core businesses include diagnostic and therapeutic imaging, laboratory diagnostics and molecular medicine, as well as digital health and enterprise services, holding 18,500 patents worldwide.

Additionally, the target in this case, Varian, is a U.S.-based enterprise founded in 1948, specializing in oncology radiation therapy. Its core operations cover radiation therapy equipment, software & services, and proton therapy, with the company holding the top market share in the global radiotherapy equipment market.

3.1 Financial Analysis

To identify the specific reasons for this merger and acquisition, it is necessary to review the financial status of the company before the merger and acquisition occurred. This paper has based on the company's annual report, collected the main financial data of Siemens Healthineers from 2015 to 2019, as shown in Table 1.

Table 1. Key financial data of Siemens Healthineers from 2015 to 2019.

Year	Revenue	YOY %	Gross Profit	Rate %	Net Income	Rate %
2015	12.94		5.07	39.18	1.32	10.20
2016	13.55	4.71	5.47	40.37	1.35	9.96
2017	13.80	1.85	5.77	41.81	1.47	10.65
2018	13.43	-2.68	5.47	40.73	1.43	10.65
2019	14.52	8.12	5.80	39.94	1.61	11.09

As shown in the Table 1, in the five years prior to the acquisition, key financial indicators showed a trend of steady growth except for minor declines in 2018. The revenue growth rate relatively increased to 8.2% in 2019, while growth was not significant

in other years. Gross profit and net profit grew stably except in 2019; the gross profit margin trended upward before 2017 and then declined slightly; the net profit margin grew year by year. Overall, Siemens Healthineers maintained a stable financial condition and normal operational performance in the five years before the acquisition, with no significant issues observed.

For the target firm, this paper collected Varian's key financial data from 2015 to 2019 (as shown in Table 2):

Table 2. Key financial data of Varian Medical from 2015 to 2019.

Year	Revenue	YOY %	Gross Profit	Rate %	Net Income	Rate %
2015	3.10		1.28	41.39	0.41	13.29
2016	3.22	3.87	1.36	42.31	0.40	12.5
2017	2.67	-17.08	1.16	43.31	0.25	9.38
2018	2.92	9.36	1.27	43.63	0.15	5.15
2019	3.23	10.62	1.37	42.49	0.29	9.06

Unlike Siemens Healthineers' stable performance, Varian's key financial data presented in Table 2 showed relatively large fluctuations, decreasing significantly by 17.08% in 2017 and surging by 10.62% in 2019. The gross profit margin trended steadily upward overall, with a slight decline in 2019; net profit and net profit margin dropped notably in 2016 and 2017. Overall, Varian Medical's performance was less stable, especially the sharp financial decline in 2017. However, in the long run, no severe financial crisis emerged, indicating the company demonstrated certain resilience and market competitiveness.

3.2 Verify the Impact of M&A

To scientifically and accurately evaluate the market reaction on the M&A announcement date, this paper uses Cumulative Abnormal Return (CAR) as the measurement index. The model first calculates the difference between the actual return (R_t) and normal return ($E[R_t]$) of the target firm's stock within the event window, namely the abnormal return (AR), and then cumulates AR over the selected time period to obtain CAR. This indicator enables a more precise evaluation of the market's excess reaction to M&A events. Specifically, it effectively avoids interference from systematic factors such as market fluctuations and industry trends, allowing the study to focus more accurately on the market reaction triggered by the M&A event itself. The calculation method is as follows.

First, calculate the normal rate of return:

$$E(R_t) = \alpha + \beta R_{t-1}. \quad (1)$$

Then calculate AR:

$$AR_t = R_t - E(R_t). \quad (2)$$

Finally, calculate the CAR:

$$CAR_t = \sum_{i=1}^t AR_i, \quad (3)$$

where t represents the date and R_t is the actual return of the stock.

This paper designates $t=0$ as the event day [13]. Specifically, it is August 2, 2022, the date when Siemens Healthineers announced the acquisition of Varian. Referencing the study by some researches, the event window for this case is set from $t-5$ to $t+5$ [14]. Since the announcement day was not a trading day, the event window consists of 10 trading days in total—a length that facilitates observation of the market’s immediate reaction to the event and minimizes interference from other factors. Additionally, for the estimation window, this paper follows MacKinlay’s suggestion that 120 days prior to the event are suitable for routine research [15]. Thus, the period from $t-125$ to $t-6$, comprising 120 trading days, is selected to estimate the benchmark for normal stock returns.

In terms of data selection, this paper collects the closing prices of Siemens Healthineers and Varian from February 4, 2020, to August 7, 2020, to calculate the stock return R_t . The German DAX index was used to estimate the α and β values of Siemens Healthineers by linear regression while the S&P 500 index is applied for Varian’s α and β . The expected returns $E[R_t]$ for both firms are then derived to calculate their AR and CAR.

For the acquirer Siemens Healthineers, this paper calculates $\alpha = 0.001$ and $\beta = 0.549$ for Siemens Healthineers using equation (1), and computes the AR and CAR according to equations (2) and (3), respectively. The calculation results are shown in Figure 1:

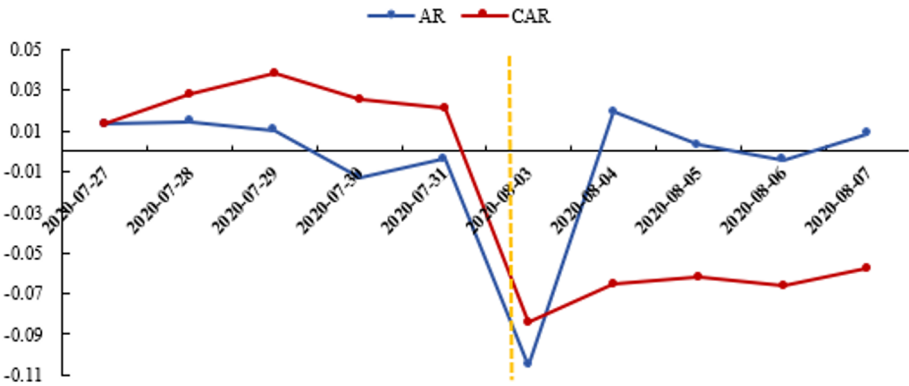


Fig. 1. AR and CAR values of Siemens Healthineers.

The next step is to use the t-test to confirm whether the announcement of the M&A event has a significant impact on the company. Based on the data from the $t-5$ to $t+5$ period, the calculated p-value is 0.00, which is less than 0.05, indicating that the M&A announcement has a significant impact on Siemens Healthineers’ performance.

Next, it is necessary to observe the trends of AR and CAR to determine the success of the M&A event. Before the event day, Siemens Healthineers’ CAR remained positive, with a continuous upward trend from July 27 to July 29, reflecting the market’s positive expectations for the stock. Although AR showed negative values at times, it

generally made a significant positive contribution to CAR. Since the M&A announcement date, August 2, was not a trading day, the changes on the closest days—July 31 and August 3—were observed. Notably, AR fell sharply, CAR turned from positive to negative, and the decline was substantial, indicating a strong negative market reaction after the announcement. Overall, from the acquirer's perspective, the outcome of this M&A was not positive. A deeper analysis reveals that the total announced acquisition price was \$16.4 billion, with a premium of approximately 42%—far exceeding the average premium level in the medical industry during the same period. This may have led the market to question whether Siemens Healthineers paid an excessively high price, thereby lowering expectations.

For the target firm Varian, this paper uses the same methodology for evaluation. The event window is still set as the 10 trading days from $t-5$ to $t+5$, while the estimation window spans 120 trading days from $t-125$ to $t-6$. Using equation (1), Varian's α is calculated as -0.0004 and β as 1.078 . The AR and CAR are computed according to equations (2) and (3), respectively. The calculation results are presented in Figure 2:

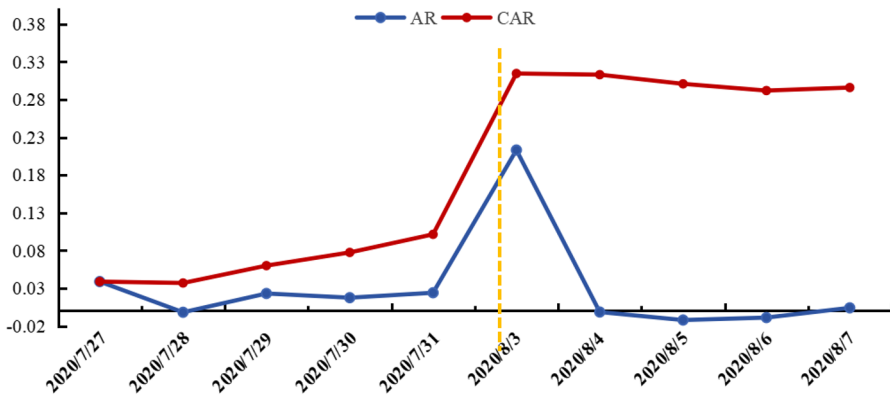


Fig. 2. AR and CAR values of Varian.

According to the t-test results, Varian's p-value is 0.212, which is greater than 0.050, indicating that the announcement had no significant impact on Varian.

As shown in the trends of AR and CAR in Figure 2, unlike Siemens Healthineers, Varian's CAR remained positive both five days before and after the announcement. Observing the changes on July 31 and August 3, both AR and CAR increased significantly, reflecting the market's positive expectations for Varian. Although AR decreased and turned negative in the days after August 4, CAR remained at a high level. This demonstrates a significant positive market reaction to Varian following the announcement, indicating that the transaction was fully successful from the target firm's perspective.

4 Suggestion

4.1 Suggestions for the Government

The government should place greater emphasis on monitoring the post-M&A performance of enterprises during supervision. For horizontal M&A, regulators can prioritize reviewing the realization mechanisms of post-M&A synergies; vertical M&A requires evaluating the impact of industrial chain integration on cost control; while conglomerate M&A may focus on the alignment between the enterprise's strategy and its inherent capabilities. This involves shifting the core of regulatory review from whether to approve the transaction to how to guide the transaction to achieve value addition.

4.2 Suggestions for the Enterprises

To ensure sustained growth post-M&A, enterprises need to continuously monitor industry and market trends to avoid misdirected strategic paths. This is particularly critical for high-tech firms, which must anticipate future technological trajectories to identify compatible M&A targets and acquire beneficial resources. Additionally, in terms of internal governance, companies should enhance the focus on corporate performance and financial health. When significant performance decline occurs, proactive analysis of underlying causes is essential, coupled with prompt measures to mitigate losses. For enterprises facing severe financial crises, M&A can serve as a vehicle for transformation or upgrading, thereby preventing corporate insolvency.

5 Conclusion

This paper first analyzes the causes of M&A from the perspectives of both acquirers and targets, then draws the following conclusions through the case study of Siemens Healthineers' acquisition of Varian:

First, acquirers pursue M&A primarily for self-interest growth, which is proactive choice to enhance competitive advantages. In contrast, target firms' motivations are relatively passive, mostly survival-driven responses to crises.

Second, this paper finds through case analysis that Siemens Healthineers' CAR turned from positive to negative, with the market reacting negatively. The t-test showed a p-value <0.05 , indicating significant impact. Varian, conversely, saw CAR turn from negative to positive, demonstrating full success for the target. The t-test p-value >0.05 showed no prominent impact on Varian.

This study has two limitations, the first one is that it focuses only on short-term market reactions before/after M&A, ignoring long-term performance; The second one is that the CAR model assumes market efficiency, which is idealized. However, real markets may exhibit delayed or overreactions, affecting evaluation accuracy.

Based on the above limitations, future research could observe post-M&A short-term market reactions and long-term operational performance from multiple dimensions to provide a more comprehensive evaluation of M&A impacts. Regarding the idealized

limitations of the CAR model, subsequent studies can incorporate investor irrationality by integrating reaction biases from behavioral finance. Additionally, considering real-world frictions such as information asymmetry, transaction costs, and regulatory constraints can help avoid evaluation errors arising from market efficiency assumptions.

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