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The effect of stock mispricing timing on M&A performance and the role of payment method as a mediator: Evidence from Chinese firms

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Abstract

This study examines the impact of stock mispricing timing on merger and acquisition (M&A) performance considering the mediating role of payment method by selecting Chinese A-share-listed companies from 2007 to 2021. This study uses a quantitative method based on multivariate regression analysis. The primary data collection technique used is an archival research method. The finding of this study is that stock mispricing timing significantly affects M&A performance. Announcing acquisitions during periods of stock overvaluation significantly enhances short-term market performance but may lead to diminished long-term market and financial performance. Conversely, acquisitions announced during periods of stock undervaluation are associated with less favourable short-term market performance but potentially foster long-term performance improvement. Payment methods partially mediate these effects with the stock payment method augmenting short-term performance and the cash payment method facilitating long-term performance. These findings underscore the importance of considering stock mispricing timing and payment method choice in M&A decisions to optimize overall performance outcomes. The study provides new evidence and perspectives on the impact of the capital market on the operation of the real economy which has significant policy implications for the healthy development of the current Chinese capital market and M&A market.

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1. Introduction

The goal of the M&A landscape is to improve corporate performance and value through resource integration and management consolidation based on the pursuit of synergistic effects (Zhu & Meng, 2021). However, reality often diverges from this ideal with some M&A activities failing to deliver expected improvements or resulting in value destruction (Kumar, Sengupta, & Bhattacharya, 2023). This phenomenon termed "M&A performance collapse" has become particularly conspicuous in the Chinese capital market prompting extensive scrutiny from industry practitioners and academics (Lan & Gao, 2023; Liu & Wei, 2022). The ramifications of poor M&A performance extend beyond shareholder interests posing challenges to long-term corporate development (He, Zeng, Wu, & Liu, 2022). The determinants of transaction success or failure remain elusive despite extensive research efforts and investments in M&A activities. There are still gaps in our understanding of the underlying causes of unsatisfactory results. However, previous research has shed light on several aspects influencing M&A performance particularly in light of China's unique market environment (Guo

& He, 2024; Renneboog & Vansteenkiste, 2019). Furthermore, prior research has predominantly concentrated on firm-specific and transaction-related factors. It is imperative to delve deeper into the impact of broader market environmental factors on M&A activities (Li, Huang, & Guo, 2020).

Recent studies highlight the crucial role of market timing in shaping M&A performance especially within the dynamic landscape of China's capital market (Li, Xiao, & Mao, 2022; Tampakoudis & Anagnostopoulou, 2020). However, research on this topic remains limited with scant exploration of the mechanisms through which market timing affects M&A outcomes. Additionally, the mediating role of payment methods in this relationship still needs to be explored despite its significance in merger transactions.

Initially, studies on market timing have predominantly centred on established capital markets in Europe and the United States with limited exploration within China's distinctive market landscape. Considering China's developing capital market and its distinct features such as "policy-driven markets" substantial fluctuations in stock prices and increased information asymmetry (Zeng, Zeng, & Huang, 2020) findings from research conducted in developed capital markets may not directly translate to China.

Furthermore, most scholars have focused primarily on the direct relationship between the two, neglecting in-depth analysis of specific pathways and mechanisms through which stock market timing influences M&A performance within the research framework investigating the effect of stock market timing on M&A performance. Among the various factors influencing M&A performance, the payment method is recognized as a critical element (Nnadi, Volokitina, & Aghanya, 2020). According to market timing theory, companies select different payment methods during acquisitions based on market conditions. However, research on the mediating role of payment method in the correlation between market timing and M&A performance remains limited particularly within the context of China's capital market. Therefore, incorporating payment method as an intermediary variable enhances our understanding of the mechanism through which stock market timing impacts M&A performance. Additionally, this approach complements existing knowledge by integrating macro-level market environment factors and micro-level merger transaction features thereby providing insights into the creation or erosion of merger transaction value.

This study seeks to address these gaps in China by thoroughly examining the impact of stock market timing on M&A performance with an emphasis on the payment method's mediating role. It aims to explore the following questions: What is the effect of stock mispricing timing on M&A performance? How does the payment method mediate the relationship between stock mispricing timing and M&A performance?

This study aims to provide valuable insights for Chinese companies navigating the complex landscape of mergers and acquisitions by examining both short-term market reactions and long-term performance implications. Ultimately, the results are anticipated to inform strategic decision-making and foster the sustainable development of China's capital market.

The specific arrangement of the paper is as follows: The second section is the literature review and research hypothesis. The third section is methodology. The fourth section is empirical results and analysis and finally, the research concludes with conclusion and recommendations.

2. Literature Review and Research Hypothesis

2.1. Stock Mispricing Timing and M&A Performance

Mergers and acquisitions (M&A) activities play a pivotal role in industry consolidation and are often perceived as measures to enhance shareholder value (Kellner, 2024). However, the impact of M&A actions on company performance particularly stock mispricing remains a subject of debate in the literature.

Existing research has provided conflicting findings regarding the effect of stock mispricing timing on M&A performance. On one hand, studies suggest that mergers initiated during periods of stock mispricing can create short-term value for acquiring firms. Li et al. (2020) analyzed 19,355 merger transactions of Chinese listed companies from 2008 to 2017 and found that companies are more likely to pursue mergers when their stock is undervalued. They further observed that acquirers tend to experience better market performance when their stock prices are undervalued, although this timing behavior does not necessarily result in synergistic effects. Kim, Lee, and Officer (2022) found that acquirers with overvalued stocks tend to achieve higher tender offer returns than non-acquirers with overvalued stocks.

On the other hand, other studies suggest that mergers driven by stock mispricing may lead to value destruction. Shang (2023) argued that mergers conducted during periods of stock overvaluation do not enhance the long-term M&A performance of listed companies. He et al. (2022) studied 135,885 merger transactions of Chinese-listed companies between 2007 and 2021. They discovered that stock mispricing timing has a negative relationship with the long-term market and financial performance (synergistic effect). It has a positive correlation with short-term post-acquisition market performance.

According to the market catering theory, during periods of stock price mispricing, management might be motivated to pursue mergers and acquisitions to cater to market sentiment and enhance short-term stock prices. This is especially prominent in the Chinese capital market where listed companies frequently acquire non-listed companies to capitalize on valuation discrepancies. An and Chen (2019) noted that when the stock prices of acquiring companies are overvalued, there is a strong urge within management to pursue mergers and acquisitions. However, this pursuit of market sentiment-driven mergers might lead management to focus

solely on stock price elevation potentially overlooking the actual operational and strategic conditions of the target companies. Consequently, this could hinder the realization of long-term synergies post-acquisition.

The literature provides mixed evidence regarding the impact of stock mispricing timing on M&A performance. Studies that emphasize the possible long-term consequences of value destruction differ from those that emphasize the short-term advantages of mergers motivated by stock mispricing. Therefore, this study proposes the following hypotheses:

Hypothesis 1a (H_{1a}): Stock mispricing timing has a significant and positive impact on short-term market performance.

Hypothesis 1b (H_{1b}): Stock mispricing timing has a significant and negative impact on long-term market performance.

Hypothesis 1c (H_{1c}): Stock mispricing timing has a significant and negative impact on financial performance.

2.2. Stock Mispricing Timing and Payment Method

The literature on market mispricing timing and payment method in M&As presents varying perspectives and conclusions providing insights into the influence of stock mispricing on payment method decisions.

Many scholars argue that the extent of stock price overvaluation significantly impacts the choice of payment method in M&A transactions. Lohmeier and Schneider (2022) assert that even overvalued acquiring firms tend to prefer stock-based payment methods indicating a positive correlation between stock mispricing and the likelihood of using stock as payment. Similarly, Sun and Wei (2021) conducted a study on Chinese publicly listed companies from 2009 to 2018 finding that stock mispricing exerts a positive influence on the use of stock payments during acquisitions. According to market timing theory, stock mispricing influences M&A activities with overvalued stock prices leading to a preference for stock-based payments. He et al. (2022) argue that using stock as payment during stock overvaluation helps mitigate investment risk and financing pressure associated with cash payments.

This study posits that stock mispricing timing significantly affects the choice of payment method in M&A transactions considering the arguments presented in the literature.

Hypothesis 2 (H_2): Stock mispricing timing significantly impact payment methods.

2.3. Payment Method and M&A Performance

The literature examining the relationship between payment methods and M&A performance reflects a spectrum of viewpoints and conclusions primarily focusing on cash and stock payment methods. However, divergent research findings have emerged with contrasting perspectives shaping scholarly discourse.

Some scholars argue that cash payment methods yield superior M&A performance attributing this outcome to information asymmetry and investor perceptions. Bessler, Kruizenga, and Westerman (2020) found that M&A transactions involving cash payments result in greater abnormal returns to acquirers compared to stock payments. Similarly, Feito-Ruiz, Fernández, and Menéndez-Requejo (2021) found that announcing cash payments in M&A is more likely to trigger a rise in the stock price for acquiring shareholders. These findings suggest that cash payments may mitigate information asymmetry and signal favourable prospects to investors ultimately enhancing M&A performance.

Conversely, other scholars contend that stock payment methods outperform cash payments in terms of M&A performance. Song and Zhou (2020) discovered that Chinese acquiring firms using stock payments exhibit superior performance compared to those employing cash payments attributing this outcome to the signalling role of payment methods. Similarly, Wang (2020) found that Chinese listed companies using stock payments obtain positive cumulative abnormal returns indicating the market's positive response to such payment methods.

The signalling theory provides a theoretical framework to understand the impact of payment methods on M&A performance. According to this theory, the choice of payment method conveys signals about the acquiring company's financial situation, growth prospects and managerial intentions influencing investor perceptions and consequently, stock prices. In the Chinese context, stock payments are often associated with positive signals of low financing costs, sound corporate governance and promising prospects driving up stock prices and enhancing M&A performance (Ma & Ye, 2019; Tseng & Chen, 2023).

This study posits that the choice of payment method significantly influences M&A performance based on signalling theory and empirical evidence.

Hypothesis 3 (H_3): Payment method significantly impact M&A performance.

2.4. Stock Mispricing Timing, Payment Method and M&A Performance

An area of particular interest lies in understanding how the choice of payment method interacts with market timing to influence M&A performance outcomes within the realm of mergers and acquisitions (M&A). This dynamic interplay has been explored in several studies shedding light on the mediating role of payment methods in the context of market timing and M&A performance.

Research examining the mediating role of payment method between stock mispricing timing and M&A performance has yielded valuable insights. Gobbo and Gigante (2022) conducted a study based on M&A

transaction data in Europe spanning from 1987 to 2019. Their findings suggest that opting for the stock payment method when the company's stock is overvalued can result in higher market returns. Similarly, Tsai, Yen, Ho, and Tsai (2021) analysed a sample of 2204 M&A transactions announced by US companies between 1985 and 2014. Their research revealed that market timing before mergers and acquisitions significantly influences the choice of payment method, subsequently impacting market reactions after the transaction announcement. Zeng et al. (2020) treated payment method as a mediating variable focusing on publicly listed companies initiating mergers and acquisitions on the Chinese stock market from 2010 to 2018. Their empirical examination demonstrated that industry-specific systematic mispricing positively influenced goodwill with the payment method playing a mediating role in this relationship.

The mechanisms through which market timing affects M&A performance underscore the significance of payment method selection which in turn mediates the relationship between market timing and M&A outcomes. However, it is noteworthy that there remains a scarcity of literature considering payment methods as mediating variables particularly in relation to how these methods mediate the effects of market timing on M&A outcomes.

This study posits that payment method plays a crucial mediating role between stock mispricing timing and M&A performance based on the theoretical frameworks of market timing theory and signalling theory.

Hypothesis 4 (H_4): Payment method has a mediating impact between stock mispricing timing and M&A performance.

3. Methodology

3.1. Data Source

This research conducted a pooled cross-sectional study on the acquiring companies that had undergone mergers and acquisitions each year between January 1st, 2007 and December 31st, 2021. Financial data about the sample firms and stock market data were obtained from the China Stock Market and Accounting Research Database (CSMAR). We have used the subsequent sample selection criteria excluding special treatment firms, financial industry firms and non-buyer companies with failed or unclear M&A transactions, M&A events valued at less than 1 million Chinese yuan (RMB) and firms with incomplete data. Only the initial M&A transaction within a quarter was considered for firms with multiple transactions. Excel was then used for the initial screening and formatting of the sample data. The data were statistically analysed using STATA 17.0.

The final study of the impact of market timing on short-term market performance used data from 8010 samples. The final study of the impact of market timing on long-term market performance used data from 7454, 7005 and 6554 samples. The final study of the impact of market timing on financial performance used data from 7316, 6677 and 5972 samples. The data in this paper are all from databases, no ethical considerations are involved and no funding is required.

3.2. Research Method

This study adopts a quantitative research approach to investigate the impact of stock mispricing timing on M&A performance in China. The research methodology includes secondary data analysis, descriptive statistics, multiple regression analysis, robustness testing and other techniques.

In this study, the market-to-book ratio decomposition adjusted model is employed to calculate stock mispricing timing. This model is pivotal in providing precise and accurate measures of mispricing, a critical component of our analysis. The event study methodology is used to assess M&A performance. This method allows us to assess the short-term market responses to merger announcements and offers insightful data on the direct effects of M&A activity on stock prices which is highly regarded for its efficacy. The study applies Ordinary Least Squares (OLS) and Logit models to examine the relationships between stock mispricing timing, payment method and M&A performance.

The selection and application of these techniques are crucial for ensuring the reliability and validity of our research findings.

3.3. Variable Measurement

3.3.1. M&A Performance

Assessing a firm's performance entails considering two primary dimensions: market performance and financial performance. Previous research on evaluating M&A performance has frequently employed the event study methodology to assess short-term and long-term market performance alongside the accounting study approach to assess financial performance (Vijayvargiya, 2020). Consequently, this study undertakes a comprehensive evaluation of firm M&A performance by examining both short- and long-term market performances along with financial performance.

3.3.1.1. Short-Term Market Performance

The event study methodology has been employed to assess the short-term market performance with the Cumulative Abnormal Return (CAR) serving as the metric for such evaluation in this analysis. The CAR for the selected companies has been computed across two window periods: (-2, +2) and (-5, +5) aligning with

methodologies used in prior research. A 120-day estimation period has been selected covering the period from 150 days preceding the announcement of the self-acquisition event to 31 days before the announcement date to establish the CAR.

The usual return for the firms involved in M&A has been calculated using the standard market model which aligns with earlier research such as He et al. (2022). Regression parameters were estimated using the Ordinary Least Squares (OLS) method, a commonly used approach in research. An equation based on the standard market model was used to calculate the normal return for the stocks of the sample firms:

Adjustments are performed to account for the typical relationship between the return on stock i during month t and the return on the market index Rm to analyse the impact of the event on individual stocks denoted as i.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

In this study, the variable t represents the day relative to the event while i denotes the sample firm. R_{it} signifies the stock return for company i on a specific event date t while R_{mt} represents the market return on the event day t (with the event day designated as day 0) within the estimated window. The data for R_{it} and R_{mt} are sourced from individual stock returns and value-weighted comprehensive market index returns retrieved from the CSMAR database. Parameter estimates α_i and β_i are derived from the ordinary least squares (OLS) regression process. Here, α_i signifies the estimated intercept of firm i during the regression equation specified period and β_i denotes the OLS estimations of the market model parameters for firm i (the slope of the equation). ε_{it} represents the error term for stock i on the event day t within the sample.

Subsequently, the ordinary least squares (OLS) parameter estimation technique is applied to compute α_i and β_i from the estimation period. Once α_i and β_i are determined using Equation 1, it becomes essential to calculate daily abnormal stock returns (AR) for firm i within the specified event window on day t. This entails using the αi and βi derived from Equation 1 to forecast the expected return during the event period. Abnormal stock returns (AR) reflect the degree to which expected normal returns ($E(R_{it})$) differ from actual realized stock returns (R_{it}) on the event day. The expected returns are as follows:

$$E(R_{it}) = \hat{\alpha}_\iota + \hat{\beta}_\iota R_{mt} \quad (2)$$

$$AR_{it} = R_{it} - \mathrm{E}(R_{it}) \quad (3)$$

The cumulative abnormal return (CAR) for each designated window period from t1 to t2 is computed by aggregating ARs accrued over the respective period. The following CAR from t1 to t2 is carried out using all terms that have previously been defined:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (4)$$

3.3.1.2. Long-Term Market Performance

In this study, long-term market performance is assessed through the computation of "Buy-and-Hold Abnormal Returns" (BHAR) for the acquiring firm's stock for three years. BHAR represents the return that an investor would achieve if they purchased the acquiring company's stock upon the announcement of the acquisition and held it until a specified later date.

According to methods used in earlier studies, the long-term returns are calculated monthly, compounded over 36 months after the M&A event and adjusted by the benchmark return (Brahma, Zhang, Boateng, & Nwafor, 2023; Variava & Kapadia, 2022):

$$BHAR_{iT} = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}(1 + R_{mt}) \quad (5)$$

In the provided equation, t denotes the month relative to the event. T denotes the total number of months, and i signify the sample firm. $BHAR_{iT}$ represents the total return for firm i from a buy-and-hold strategy initiated following the completion month of the M&A and maintained for T months with T taking values of 12, 24, and 36.

3.3.1.3. Financial Performance

This study employs Return on Assets (ROA) as a metric for financial performance which has been widely used in acquisition research (Ogachi & Zoltan, 2020). ROA is computed by dividing earnings before interest and taxes by total assets.This study uses the change in ROA (ΔROA) as a proxy indicator to assess a firm's financial performance taking inspiration from approaches employed in previous studies such as Nguyen and Vu (2021) and Suk and Wang (2021). ΔROA_1 represents the change in ROA of the sample firm one year before and after the initial M&A announcement date. ΔROA1 is determined using the following method which includes all terms that have been previously defined:

$$\Delta ROA_1 = ROA_{t+1} - ROA_{t-1} \quad (6)$$

The ΔROA_2 signifies the change in ROA for the sample firms between the second year following the M&A announcement date and the preceding year. Its calculation is performed as follows using all previously defined terms:

$$\Delta ROA_2 = ROA_{t+2} - ROA_{t-1} \quad (7)$$

The ΔROA_3 denotes the change in ROA for the sample firms between the third year following the M&A announcement date and the preceding year. Its calculation is conducted as follows incorporating all previously defined terms:

$$\Delta ROA_3 = ROA_{t+3} - ROA_{t-1} \quad (8)$$

3.3.2. Stock Mispricing Timing

This research uses the market-to-book ratio (M/B) to analyse the extent of stock mispricing based on precise data that is taken from He et al. (2022). Here, M represents the firm's market value and B represents the book value. M/B can be decomposed into two components: M/B = M/V × V/B, where M/V denotes mispricing and V/B represents the company's actual growth potential by introducing a variable V representing the true value of the stock. The following results from taking the logarithm of both sides of the equation:

$$m - b = (m - v) + (v - b) \quad (9)$$

Furthermore, Equation 9 can be further decomposed into Equation 10 by introducing a linear function based on the coefficient α estimated from financial information. Mispricing can be subdivided into two components: $m_{it} - v(\theta_{it}; \alpha_{jt})$ and $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$.

$$m_{it} - b_{it} = [m_{it} - v(\theta_{it}; \alpha_{jt})] + [v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)] + [v(\theta_{it}; \alpha_j) - b_{it}] \quad (10)$$

In this study, j represents the industry to which the sample firm belongs. m_{it} represents the natural logarithm of the market capitalization value of i on a given date t while b_{it} represents the natural logarithm of firm i's book value on the same date t. θ_{it} denotes the accounting information of firm i at time t. The term (θ_{it}; α_{jt}) denotes the estimated true value of firm i utilizing concurrent industry-level valuation multiples α_{jt}.

Therefore, the initial component $[m_{it}-v(\theta_{it};\alpha_{jt})]$ in Equation 10 captures the valuation error arising from firm-specific disparities in concurrent industry-level valuations. Additionally, $v(\theta_{it};a_j)$ signifies the inferred true value of firm i using long-term industry-level valuation multiples α_j where the second part, $[v(\theta it;\alpha_{jt})-v(\theta_{it};\alpha_j)]$ in Equation 10 encapsulates the valuation discrepancy resulting from the disparity between current industry valuation and long-term industry valuation. The third part, $[v(\theta_{it};\alpha_j)-b_{it}]$ within Equation 10 signifies the contrast between long-term value and book value, namely the natural logarithm of the true value-to-book ratio, encompassing growth prospects.

Hence, this study uses the firm-specific valuation error, $[m_{it}-v(\theta_{it};\alpha_{jt})]$ as an indicator for measuring stock mispricing timing (SMT) in Equation 10 consistent with methodologies employed in prior studies such as Beccalli, Doninelli, and Orsini (2022) and Razmian, Fallah Shams, Khodaei Valahzaghard, and Hasani (2020). $[m_{it}-v(\theta_{it};\alpha_{jt})]$ computed using firm-specific accounting data denoted as θit and concurrent sector accounting multiples represented as α_{jt} with the objective of assessing the degree to which the firm is undervalued compared to its concurrent industry peers.

$$Stock\ mispricing\ timing(SMT) = m_{it} - v(\theta_{it}; \alpha_{jt}) \quad (11)$$

We need to estimate the valuation models $v(\theta_{it};\alpha_{jt})$. Representing market value as a basic linear model of these variables results in the following equation:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(NI)^+_{it} + \alpha_{3jt} I(<0) NI_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it} \quad (12)$$

Where NI represents the net income, LEV represents the market leverage ratio. After each quarter, the total market value (m_{it}) and total assets (b_{it}) of company i are recorded along with the natural logarithm of the absolute value of its net profit $\ln(NI)^+_{it}$. An indicator function ($I(<0)\ \ln(NI)^+_{it}$) distinguishes instances where the net profit is negative NI<0 indicating financial loss. Additionally, the leverage ratio LEV_{it} for company i at quarter-end is considered. Regression analysis is then conducted using Equation 12 with data from all companies at the quarter's end to derive the regression coefficient α_{jt}. Subsequently, the fitted value of m_{it} is computed as $v(\theta_{it};\alpha_{jt})$.

The magnitude of the stock mispricing timing (SMT) reflects the extent of mispricing. A positive SMT (SMT_P) indicates that the firm's stock price is overvalued whereas a negative SMT (SMT_N) suggests that the stock price is undervalued. SMT_P is defined as the value of SMT when SMT is greater than 0 and it is set to 0 when SMT is less than or equal to 0. On the other hand, SMT_N is defined as the absolute value of SMT when SMT is less than 0 and it is set to 0 when SMT is greater than or equal to 0.

3.3.3. Payment Method

This study classifies payment methods into cash payment and stock payment categories following Song and Zhou (2020) categorization method. When the cash payment component of a mixed payment exceeds 80%, it is classified as cash payment with the remaining portion classified as a stock payment. Stock payment refers to the acquiring party using stocks as a payment tool to acquire the target company's shares. Conversely, cash

payment involves the acquiring party using a certain amount of cash to purchase the assets or equity of the target company (Chen, Zhao, & Niu, 2020).

The payment method is treated as a dummy variable wherein a value of 1 is assigned if the acquiring company uses cash payment or a mixed payment including cash and a value of 0 if the stock payment method is used (Shi, Cai, & Liu, 2021).

3.3.4. Control Variable

We conducted a literature review to explore the factors influencing M&A performance among acquiring firms in previous studies. The review revealed that the influential factors affecting M&A performance can be classified into three main categories: firm, deal and environmental characteristics. Hence, this study integrates 15 control variables into the regression model encompassing aspects of these three categories. Control variables related to firm characteristics encompass firm size, financial leverage, profitability, sales growth, cash flow, firm age, equity nature, proportion of the largest shareholder, CEO duality, proportion of independent directors, and executive overconfidence. Transaction-related control variables include relative deal size, transaction type and related-party transaction. Environmental characteristics are represented by the control variable of stock volatility (He et al., 2022). The precise calculation methods for these parameters are outlined in Table 1.

Table 1. Definition of variables.

Variables name	Symbol	Measurement
Dependent variable		
Short-term market performance	CAR(-2,2) CAR(-5,5)	The cumulative abnormal return of the acquirer within the [-2,2] and [-5,5] window periods surrounding the M&A announcement.
Long-term market performance	BHAR12 BHAR24 BHAR36	The acquirer's buy-and-hold abnormal return over the 12, 24 and 36 month periods subsequent to the acquisition.
Financial performance	ΔROA1 ΔROA2 ΔROA3	Changes in return on total assets for the acquirer between the first, second and third year after the M&A announcement date and the preceding year.
Independent variable		
Stock mispricing timing	SMT	The firm-specific valuation discrepancy is used to evaluate stock mispricing after breaking down the market-to-book ratio (M/B) into three components.
Positive stock misevaluation	SMT_P	If SMT is greater than 0, SMT_P is the value of SMT.
Negative stock misevaluation	SMT_N	If SMT is less than or equal to 0, SMT_P is set to 0.
Mediator variables		
Payment method	Pay	A dummy variable that is equal to one if the payment method involves cash or a mixed payment including cash and equals zero if the payment is solely in stock.
Control variables		
Firm size	Size	The natural logarithm of the book value of total assets at the close of the fiscal year preceding the acquisition announcement date.
Financial leverage	Leverage	The ratio of total debt to the book value of assets at the close of the fiscal year preceding the acquisition announcement date.
Profitability	ROE	The ratio of net income to total equity at the close of the fiscal year preceding the acquisition announcement date.
Sales growth	Growth	The change in main operating revenue from the current year to the previous year is divided by the previous year's main operating revenue.
Cash flow	Cash	The ratio of net cash flow from operating activities to total debt at the close of the fiscal year preceding the acquisition announcement date.
Firm age	Age	The calculation involves taking the natural logarithm of the difference between the current year and the establishment year, and then adding one."
Equity nature	Nature	A dummy variable that equals one if the firm is non-state-owned at the M&A announcement date and zero otherwise.

Variables name	Symbol	Measurement
Proportion of the largest shareholder	Holding1	The ratio of the total number of shares held by the largest shareholder to the total number of shares outstanding.
CEO duality	Duality	A dummy variable that is equal to one if the CEO and the chairman are the same individual and zero otherwise.
Proportion of independent directors	Director	The ratio of independent directors to the total number of supervisory board members.
Executive overconfidence	Overconfidence	The sum of the compensation of the top three highest-paid executives is divided by the total compensation of all executives.
Relative deal size	Deal Size	The ratio of transaction value to the total assets of the acquirer at the close of the fiscal year preceding the acquisition announcement date.
Transaction type	Type	A dummy variable that equal to one, if the transaction type is equity transfer and zero if it is an asset acquisition.
Related-party transaction	Related	A dummy variable equal to one if the M&A transaction is a related-party transaction zero otherwise.
Stock volatility	Volatility	The annualized volatility of daily stock returns is calculated over quarters t−4 before the announcement of an M&A to quarters t−3. The change in volatility is determined by the difference between the volatility measured over quarters t−2 through t−1 and the volatility measured over quarters t−4 through t−3.
Industry	Industry	Set 47 dummy variables based on the two-digit China industry classification system (CICS) codes.
Year	Year	15 years from 2007 to 2021 encompassing a total of 60 quarters set to 60 dummy variables.

3.4. Variable Descriptive Statistics

Table 2 presents the descriptive statistics of the main variables. We use a T-test to examine whether there is a significant change in the mean of the M&A performance. According to Table 2, it is evident that the average of CAR (-2, 2) and CAR (-5, 5) are 0.0088 and 0.0087 respectively suggesting that the average stock prices of listed companies witnessed a rise of 0.88% and 0.87% during the announcement period reflecting a positive market response to the merger events. In the long term, the sample firms have a significantly positive trend in their market performance after mergers and acquisitions. The sample firms generally exhibit a declining trend in financial performance (ΔROA) in different time periods after the merger compared to before the merger with the observed financial performance values typically significantly less than zero; The average value of SMT is 0.0077 indicating proximity to zero. Descriptive statistics reveal that the values of SMT_P are consistently higher than those of SMT_N. This shows that the sample companies' average level of overvaluation tends to be higher than the average level of undervaluation across the firms.

Table 2. Descriptive statistics of the main variables.

Variables	Obs.	Mean	STD	Min.	Max.	Percentiles		One-sample test	
						25%	75%	t-statistic	z--statistic
CAR(-2,2)	8010	0.009	0.076	-0.250	0.309	-0.029	0.037	10.430***	5.555***
CAR(-5,5)	8010	0.009	0.107	-0.443	0.538	-0.045	0.050	7.314***	3.439**
BHAR12	7454	0.095	0.988	-1.459	50.588	-0.223	0.235	8.292***	0.881
BHAR24	7005	0.149	0.938	-2.338	23.817	-0.325	0.350	13.323***	1.117
BHAR36	6554	0.187	1.159	-2.543	28.614	-0.411	0.404	13.069***	-1.226
ΔROA1	7316	-0.013	0.064	-0.299	0.289	-0.033	0.012	-16.624***	-20.757***
ΔROA2	6677	-0.012	0.071	-0.310	0.275	-0.043	0.011	-22.533***	-25.694***
ΔROA3	5972	-0.025	0.075	-0.324	0.253	-0.050	0.010	-25.673***	-27.654***
SMT	8010	0.008	0.484	-1.002	1.408	-0.336	0.298	-	-
SMT_P	8010	0.196	0.315	0.000	1.408	0.000	0.298	-	-
SMT_N	8010	0.188	0.247	0.000	1.002	0.000	0.336	-	-
Pay	8010	0.928	0.258	0.000	1.000	1.000	1.000	-	-

Note: The last two columns report the t statistic for the one- sample T-test of dependent variables which examines the difference between means and the z-statistic for the one -sample Wilcoxon signed rank test which examines the difference between medians. The T-test reports the t-value and the Wilcoxon signed rank test reports the z-value. Significance levels are denoted by an asterisk, ***for 1%, **for 5%, and *for 10%.

3.5. Correlations Analysis

The precision and scientific validity of the empirical outcomes in this study were confirmed by a correlation test of variables conducted before the regression analysis. We employed the Spearman's rho correlation (the upper-right diagonal) and Pearson correlation (the lower-left diagonal) coefficients to analyze the correlations between variables. Table 3 illustrates the outcomes of the correlation examination for the primary variables. The correlation coefficients of the independent variables, control and mediator variables with M&A performance are all statistically significant at the 1% level as depicted in Table 3. The likelihood of multicollinearity among the selected variables in this study is low thus enabling the progression of the subsequent stages of the research.

Table 3. Correlation among main variables.

Variables	1.CAR (-2,2)	2.CAR (-5,5)	3.BHAR12	4.BHAR24	5.BHAR36	6.ΔROA1	7.ΔROA2	8.ΔROA3	9.SMT	10.SMT_P	11.SMT_N	12.Pay
1.CAR (-2,2)	1	0.699***	0.157***	0.122***	0.107***	0.014	0.005	-0.002	0.060***	0.059***	-0.052***	-0.172***
2.CAR (-5,5)	0.774***	1	0.211***	0.168***	0.142***	0.012	0.012	0.008	0.054***	0.054***	-0.041***	-0.158***
3.BHAR12	0.173***	0.213***	1	0.703***	0.542***	0.277***	0.218***	0.139***	-0.089***	-0.073***	0.094***	-0.112***
4.BHAR24	0.125***	0.165***	0.686***	1	0.764***	0.264***	0.315***	0.225***	-0.159***	-0.140***	0.154***	-0.094***
5.BHAR36	0.102***	0.131***	0.509***	0.744***	1	0.196***	0.291***	0.303***	-0.164***	-0.140***	0.159***	-0.069***
6.ΔROA1	0.032**	0.032**	0.270***	0.247***	0.185***	1	0.678***	0.561***	0	-0.001	-0.002	-0.141***
7.ΔROA2	0.026*	0.032**	0.209***	0.296***	0.266***	0.628***	1	0.687***	-0.034**	-0.034**	0.024*	-0.093***
8.ΔROA3	0.003	0.014	0.126***	0.207***	0.277***	0.523***	0.631***	1	-0.071***	-0.068***	0.058***	-0.066***
9.SMT	0.079***	0.085***	-0.070***	-0.153***	-0.168***	-0.006	-0.047***	-0.085***	1	0.926***	-0.944***	-0.027
10.SMT_P	0.081***	0.092***	-0.043***	-0.118***	-0.128***	-0.007	-0.052***	-0.089***	0.893***	1	-0.856***	-0.018
11.SMT_N	-0.054***	-0.052***	0.081***	0.152***	0.168***	0.004	0.027**	0.056***	-0.843***	-0.512***	1	0.017
12.Pay	-0.255***	-0.230***	-0.130***	-0.098***	-0.076***	-0.136***	-0.087***	-0.064***	-0.027	-0.025	0.023	1

Note: ***Correlation is significant at the 0.01 level (2-tailed). **Correlation is significant at the 0.05 level (2-tailed). *Correlation is significant at the 0.1 level (2-tailed).

3.6. Research Model Development

3.6.1. Research Model of Stock Mispricing Timing and M&A Performance

This study develops the following model to evaluate hypothesis 1a and examine the effect of timing stock mispricing on short-term market performance:

$$CAR_{i,t} = \beta_0 + \beta_1 SMT_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (13)$$

$$CAR_{i,t} = \beta_0 + \beta_1 SMT\_P_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (14)$$

$$CAR_{i,t} = \beta_0 + \beta_1 SMT\_N_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (15)$$

In this analysis, $CAR_{i,t}$ signifies the market response to the initial M&A activity of firm i during quarter t. The event window selection is based on considering the announcement date of the M&A as the event day with window periods of (-2, +2) and (-5, +5) being chosen respectively. $SMT_{i,t}$ represents the extent of stock price mispricing observed in firm i during its first M&A endeavour in quarter t. $SMT\_P_{i,t}$ denotes positive mispricing suggesting a potential overvaluation of the firm's stock price whereas $SMT\_N_{i,t}$ indicates negative mispricing, implying potential undervaluation of the stock price. $Control\ variables_{i,t}$ encompasses the pertinent control variables. β_0 stands for the intercept and signifies the baseline value while β represents the coefficient of the independent variable offering insight into the impact on the dependent variable. λ_k and λ_t denote industry and quarterly fixed effects, respectively. Finally, ε represents the error term accounting for unexplained variability in the model.

This study develops the following model to evaluate hypothesis 1b and investigate the effect of timing stock mispricing on long-term market performance:

$$BHAR_{i,t} = \beta_0 + \beta_1 SMT_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (16)$$

$$BHAR_{i,t} = \beta_0 + \beta_1 SMT\_P_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (17)$$

$$BHAR_{i,t} = \beta_0 + \beta_1 SMT\_N_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (18)$$

In this study, $BHAR_{i,t}$ denotes the long-term stock market response to the initial M&A activity of firm i in quarter t. The M&A announcement date is designated as the event day with event windows selected as 12 months, 24 months and 36 months following the event day.

This study proposes the following model to evaluate hypothesis 1a and examine the effect of stock mispricing timing on financial performance:

$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT_{i,t} + \sum_m \beta_m \, ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (19)$$

$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT\_P_{i,t} + \sum_m \beta_m \, ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (20)$$

$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT\_N_{i,t} + \sum_m \beta_m \, ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (21)$$

In this context, $\Delta ROA_{t+n,t-1}$ represents the change in ROA for the sample firms between the t+n year after the M&A announcement date and the preceding year. The study assesses the variations in financial performance by calculating the changes in ROA for 1 year, 2 years and 3 years following the M&A denoted as $\Delta ROA_{t+1,t-1}$, $\Delta ROA_{t+2,t-1}$, and $\Delta ROA_{t+3,t-1}$, respectively. In the model specified from (19) to (21), a new set of control variables denoted as "control variables $2_{i,t}$," is used to prevent endogeneity between the dependent variables, ROA and profitability (ROE). Notably, profitability (ROE) is excluded from the control variables.

3.6.2. Research Model of Stock Mispricing Timing and Payment Method

This research proposes the following model to test hypothesis 2 and examine the effect of stock mispricing time on payment methods:

$$Pay_{i,t} = \beta_0 + \beta_1 SMT_{i,t} + \sum_m \beta_m \, ControlVariables3_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (22)$$

$$Pay_{i,t} = \beta_0 + \beta_1 SMT\_P_{i,t} + \sum_m \beta_m \, ControlVariables3_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (23)$$

$$Pay_{i,t} = \beta_0 + \beta_1 SMT\_N_{i,t} + \sum_m \beta_m \, ControlVariables3_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (24)$$

The control variables in this model differ from the previous model's "control variables i,t" as the dependent variable is the payment method. This study includes seven parameters that affect the payment method as control variables in the regression model, based on the research of Sun and Wei (2021) and Zeng et al. (2020). These factors are financial leverage, profitability, sales growth, executive overconfidence, equity nature, transaction type and related-party transaction. They are designated as " control variables $3_{i,t}$" in the model.

3.6.3. Research Model of Payment Methods and M&A Performance

This study proposes the following model to evaluate hypothesis 3 and investigate how payment methods affect M&A performance:

$$CAR_{i,t} = \beta_0 + \beta_1 Pay_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (25)$$

$$BHAR_{i,t} = \beta_0 + \beta_1 Pay_{i,t} + \sum_m \beta_m \, ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (26)$$

$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 Pay_{i,t} + \sum_m \beta_m \, ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (27)$$

3.6.4. Research Model of Stock Mispricing Timing, Payment Method and M&A Performance

This research establishes the subsequent model to assess hypotheses 4 and examine the research goal of testing the correlation between stock mispricing timing, payment method and M&A performance:

$$CAR_{i,t} = \beta_0 + \beta_1 SMT_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (28)$$
$$CAR_{i,t} = \beta_0 + \beta_1 SMT\_P_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (29)$$
$$CAR_{i,t} = \beta_0 + \beta_1 SMT\_N_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (30)$$
$$BHAR_{i,t} = \beta_0 + \beta_1 SMT_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (31)$$
$$BHAR_{i,t} = \beta_0 + \beta_1 SMT\_P_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (32)$$
$$BHAR_{i,t} = \beta_0 + \beta_1 SMT\_N_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (33)$$
$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (34)$$
$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT\_P_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (35)$$
$$\Delta ROA_{t+n,t-1} = \beta_0 + \beta_1 SMT\_N_{i,t} + \beta_2 Pay_{i,t} + \sum_m \beta_m ControlVariables2_{i,t} + \lambda_k + \lambda_t + \varepsilon \quad (36)$$

4. Empirical Results and Analysis

4.1. Multiple Regression Result of Stock Mispricing Timing and M&A Performance

4.1.1. Multiple Regression Result of Stock Mispricing Timing and Short-term Market Performance

This study investigates the impact of stock mispricing timing on short-term market performance. The regression results for Equations 13 to 15 are presented in Table 4. Columns (1) and (4) show that the coefficient of SMT is significantly positive indicating that stock mispricing timing has a significant impact on short-term market performance. Columns (2) and (5) reveal that the estimate for SMT_P is significantly positive indicating that the greater the overvaluation of acquiring firms' stocks before the merger, the stronger the short-term market performance. Columns (3) and (6) indicate that the coefficient of SMT_N is significantly negative suggesting that the greater the undervaluation of acquiring firms' stocks before the merger, the worse the short-term market performance, confirming hypothesis 1a.

Table 4. Result of stock mispricing timing and short-term market performance.

Variables	(1) CAR(-2,2)	(2) CAR(-2,2)	(3) CAR(-2,2)	(4) CAR(-5,5)	(5) CAR(-5,5)	(6) CAR(-5,5)
SMT	0.007*** (3.054)			0.015*** (4.714)		
SMT_P		0.011*** (3.112)			0.024*** (4.600)	
SMT_N			-0.007* (-1.922)			-0.016*** (-3.166)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.009 (0.212)	0.007 (0.159)	0.005 (0.112)	0.066 (1.399)	0.061 (1.290)	0.057 (1.206)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	8010	8010	8010	8010	8010	8010
R^2	0.091	0.092	0.090	0.092	0.092	0.090
Adj. R^2	0.077	0.078	0.077	0.078	0.078	0.076

Note: The values in the brackets represent the results of t statistics. ***, * denote significance at the 1% and 10% levels, respectively.

4.1.2. Multiple Regression Result of Stock Mispricing Timing and Long-term Market Performance

Table 5 shows the regression results of stock mispricing timing on long-term market performance. In columns (1), (4) and (7), the estimate for SMT is significantly negative suggesting that stock mispricing timing has a significant impact on long -term market performance. Furthermore, columns (2), (5) and (8) demonstrate a significantly negative estimate for SMT_P highlighting that higher overvaluation of acquiring firms' stocks before the merger leads to poorer long-term market performance. Conversely, columns (3), (6), and (9) show a significantly positive estimate for SMT_N suggesting that a greater undervaluation of acquiring firms' stocks before the merger strengthens the long-term market performance of the acquirer, thereby confirming hypothesis 1b.

4.1.3. Multiple Regression Results of Stock Mispricing Timing and Financial Performance

The regression results of the impact of stock mispricing timing on financial performance are shown in Table 6. Columns (1), (4) and (7) exhibit a significantly negative estimate for SMT signifying a substantial impact of stock mispricing timing on financial performance. Moreover, columns (2), (5) and (8) reveal a significantly negative estimate for SMT_P, indicating that a higher overvaluation of acquiring firms' stocks before the merger correlates with worse financial performance for the acquirer. In contrast, columns (3), (6), and (9) demonstrate a significantly positive estimate for SMT_N suggesting that a greater undervaluation of acquiring firms' stocks before the merger enhances the financial performance of the acquirer, thus confirming hypothesis 1c.

The above findings support the argument that when acquirers announce acquisitions when their stock prices are overvalued, there is a significant increase in short-term market performance but this might lead to a substantial decline in long-term market and financial performance. On the other hand, for acquirers that announce acquisitions when their stock prices are undervalued, although short-term market performance might not be favorable, it could be conducive to long-term performance improvement. The result of this study is consistent with He et al. (2022) and Shang (2023).

The results provide new evidence for explaining the significant phenomenon of "post-merger performance collapse" in the Chinese capital market in recent years (Lan & Gao, 2023; Liu & Wei, 2022) focusing on the perspective of catering to the market. When stock prices are overvalued, Chinese companies to cater to investors' enthusiasm in the market tend to engage in mergers and acquisitions blindly (Liu, 2022; Wang, Zhang, & Dou, 2023). Although this behavior may lead to a short-term increase in the company's stock price, it may not have synergistic effects on the enterprise. This may result in the collapse of post-merger performance for the company.

Table 5. Result of stock mispricing timing and long-term market performance.

Variables	(1) BHAR12	(2) BHAR12	(3) BHAR12	(4) BHAR24	(5) BHAR24	(6) BHAR24	(7) BHAR36	(8) BHAR36	(9) BHAR36
SMT	-0.041***			-0.119***			-0.175***		
	(-3.642)			(-6.970)			(-8.041)		
SMT_P		-0.045**			-0.148***			-0.200***	
		(-2.505)			(-5.496)			(-6.102)	
SMT_N			0.080***			0.204***			0.319***
			(3.936)			(6.568)			(7.663)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.535***	0.568***	0.532***	1.086***	1.169***	1.0971***	1.658***	1.750***	1.646***
	(3.859)	(4.112)	(3.817)	(5.299)	(5.766)	(5.306)	(4.024)	(4.194)	(4.052)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7454	7454	7454	7005	7005	7005	6554	6554	6554
R^2	0.153	0.152	0.153	0.188	0.186	0.187	0.197	0.194	0.197
Adj. R^2	0.139	0.138	0.139	0.174	0.172	0.173	0.182	0.179	0.182

Note: The values in the brackets are the results of t-statistical. *** and ** represent 1% and 5% significant levels respectively.

Table 6. Result of stock mispricing timing and financial performance.

Variables	(1) ΔROA1	(2) ΔROA1	(3) ΔROA1	(4) ΔROA2	(5) ΔROA2	(6) ΔROA2	(7) ΔROA3	(8) ΔROA3	(9) ΔROA3
SMT	-0.003**			-0.008***			-0.011***		
	(-2.191)			(-4.585)			(-5.625)		
SMT_P		-0.003			-0.011***			-0.016***	
		(-1.417)			(-4.181)			(-5.282)	
SMT_N			0.006**			0.010***			0.014***
			(2.514)			(3.613)			(4.122)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	-0.004	-0.002	-0.005	0.008	0.012	0.011	0.056**	0.054***	0.054***
	(-0.244)	(-0.102)	(-0.278)	(0.400)	(0.619)	(0.576)	(2.485)	(2.675)	(2.671)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7316	7316	7316	6677	6677	6677	5972	5972	5972
R^2	0.096	0.095	0.096	0.075	0.075	0.073	0.089	0.089	0.086
Adj. R^2	0.081	0.081	0.081	0.059	0.059	0.058	0.072	0.072	0.069

Note: The values in the brackets are the results of t statistical. *** and ** represents 1% and 5% significant level, respectively.

4.2. Multiple Regression Results of Stock Mispricing Timing and Payment Method

This study investigates the impact of stock mispricing timing on payment methods. The regression results for Equations 22 to 24 are presented in Table 7. Columns (1) show that the estimate for SMT is significantly negative suggesting that the stock mispricing timing has a significant effect on the payment method. Columns (2) reveal that the estimate for SMT_P is significantly negative indicating that the larger the overvaluation of the acquirer's stock price before the merger, the more inclined they are to opt for stock payment. Columns (3) indicate that the greater the extent of undervaluation of the acquirer's stock price before the merger, the more likely they are to choose cash payments. This finding aligns with the conclusions of Sun and Wei (2021).

This is consistent with the findings of previous studies by Sun and Wei (2021). According to the market timing theory, the finding can be explained by the fact that when the acquiring company's stock is overvalued by the market indicating that the stock price exceeds the company's intrinsic value, the acquiring company's choice of stock payment can reduce the dilution of the acquiring company's equity and enable the acquiring company to timely transfer the investment risk arising from stock price fluctuations (He et al., 2022). Conversely, if the acquiring company uses cash payment when its stock is overvalued, the capital gains resulting from mispricing may not be realized in the short term. Once the market environment changes or investors adjust their expectations of stock prices choosing cash payments may incur higher opportunity costs (Zeng et al., 2020).

Table 7. Result of stock mispricing timing and payment method.

Variables	(1) Pay	(2) Pay	(3) Pay
SMT	-0.312*** (-2.752)		
SMT_P		-0.457*** (-2.693)	
SMT_N			0.448** (2.027)
Control variables	Yes	Yes	Yes
_Cons	4.259*** (7.611)	4.353*** (7.783)	4.186*** (7.438)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	8010	8010	8010
Pseudo R^2	0.145	0.145	0.144
_Cons	4.259***	4.353***	4.186***

Note: The values in the brackets are the results of t statistical. *** and ** represent 1% and 5% significant levels respectively.

4.3. Multiple Regression Result of Payment Method and M&A Performance

This study investigates the impact of payment methods on M&A performance. The regression results for Equations 25 to 27 are presented in Table 8. The estimate for pay is significantly negative suggesting that companies using cash payment have poorer performance in mergers and acquisitions while companies using stock payment exhibit better performance in mergers and acquisitions. This finding aligns with the conclusions of Sun and Wei (2019) and Chen et al. (2020). Similarly, according to Chen et al. (2020), when considering China's unique institutional structure, stock payment performs significantly higher than cash payments.

The finding lends empirical support to the "Administrative Measures for Major Asset Restructuring of Listed Companies" issued by the China Securities Regulatory Commission (CSRC) on February 17, 2023 (China Securities Regulatory Commission, 2023). The Chinese government has intensified supervision over cash payments to deter listed companies and their subsidiaries from executing acquisitions that are overvalued, overextended, and reliant on goodwill, resulting in subpar post-acquisition performance with regard to payment method selection in mergers and acquisitions. Article 31 of the "Administrative Measures for Major Asset Restructuring of Listed Companies" explicitly outlines that for cash-based restructuring, exchanges may undertake self-regulation through inquiries, on-site inspections, on-site supervision and mandating intermediary institutions to furnish verification and disclose professional opinions. For instance, in 2022, the number of cash-based restructurings disclosed by listed companies on the Shanghai Stock Exchange notably decreased to 26 cases indicating a reduction in cash-based restructurings. According to a regulatory inquiry perspective , in 2022, a total of 5 mergers and restructurings on the Shanghai Stock Exchange were terminated constituting approximately 20% of cases (China Securities Regulatory Commission, 2023). These measures aim to alleviate the adverse impact of cash payment methods on company mergers and acquisitions.

Thus, the outcomes of this study align with the actual circumstances of Chinese listed companies and the endorsement of the "Administrative Measures for Major Asset Restructuring of Listed Companies" in China.

4.4. Multiple Regression Results of Stock Mispricing Timing, Payment Method and M&A Performance

Tables 9, 10 and 11 present the examination results of the combined impact of stock mispricing timing and payment method on M&A performance. It can be observed that there is a negative correlation between pay and CAR and it is significant at the 1% level. "SMT, SMT_P, and SMT_N each significantly influence CAR, BHAR, and ΔROA, although their coefficient values are relatively lower compared to direct effects." Therefore, payment method plays a partial mediating role in the correlation between stock mispricing timing and M&A performance.

The findings suggest that when acquirers announce an acquisition during a period of stock price overvaluation employing a stock payment method leads to a notable improvement in the company's short-term market performance. However, relying on stock-based acquisitions to capitalize on overvalued stock timing proves to be detrimental to acquirer shareholders' long-term interests.

Table 8. Result of payment method and M&A performance.

Variables	(1) CAR(-2,2)	(2) CAR(-5,5)	(3) BHAR12	(4) BHAR24	(5) BHAR36	(6) ΔROA1	(7) ΔROA2	(8) ΔROA3
Pay	-0.042***	-0.052***	-0.090***	-0.077**	-0.095**	-0.015***	-0.010***	-0.012***
	(-7.966)	(-6.885)	(-4.505)	(-2.546)	(-2.369)	(-6.720)	(-3.393)	(-3.515)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.054	0.110**	0.717***	1.374***	1.959***	0.020	0.033*	0.078***
	(1.351)	(2.568)	(5.106)	(6.599)	(4.671)	(1.186)	(1.661)	(3.837)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8010	8010	7454	7005	6554	7316	6677	5972
R^2	0.106	0.100	0.154	0.183	0.190	0.101	0.073	0.085
Adj. R^2	0.092	0.086	0.140	0.168	0.175	0.086	0.058	0.069

Note: The values in the brackets are the results of t statistical. ***, **, * represent 1%, 5%, 10% significant levels, respectively

Table 9. Result of stock mispricing timing, payment method and short-term market performance.

Variables	(1) CAR(-2,2)	(2) CAR(-2,2)	(3) CAR(-2,2)	(4) CAR(-5,5)	(5) CAR(-5,5)	(6) CAR(-5,5)
SMT	0.007***			0.0147***		
	(3.110)			(4.781)		
SMT_P		0.011***			0.0243***	
		(3.119)			(4.634)	
SMT_N			-0.007**			-0.017***
			(-2.032)			(-3.264)
Pay	-0.042***	-0.042***	-0.042***	-0.052***	-0.052***	-0.052***
	(-7.978)	(-7.972)	(-7.975)	(-6.917)	(-6.908)	(-6.906)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.065	0.062	0.061	0.134***	0.128***	0.125***
	(1.600)	(1.540)	(1.503)	(3.068)	(2.945)	(2.875)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	8010	8010	8010	8010	8010	8010
R^2	0.107	0.107	0.106	0.103	0.103	0.101
Adj. R^2	0.093	0.093	0.092	0.089	0.089	0.087

Note: The values in the brackets are the results of t statistical. *** and ** represents 1% and 5% significant level, respectively.

Table 10. Result of stock mispricing timing, payment method and long-term market performance.

Variables	(1) BHAR12	(2) BHAR12	(3) BHAR12	(4) BHAR24	(5) BHAR24	(6) BHAR24	(7) BHAR36	(8) BHAR36	(9) BHAR36
SMT	-0.041***			-0.119***			-0.174***		
	(-3.648)			(-6.958)			(-8.031)		
SMT_P		-0.046**			-0.148***			-0.120***	
		(-2.533)			(-5.499)			(-6.101)	
SMT_N			0.080***			0.204***			0.318***
			(3.911)			(6.542)			(7.644)
Pay	-0.090***	-0.090***	-0.089***	-0.076**	-0.077**	-0.076**	-0.093**	-0.0949**	-0.093**
	(-4.504)	(-4.518)	(-4.481)	(-2.515)	(-2.544)	(-2.497)	(-2.336)	(-2.367)	(-2.314)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.651***	0.683***	0.648***	1.184***	1.268***	1.195***	1.781***	1.8749***	1.768***
	(4.608)	(4.869)	(4.557)	(5.610)	(6.081)	(5.611)	(4.279)	(4.449)	(4.308)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7454	7454	7454	7005	7005	7005	6554	6554	6554
R^2	0.155	0.155	0.156	0.189	0.187	0.188	0.198	0.194	0.198
Adj. R^2	0.141	0.141	0.142	0.175	0.172	0.174	0.183	0.179	0.183

Note: The values in the brackets are the results of t statistical. *** and ** represent 1% and 5% significant levels, respectively

Table 11. Result of stock mispricing timing, payment method and financial performance.

Variables	(1) ΔROA1	(2) ΔROA1	(3) ΔROA1	(4) ΔROA2	(5) ΔROA2	(6) ΔROA2	(7) ΔROA3	(8) ΔROA3	(9) ΔROA3
SMT	-0.003**			-0.008***			-0.011***		
	(-2.135)			(-4.543)			(-5.618)		
SMT_P		-0.003			-0.011***			-0.016***	
		(-1.400)			(-4.153)			(-5.270)	
SMT_N			0.006**			0.010***			0.014***
			(2.424)			(3.567)			(4.122)
Pay	-0.015***	-0.015***	-0.015***	-0.010***	-0.010***	-0.010***	-0.012***	-0.012***	-0.012***
	(-6.696)	(-6.716)	(-6.681)	(-3.342)	(-3.364)	(-3.350)	(-3.477)	(-3.471)	(-3.503)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
_Cons	0.016	0.018	0.015	0.020	0.024	0.024	0.066***	0.070***	0.070***
	(0.912)	(1.053)	(0.885)	(0.982)	(1.200)	(1.155)	(3.196)	(3.380)	(3.386)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7316	7316	7316	6677	6677	6677	5972	5972	5972
R^2	0.101	0.101	0.101	0.077	0.076	0.075	0.091	0.096	0.088
Adj. R^2	0.087	0.087	0.087	0.061	0.061	0.059	0.074	0.074	0.071

Note: The values in the brackets are the results of t statistical. *** and ** represents 1% and 5% significant level, respectively.

4.5. Robustness Test

We conducted a sample reduction analysis from 2007 to 2019 to assess the robustness of our findings. The decision to exclude the years 2020 and 2021 from the sample was motivated by the significant disruptions caused by the COVID-19 pandemic in global financial markets and business operations. The objective is to examine whether the observed effect of market timing on M&A performance remains consistent after excluding years characterized by special events such as the pandemic. Regression equations 13 to 36 are reanalyzed and the results support the validity of the findings reached in this study by eliminating data from 2020 to 2021. This study integrates company-level fixed effects into formulas (13) to (36) while taking into account the distinctive attributes of each company. This addition serves to address unobserved heterogeneity across companies, thereby reducing its potential impact on regression outcomes and bolstering the reliability of the study's findings. The regression outcomes underscore the resilience of the conclusions drawn in this study.

The observed impact of stock mispricing timing on M&A performance is more inclined to be explained by the research variables than by unobserved, company-specific factors due to our robustness test.

5. Conclusion and Recommendations

5.1. Findings

This study investigates the effect of stock mispricing timing on mergers and acquisitions (M&A) in China from 2007 to 2021 examining the short-term announcement period and long-term market performance as well as financial performance. Additionally, the mediating effect of payment method is explored. The research findings suggest that acquirers announcing acquisitions when their stock prices are overvalued experience a significant increase in short-term market performance but this may lead to a notable decline in long-term market and financial performance. Payment method partially mediates this relationship, particularly when a stock payment method is used. Conversely, for acquirers announcing acquisitions when their stock prices are undervalued, although short-term market performance might not be favourable, it could facilitate long-term performance improvement. Payment method also plays a partial mediating role in this scenario with a more pronounced effect observed when a cash payment method is employed. Therefore, announcing acquisitions during times of overvaluation tends to enhance short-term performance more than during times of undervaluation with the choice of a stock payment method potentially augmenting the impact on M&A performance.

5.2. Implications

This study extends existing research by examining the mediating role of payment method in M&A enhancing our understanding of the impact pathway of market timing on M&A performance. This novel perspective supplements the limited research on payment method mediation contributing to a more comprehensive theoretical framework. This study offers a holistic approach to understanding the mechanisms influencing M&A outcomes by integrating various stages of the M&A process including market timing selection, payment method determination and M&A performance evaluation.

The findings of this research can also inform acquiring companies about optimizing their M&A strategies. The theoretical framework and empirical evidence linking market timing, payment method and M&A performance provide tailored guidance for decision-making, enabling companies to seize market opportunities, mitigate risks and create long-term value through their M&A endeavours.

5.3. Recommendations

"Based on these findings, we recommend that Chinese government regulators improve capital market pricing efficiency and foster the healthy growth of both the capital market and the mergers and acquisitions sector. This will help prevent market catering and blind mergers and acquisitions."

We recommend conducting comprehensive evaluations of potential risks and benefits associated with merger decisions by considering market conditions, payment methods, and short- and long-term performance impacts for M&A firms. It's essential to remain vigilant of market conditions and valuation trends, particularly when facing the scenario of overvalued stock, to make informed decisions aligned with performance objectives.

5.4. Limitations and Future Research Suggestions

It is crucial to understand some limitations that provide prospects for future research to enhance and broaden knowledge in this area regardless of whether this study has provided insightful information about the relationship between market timing, payment method, and M&A performance within emerging economies: Firstly, the study concentrated on Chinese-listed companies within a specific timeframe. Future investigations could extend their scope to include companies from other emerging economies to ascertain the applicability of the findings across diverse contexts. Secondly, the utilization of cross-sectional data in this study constrains the ability to definitively establish causal relationships. Subsequent research could adopt longitudinal or experimental methodologies to obtain a more comprehensive comprehension of the causal links between market timing, payment method, and M&A performance. Lastly, while the study has identified the mediating

role of payment methods, the underlying mechanisms driving this mediation are intricate and multifaceted. Future inquiries could delve deeper into understanding the psychological, behavioral and economic mechanisms that underlie the observed relationships.

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