Method of Payment and Shareholders Stock Returns: Evidence from Mergers

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ABSTRACT

Manuscript type: Research paper

Research aims: Extant literature has largely focused on how the all-cash and all-stock acquisition payment methods impact shareholders' returns. It also suggests that the mixed payment method (i.e. various cash-to-stock ratios) is a unique (rather than a hybrid) payment category. Nonetheless, the justification for its uniqueness and the impact of announcing the different ratios remain unclear. This paper aims to fill the gap by examining the effect of the mixed payment method (together with the various constituent cash-to-stock ratios) on acquirer firm shareholders' returns.

Design/Methodology/Approach: This study uses a market model event study on a sample of 305 mergers in the U.S. from 2004 until 2018.

Research findings: The key findings are: (1) shareholders reacted negatively to the mixed method of payment announcement by the acquirer firm, and (2) higher cash-to-stock ratios in this method presented higher abnormal stock price returns.

Theoretical contribution/Originality: This paper presents a more focused study on how the mixed payment method category (and the different cash-to-stock ratios) impact shareholder returns. Moreover, the twenty-percentage-point change criterion used provides granularity in studying the impact.

Practitioner/Policy implications: It provides a basis for guiding managers in considering the appropriate cash-to-stock ratio for mixed payment acquisition offers. This would also guide policymakers in state-owned firms on the mixed method of payment offers and to safeguard the shareholders' interests.

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1. Introduction

The strong form market efficiency theory suggests that the acquirer firm's announcement about the mergers and acquisitions (M&A) should not affect their stock price returns. This is because stock prices should reflect all information, be it old, new or even non-public. However, if the stock market were semi-strongly efficient, stock prices would reflect all publicly available information at the time of the announcement. Such information would give a signal to shareholders, which can be either good or bad (Gigante, Cerri, & Leone, 2023; Jindra & Moeller, 2020; Mehrotra & Sahay, 2018). As a result, shareholders will react according to the signal, with a good signal resulting in a positive reaction. This positive reaction leads to an increase in the stock price, and shareholders benefit from higher returns. On the other hand, if shareholders interpret the given news as a bad signal and react unfavourably, the stock price will fall resulting in negative returns (Tseng & Chen, 2023; Giannopoulos, Holt, Khansalarcai, & Mogoya, 2017; Caiazza & Pozzolo, 2016).

Among the information disclosed during M&A announcements is the method of payment which could in turn affect the acquirer firm's shareholders' wealth. Given the importance of the impact of the method of payment on the acquirer's stock price performance, it is necessary to examine the different types of methods of payment offered and to what extent the different methods of payment offered affect the acquirer shareholder returns. Previous studies found that the acquirer firm's shareholders earn a higher return when their firm offers all-cash payment to the target. The all-cash method typically sends a good signal; so, shareholders respond positively to the news and earn a positive abnormal return (AR) during the announcement period. In contrast, the all-stock method typically sends a bad signal and results in a negative reaction from shareholders. Therefore, the acquirer's shareholders record a negative AR (Gigante et al., 2023; Ang, Daher, & Ismail, 2019; Andriosopoulos et al., 2016). Besides, researchers have included the mixed method of payment, i.e. a combination of both cash and stock offers in their studies. The results

indicate that the all-cash method of payment brings the highest AR to the acquirer's shareholders. This is followed by the mixed method and the all-stock method (Harford & Uysal, 2014; Uysal, 2011; Faccio, McConell, & Stolin, 2006). Although researchers have studied the mixed method of payment, their analyses have just focused on comparing with other methods of payment (all-cash and all-stock). In other words, the impact of the mixed method of payment on the shareholders' returns remains unclear.

The mixed payment method offers a wide range of cash-to-stock ratios (Teti, Dallocchio, & Currao, 2022; DePamphilis, 2015; Ben-Amar & Andre, 2009). This mixed payment method is seen as a payment category that differs from the all-cash or all-stock payment methods. (Boone et al., 2014; Bruslerie, 2013). Nonetheless, the earlier studies on mixed method were conducted in comparison with other methods of payment. The assertion that the mixed payment method is unique does not seem to be clearly justified. Therefore, examining different cash-to-stock ratio offers is important to determine the impact of the announcement of a mixed method on the acquirer's shareholders' return. Accordingly, this study aims to examine the effect of the mixed payment method on the acquirer's shareholder returns. By applying a market model event study, we examine a sample of 305 mergers that occurred in the U.S. during 2004-2018. The key findings are as follows: (1) the announcement of a mixed method of payment conveyed a bad signal and shareholders reacted negatively to the announced news; (2) the mixed method offers with a higher cash-to-stock ratio generated higher stock price returns; and (3) consistent with the semi-strong efficient market hypothesis, shareholders' reactions were more market-driven and demonstrated sensitivity to acquirer-related news.

To the best of the authors' knowledge, studies on the mixed method of payment with different cash-to-stock ratios are limited. Hence, this study is likely to provide useful information for analysing the cash-to-stock ratios under the mixed method and how it will affect the acquirer firm's stock price. It also contributes to the current body of knowledge on the signalling effect of the mixed method of payment announcement and the reaction of shareholders that leads to the stock price movement. In addition, the impact of announcing a mixed method of payment on stock price movement will enlighten shareholders on the disparate impact of various cash-to-stock ratio offerings by acquirer firms. This will help them optimise their investment strategies and diversify their financial asset classes.

The rest of this paper is organised as follows: Section 2 reviews and critiques extant literature. Section 3 discusses the data and methodology adopted. Section 4 analyses and presents the results, and finally, Section 5 concludes.

2.   Literature review

Previous studies have indicated that shareholders rationally process the information available when the method of payment is announced. Hence, shareholders' sentiment plays a significant role in the short-term reaction to the method of payment announced by the acquirer firm. Due to the information asymmetry, the method of payment acts as a signalling device for the acquirer firm's stock value (Wnuczak & Osiichuk, 2024; Gigante et al., 2023; Meglio, King, & Shijaku, 2023). Moreover, previous studies finds evidence supporting a strong correlation between acquirer shareholders' gains and information asymmetry. This includes studies on various countries such as the U.S. (Jindra & Moeller, 2020; Alexandridis, Antypas, & Travlos, 2017; Bargeron, Lehn, Moeller, & Schlingemann, 2014), the United Kingdom, Europe, and Asia-Pacific (Ahmed & Elshandidy, 2021; Shah & Arora, 2014; Draper & Paudyal, 2008), China (Yang, Lu, & Xiang, 2020), and Indonesia (Ratih, Hanafi, Setiyono, & Lantara, 2023). Besides that, the sensitivity towards repeated or outdated news could lead to shareholders' overreaction leading to a reversal of their returns (Dessaint, Foucault, Fresard, & Matray, 2019; He & Zhang, 2018; Cai, Song, & Walkling, 2011). In addition, any information leakage to the stock market before the official announcement leads to early reaction from shareholders. Hence, the impact of the announcement could be reflected in stock prices before the announcement date (Cai et al., 2011; Tetlock, 2011; Cornett, Tanyeri, & Tehranian, 2011).

Table 1 highlights some key themes inferred from previous studies on the signalling effect and method of payment offers by acquirer firms. Signalling refers to how investors respond to the firm's insiders (e.g. top managers or key shareholders) crucial announcements. Investors infer insider signals on the stock's value arising from such announcements. The theory suggests that the investors' evaluation of a firm's M&A activity may be driven more by the inferred information rather than the more rational question of whether there is valuable synergy in the M&A.

Next, the acquirer firm's choice of the three methods of payment tends to be driven by its perception of whether its stock is under- or over-valued. First, an acquirer firm tends to choose the all-cash option

if it believes its stock is undervalued. Hence, an all-cash offer would typically result in a positive response from the investors and drive up the stock price. Second, the reverse holds true. A firm would tend to choose the all-stock option if it perceives its stock to be overvalued. Hence, an all-stock offer would typically result in a negative response from the investors and drive down the stock price. Finally, the choice of the third option, i.e. the mixed method, remains unclear. The acquirer shareholders' reaction towards the mixed method of payment offer and the different cash-to-stock ratios remains unclear. Therefore, further empirical evidence from previous studies was gathered. Empirical evidence was collected from the 1980s to the most recent articles.

Table 1. Key Themes from Extant Literature on Signalling Effects and Method of Payment Offer

Signalling / Method of Payment		Key themes	Illustrative References
Signalling effect		1. Information provided by the acquirer firm would send a signal about its perception of its stock value. Since stock markets are typically semi-strongly efficient, the stock market's response to the announcement is contingent on the information that the acquirer firm conveys. 2. Shareholders tend to react based on the information inferred rather than the potential synergy from the M&A. This is due to information asymmetry and the signal it conveys to the stock market.	Wnuczak & Osiichuk (2024); Alsharif (2023); Gigante et al., (2023); Meglio et al., (2023); Jindra & Moeller (2020); Ang et al., (2019_; Eckbo et al., (2018); Giannopoulos et al., (2017).
Method of payment	All-cash	• Acquirers with undervalued stocks are interested in using cash offers. This is a favourable (good) signal for the stock market, and shareholders react positively to the announced news. As a result, the acquirer's shareholders benefit from a positive AR through an increase in the stock price.	Gigante et al., (2023); Ang et al., (2019); Martin (1996); Servaes (1991); Franks, Harris, & Mayer (1988).

Signalling/ Method of Payment		Key themes	Illustrative References
Method of payment	All-stock	• Acquirers with overvalued stocks prefer stock offers. So, such offer announcements send an unfavourable (bad) signal, and shareholders react negatively to the news, causing acquirers' stock prices to fall.	Gigante et al., (2023); Ang et al., (2019); Connelly, Certo, Ireland, & Reutzel (2011).
	Mixed	• The mixed method of payment is a unique offer with multiple options in cash-to-stock ratio offers. Hence, this method should be treated separately from, and not just a mixture of, the all-cash and all-stock offerings methods. • However, most of the examinations of the mixed method of payment have been conducted without further evaluation of the cash-to-stock ratio offers. The existing literature contains some speculation but no empirical testing, so the expectation for the mixed method of payment has not been confirmed in the current literature.	Omotesho & Obadine (2024); Klitzka et al., (2020); Yang et al., (2019); Mateev (2017); Boone et al., (2014); Uysal (2011).

Table 1A in the Appendix provides empirical backing for the key themes presented in Table 1. It summarises the empirical findings on how the method of payment impacts shareholder returns. Table 2 extracts the more recent (ten years) empirical findings from Table 1A. A review of Table 2 suggests that the more recent findings closely mirror those of the overall findings that range back to 1987. In other words, the all-cash payment method (Panel A) typically yields positive shareholder returns while the all-stock method (Panel C) typically yields negative returns. The mixed payment method, however, tends to yield positive returns in more recent times compared with the largely unclear findings over the longer period in Table 1A. Nonetheless, these past papers did not study the outcomes for the different cash-to-stock ratios.

Table 2. Extract of Empirical Findings (2015 – 2025) on Method of Payment and Shareholder Returns

Author(s)	Country	Sample size	Shareholder Returns		
			Performance measure	Returns (per cent)	Sign & significance
Panel A: All-cash					
Mateev (2017)	UK	909	CAR (-1, +1)	+0.89**	
Song, Tippet, & Vivian, (2017)	China	168	CAR (day 0)	+0.012**	
Giannopoulos et al., (2017)	US	214	CAR (-1, +1)	+0.55***	Positive and significant
Yang, Guariglia, & Guo, (2019)	China	3,285	CAR (-2, +2)	+0.86**	
Klitzka, He & Schiereck (2020)	US	851	CAR (-1, +1)	+1.17*	
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.26*	
Liu (2022)	US	898	CAR (-1, +1)	+25.99	Positive but insignificant
*Panel B: Mixed^*					
Liu (2022)	US	239	CAR (-1, +1)	+16.46	Positive but insignificant
Mateev (2017)	UK	449	CAR (-1, +1)	+1.94***	
Yang et al., (2019)	China	203	CAR (-2, +2)	+0.88*	
Klitzka, He & Schiereck (2020)	US	268	CAR (-1, +1)	+1.677*	Positive and significant
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.68*	
Panel C: All-stock					
Mateev (2017)	UK	364	CAR (-1, +1)	-0.03*	
Song et al., (2017)	China	45	CAR (day 0)	-0.02**	Negative and significant
Giannopoulos et al., (2017)	US	138	CAR (-1, +1)	-2.47***	
Liu (2022)	US	168	CAR (-1, +1)	+9.18	Positive but insignificant
Klitzka, He & Schiereck (2020)	US	96	CAR (-1, +1)	+0.39*	Positive and significant
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.91*	

Mixed^ represents the mixed method of payment.
***/**/* represent the level of significance at 1 per cent/5 per cent/10 per cent.
CAAR represents Cumulative Average Abnormal Return; CAR represents Cummulative Abnormal Return
BHAR represent Buy-And-Hold Abnormal Returns; insig. represent insignifant.

Some have argued that the mixed method of payment is a unique offer with various cash-to-stock ratios (de Bodt, Cousin, & Officer, 2022; Cho & Ahn, 2017; DePamphilis, 2015; Boone et al., 2014). The different cash-to-stock ratios play an important role because it provides insight as to how acquirer firms perceive their stock value (Scheuering, 2015; Bruslerie, 2013). If the acquirer firm offers an extremely low cash-to-stock ratio, shareholders may question why their firm chooses to offer a small percentage of cash instead of an all-cash or all-stock offer. Therefore, this underscores the importance of the effective cash-to-stock ratio offer in this payment method. To support the argument, a study from Boone et al., (2014) claims that the mixed method should be treated separately from, and not just a mixture of cash and stock offerings. Nonetheless, there is no known published paper that has further examined Boone et al., (2014)'s contention.

Hence, this paper aims to provide insight into the mixed method of payment and the different cash-to-stock ratio and its impact on acquirer shareholders' returns. Drawing from the discussions in the preceding paragraphs on Table 1, one would expect a low cash-to-stock ratio offering to send a bad signal to the stock market, leading to a negative reaction from shareholders and lower stock price return. Hence, the following testable hypothesis is proposed: *The lower cash-to-stock ratio in the mixed method of payment leads to lower returns for the acquirer shareholders.*

3.   Data and Methodology

3.1   Data description and source

The sample consists of announcements from acquirer firms that offer a mixed method of payment. The New York Stock Exchange (NYSE) and NASDAQ are used as market indexes since these acquirer firms were traded on the NYSE or NASDAQ. The NYSE and NASDAQ are reliable exchanges that are sensitive to short-term stock market movements. The sample spans 15 years, beginning on January 1, 2004, and ending on December 31, 2018. Two categories of data were collected: (1) the acquirer firm's daily stock prices and the NYSE and NASDAQ indices, and (2) the date of the acquirer firm's announcement of the mixed method of payment offer. Data is obtained from Security Data Corporation (SDC) Platinum Worldwide Mergers and Acquisitions, Bloomberg, and Thomson Reuters's Data Stream. Each announcement date is cross-checked against these databases to ensure its accuracy and reliability. The event date chosen is strictly based on the date of the first announcement in the press by

the acquirer firm. The sample is limited to domestic mergers, and all transactions are completed mergers. Furthermore, the selected sample consists of a merger deal size of more than USD1 billion. Besides, acquirer firms that announced bonus shares, dividends, or ex-dates on any type of dividend within 30 days before or after the merger announcement are excluded from the sample. This is to avoid any confounding effect that could affect the findings.

For the period 2004-2018, the total number of mergers with a deal value greater than USD1 billion is 932. This figure later excludes mergers with all-cash (550 deals) or all-stock (65 deals) payment methods. Additionally, 12 deals were excluded due to missing data. As a result, the final sample size is 305 mergers with a mixed method of payment offers. Next, the 305 samples are distributed based on the cash-to-stock ratio offered by acquirer firms. The sample of higher stock-to-cash ratio consists of 163 deals, while higher cash-to-stock ratio consist of 124 deals. Furthermore, the total sample divides into distinct portfolios: cash offer equal to or higher than 80 per cent (22 deals), cash offer between 60 and 80 per cent (54 deals), cash offer between 40 and 60 per cent (107 deals), cash offer between 20 and 40 per cent (71 deals), and cash offer less than 20 per cent (51 deals).

3.2 Method of analysis

The market model event study is applied to examine the effect of the mixed method of payment on the acquirer firms' stock price. The market model has been used to estimate the abnormal return since it produces results with smaller correlations across stock abnormal returns (Ahmed, Elsayed, & Chen, 2023; Jain, Kashiramka, & Jain, 2021; Rani, Yadav, & Jain, 2013). The NYSE and NASDAQ indexes are used to predict each firm's market model by estimating a regression equation (1) over the estimation period using daily returns. Next, the market model parameters ($\propto_i$ and β_i) are obtained during the pre-event period, which runs from day -230 to day -31. This pre-event period will be referred to as the estimation period. The parameter estimation involves enough observations, for which the period must be long. The observation from previous studies indicate that researchers applied a length of 100 to 250 days before the event window (Rani et al., 2013; MacKinlay, 1997; Holland and Hodgkinson, 1994). Furthermore, the estimation period in this paper is based on the review from previous literature that a 200-day period was chosen as their estimation period (Ahmed et al., 2023; Gigante et al., 2023; Isa & Lee, 2011). As a result, the market model for any firm *i* will be specified as follows:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \qquad t = \text{-230, -129, ... -31} \qquad (1)$$

where,

$R_{i,t}$	= the stock return for firm i in period t
$R_{m,t}$	= return of market portfolio (NYSE and NASDAQ) in period t
α_i	= the mean return over the period
β_i	= the sensitivity of the firm's stock i to the market
$\varepsilon_{i,t}$	= the regression residual in period t

Meanwhile, there may be heteroscedasticity and autocorrelation problems in the market model for thinly (or infrequently) traded securities, particularly with the use of daily data. Hence, the Ordinary Least Square (OLS) regression for the market model can lead to inaccurate results. To overcome this problem, the Scholes and William (1977) technique is used to estimate the market model's beta.

Next, the expected returns for each firm as per equation (2). The length of the event window selected is from day -30 to day +30. The selection of this event window is based on the announcement effect on stock prices may occur before or after the announcement date. As a result, the event window should be open a few days longer as the market reacts to the news (Ma et al., 2009; Krivin et al., 2003).

$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t} \qquad t = \text{-30 ....,0 ...., +30} \qquad (2)$$

where,

$E(R_{i,t})$ = return for firm i in period t
$R_{m,t}$ = return of market portfolio (NYSE and NASDAQ) in period t

The abnormal returns $(AR_{i,t})$ for firm i during event day t are calculated by subtracting the market model predicted return from the observation returns as stated in equation (3). It reflects an estimate of the change in the value of firm i at day t of the event period.

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \qquad (3)$$

where,

$AR_{i,t}$	= abnormal stock return for firm i in period t
$R_{i,t}$	= actual return for firm i in period t
$E(R_{i,t})$	= the expected return derives from the market model.

Next, the $AR_{i,t}$ will be aggregated across the sample firms as stated in equation (4) to obtain the average abnormal returns (AAR_t) for each day of the event window.

$$AAR_t = \frac{1}{N}\sum_{t=1}^{N} AR_{i,t} \qquad\qquad T = -30, \ldots\ldots.. 0, \ldots\ldots.+30 \quad (4)$$

where,
N = number of acquirer firms in the sample
AAR_t = average abnormal return in period t

Finally, the cumulative average abnormal returns (CAAR) are calculated using the equation (5) by aggregating the AAR_t (Isa & Lee, 2011; Ma, Pagan, & Chu, 2009; Binder, 1998). The measure of CAAR uses windows for varied sets of periods (in days), namely, (-30, +30), (-1,0), (-1, +1), (-3, +3), (-5, +5), (-15, +15), and (+3, +30).

$$CAAR_{t1,t2} = \sum_{t=t1}^{t2} AAR_t \qquad\qquad [t1, t2] \in [-30 \ldots\ldots to \ldots\ldots +30] \quad (5)$$

where,
$t1,t2$ = the accumulated period over the event window.
$CAAR_{t1,t2}$ = total effect of the mixed method of payment announcement over the specific period.

Besides that, the analysis of the statistical significance of abnormal returns is important to test the hypothesis. Hence, the standard t-test is used to determine the abnormal returns' statistical significance. The parametric tests are applied to analyse event studies and report that they are well specified for the null hypothesis. To obtain the standardised abnormal returns for security, $SAR_{i,t}$, divide each AAR_t by the estimated standard deviation as stated in Equation (6)

$$SAR_{i,t} = \frac{\overline{AR_{i,t}}}{S(AR_{i,t})} \qquad\qquad\qquad\qquad (6)$$

where,

$$\hat{S}(AR_{i,t}) = \sqrt{\left(\frac{1}{100-1}\right) \sum_{t=-230}^{t=-31}(AR_{i,t} - AR_i)^2}$$

$$AR_i = \frac{1}{100} \sum_{t=-230}^{t=-31} AR_{i,t}$$

Then, a t-test for a given day is applied to examine the significance of daily abnormal returns. The formula is given as follows:

$$T_t = (\sum_{i=1}^{N_t} SAR_{i,t}) * (N_t)^{-1/2} \tag{7}$$

The test statistic is distributed under the null hypothesis, which is the mean of day t is zero abnormal return and not different from zero. However, when the event has a significant effect on the acquirer firm's returns, hence the null hypothesis is rejected. Next, to assess the statistical significance for $CAAR_{t1,t2}$ the formula is stated as follows:

$$T_{[t,T]} = \frac{\sqrt{\sum_{t=1}^{T} T_t^2}}{\sqrt{T}} \tag{8}$$

where,
T_t = the test statistics for AAR for the day
T = the number of days (multi-period event interval)

4. Results and Discussions

The analysis is conducted by breaking the cash-to-stock ratio into a twenty-percentage-point criterion. Hence, eight portfolios were created as follows: P1 (overall sample of acquirer firms); P2 (higher cash-to-stock ratio); P3 (higher stock-to-cash ratio); P4 (cash ratio equal to or above 80 per cent); P5 (cash ratio equal to or above 60 per cent but less than 80per cent); P6 (cash ratio equal to or above 40 per cent but less than 60 per cent); P7 (cash ratio equal to or above 20 per cent but less than 40 per cent); and P8 (cash ratio is less than 20 per cent). Figure 1 depicts the CAAR for acquirer firms for the first three portfolios, from P1 to P3. Figure 2 shows the following five portfolios, ranging from P4 to P8. Meanwhile, Table 3 summarises the acquirers' CAAR around the announcement period for all portfolios.

The findings show the mixed method offer destroys value for acquirer shareholders. The shareholders'reaction to the announcement of this method indicates a bad signal. Hence, they reacted negatively to the transmitted news. Consistent with Fama's (1970) semi-strong form efficient market hypothesis, this is evidenced as the stock price movements reflected the available information

during the announcement. The results also specify the information signal as shareholders reactions are more information-driven from the announced news to the stock market. This is supported by the findings from Ang et al. (2019), Gerasimos (2015), and Connelly et al. (2011).

Prior to the announcement day, acquirer firms have a positive CAAR value. However, it declines on day 0 and reaches a bottom, especially for P6 which is approximately -6 per cent on day 30. In contrast, P5 and P8 reach a maximum at day 0 and day 24, respectively. While the remaining portfolios experienced lower-end declines following the announcement. The P5 indicates positive abnormal returns on the day of the announcement, but the return drops the next day after the announcement. In contrast, the results of the other portfolios directly contradict those of P5. These findings indicate the importance of proper mix of cash-to-stock ratio as evidenced by Bruslerie (2013). It is evidenced that shareholders expect a right mix of cash and stock as they prefer liquidity and participation in newly merged firm. The mix of 60 to 79 per cent cash ratio led to a better return for acquirer shareholders.

Figure 1. Acquirer's CAAR: From P1 to P3 Around the Announcement Day, 2004-2018
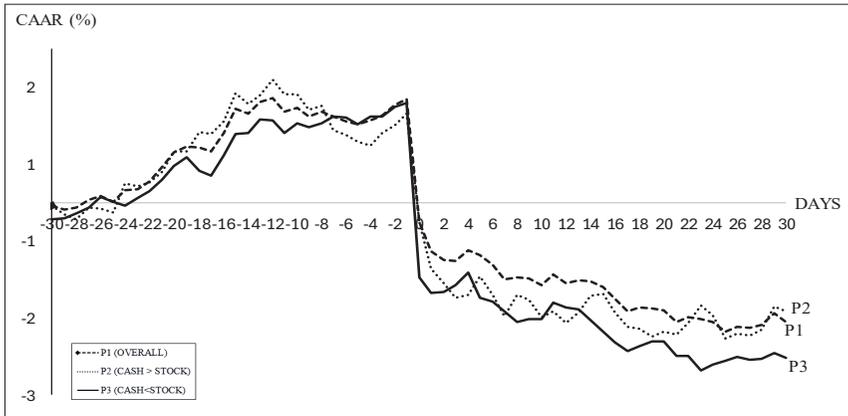
Notes: Percentage cumulative returns for acquirer firms based on the sample in P1, P2, and P3 for 30 days before and after the announcement of the mixed method of payment.

Figure 2. Acquirer's CAAR: From P4 to P8 Around the Announcement Day, 2004-2018
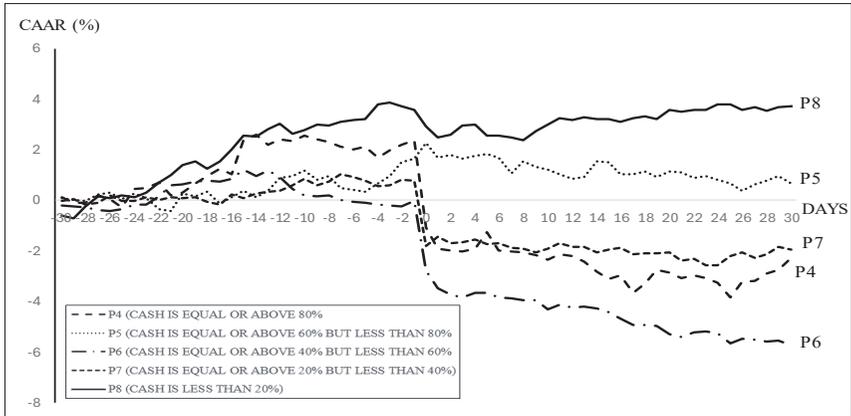
Notes: Percentage cumulative returns for acquirer firms based on the sample from P4 till P8 for 30 days before and after the announcement of the mixed method of payment.

Meanwhile, the immediate impact on CAAR a day before and a day after the announcement has been investigated. According to Table 3, a higher cash-to-stock ratio led to a higher CAAR when the announcement was immediately communicated. This is evident as P2 had a higher CAAR than P3. Furthermore, the findings demonstrate a similar pattern with P5 having a larger CAAR than P6 to P8. Furthermore, it holds true when the sub-window (-1, +1) is checked. Nevertheless, we notice that the cash ratio 80 per cent and above evidenced a negative CAAR for sub-windows (-1,0) and (-1, +1) at the 1 per cent level of significance. In line with shareholders' behaviour, it could indicate that they expressed disappointment when a very high cash ratio is offered rather than all-cash method. Besides, the lower stock ratio of less than 20 per cent could lead a minimal participation in the newly merged firm. This finding is supported by the results of P5 to P7 at which their CAAR is higher than P4 itself. The cash ratio ranging from 20 to 80 per cent resulted in a greater CAAR than P4 emphasises their expectations for the right mix of cash-to-stock ratio.

Table 3. The summary of acquirers' CAAR around the announcement period: From Portfolio 1 to Portfolio 8, 2004-2018

Sub-window	CAAR (per cent)		
	Overall (P1)	Higher cash-to-stock ratio (P2)	Higher stock-to-cash ratio (P3)
(-30, +30)	-1.4990**	-1.3992	-1.9549*
(-1,0)	-1.5136***	-1.2567***	-2.2246***
(-1, +1)	-1.9017***	-1.8650***	-2.4203***

Sub-window	CAAR (per cent)					
	Portfolio	Cash ratio	Stock ratio	Portfolio	Cash ratio	Stock ratio
	P4	≥80	≤20	P7	≥20 to <40	>60 to ≤80
(-30, +30)		-2.3201			-2.0427	
(-1,0)		-3.2761***			-2.6191***	
(-1, +1)		-4.1137***			-2.2661***	
	P5	≥60 to <80	>20 to <60	P8	<20	≥80
(-30, +30)		**0.6286**			4.1564**	
(-1,0)		**0.7425****			-0.8109**	
(-1, +1)		**0.1718**			-1.2337***	
	P6	≥40 to <60	>40 to ≤60			
(-30, +30)		-5.6827***				
(-1,0)		-2.5478***				
(-1, +1)		-3.2263***				

Notes: Returns are in percentages. The statistical significance indicates ***, **, and * as significant at the 1 per cent, 5 per cent, and 10 per cent levels, respectively.
≥ means equal or more than, > means more than, and < means less than.

Next, we conducted a detailed analysis on CAAR for each portfolio for various sub-windows. The results are presented in Table 4. First, both P2 and P3 were analysed. We find that the higher cash-to-stock ratio (P2) resulted in greater CAARs than the higher stock-to-cash ratio (P3) for all sub-windows. The CAAR for P2 is -1.3992 per cent for the entire event window, greater than the CAAR for P3, which is -1.9549 per cent and statistically significant at the 10 per cent level. Second, we continued to portfolio P4 to P8. It shows that the CAAR of P5 is positive 0.6286 per cent for the entire event window.

This CAAR value is higher than those P4 to P7 which recorded -2.3201, -5.6827 and -2.0427 per cent, respectively. Moreover, a similar pattern is observed for the 3, 6, 11, and 31-day announcement period. At 1 per cent significant level, P5 still dominating greater CAAR than P4 to P8. Notwithstanding, the t-statistic test indicates that the CAARs between P4 to P7 are significantly different. Supporting the signalling theory, the shareholders' reaction could be explained in two situations; (1) the higher cash-to-stock ratio is favoured as evidenced for P2 and P3; and (2) while the higher cash-to-stock is a good signal, they expect a right mix of cash and stock as per the results from P5.

Meanwhile, we notice three intriguing findings. First, some results indicate that a higher stock-to-cash ratio resulted in a higher CAAR for various sub-windows. For instance, a cash ratio of 20 to 40 per cent indicates a higher CAAR than a cash ratio of 40 to 60 per cent. This is evidenced when we observed that the CAAR for P7 is larger than P6 over the entire event window and over several sub-windows around the announcement day (day -3 to day 3, day -5 to day 5, and day -15 to day 15). However, this finding is explained by the abrupt movement in returns during the pre-announcement period. As shown in Figure 2, the CAAR for P6 declined on day -7 and reaches -0.197 per cent, which persists until day -2. The downward trend continues until day 30. In contrast, P7 resulted in an unexpected upward trend on day -16 with a positive CAAR of 0.3828 per cent. This positive movement continues until the day 1. Nevertheless, the CAAR declined from day 0 to day 30. It could indicate the possibility of information leakage prior to the announcement and lead to the shareholders' overreaction to the early information. This possibility supported by findings of Tetlock (2011), Cai et al. (2011), and Antweiler and Frank (2006).

Second, we observe that samples with a cash ratio of more than 80 per cent (P4) had the lowest CAAR among the other portfolios for several sub-windows. This finding is contradictory because the highest cash-to-stock ratio offer resulted in a negative CAAR on announcement day. The two and three days preceding the announcement period also shows a negative CAAR at 5 per cent and 10 per cent significant level. This contradicts the findings of Gigante et al. (2023), Ang et al. (2019), and Golubov et al. (2015), which concluded that cash offers elicit a positive reaction and lead to positive returns. However, we notice that P4 contains acquirers with high free cash flow availability. This could enable them to include a significant amount of cash in their offerings. It could signal their shareholders on their firms' motive in offering such a high cash

Table 4. Difference Between Acquirers' CAAR by Multiple Event Window: From Portfolio 1 to Portfolio 8, 2004-2018

Event window period (-30,+30)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-1.4990 **	-1.3992	-1.9549 *	-2.3201	0.6286	-5.6827 ***	-2.0427	4.1564 **
t-statistic	-2.0390	-1.2119	-1.8926	-0.8963	0.3677	-4.2503	-1.2771	2.1464

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		0.8857	1.0436	-6.8299***	5.3255***	2.4097**	-3.1186***
P3			0.4262	-7.6754***	4.7470***	1.4848	-3.6824***
P4				-5.1702***	3.7020***	0.6096	-9.0700***
P5					9.1580***	9.6182***	-9.6745***
P6						-3.8438***	-3.2209***
P7							-5.2080***
P8							

Event window period (-1,0)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-1.5136 ***	-1.2567 ***	-2.2246 ***	-3.2761 ***	0.7425 **	-2.5478 ***	-2.6191 ***	-0.8109 **
t-statistic	-2.5710	-6.0115	-3.8949	-6.9893	2.3988	-3.5241	-6.0429	-2.3127

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		0.2185	-0.1005	-1.9420*	1.2126	0.6670	-3.5564***
P3			-0.2318	-1.5174	0.8885	0.4000	-2.5943***
P4				-0.7430	0.9346	0.5410	-1.4726
P5					2.3836**	1.8684*	-2.8240***
P6						-0.4780	-3.2775***
P7							-2.8266***
P8							

Notes: Returns are in percentages. The statistical significance indicates ***, **, and * as significant at the 1 per cent, 5 per cent, and 10 per cent levels, respectively.

Table 4. Difference Between Acquirers' CAAR by Multiple Event Window: From Portfolio 1 to Portfolio 8, 2004-2018 (continued)

Event window period (-1,+1)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-1.9017 ***	-1.8650 ****	-2.4203 ****	-4.1137 ****	0.1718	-3.2263 ***	-2.2661 ***	-1.2337 ***
t-statistic	-2.6645	-7.2839	-3.5662	-7.1657	0.4531	-3.8811	-6.3886	-2.8729

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		0.3005	0.1594	-2.9262***	1.7597*	0.8497	-4.3729***
P3			-0.0442	-2.6229***	1.3910	0.4906	-3.8217***
P4				-1.5585	1.1281	0.4034	-2.3620***
P5					3.7087***	3.2487***	-2.9852***
P6						-0.9642	-4.6312***
P7							-4.4044***
P8							

Event window period (-3,+3)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-1.8185 ***	-1.9847 ****	-2.1995 ****	-3.7312 ****	0.9948 *	-3.6912 ***	-2.2238 ***	-0.8562
t-statistic	-7.3021	-5.0747	-6.2861	-4.2549	1.7179	-8.1498	-4.1042	-1.3053

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		0.0912	0.0281	-3.9944***	2.5670**	0.9516	-7.1038****
P3			-0.0330	-3.5464***	2.3772**	0.7994	-6.3107****
P4				-2.0895***	1.8907*	0.6052	-3.8636***
P5					5.3363***	4.5323***	-5.8609***
P6						-1.7112*	-7.3297***
P7							-7.1974***
P8							

Notes: Returns are in percentages. The statistical significance indicates ***, **, and * as significant at the 1 per cent, 5 per cent, and 10 per cent levels, respectively.

Table 4. Difference Between Acquirers' CAAR by Multiple Event Window: From Portfolio 1 to Portfolio 8, 2004-2018 (continued)

Event window period (-5,+5)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-1.7418 ***	-1.8444 ***	-2.3418 ***	-3.2713 ***	1.4018 *	-3.6068 ***	-2.6422 ***	-0.6218
t-statistic	-5.5795	-3.7620	-5.3390	-2.9758	1.9311	-6.3526	-3.8899	-0.7562

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		-0.0453	-0.1390	-4.4276***	3.1129***	1.0410	-9.4917***
P3			-0.1037	-3.8449****	3.0113***	1.0105	-8.2594***
P4				-2.3118**	2.4953**	0.8371	-5.0429***
P5					6.1281***	4.9806***	-7.2512***
P6						-2.1759**	-9.1950***
P7							-9.2536***
P8							

Event window period (-15,+15)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-2.0023 ***	-2.2412 ***	-2.2928 ***	-4.1667 **	1.3522	-5.3030 ***	-2.1798 *	1.1744
t-statistic	-3.8206	-2.7230	-3.1139	-2.2579	1.1096	-5.5638	-1.9117	0.8507

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		0.3683	-0.1008	-4.8999***	4.0732***	1.8573*	-3.0588***
P3			-0.3511	-5.4035****	3.8242***	1.4978	-3.6302***
P4				-2.7454***	3.3453***	1.3698	-7.3097***
P5					7.4632***	7.2240****	-5.2703***
P6						-2.7629***	-3.2053***
P7							-5.3493***
P8							

Notes: Returns are in percentages. The statistical significance indicates ***, **, and * as significant at the 1 per cent, 5 per cent, and 10 per cent levels, respectively.

Table 4. Difference Between Acquirers' CAAR by Multiple Event Window: From Portfolio 1 to Portfolio 8, 2004-2018 (continued)

Event window period (+3,+30)

	P1 (N=305)	P2 (N=142)	P3 (N=163)	P4 (N=22)	P5 (N=54)	P6 (N=107)	P7 (N=71)	P8 (N=51)
CAAR (%)	-0.8101	-0.3723	-0.8530	-0.2856	-1.1162	**-1.9902** **	-0.2497	1.1259
t-statistic	-1.6265	-0.4759	-1.2190	-0.1628	-0.9638	-2.1971	-0.2305	0.8582

t-statistic for difference

	P2	P3	P4	P5	P6	P7	P8
P2		3.0775***	9.1410***	-3.4236***	3.6624***	9.0396***	-5.6712***
P3			7.4955***	-8.9531***	8.5366***	4.0655***	-4.4839***
P4				-8.2901***	8.7694***	-5.2803***	-4.0637***
P5					8.9104***	6.5953***	-4.4107***
P6						-9.1931***	-5.9957***
P7							-7.6732***
P8							

ratio. In line with the Jensen's (1986, 1988) agency costs of free cash flow, shareholders might react negatively that their firm managers could waste the available cash by investing in an unprofitable merger rather than returning the excess cash to them. Furthermore, shareholders may react unfavourably with their firms' risk-sharing attitude by offering a very minimal stock ratio instead of all-cash. Third, the samples with a stock ratio more than 80 per cent (P8) had the highest CAAR for the entire event window at 4.1564 per cent. Nevertheless, we discover some statistically significant negative CAAR for some sub-window which is (-1,0) and (-1, +1). Meanwhile, other sub-window resulted in insignificant results for P8. This is evidence for sub-window from (-3, +3) to (+3, +30).

Overall, the announcement of a mixed method of payment sent an unfavourable (bad) signal and causing shareholders to react negatively to the acquirer's news. The overall sample (P1) provides evidence of this. The negative CAAR associated with the announcement period shows that it erodes the acquirer shareholders' returns. However, further examinations from P2 to P3 indicates that a higher cash-to-stock ratio experienced a greater CAAR. This finding is also evidence for P5, P6, and P7. This result is consistent with the findings of Eckbo, Makaew, and Thorbirn (2018), Ben-David et al., (2014), and Boone et al., (2014) that cash offers provide better returns to acquirer shareholders. Hence, this study finds that the higher cash-to-stock ratio in a mixed method of payment offers resulted in greater CAAR than the higher stock-to-cash ratio offered by acquirer firms.

4.1 Robustness of results

We conducted robustness checks to establish the validity of our results as summarized in Table 5. To check for robustness, we applied two alternative models, following Ma et al., (2019); Shah & Arora (2014); Chuang (2014); and Ismail & Krause (2010). First, we apply the market-adjusted return model. In this model, the formula for the $(AR_{i,t})$ is calculated by obtaining the value of the stock return for firm i in period t $(R_{i,t})$ minus the return on a market index $(R_{m,t})$. Second, the robustness was tested by using the mean-adjusted return model, where the formula for the $(AR_{i,t})$ is $R_{i,t}$ minus $\overline{R}_{i,t}$. The $R_{i,t}$ represents the stock return for firm i in period t, and $\overline{R}_{i,t}$ represents the average return for firm i in period t during the estimation window.

Having performed these robustness checks, we found three similar patterns. First, the CAAR values for all eight portfolios are statistically significant for most of the sub-windows from (-30, +30) to (-15, +15). This indicates an acceptable range of the CAAR value.

Second, a large window period was observed (-30, +30). This suggests that the CAAR values are robust vis-à-vis those obtained from these two alternative models. For instance, the CAAR for the overall sample (P1) is negative 1.499 per cent at the 5 per cent significance level, in line with those from the market-adjusted and mean-adjusted mean models at negative 1.082 and negative 1.221 respectively. Third, a comparison with the sub-window (-1, +1) supports the robustness of the main model's results a day before and after the announcement has been made. The results indicate a similar pattern of CAAR across all the main and alternative models at the 1 per cent level of significance.

Since the same pattern of results was confirmed, the findings are deemed reliable and valid. It provides evidence that the announcement of a mixed method of payment sends a bad signal to the stock market and causes shareholders to react negatively to the acquirer's news. Accordingly, the results of the market-adjusted return and mean-adjusted return models support the findings that the higher stock-to-cash ratio does lead to lower returns for the acquirer's shareholders.

Table 5. Robustness Test Difference Between Acquirer CAAR:
From Portfolio 1 to Portfolio 8, 2004-2018

Event window period	(N= 305) P1								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	-1.4990	**	-2.0390	-1.0817	**	-2.3447	-1.2206	**	-2.2104
(-1,0)	-1.5136	***	-2.5710	-0.9637	***	-4.1525	-1.1889	***	-3.4549
(-1,+1)	-1.9017	***	-2.6645	-1.4668	***	-3.9910	-1.2284	***	-3.3185
(-3,+3)	-1.8185	***	-7.3021	-1.1191	***	-8.7849	-1.2398	***	-7.0940
(-5,+5)	-1.7418	***	-5.5795	-1.0737	***	-6.7235	-1.2498	***	-5.8936
(-15,+15)	-2.0023	***	-3.8206	-2.1000	***	-4.1032	-1.2203	***	-3.0962
(+3,+30)	-0.8101		-1.6265	-0.3876		-1.5212	-0.1504	**	-2.2243

Event window period	(N= 142) P2								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	-1.3992		-1.2119	-0.9453	**	-2.0702	-1.25105	*	-1.8246
(-1,0)	-1.2567	***	-6.0115	-0.8735	***	-3.4003	-1.15881	***	-6.3742
(-1,+1)	-1.8650	***	-7.2839	-1.0901	***	-3.6533	-1.21537	***	-7.0582
(-3,+3)	-1.9847	***	-5.0747	-1.2625	***	-8.7121	-1.24005	***	-5.1501
(-5,+5)	-1.8444	***	-3.7620	-1.4087	***	-6.5978	-1.24479	***	-4.1896
(-15,+15)	-2.2412	***	-2.7230	-2.0326	***	-4.0236	-2.27068	***	-2.7596
(+3,+30)	-0.3723		-0.4759	-0.2906		-1.1912	-0.07439		-0.7980

Event window period	(N= 163) P3								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	-1.9549	*	-1.8926	-1.7839	***	-2.5898	-1.2995	**	-2.1455
(-1,0)	-2.2246	***	-3.8949	-1.7940	***	-4.4873	-2.2209	***	-8.7385
(-1,+1)	-2.4203	***	-3.5662	-1.9342	***	-3.9170	-2.2491	***	-8.0482
(-3,+3)	-2.1995	***	-6.2861	-1.8864	***	-8.6450	-1.8499	***	-5.2860
(-5,+5)	-2.3418	***	-5.3390	-1.8772	***	-6.8242	-2.2798	***	-4.7203
(-15,+15)	-2.2928	***	-3.1139	-1.9125	***	-4.2286	-1.8063	***	-3.0787
(+3,+30)	-0.8530		-1.2190	-0.3449	*	-1.6816	-0.2026	**	-2.1425

Event window period	(N= 22) P4								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	-2.3201		-0.8963	-2.6096	**	-2.4861	-1.7108	*	-1.6726
(-1,0)	-3.2761	***	-6.9893	-2.9384	***	-5.4601	-2.7009	***	-4.0578
(-1,+1)	-4.1137	***	-7.1657	-3.5219	***	-5.1298	-3.5389	***	-7.9570
(-3,+3)	-3.7312	***	-4.2549	-3.3549	***	-4.4352	-3.5096	***	-4.9256
(-5,+5)	-3.2713	***	-2.9758	-3.1955	***	-7.1691	-2.5326	***	-4.1066
(-15,+15)	-4.1667	**	-2.2579	-3.8419	***	-4.4661	-3.5377	**	-2.4698
(+3,+30)	-0.2856		-0.1628	-0.5158		-1.4283	-0.0560		-0.2706

Event window period	(N= 54) P5								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	0.6286		0.3677	-0.0630		-0.2655	0.5684		0.2589
(-1,0)	0.7425	**	2.3988	0.2699	***	-6.2793	0.7244	*	1.8221
(-1,+1)	0.1718		0.4531	0.3937	***	-7.4793	0.1489		0.3058
(-3,+3)	0.9948	*	1.7179	0.2880	***	-3.5824	0.8658		1.1641
(-5,+5)	1.4018	*	1.9311	1.2282	**	-2.2638	1.0803		1.1587
(-15,+15)	1.3522		1.1096	1.1189		-0.7028	2.2209		1.4190
(+3,+30)	-1.1162		-0.9638	-1.2105		-1.3091	-1.2425		-1.5076

Event window period	(N= 107) P6								
	Market Model			Market Adjusted Model			Mean Adjusted Return Model		
	CAAR (%)		t-statistic	CAAR (%)		t-statistic	CAAR (%)		t-statistic
(-30,+30)	-5.6827	***	-4.2503	-5.3125	***	-2.6605	-5.5933	***	-3.7555
(-1,0)	-2.5478	***	-3.5241	-2.2606	***	-4.1121	-2.2636	***	-6.2142
(-1,+1)	-3.2263	***	-3.8811	-3.5459	***	-4.1303	-2.3193	***	-6.1150
(-3,+3)	-3.6912	***	-8.1498	-3.5310	***	-6.1614	-3.3778	***	-7.0599
(-5,+5)	-3.6068	***	-6.3526	-3.4597	***	-6.9677	-3.3827	***	-5.7056
(-15,+15)	-5.3030	***	-5.5638	-5.5716	***	-4.4690	-4.5004	***	-4.4432
(+3,+30)	-1.9902	**	-2.1971	-1.5331		-1.5949	-1.2517	**	-2.3521

Event window period	(N= 71) P7					
	Market Model		Market Adjusted Model		Mean Adjusted Return Model	
	CAAR (%)	t-statistic	CAAR (%)	t-statistic	CAAR (%)	t-statistic
(-30,+30)	-2.043	-1.2771	-2.4517 *	-1.9571	-1.3875 *	-1.9210
(-1,0)	-2.619 ***	-6.0429	-2.5290 ***	-2.6592	-2.2535 ***	-6.9386
(-1,+1)	-2.266 ***	-6.3886	-2.5465 ***	-3.6770	-2.2223 ***	-4.9694
(-3,+3)	-2.224 ***	-4.1042	-2.5341 ***	-6.8314	-1.2534 ***	-3.7073
(-5,+5)	-2.642 ***	-3.8899	-2.5586 ***	-5.6996	-2.3496 ***	-4.0811
(-15,+15)	-2.18 *	-1.9117	-2.5413 ***	-3.2898	-1.4249 ***	-2.9544
(+3,+30)	-0.25	-0.2305	-0.1207	-0.7721	-0.1841	-1.3467

Event window period	(N= 51) P8					
	Market Model		Market Adjusted Model		Mean Adjusted Return Model	
	CAAR (%)	t-statistic	CAAR (%)	t-statistic	CAAR (%)	t-statistic
(-30,+30)	4.1564 **	2.1464	4.7347 *	-1.7431	3.5396 **	2.0738
(-1,0)	-0.8109 **	-2.3127	-0.8393 ***	-3.9970	-0.0715	-1.5168
(-1,+1)	-1.2337 ***	-2.8729	-1.0560 ***	-3.2982	-1.1649 ***	-2.8583
(-3,+3)	-0.8562	-1.3053	-0.9985 ***	-6.9934	-0.1483 *	-1.6831
(-5,+5)	-0.6218	-0.7562	-0.9766 ***	-5.4562	-0.0764	-0.6914
(-15,+15)	1.1744	0.8507	1.1777 ***	-3.2539	0.2433	1.3119
(+3,+30)	1.1259	0.8582	0.3892	-1.3631	0.1494	0.8475

Notes: Returns are in percentage. The statistical significance indicates ***, **, and * as significant at the 1 per cent, 5 per cent, and 10 per cent levels, respectively.

5. Conclusion and Implications

This study examines the announcement effect of the cash-to-stock ratio in the mixed method of payment and how it affects the acquirer firm's shareholders' wealth. The research is conducted based on the testable hypothesis that a lower cash-to-stock ratio in the mixed method of payment leads to lower returns for the acquirer firm's shareholders. This study finds that acquirer firms incur losses to their shareholders when they announce to offer a mixed method of payment. Such an announcement sends a bad signal to the stock market, and shareholders react negatively. Furthermore, shareholders' reactions were more market-driven and sensitive to acquirer firm-related news. We also notice that the mixed method of payment has a proclivity as a hybrid of cash and stock offer. This assertion is supported by the results that a higher CAAR value was found for samples with higher cash-to-stock ratios.

The optimal mix of cash-to-stock ratio leads to a higher return for acquirer shareholders. It shows that a mix of 60 to 80 per cent cash and 20 to 40 per cent stocks is an optimal ratio that creates a positive reaction among shareholders. Besides, a very high cash or stock ratio in the mixed method leads to a question on why the acquirer firm did not offer all-cash or all-stock rather than the mixed method with a non-balanced cash-to-stock ratio. Furthermore, this leads to two possible questions among shareholders: (1) why offer a very high cash ratio instead of holding cash for any other future investment? and (2) by offering a very high stock ratio, does the acquirer firm exploit its overvalued stock by taking advantage of market mispricing? Hence, shareholders expect a right mix of cash and stock at which they prefer liquidity and would like to participate in newly merged firm. This underscores the importance of the optimal cash-to-stock ratio in the mixed method of payment.

The findings from this study provides three implications. First, it extends the current knowledge of the mixed method of payment as a separate category by integrating signalling theory and applying a twenty-percentage-point change criterion for the different portfolios created.

Second, it provides managers and investors some insights on how the mixed payment method and the different ratios may impact shareholder returns. In general, the mixed payment method tends to send negative signals to investors. Nonetheless, should the mixed payment method be unavoidable, a higher cash-to-stock ratio would tend to result in better shareholder returns.

Third, it provides insights to public policymakers on M&A payment methods, for both the acquirer and investor firm situations. The former may consider the implication of their chosen M&A payment method on their shareholders' returns. The latter may consider the implication of the mixed payment method to safeguard their investment returns. This may apply to officers who oversee government-linked investment companies (GLIC) and government-linked companies (GLC). These officers may consider the findings that in general, the all-cash method tends to yield better shareholder returns. While the mixed payment method tends to yield poorer returns, those with a higher cash-to-stock ratio would be preferred.

Appendix

Table 1A: The Summary of Empirical Studies on Method of Payment Offer and Shareholders' Returns in M&A

Author (s)	Country	Sample size	Shareholder Returns		
			Performance measure	Returns (per cent)	Sign & significance
Panel A: All-cash					
Wansley, Lane, & Yang (1987)	US	64	CAR (-1,0)	+6.17**	
Franks et al., (1987)	US	392	CAAR (+1M, +24M)	+3.60*	
Travlos (1987)	US	60	CAR (-10, +10)	+0.13*	
Franks, Harris, & Titman, (1991)	UK	348	CAR (0, +24M)	+1.75**	
Datta, Datta, & Raman, (2001)	US	337	CAR (-1,0)	+0.52***	
Linn & Switzer (2001)	US	152	BHAR (+1Y, +5Y)	+3.14***	
Moeller et al., (2004)	US	2,958	CAR (-1, +1)	+1.38***	Positive and significant
Goergen & Renneboog (2004)	Europe	33	CAR (-2, +2)	+0.90*	
Conn, Cosh, Guest, & Hughes, (2005)	UK	2,273	CAR (-1, +1)	+0.53***	
Mateev (2017)	UK	909	CAR (-1, +1)	+0.89**	
Song, Tippet, & Vivian, (2017)	China	168	CAR (day 0)	+0.012**	
Giannopoulos et al., (2017)	US	214	CAR (-1, +1)	+0.55***	
Yang, Guariglia, & Guo, (2019)	China	3,285	CAR (-2, +2)	+0.86**	
Klitzka, He & Schiereck (2020)	US	851	CAR (-1, +1)	+1.17*	
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.26*	
Bellamy & Lewin (1992)	US	156	CAR (-5, +5)	+0.83	
Loughran & Vijh (1997)	Australia	210	CAR (-10, +10)	+0.84	Positive but insignificant
Franks et al., (1988)	US	405	BHAR (+1M, +60M)	+18.5	
Liu (2022)	US	898	CAR (-1, +1)	+25.99	

Author (s)	Country	Sample size	Shareholder Returns		
			Performance measure	Returns (per cent)	Sign & significance
Chang (1998)	US	304	CAR (-1,0)	-0.02	Negative but insignificant
Ben-David, Drake, & Roulstone, (2014)	US	2,886	CAR (-1, +1)	-3.49	
Gregory (1997)	US	333	CAR (0, +24)	-9.18**	Negative and significant
*Panel B: Mixed^*					
Franks et al., (1991)	US	114	CAR (-5, +5)	-1.18	Negative but insignificant
Loughran & Vijh (1997)	US	228	BHAR (+1M, +60M)	-9.6	
Gregory (1997)	US	35	CAR (0, +24)	-4.17	
Datta et al., (2001)	US	1,382	CAR (-1,0)	-0.1	
Faccio et al., (2006)	Europe	727	CAR (-2, +2)	-0.66	
Linn & Switzer (2001)	US	50	BHAR (+1Y, +5Y)	+2.03	Positive but insignificant
Goergen & Renneboog (2004)	Europe	23	CAR (-2, +2)	+0.22	
Ben-David et al., (2014)	US	825	CAR (-1, +1)	+0.85	
Liu (2022)	US	239	CAR (-1, +1)	+16.46	
Moeller et al., (2004)	US	4,203	CAR (-1, +1)	+1.45***	Positive and significant
Conn et al., (2005)	UK	1,958	CAR (-1, +1)	+0.63***	
Dong, Hirshleifer, Richardson, & Teoh, (2006)	US	56	CAR (0, +20)	+2.10***	
Uysal (2011)	US	563	CAR (-1, +1)	+0.014**	
Boone et al., (2014)	US	501	Market-to-book	+0.223**	
Harford & Uysal (2014)	US	3,833	CAR (-2, +2)	+0.013**	
Mateev (2017)	UK	449	CAR (-1, +1)	+1.94***	
Yang et al., (2019)	China	203	CAR (-2, +2)	+0.88*	
Klitzka, He & Schiereck (2020)	US	268	CAR (-1, +1)	+1.677*	
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.68*	

Author (s)	Country	Sample size	Shareholder Returns		
			Performance measure	Returns (per cent)	Sign & significance
Panel C: All-stock					
Franks et al., (1988)	US	599	CAR (0, +24M)	-9.40*	
Franks et al., (1991)	US	128	CAR (-5, +5)	-3.15***	
Loughran & Vijh (1997)	US	314	BHAR (+1M, +60M)	-24.2***	
Gregory (1997)	US	84	CAR (0, +24)	-19.23***	Negative and significant
Chang (1998)	US	232	CAR (-1,0)	-2.46***	
Faccio et al., (2006)	Europe	3,312	CAR (-2, +2)	-1.81**	
Mateev (2017)	UK	364	CAR (-1, +1)	-0.03*	
Song et al., (2017)	China	45	CAR (day 0)	-0.02**	
Giannopoulos et al., (2017)	US	138	CAR (-1, +1)	-2.47***	
Wansley et al., (1987)	US	118	CAR (-1,0)	-1.51	Negative but insignificant
Ben-David et al., (2014)	US	4,535	CAR (-1, +1)	-4.86	
Travlos (1987)	US	100	CAR (-10, +10)	+1.6	
Bellamy & Lewin (1992)	Australia	210	CAR (-10, +10)	+0.45	Positive but insignificant
Linn & Switzer (2001)	US	211	BHAR (+1Y, +5Y)	+0.77	
Liu (2022)	US	168	CAR (-1, +1)	+9.18	
Franks et al., (1987)	US	127	CAAR (+1M, +24M)	+1.80**	
Yang et al., (2019)	China	508	CAR (-2, +2)	+11.67**	Positive and significant
Klitzka, He & Schiereck (2020)	US	96	CAR (-1, +1)	+0.39*	
Omotesho & Obadine (2024)	UK	200	CAR (-30, +7)	+0.91*	

Mixed^ represents the mixed method of payment.
***/**/* represent the level of significance at 1 per cent/5 per cent/10 per cent.
CAAR represents Cumulative Average Abnormal Return
BHAR represent Buy-And-Hold Abnormal Returns; insig. represent insignifant.

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