Payment Methods in M&A transactions

Do certain mergers destroy value for bidder shareholders?

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I. Problem Description

Corporate takeovers are significant financial events, crucial for both individual firms and global capital reallocation, evidenced by trillions in M&A deals annually. This research aims to understand if these mergers affect bidder shareholder wealth, specifically by examining how the method of payment (stock vs. cash) and the target's status (public vs. private) influence value, which we measure through stock market reactions to M&A announcements. Our study utilizes a comprehensive dataset of over 5,000 M&A deals from 1990-2014, which has been carefully filtered according to established research criteria, including only domestic U.S. transactions with public acquirers and targets of all statuses (public, private, or subsidiaries), focusing on completed control transactions where the acquirer gains 100% ownership from less than 50% pre-deal. Furthermore, deals must have a value of at least $1 million and a relative transaction size of at least 1% of the acquirer's market value, while financial industries (SIC codes 6000-6999) are excluded. Crucially, all necessary information to compute the acquirer's cumulative abnormal return (CAR) and control variables must be available in the CRSP and COMPUSTAT databases. Through this methodical approach involving data familiarization, descriptive analysis, and detailed regression analysis that explores bidder returns relative to deal structure and target type, we seek to provide clear insights into the dynamics of corporate takeovers and their implications for shareholder value.

II. Research Methodology and Results

2.1 Exploratory Analysis

The dataset `CAR_MA` consists of 17 variables and 5154 observations which are M&A deals from the period of 1990 to 2014. All variables are in numeric and integer data type, requiring no further formatting.

Variable	Description
yyyymmdd	Year, month, and day of the deal announcement
bidder.car	The acquirer’s cumulative abnormal return (CAR) calculated over a three-day event window centered on the deal announcement. Abnormal returns are calculated using the market model. Estimation window is from day -300 to day -91 relative to the announcement on day 0
deal.value	the deal value in millions of U.S. dollars
bidder.size	the bidder’s market value at the end of the fiscal year before the acquisition announcement in millions of U.S. dollars
deal.allstock	a dummy variable equal to 1 if the transaction is fully paid in stock
private	a dummy variable equal to 1 if the target is a private company
public	a dummy variable equal to 1 if the target is a public company

bidder.mtb	the acquirer market value of assets (defined as the book value of total assets minus common equity plus the market value of equity) divided by the acquirer book value of assets
bidder.runup	the market-adjusted buy and hold return of the acquirer's stock price from day -210 to day -11 with respect to the announcement date
bidder.f cf	(free cash-flow) the acquirer's operating income before depreciation minus interest expense and income taxes plus changes in deferred taxes and investment tax credit minus dividends on both preferred and common share divided by the book value of total assets
bidder.lev (leverage)	the acquirer's long-term debt divided by the market value of assets, defined as above
bidder.sigma	the standard deviation of the acquirer market-adjusted daily returns from day -210 to day -11 with respect to the announcement date
deal.relsize	the ratio of the deal value to the acquirer market value
horz (horizontal)	a dummy variable equal to 1 if the bidder and the target operate in the same industry at the two-digit SIC code level
deal.tenderoffer	a dummy variable equal to 1 if the deal is classified as a tender offer in the SDC database
hostile	a dummy equal to 1 if the transaction is classified as hostile in the SDC database.

The dataset does not contain any missing values. When plotting distribution of each variable in the dataset, variables `deal.value`, `bidder.size`, `bidder.sigma`, `del.relsize`, `bidder.mtb`, `bidder.lev` are significantly right-skewed while `bidder.fcf` histogram plot demonstrates left skewed distribution, indicating that these variables might include outliers. To investigate the dataset further, we plot boxplots of all numeric variables to identify outliers. It can be seen from the box plots that all numeric variables contain outliers. To handle outliers, there are two common approaches including trimming and winsorization. While both methods aim to reduce the influence of outliers and improve the fits and outcomes of our models, the former might considerably reduce the number of observations in our dataset. Due to the limited size of the dataset, we decided to winsorize the variables with outliers at (0.025, 0.975) percentile. For the outliers that fall beyond these bounds, their values will be adjusted to the nearest bound.

Besides, the dataset is slightly skewed towards private and fully paid in stock deals. Most of the deals are neither tender offers nor hostile, meaning that both acquiring and target company's leadership reach mutual agreement and cooperate during the acquisition process.

Figure I
Visualization of different variables in the dataset

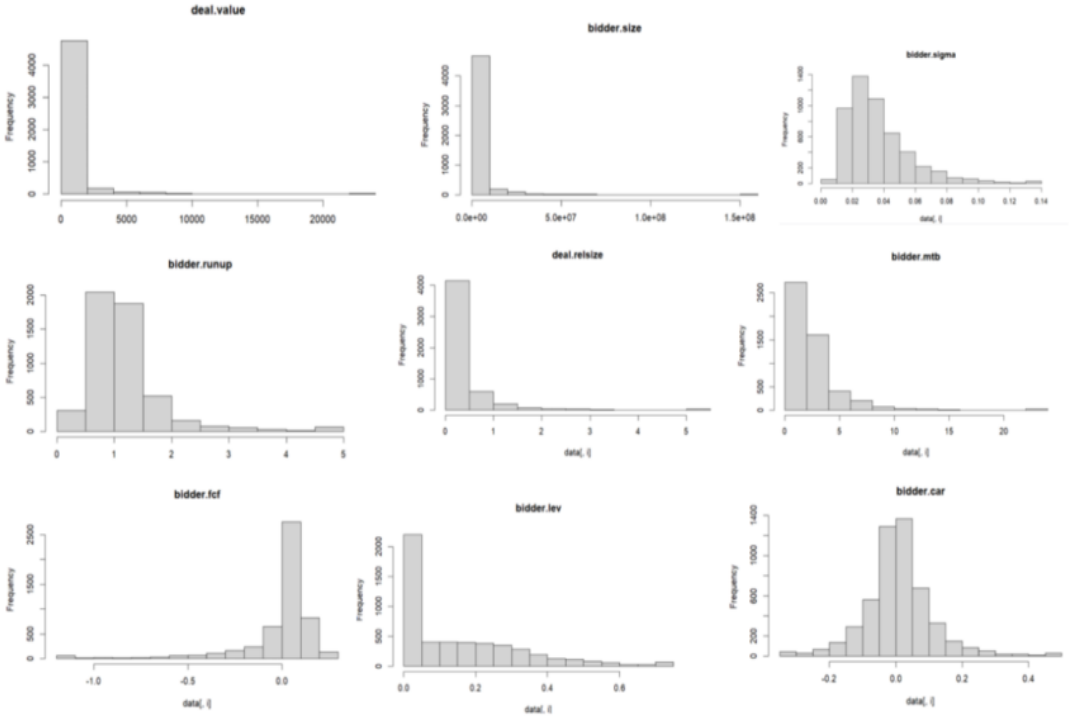
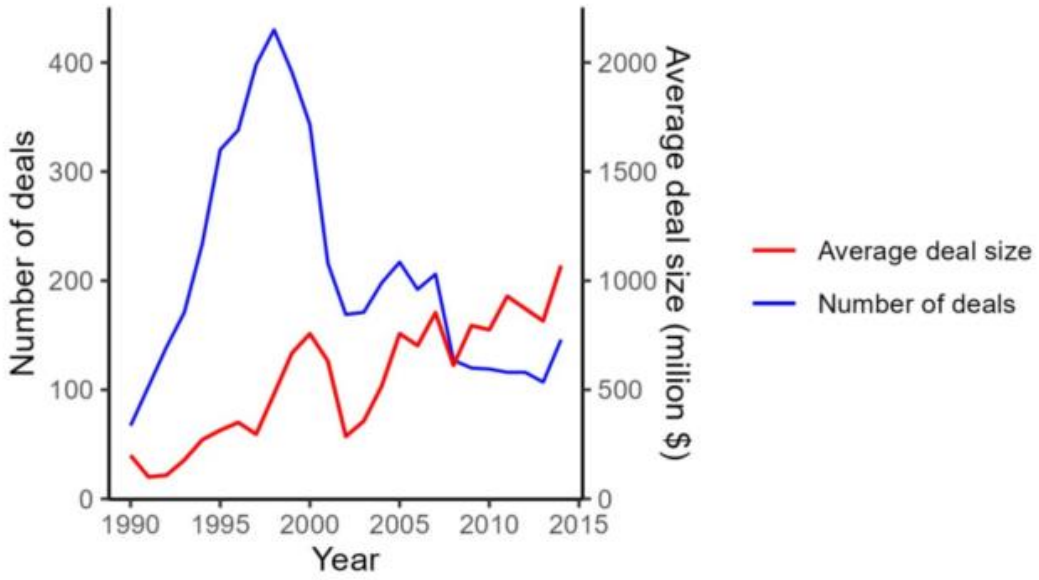


Figure II
Plots to yearly deal statistics



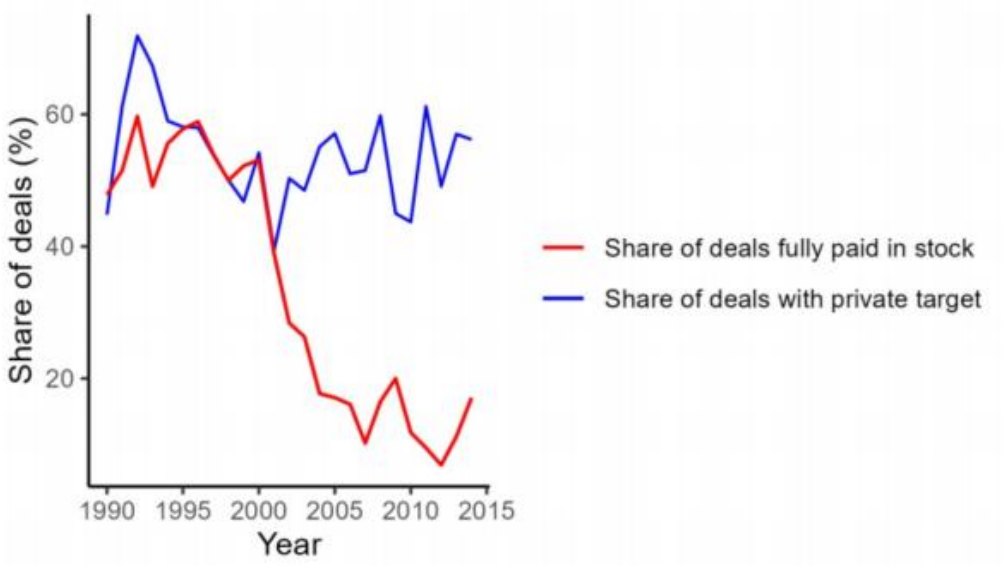


Table I
Yearly deal statistics

Year	Deals	Avg deal size	Share of private target deals	Share of deals paid in stock
1990	67	199.452	0.448	0.478
1991	103	100.706	0.612	0.515
1992	139	108.152	0.719	0.597
1993	171	178.110	0.673	0.491
1994	234	271.152	0.590	0.556
1995	320	314.354	0.581	0.578
1996	338	350.322	0.580	0.589
1997	398	296.226	0.538	0.540
1998	430	480.649	0.500	0.500
1999	391	668.590	0.468	0.522
2000	343	756.472	0.542	0.531
2001	216	631.400	0.394	0.389
2002	169	286.155	0.503	0.284
2003	171	356.395	0.485	0.263
2004	198	517.214	0.551	0.177
2005	217	756.980	0.571	0.171
2006	192	702.587	0.510	0.161
2007	206	853.200	0.515	0.102
2008	127	611.991	0.598	0.165
2009	120	794.180	0.450	0.200
2010	119	774.955	0.437	0.118
2011	116	928.365	0.612	0.095
2012	116	871.687	0.491	0.069
2013	107	815.653	0.570	0.112
2014	146	1069.054	0.562	0.171

According to tables and graphs above, the number of M&A deals fluctuated over the period of 1990 to 2014. The highest point was observed in 1998, reaching 430 deals, but consequently experiencing significant decline, halving during the 2000s. Even though the number of deals declined over time, the average size of deals increased considerably during this period. This suggests that although there were fewer deals, they tended to be larger in terms of monetary value. Furthermore, there has been a notable shift in the payment method for M&A deals. The share of M&A deals fully paid in stock declined significantly over time from 45% in 1990 to approximately 17% by 2014. This suggests that acquiring companies have increasingly favoured alternative payment methods, potentially involving cash or other financial instruments, instead of relying heavily on stock payment. On the other hand, the share of M&A deals for private companies as a target remained constant and fluctuated around 60%. This indicates that private companies have consistently been attractive targets for M&A transactions.

2.2 Model Results and Interpretation

2.2.1 Regression Table 1

From our regression model, we can examine the relationship between the acquirer's CAR and the method of payment. Specifically, our goal is to understand how the use of stock as a form of payment and the public or private status of the target company impact CAR.

Table II

Results of the first regressions

In the first regression table, our objective is to gain valuable insights into the relationship of how the use of stock as a form of payment, coupled with the public or private status of the target company, influences the Cumulative Abnormal Return (CAR). There's a total of three distinct models based on different sub-sample. Model 1 and Model 2 assess the impact of stock-based payments on CAR within specific contexts: public and private targets, respectively. Model 3 adopts a more comprehensive approach, by considering the entire dataset. It extends the analysis to include an interaction term that considers the interplay between all stock payments and public status of the company. Our finding's statistical significance is indicated by the standard annotation method for p-values by ***, **, and *, represent significance levels of 1%, 5% and 10%, respectively.

Variables	(1)	(2)	(3)
All Stock Payment	-0.021***	0.008**	0.008**
	t = -5.285	t = 2.057	t = 2.057
Public			-0.017***
			t = -5.652
Allstock:public			-0.028***
			t = -5.217
Constant	0.0002	0.017***	0.017***
	t = 0.107	t = 7.863	t = 7.863
Observations	2,385	2,769	5,154
R^2	0.013	0.002	0.028
Adjusted R^2	0.012	0.001	0.028

As we can see, all three models exhibit statistical significance with p-values less than 0.05. However, it's important to note that the adjusted R-squared values are relatively low across all models, indicating that the models explain only a small portion of the variance in CAR.

Notably, Model 3, which incorporates the interaction term between the payment method and public company status, displays the highest adjusted R-squared value. This implies that this model provides the most comprehensive explanation for the variance in CAR. The t-values for all three models are notably high, indicating their statistical significance. It's worth noting that the t-values decrease after the application of heteroskedasticity-corrected standard errors, indicating the presence of heteroskedasticity.

For Model 1, concerning public companies, the negative coefficient suggests that an increase in the payment of all stock is associated with a decrease in CAR. This is also established with the negative interaction term coefficients in Model 3. Public deals may experience a greater decrease in CAR when using stock as a payment method. In contrast, in Model 2, which focuses on private companies, an increase in stock-based payment is linked to an increase in CAR.

2.2.2 Regression Table 2

The second regressions show a highly significant relationship (at the 1% level) of the method of payment and the bidder's returns in the acquisition period. For the first model involving only public targets, this relationship seems to be negative, i.e. holding all else equal, buying the target in stocks yields a return to the bidders that is 1.9% lower than when buying in cash, while for the other models, this relationship is positive, that is, the return is higher when the target is bought with stock. This is also fairly highly economically significant, as the change of the payment method by one standard deviation is reflected by an absolute change in returns of 0.052 (model 3) to 0.098 (model 1) standard deviations.

Table III
Summary statistics of the variables included in the second regression

Variable	N	Mean	SD	10th pct	25th pct	50th pct	75th pct	90th pct
Bidder's CAR	5154	0.008	0.093	-0.11	-0.042	0.005	0.055	0.12
Binary: Bought in stock	5154	0.39	0.49	0	0	0	1	1
Value of acquisition	5154	531	1223	6.2	20	73	341	1475
Binary: Tender offer	5154	0.11	0.31	0	0	0	0	1
Relative offer size	5154	0.32	0.45	0.023	0.047	0.13	0.37	0.87
Bidders' free cash flows	5154	-0.004	0.18	-0.22	-0.011	0.045	0.086	0.13
Bidders' leverage	5154	0.15	0.17	0	0.002	0.097	0.26	0.4

This result might have severe implications for future acquisitions, as buying a public company in stocks has, all else equal, a significantly negative impact on the bidder's return.

Table IV

Results of the second regressions

The second regressions test whether the method of payment in acquisitions plays a role in the bidder's returns in the acquisition period, using several controls. The regressions are based on different subsets of deals: model 1 for public targets only, model 2 for private targets only, and model 3 and 4 for all deals. The payment method is indicated by a dummy variable Bought in stock, which is 1 if the payment is entirely in stocks. Other dummy variables are Public acquisition for public targets and Tender offer for tender offers. The value and relative size of the acquisition, as well as the bidder's free cash flows and leverage, are also included as explanatory variables. The t-statistics of the estimates are computed using heteroskedasticity-corrected standard errors and reported for each variable and each regression. The significance levels are marked by ***, **, and * for 1%, 5% and 10%, respectively.

Variables	(1)	(2)	(3)	(4)
Binary: Bought in stock	-0.019***	0.012***	0.010***	0.012***
	t = -4.527	t = 3.157	t = 2.632	t = 3.157
Binary: Public acquisition			-0.018***	-0.039***
			t = -4.569	t = -3.554
Log-transformed value of acq.	-0.006***	-0.002	-0.004***	-0.002
	t = -5.363	t = -1.636	t = -5.181	t = -1.636
Binary: Tender offer	0.009**	0.009	0.013***	0.009
	t = 2.349	t = 0.447	t = 3.427	t = 0.447
Log-transformed relative size	-0.0002	0.017***	0.009***	0.017***
	t = -0.134	t = 10.694	t = 8.063	t = 10.694
Bidders' free cash flow	0.016	0.009	0.009	0.009
	t = 1.005	t = 0.799	t = 0.967	t = 0.799
Bidder's leverage	0.037***	0.007	0.019**	0.007
	t = 3.252	t = 0.664	t = 2.357	t = 0.664
Bought in stock * public			-0.030***	-0.031***
			t = -5.308	t = -5.469
Public * Log-tf. value				-0.004**
				t = -2.219
Public * tender offer				0.00003
				t = 0.002
Public * Log-tf. rel. size				-0.018***
				t = -8.089
Public * free cash flow				0.007
				t = 0.368
Public * bidder leverage				0.029*
				t = 1.849
Constant	0.023***	0.062***	0.050***	0.062***
	t = 2.764	t = 8.795	t = 9.752	t = 8.795
Observations	2,385	2,769	5,154	5,154
R^2	0.031	0.052	0.047	0.065
Adjusted R^2	0.029	0.050	0.046	0.062

For the first and the third model, it can be seen that a 1% increase in the value of the acquisition leads to a 0.006% (model 1) or 0.004% (model 3) decrease in the return, while the estimate is not significant for the other models, which is also the case for the tender-offer binary variable, where a tender offer leads to a 0.9% (model 1) or 1.3% (model 3) higher return, all else equal.

A 1% increase in the relative size of the acquisition leads to a 0.017% (model 2, 4) or 0.009% (model 3) increase in returns, while model 1 does not show any significant relationship between these variables.

The bidder's leverage has a significant impact in models 1 and 3, where a 1 unit increase in leverage contributes to a 0.037% (model 1) and 0.019% (model 3) increase in returns.

We furthermore see a negative impact of about 3% on returns if a public company was bought in stocks in models 3 and 4. In model 4, we can also find that value and relative size have a significantly negative impact on the return if looking at a public firm compared to private firms, whereas tender offers and the bidders' free cash flow do not have any significant influence on the returns in an acquisition of a public firm. Bidder leverage, on the other hand, drives up returns by 2.9% per unit increase in leverage.

All models show a significantly positive constant, i.e. acquisitions of both private and public targets yield positive abnormal returns on average, with about 2.3% for public and 6.2% for private targets.

The last regression in regression table 2 is the most appropriate for estimating the effects of public ownership of targets, because it accounts for the differences in the coefficients of deal.allstock and its interactions with target.public and target.private across the first and second regressions in regression table 1. This implies that we should include those interactions that capture these differences in future regressions.

Although we have found significant results for the effect of the payment method on the value for bidder shareholders, we cannot necessarily conclude that this is the true, unbiased effect. We motivate this by referring to the graphics and the corresponding remarks at the beginning of our report. These graphics show that the preferred payment methods changed significantly during the observation period. However, the payment method may not be the factor that affects the bidder shareholders' value. Instead, there may be a coincidental comovement of the Cumulative Abnormal Returns and the preferred payment method that does not reflect the true population. In other words, there may be a simultaneous trend of a decline in payment in stocks and lower Cumulative Abnormal Returns that is not causal.

III. Conclusions and Recommendations

This report presents an empirical analysis of the impact of the payment method in mergers and acquisitions (M&A) on the value creation or destruction for the bidder shareholders, measured by the cumulative abnormal returns (CAR) around the announcement date. We use a sample of M&A deals from 1990 to 2014, and we control for other deal characteristics widely used in M&A literature, such as the target ownership (public or private). Our main finding is that the payment method is a significant determinant of the bidder CAR in all subsamples, and that it has different effects depending on the target ownership. Specifically,

we find that paying with stocks leads to lower CAR when acquiring public targets, and to higher CAR when acquiring private targets, holding other factors constant.

However, our report may not capture the true causal effect of the payment method on the bidder CAR, as the payment method might be subject to other factors that changed over time. This is evident from the graphics and the corresponding remarks at the beginning of our report, which show that there was a significant variation in the preferred payment method over the observation period. Therefore, we recommend that future research should investigate more deeply the underlying causes and consequences of the payment method choice and its relation to the bidder CAR.