Cash Flow Duration and M&A Activity*

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Abstract

This study examines how cash flow duration affects merger activity. Using a measure of cashflow duration at the firm level with balance sheet data, we show that cash flow duration is positively connected with acquisition deal attempts. Further, firms with higher cash flow duration show the significant preference of stock payments. The market reaction to the announcement of acquisition for firms with higher cash flow duration is negative in both short and long horizon analysis. Our evidence suggests that the association between cash flow duration and merger activity is mainly driven by stock market mispricing.

JEL classification: G34, G32

Key words: Mergers and acquisitions, Cash flow duration, Misvaluation

1. Introduction

Cash flow duration have received growing attention by the literature. In particular, a recently active debate has arisen over whether the association between cash flow duration and asset returns is driven by risk or mispricing. Weber (2018) shows that market participants are overly optimistic about the prospects of high-duration firms, resulting in their overvaluation. On the other hand, Gonçalves (2021a; 2021b) and Gormsen and Lazarus (2021) argue that the duration factor could be because of a risk premium near-term cash flows. Although the impact of cash flow duration on asset returns has implications for the discount rates in firms' decision making, past works has not directly tested the corporate real and financial policies resulting from their cash flow duration driven by risk or mispricing. We contribute to this literature by providing evidence how firms' cash flow duration leads to the decision to acquire another firm.

Our work is motivated by a large literature to focus on the driving forces behind acquisitions. Some studies argue that stock market misvaluation drives merger activity (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf, Robinson, and Viswanathan, 2005). They predict that if financial markets value firms incorrectly, overvalued firms are eager to make acquisitions of relatively undervalued firms. On the other hand, others suggest that firms confronted with high cash flow risk are more likely to vertically integrate for the purpose of risk management. Garfinkel and Hankins (2011) show that firms experiencing increases in cash flow volatility are more likely to engage in vertical mergers, which in aggregate drives merger waves. However, it is unclear whether cash flow duration affects the merger activity and the channels through which this relation works. In this study, using cash flow duration, we empirically test whether acquirers can exploit their overvalued equity to create value for acquiring firms' shareholders or they can use merger activity for their risk management.

The primary empirical predictions in our study are associated with two competing hypotheses of the relationship between cash flow duration and merger activity. First, misvaluation hypothesis proposes that bidders are more valued than their targets and overvalued bidders engage in stock acquisitions to exchange overvalued stocks for less overvalued assets. Consistent with the proposition, we conjecture that firms with higher cash flow duration are more likely to be an acquirer and have the significant preference of stock payments. Additionally, the market reaction to the announcement of acquisition for overvalued bidders measured by cash flow duration, can be negative in both short and long horizon analysis. On the other hand, risk management hypothesis asserts that mergers happen when the cash flow risk of bidders increases. Cash flow duration is positively related to equity risk measures including price volatility and equity beta (Dechow, Sloan, and Soliman, 2004). Thus, the risk management hypothesis provides us following testable predictions. As the first prediction, short-duration firms are more likely to engage in acquisitions to manage those risks, since they have higher exposures to cash flow risk or reinvestment risk. Also, short-duration firms are more likely to acquire long-duration firms to reduce the cash flow risk, when choosing a target firm. Regarding the market reaction to the announcement of acquisition, short-duration firms can have positive reaction in both short and long horizon analysis. These competing hypotheses of misvaluation and risk management channel can help to understand the relationship between cash flow duration and merger activity.

Using a sample of 3,850 M&A attempts over the period of 1981 to 2020, we find that cash flow duration is positively connected with acquisition deal attempts and firms with higher cash flow duration have the significant preference of stock payments. The market reaction to the announcement of acquisition for bidders with higher cash flow duration is negative in both short and long horizon analysis. Our evidence suggests that the association between cash flow duration and merger activity is mainly driven by misvaluation hypothesis. Further, the

relationship between cash flow duration and merger activity is more strengthened in periods of high investment sentiment and more pronounced for firms with weak outside monitoring, which supports the misvaluation hypothesis.

A large literature has considered firms' misvaluation as a driver of merger activity. Schleifer and Vishny (2003) argue that market valuation peak causes acquirers with overvalued stock to merge undervalued targets using their stocks. Rhodes-Kropf and Viswanathan (2004) theoretically show that target companies accept more bids from overvalued acquirers during bull markets since they overestimate synergies from acquisition deals. Using market-to-book ratios as market valuations, Rhodes-Kropf, Robinson, and Viswanathan (2005) find that merger activities occur when the market valuations are high compared to true valuations, which is consistent with Rhodes-Kropf and Viswanathan (2004). Ben-David, Drake, and Roulstone (2015) show that misvaluation measured by short interest, can cause the underperformance of stock bidders and the overperformance of cash bidders. On the other hand, Garfinkel and Hankins (2011) suggest firms' risk management can lead to the merger activity and find that firms with high cash flow volatility tend to merge vertically. This study uses cash flow duration as the measure of either misvalation or cash flow risk and examines whether the cash flow duration have influences on merger activities through misvaluation or risk management channel.

Our work joins a growing literature on the roles played by cash flow duration in explaining expected equity returns. Dechow, Sloan, and Soliman (2004) find that cash flow duration is positively related to equity risk measures including price volatility and equity beta. Weber (2018) show that average future stock returns are lower for higher duration equities and stock market participants overvalue long duration companies suggesting their lower returns. While Weber (2018) links cash flow duration to mispricing, Gonçalves (2021b) argues that the differential returns are explained by reinvestment risk. Also, Chen and Li (2020) and Gormsen

and Lazarus (2021) find that the short duration premium are associated with the cross-section anomalies of equity returns including value and profitability. Thus, there is mixed evidence on whether the short duration premium is determined by mispricing or risk. However, prior research has not analyzed the firms' financial decisions resulting from cash flow duration driven by risk or mispricing. Our work contributes to this literature by providing evidence that firms' cash flow duration leads to the decision to acquire another firm.

The rest of the paper is organized as follows. Section 2 describes our data and variables. Section 3 presents the main empirical tests and results, and Section 4 and 5 elaborate two competing hypotheses tests. Section 6 concludes this study.

2. Data and variables

2.1. Data

We obtain our M&A data from the Thomson Financial Securities Data Company (SDC) database. We begin with all M&A attempts between US public firms announced between January 1, 1981 and December 31, 2020. Following the previous studies on M&As (e.g., Luo, 2005), we apply a series of data filters: (1) a deal type must be classified as "disclosed value M&A," "leveraged buyout," "tender offer," or "exchange offer"; (2) the proposed deal value must be at least $1 million; (3) the potential acquirer must own less than 50% of the target firm's shares before the acquisition attempt and must seek to own more than 50% after the transaction; and (4) we exclude deals with hostile or unsolicited initial reception and all challenged deals. Appendix A explains our sample selection procedure in detail.

We also use several other databases. We obtain accounting data from the Compustat annual and quarterly files, stock market data from the Center for Research in Security Prices (CRSP), institutional ownership data from the Thomson Reuters 13F, and analyst earnings

forecasts data from the Institutional Brokers Estimates System (I/B/E/S). We form the sample for our investigation of the relation between cash flow duration and M&A activity by merging the M&A data with the universe of firms included in the Compustat-CRSP merged database. We require that the potential acquirer have accounting data available for the fiscal year preceding the M&A.

2.2. Variables

Our key explanatory variable is cash flow duration of equity, defined as the weighted average of the times until each cash flow from equity, similar in spirit to the traditional Macaulay duration for bonds. Unlike bond duration, however, the estimation of equity duration is not straightforward since the amount and timing of the cash flows from equity are unknown beforehand. To overcome such complication, we follow the approaches of Dechow, Sloan, and Soliman (2004) and Weber (2018). They divide the life of equity into two parts, a finite forecasting horizon and the remaining infinite period, and then forecast cash flows assuming clean surplus accounting and first-order autoregressive (AR(1)) processes for both returns on equity and growth in equity.

Specifically, we estimate the cash flow duration of firm i for year t, denoted by $CFD_{i,t}$, as

$$CFD_{i,t} = \frac{\sum_{s=1}^{T} s \times CF_{i,t+s}/(1+r)^s}{P_{i,t}} + \left(T + \frac{1+r}{r}\right) \times \frac{P_{i,t} - \sum_{s=1}^{T} CF_{i,t+s}/(1+r)^s}{P_{i,t}}, \quad (1)$$

where $CF_{i,t+s}$ is the cash flow of firm i at time $t+s$ and $P_{i,t}$ is price at time t. r is the expected return on equity. T is the length of a finite forecasting horizon. With the assumption of clean surplus accounting, cash flows can be measured as

$$CF_{i,t} = E_{i,t} - \left(BV_{i,t} - BV_{i,t-1}\right) = BV_{i,t-1} \times \left[\frac{E_{i,t}}{BV_{i,t-1}} - \frac{\left(BV_{i,t} - BV_{i,t-1}\right)}{BV_{i,t-1}}\right], \quad (2)$$

where $E_{i,t}$ is net income and $BV_{i,t}$ is the book value of equity. The returns on equity, $E_{i,t}/BV_{i,t-1}$, is assumed to have an AR(1) coefficient of 0.57 and a long-run mean of 0.12. The growth in equity, $\left(BV_{i,t} - BV_{i,t-1}\right)/BV_{i,t-1}$, is assumed to have an AR(1) coefficient of 0.24 and a long-run mean of 0.06. We assume that the cost of equity r is 0.12 and the length of a finite forecasting horizon T is ten years.

The cash flow duration estimated in this way is vulnerable to measurement error and has some large outliers (Ozdagli and Velikov, 2020). To mitigate the problems caused by such estimation error, we use the percentile rank of the cash flow duration within each yearly cross-section, instead of cash flow duration per se, throughout the paper.

When examining the relation between cash flow duration and M&A activity, we control for the two sets of variables previously documented to be associated with M&A activity. One set of control variables captures the firm-specific characteristics, including market-to-book ratio, past 12-month returns, leverage, cash scaled by asset, sales scaled by asset, return on asset, and cash flow volatility. The other set of control variables captures the M&A deal characteristics, including deal value and indicators for a lockup condition, tender offers, and the presence of termination fees. The definitions of these variables are provided in Appendix B.

2.3. Descriptive statistics

We form the two types of samples: the full sample and the M&A sample. The full sample consists of 152,632 firm-year observations in the Compustat-CRSP merged database with the cash flow duration being estimated. The M&A sample comprises 3,850 M&A attempts

screened as described in Appendix A. Table 1 reports the descriptive statistics of the full sample and the M&A sample in Panels A and B, respectively. Panel A shows that the average firm in the full sample has a cash flow duration of 17.49 years, a market-to-book ratio of 3.22, and a total asset of $1.56 billion. Of the full sample of firm-year observations, only about 2.3% show acquisitions, as indicated by the mean value of Acquisition dummy. Panel B shows that acquirers in the M&A sample, on average, have a cash flow duration of 17.55 years, a market-to-book ratio of 3.96, and a total asset of $7.45 billion. Compared with the average firm in the full sample, acquirers in the M&A sample are larger, have higher cash flow duration and market-to-book ratios, and experience greater past performance and profitability.

[Table 1 about here]

Panel B also presents the deal characteristics for our sample M&A deals. The mean deal value is $1.44 billion and the median is $0.15 billion. Since the deal value is highly right-skewed, we take the logarithm of the deal size for our analysis. When acquirers pay for an M&A, they can pay the deal by stock only, cash only, or a combination of the two. Of 3,850 deals, 35.4% are paid in stock only, 28.1% in cash only, and the remaining in both. The market reaction to the M&A announcement is measured with the buy-and-hold abnormal returns (BHAR) over the trading days [-1, +1] around the M&A announcements. The mean BHARs for acquiring and target firms are -1.0% and 24.9%, respectively. This confirms a well-documented phenomenon in the M&A literature that the market tends to react to M&A announcements negatively for acquirers but positively for target firms.

Panel C shows that cash flow duration is positively correlated with market-to-book ratio. In addition, high cash flow duration is associated with low return on asset, but high cash flow volatility. These correlations are in line with those reported in Weber (2018).

3. Empirical results for the main hypotheses

We examine the relation between firms' cash flow duration and their merger activity in three main aspects: the likelihood of being an acquirer, means of payment, and valuation consequences.

3.1. Acquisition likelihood

We begin by investigating whether cash flow duration determines a firm's decision to engage in acquisition. Using the full sample of all Compustat firms with available data, we estimate the following probit model to investigate the relation between cash flow duration and firm acquisitiveness:

$$Pr(Acq\_dum_{i,t} = 1) = \Phi\left(\gamma_0 + \gamma_1 \, CFD_{i,t-1} + \phi' \boldsymbol{Z}_{i,t-1} + Y_t + I_k + \varepsilon_{i,t}\right), \quad (3)$$

where $Acq\_dum_{i,t}$ is an indicator that equals one if firm i makes at least one acquisition announcement in year t, and zero otherwise. $CFD_{i,t-1}$ is the cash flow duration, and $\boldsymbol{Z}_{i,t-1}$ is a vector of firm-level control variables, including market-to-book ratio, firm size, past performance, leverage, cash-to-asset ratio, sales-to-asset ratio, and return-on-asset. Firm-level variables are measured for the fiscal year ending in the previous calendar year. We further control for common time and industry factors that could affect acquisitiveness by including year fixed effects Y_t and industry fixed effects I_k in the regressions.[1] The industry classification for the fixed effect is based on Fama and French's (1997) 48 groupings.

[Table 2 about here]

[1] Since our sample covers both hot and cold M&A periods, M&A attempts cluster during the merger waves of the late 1990s and generally decline thereafter, as shown in Appendix C. Previous studies having the neoclassical economic view explain the merger waves based on technological, regulatory, or economic shocks to industries (see, for example, Harford, 2005). We control for such waves and industry-level shocks by including the year and industry fixed effects in our main analyses. In the Online Appendix, we repeat all the analyses without the fixed effects and find similar results.

Table 2 reports the estimated coefficients from the probit regressions with the corresponding z-statistics. We calculate z-statistics based on heteroscedasticity-robust standard errors clustered by firms. Column (1) shows that cash flow duration has a positive coefficient of 0.214, highly statistically significant. The marginal effect associated with this coefficient suggests that a one-standard-deviation increase in the duration from its mean is associated with a 0.3% increase in acquisition likelihood.[2] This effect is economically significant considering that the unconditional probability of announcing an acquisition is 2.3%.

Such effect of cash flow duration is not subsumed by the market-to-book ratio, a commonly used proxy for market valuation. Column (2) shows the market-to-book ratio is positively associated with acquisition likelihood, confirming that overvalued firms captured by high market-to-book ratios are more likely to engage in acquisition.[3] We control for this market-to-book effect in Column (3) and find that the coefficient of the cash flow duration is somewhat reduced to 0.206, but still highly significant both statistically and economically. Lastly, we further control for a decomposed market-to-book ratio. Rhodes-Kropf, Robinson, and Viswanathan (2005) propose a decomposition the breaks the market-to-book ratio into three components: firm-specific, sector-wide, and long-run components. When we control for such decomposed market-to-book ratios in Column (5), we still find that the cash flow duration is a significant determinant of firm acquisitiveness. The results reported in Table 2 support the misvaluation hypothesis that high cash flow duration is associated with a higher likelihood of being an acquirer in the following year.

[2] The marginal effect estimate of the cash flow duration is 0.011 and a standard deviation of the duration is 0.272 in the full sample. The multiplication of the two results in 0.299%.

[3] For comparison, the marginal effect associated with the coefficient of the market-to-book ratio (i.e., 0.010) suggests that a one standard deviation increase in the market-to-book ratio from its mean is associated with a 0.4% increase in acquisition likelihood.

3.2. Method of payment

To examine the effect of cash flow duration on the payment method for M&A transactions, we conduct three different types of analyses in Table 3. First, we use the full sample and examine how cash flow duration of firms is related to their decision to engage in a stock merger. Since the payment method is observed only for firms which first decide to carry out an acquisition, this type of analysis is subject to a selection concern. To mitigate this issue, we estimate a two-stage Heckman model to control for the decision to engage in an acquisition in the first stage, and then explain the method of payment in the second stage. The first stage models the decision to announce an acquisition, similar to the analysis in Table 2. The second stage models the choice of the payment method. For identification purposes, we choose cash flow volatility as instrument for the endogenous selection based on Garfinkel and Hankins' (2011) finding that cash flow uncertainty encourages firms to engage in acquisitions. Since cash flow volatility is unlikely to affect the method of payment, it satisfies the exclusion restriction.

Panel A of Table 3 presents the estimation results from the second stage of the Heckman model. The dependent variable in the second stage is a dummy variable which takes the value of one if the payment for M&A deals is fully in stock, and zero otherwise. Across all specifications, the coefficients of cash flow duration are significantly positive, indicating that high duration firms are more likely to engage in stock mergers. Economically, the influence of cash flow duration on the payment method appears important. The marginal effects associated with the estimated coefficients of cash flow duration, 0.355–0.414, imply that a one-standard-deviation increase in cash flow duration from its mean is associated with a 1.33–1.58% increase in the likelihood of a stock merger. Given an unconditional probability of 0.8% for a stock merger in any firm-year observation, this effect is economically large.

[Table 3 about here]

Second, we use the M&A sample, instead of full sample, and then estimate a probit model in which the dependent variable is a stock merger dummy variable. Since our sample consists of deal-level observations now, we control for various deal characteristics as well as firm-specific characteristics that could affect the payment method. Panel B reports the estimation results from the probit model. The coefficients of cash flow duration range from 0.478 to 0.542, all statistically significant at the 1% level. The economic magnitude is also significant. The marginal effects associated with these coefficients imply that a one-standard-deviation increase in cash flow duration is associated with a 3.0–3.4% increase in the likelihood of a stock merger.

Lastly, we estimate a Tobit model with the proportion of stock payment using the M&A sample. Panel C shows that in all specifications, cash flow duration has significantly positive coefficients, ranging from 0.533 to 0.623. These coefficients imply economically significant marginal effects: a one-standard-deviation increase in cash flow duration is associated with a 12.5–14.6% increase in the proportion of stock payment. Thus, regardless of model specifications, the results in Table 3 uniformly show that high duration firms are more likely to choose stock payment as opposed to cash payment, thereby supporting the misvaluation hypothesis.

3.3. Stock market performance

We gauge the effect of cash flow duration on acquirer shareholder value both in the short run and long run. We measure the short-run valuation effect via acquirers' BHAR over the trading days [-1, +1] around M&A announcements: the normal returns are estimated using the Fama and French's (1993) three-factor model. In Table 4, we regress the acquirer three-day BHARs on cash flow duration and a set of control variables known to affect the M&A

announcement returns. Columns (1) and (2) show that cash flow duration has a significantly negative coefficient of -0.051, indicating that high duration firms experience more negative abnormal returns around the acquisition announcements than low duration firms. The negative relation between cash flow duration and announcement returns is driven by stock mergers. When we regress the acquirers' BHARs separately by the payment method in Columns (3)-(8), we find that the coefficient of cash flow duration is significantly negative only for stock mergers. It is even positive, though insignificant, for cash mergers. The coefficients of cash flow duration for stock mergers, -0.089 and -0.086, indicate that a one-standard-deviation increase in cash flow duration is associated with a decrease of 2.0–2.1% in acquirers' three-day BHARs. Thus, the results in Table 4 suggest that the stock market reacts more negatively to announcements of stock mergers by higher duration firms. In the Online Appendix, we examine the corresponding BHARs of target firms and find no evidence of a meaningful relation between cash flow duration and target firms' stock price reaction at M&A announcements.

[Table 4 about here]

We next turn to the long-run valuation effect. We measure two- and three-year BHARs of acquiring firms as the difference between the acquirer's buy-and-hold return over two (or three) years after the deal completion and that of a matched firm from the same industry and of similar sizes and book-to-market ratios (Barber and Lyon, 1996; Lyon, Barber, and Tsai, 1999). In Table 5, we run the regressions of two- and three-year BHARs of acquriers in Panels A and B, respectively. Columns (1) and (2) of Panel A show that the coefficients of cash flow duration are -0.541 and -0.557, significant at the 5% level. This suggests that high duration acquirers exhibit poorer stock performance in the long-run. The separate regressions by the method of payment in Columns (3) to (8) reveal that the negative relation between cash flow

duration and acquirer long-run stock performance is largely driven by stock mergers. The coefficients of cash flow duration more than double to -1.167 and -1.244 for stock mergers, implying that a one-standard-deviation increase in cash flow duration is associated with a decrease of 27.2–29.0% in acquirers' two-year BHARs. On the contrary, the coefficients of cash flow duration are not significantly different from zero for mixed and cash mergers. We find similar results for three-year BHARs in Panel B. Thus, the results in Table 5 suggests that acquisitions by high duration firms are value-decreasing in the long-run, especially for stock mergers. We confirm this using the calendar-time portfolio approach in the Online Appendix.

[Table 5 about here]

4. Additional tests for the misvaluation hypothesis

4.1. Variation with investor sentiment

We investigate whether the relation between cash flow duration and M&A activity documented in Section 4 varies with investor sentiment. In periods of high investor sentiment, investors tend to have an overly optimistic view, especially about the future of hard-to-value firms, exacerbating any overpricing (Baker and Wurgler, 2006; Stambaugh, Yu, and Yuan, 2012). If a market mispricing explanation is at the core of the relation between cash flow duration and merger activity, such relation should be stronger during periods of high investor sentiment.

To examine the variation with investor sentiment, we obtain the monthly data of Baker and Wurgler's (2006) sentiment index from Jeffrey Wurgler's website and take an average to obtain yearly value following Mclean and Zhao (2014). We identify the low (high) sentiment period as the one in which the sentiment index is below (above) its sample median as in Stambaugh, Yu, and Yuan (2012). We then repeat the analyses in Section 4 for each period. In

Panel A of Table 6, we run the Table 2 probit regressions about the acquisition likelihood separately for high and low sentiment periods. We find that the coefficient of cash flow duration is positively significant during the high sentiment period but insignificant during the low sentiment period, indicating that the positive relation between cash flow duration and acquisition likelihood is more pronounced during the high sentiment period. In panel B, we run the Table 3 probit and tobit regressions about the payment method separately for high and low sentiment periods. Again, we find that the coefficients of cash flow duration are significantly positive during the high sentiment period but negative and insignificant during the low sentiment period, suggesting a greater tendency of high duration firms towards stock mergers during the high sentiment period. In Panel C, we run the Table 4 regression of three-day BHARs in Columns (1) and (2), and the Table 5 regression of three-year BHARs in Columns (3) and (4). In both short-run and long-run performance regressions, the cash flow duration has significantly negative coefficients only during the high sentiment period, suggesting that acquisitions by high duration firms are more value-reducing during the high sentiment period. Thus, the results in Table 6 show that the duration–M&A relation found in Section 4 becomes stronger during the high sentiment period, lending credence to the misvaluation hypothesis.

[Table 6 about here]

4.2. Variation with outside monitoring

We next examine how the duration–M&A relation varies with outside monitoring. Managers of firms with weaker outside monitoring are more likely to invest in poor projects. If the duration–M&A relation is due to managers of high duration firms exploiting overvalued stocks, the relation should be stronger for firms with weaker outside monitoring. Institutional ownership and analyst coverage are considered as an effective governance mechanism in

monitoring managers (see, for example, Cremers and Nair, 2005; Yu, 2008). Thus, we predict that the duration–M&A relation should be stronger for acquirers with low institutional ownership and analyst coverage.

In Table 7, we calculate institutional ownership ratio as the percentage of outstanding shares of equity held by institutional investors. We divide the sample into high and low groups based on top 30% and bottom 30% values of institutional ownership and repeat the analyses in Section 4 for each subsample. Panels A, B, and C show the impacts of cash flow duration on the acquisition likelihood, payment method, and stock market performance, respectively. For acquirers with low institutional holdings, high cash flow durations are significantly associated with high firm acquisitiveness, preference for stock payment, and poor stock market performance following M&As. By contrast, for acquirers with high institutional holdings, cash flow duration is no longer significantly associated with the M&A decisions.

[Table 7 about here]

In Table 8, we measure analyst coverage by the number of financial analysts following the firm as reported in I/B/E/S. As in Table 7, we examine the impacts of cash flow duration on the acquisition likelihood, payment method, and stock market performance separately for high and low groups of analyst coverage in Panels A, B, and C, respectively. We find that high cash flow durations are significantly associated with high firm acquisitiveness, preference for stock payment, and poor post-M&A performance for acquirers with low analyst coverage, but not for acquirers with high analyst coverage. Thus, the results in Tables 7 and 8 show that our finding of the duration–M&A relation is especially noticeable for acquirers with weaker outside monitoring, lending further support to the misvaluation hypothesis.

[Table 8 about here]

4.3. Valuation of acquirers versus targets

Shleifer and Vishny (2003) propose that firms having overvalued stock acquire less overvalued firms using their stocks as currency. Given that high cash flow duration indicates overvaluation, this leads to the prediction that acquirers should have higher cash flow durations than target firms in case of stock mergers. To test this prediction, we compare the valuation between acquirers and target firms by the method of payment in Table 9. Panel A shows that in case of stock mergers, the mean cash flow duration ranks for acquirers and targets are 0.579 and 0.548, respectively. A difference of 0.031 is statistically significant at the 1% level using a paired t-test (t-statistic=3.015), suggesting that stock acquirers tend to have higher cash flow durations than the target firms. By contrast, Panels B and C, where we focus on mixed and cash mergers respectively, show that the mean cash flow duration of acquirers is no longer higher than that of target firms. Rather, target firms appear to have higher cash flow durations than acquirers, though their difference is not statistically different from zero.

[Table 9 about here]

Such pattern in cash flow duration is remarkable since other valuation proxies do not make a difference by the payment method. The market-to-book ratio and its firm-specific and sector-wide components have higher means for acquirers in all panels, indicating that acquirers have higher valuation than their targets regardless of the payment method. Also, motivated by the Ben-David, Drake, and Roulstone's (2015) argument that short interest is a good proxy for overvaluation, we compare short interests between acquirers and targets and find that short interest has higher means for acquirers not only for stock mergers but also for the mixed deals.[4]

[4] We also examine whether our finding of the duration-M&A relation is subsumed by the short interest effect documented in Ben-David, Drake, and Roulstone (2015). To do so, we repeat all the analyses of Section 4 after controlling for short interest in the Online Appendix. We confirm that our finding is robust to the short interest effect.

Thus, unlike the market-to-book ratio and short interest which indicate higher valuation of acquirers for all types of mergers, cash flow duration exhibits higher valuation of acquirers only for stock mergers, more consistent with the misvaluation hypothesis.

5. Additional tests for the risk-management hypothesis

In this section, we conduct two additional tests about the risk-management hypothesis. First, we examine how the cash flow duration of acquirers is related to that of target firms. If firms engage in acquisitions to manage duration-related risks, low duration firms should choose to acquire high duration firms to neutralize their low duration. Thus, the risk-management hypothesis predicts that the duration of acquirers is negatively related to that of target firms. To test this prediction, we run the regression of target firms' duration on acquirers' duration in Panel A of Table 10. The first two columns show a significantly positive relation between duration of acquirers and that of target firms regardless of fixed effect controls, which contradicts the prediction. Since the relation may not be monotonic, we regress target firms' duration on a set of indicator variables for the quintiles of acquirers' duration in the last two columns. We still find a monotonic positive association between durations of acquirers and targets, contrary to the prediction.

[Table 10 about here]

Second, we investigate the changes in acquirers' cash flow duration around M&As. If firms manage duration-related risks via M&As, duration of an acquirer with previously low duration would increase after the M&A, while duration of an acquirer with previously high duration would decrease after the M&A. In Panel B of Table 10, we report acquirers' average durations before and after M&As for the full group as well as separately for five groups divided by their pre-M&A duration. We measure pre-M&A duration for the fiscal year ending in the

calendar year prior to M&A announcements and post-M&A duration for the fiscal year ending one year after the deal completion. Panel B.1 shows that average durations of acquirers in the first three pre-M&A duration quintiles increase after the M&A, while those in the last two quintiles decrease after the M&A. But, as shown in Panel B.2, this pattern is common to the control group which comprises firms that do not engage in any mergers, matched on industry and pre-M&A cash flow duration. Panel B.3 shows that compared with the control group, acquirers experience an increase in the duration following M&As, regardless of their previous duration level. This pattern is not well explained by the risk-management hypothesis. Overall, we do not find much support for the risk-management hypothesis.

6. Conclusion

This study examines the effects of cash flow duration on merger activity. According to asset pricing literature, investors seem to overvalue long-duration firms, or they require the higher premium of short-duration firms to compensate for the short cash flow or reinvestment risk. This finding can be extended to firms' financing decisions including M&A decisions. Our study highlights the role of cash flow duration in explaining firms' merger activities and thus call for more attention to be given to misvaluation or risk management channel when assessing their M&A decisions. Our empirical finding is consistent with the misvaluation channel. We find that cash flow duration is positively connected with acquisition deal attempts, and firms with higher cash flow duration have the significant preference of stock payments. The market reaction to the announcement of acquisition for firms with higher cash flow duration is negative in both short and long horizon analysis.

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Table 1. Summary Statistics

The full sample includes all Compustat firms with relevant annal data from 1980 to 2020. The M&A sample includes all merger activity between US public firms announced from 1981 to 2020, obtained from the Thomson Financial SDC M&A database. We apply a series of data filters, which are described in detail in Appendix A. The table reports the number of observations, means, quartiles, and standard deviations of various firm and M&A deal characteristics for the full and M&A samples in Panels A and B, respectively. Panel C reports pairwise correlations of the variables for the full sample. A detailed definition of each variable is provided in Appendix C.

Panel A: Full Sample

	Obs.	Mean	P25	Median	P75	Std. Dev.
Cash flow duration	152,632	17.494	14.886	16.819	18.707	9.772
Market-to-book ratio	145,332	3.223	1.134	1.960	3.525	4.178
Log (Market-to-book)	145,332	0.719	0.126	0.673	1.260	0.904
Log (Market-to-book), Firm	144,299	-0.005	-0.454	-0.024	0.429	0.740
Log (Market-to-book), Sector	144,299	0.071	-0.097	0.102	0.278	0.312
Log (Market-to-book), Long-run	144,299	0.653	0.413	0.678	0.919	0.457
Total assets ($ billion)	152,632	1.560	0.031	0.134	0.685	5.668
Past 12-month returns	151,168	0.125	-0.268	0.029	0.357	0.635
Leverage	152,626	0.233	0.038	0.194	0.361	0.217
Cash-to-asset ratio	152,610	0.179	0.026	0.089	0.251	0.214
Sales-to-asset ratio	152,632	1.163	0.567	1.031	1.560	0.833
ROA	152,632	-0.007	-0.029	0.064	0.126	0.274
Cash flow volatility	92,066	0.072	0.029	0.048	0.089	0.068
Acquisition dummy	152,632	0.023	0.000	0.000	0.000	0.150
All stock dummy	152,632	0.008	0.000	0.000	0.000	0.090

Panel B: M&A Sample

	Obs.	Mean	P25	Median	P75	Std. Dev.
Acquirer characteristics						
Cash flow duration	3,850	17.551	15.601	17.114	18.295	6.151
Market-to-book ratio	3,737	3.961	1.531	2.602	4.405	4.505
Log (Market-to-book)	3,737	0.993	0.426	0.956	1.483	0.839
Log (Market-to-book), Firm	3,737	0.195	-0.216	0.151	0.592	0.663
Log (Market-to-book), Sector	3,737	0.129	-0.058	0.161	0.346	0.326
Log (Market-to-book), Long-run	3,737	0.668	0.432	0.700	0.918	0.412
Total assets ($ billion)	3,850	7.450	0.209	1.046	4.174	21.708
Past 12-month returns	3,833	0.271	-0.098	0.167	0.479	0.662
Leverage	3,849	0.226	0.068	0.197	0.338	0.191
Cash-to-asset ratio	3,850	0.171	0.031	0.093	0.247	0.192
Sales-to-asset ratio	3,850	0.935	0.425	0.809	1.240	0.724
ROA	3,850	0.052	0.015	0.084	0.144	0.181
Cash flow volatility	2,396	0.065	0.028	0.046	0.083	0.056
Deal characteristics						
Deal value ($ billion)	3,850	1.442	0.037	0.154	0.688	6.366
All stock dummy	3,850	0.354	0.000	0.000	1.000	0.478

All cash dummy	3,850	0.281	0.000	0.000	1.000	0.449
Stock payment %	3,850	46.030	0.000	37.700	100.000	46.020
Lockup dummy	3,850	0.110	0.000	0.000	0.000	0.313
Tender dummy	3,850	0.181	0.000	0.000	0.000	0.385
Termination fee dummy	3,850	0.168	0.000	0.000	0.000	0.374
Acquirer BHAR(-1, +1)	3,836	-0.010	-0.073	-0.013	0.041	0.138
Target BHAR(-1, +1)	2,844	0.249	0.051	0.197	0.375	0.342
Acquirer 1-year BHAR	2,186	-0.012	-0.277	-0.033	0.218	0.613
Acquirer 2-year BHAR	2,186	-0.023	-0.428	-0.083	0.278	1.098
Acquirer 3-year BHAR	2,186	-0.037	-0.556	-0.132	0.336	1.276

Panel C: Pairwise Correlations in the Full Sample

	Cash flow duration	Market-to-book	Total assets	Past 12-month returns	Leverage	Cash-to-asset ratio	Sales-to-asset ratio	ROA
Market-to-book	0.109							
Total assets	-0.020	0.045						
Past 12-month returns	-0.049	0.228	0.004					
Leverage	0.047	0.073	0.068	-0.080				
Cash-to-asset ratio	0.118	0.185	-0.098	0.040	-0.396			
Sales-to-asset ratio	-0.101	-0.071	-0.084	0.033	-0.024	-0.278		
ROA	-0.236	-0.171	0.091	0.230	-0.035	-0.267	0.208	
Cash flow volatility	0.165	0.139	-0.135	-0.028	0.060	0.237	-0.080	-0.343

Table 2. Cash Flow Duration and Acquisition Activity

The table presents the estimated coefficients from the probit regression of acquisition attempts. The dependent variable equals one if a firm makes at least one acquisition announcement in a given year, and zero otherwise. The explanatory variables are measured for the fiscal year ending in the previous calendar year. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are z-statistics based on heteroscedasticity-robust standard errors clustered by firms. The last row gives the pseudo-R^2 from the probit regressions. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)
Cash flow duration	0.214***		0.206***		0.141***
	(5.61)		(5.02)		(3.27)
Market-to-book		0.010***	0.007***		
		(4.85)	(3.29)		
Market-to-book (firm)				0.087***	0.067***
				(6.46)	(4.65)
Market-to-book (sector)				0.049	0.034
				(1.34)	(0.92)
Market-to-book (long-run)				0.103***	0.095***
				(4.77)	(4.32)
Ln (Total assets)	0.202***	0.201***	0.202***	0.199***	0.200***
	(32.69)	(32.03)	(32.29)	(31.64)	(31.92)
Past 12-month returns	0.108***	0.097***	0.093***	0.079***	0.081***
	(8.85)	(7.42)	(7.12)	(5.79)	(5.93)
Leverage	-0.274***	-0.262***	-0.278***	-0.267***	-0.278***
	(-5.41)	(-4.70)	(-5.00)	(-4.84)	(-5.04)
Cash-to-asset ratio	0.162***	0.162***	0.149**	0.127**	0.124**
	(2.91)	(2.82)	(2.58)	(2.20)	(2.14)
Sales-to-asset ratio	-0.041***	-0.046***	-0.045***	-0.051***	-0.050***
	(-2.71)	(-2.91)	(-2.85)	(-3.19)	(-3.16)
ROA	-0.042	-0.087*	-0.016	-0.097**	-0.044
	(-0.81)	(-1.77)	(-0.30)	(-2.05)	(-0.83)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	146,230	140,976	140,976	140,976	140,976
Pseudo R^2	0.107	0.107	0.108	0.108	0.109

Table 3. Cash Flow Duration and Method of Payment

Panel A uses the full sample and reports the estimation results from Heckman selection model in which the dependent variable equals one if a firm makes an acquisition paid fully in stock in a given year, and zero otherwise. The remaining panels use the M&A sample only and report the estimation results from probit and Tobit models. Panel B presents the estimation results from the Probit model in which the dependent variable takes the value of one if the payment for an M&A deal is fully in stock, and zero otherwise. Panel C reports the estimation results from the Tobit model in which the dependent variable is the percentage of stock payment. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are z-statistics based on heteroscedasticity-robust standard errors clustered by firms. The last row gives the pseudo-R^2. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: Full sample, Heckman (Dependent variable: All stock payment dummy)

	(1)	(2)	(3)	(4)	(5)
Cash flow duration	0.414***		0.355**		0.370**
	(2.99)		(2.49)		(2.38)
Market-to-book		0.010	0.005		
		(1.51)	(0.79)		
Market-to-book (firm)				0.079*	0.024
				(1.86)	(0.51)
Market-to-book (sector)				0.274***	0.257***
				(3.28)	(3.00)
Market-to-book (long-run)				-0.102*	-0.127**
				(-1.75)	(-2.14)
Ln (Total assets)	-0.224***	-0.226***	-0.226***	-0.237***	-0.235***
	(-18.09)	(-18.57)	(-18.07)	(-18.47)	(-18.02)
Past 12-month returns	-0.002	0.017	0.009	-0.011	-0.008
	(-0.04)	(0.42)	(0.22)	(-0.27)	(-0.18)
Leverage	0.101	0.088	0.056	0.124	0.096
	(0.67)	(0.56)	(0.34)	(0.80)	(0.60)
Cash-to-asset ratio	-0.358**	-0.354**	-0.368**	-0.345**	-0.353**
	(-2.25)	(-2.25)	(-2.27)	(-2.15)	(-2.15)
Sales-to-asset ratio	0.008	0.012	0.010	0.027	0.027
	(0.25)	(0.36)	(0.30)	(0.81)	(0.81)
ROA	-0.227	-0.407**	-0.255	-0.429**	-0.259
	(-1.44)	(-2.27)	(-1.43)	(-2.38)	(-1.45)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	90,139	86,876	86,876	86,876	86,876
Pseudo R^2	0.012	0.012	0.013	0.013	0.014

Panel B: M&A sample, Probit (Dependent variable: All stock payment dummy)

	(1)	(2)	(3)	(4)	(5)
Cash flow duration	0.537***		0.542***		0.478***
	(3.95)		(3.75)		(3.01)
Market-to-book		0.015**	0.008		
		(2.07)	(1.14)		
Market-to-book (firm)				0.140***	0.072
				(2.99)	(1.39)
Market-to-book (sector)				0.187	0.129
				(1.52)	(1.05)
Market-to-book (long-run)				-0.052	-0.068
				(-0.69)	(-0.91)
Ln (Total assets)	-0.158***	-0.159***	-0.157***	-0.163***	-0.160***
	(-7.84)	(-7.82)	(-7.66)	(-7.98)	(-7.79)
Past 12-month returns	0.096**	0.096**	0.085*	0.072	0.075*
	(2.39)	(2.21)	(1.94)	(1.60)	(1.66)
Leverage	-0.590***	-0.656***	-0.681***	-0.631***	-0.653***
	(-3.52)	(-3.61)	(-3.77)	(-3.46)	(-3.62)
Cash-to-asset ratio	-0.169	-0.185	-0.187	-0.200	-0.188
	(-0.99)	(-1.05)	(-1.06)	(-1.12)	(-1.05)
Sales-to-asset ratio	-0.136***	-0.143***	-0.142***	-0.129***	-0.129***
	(-2.85)	(-2.96)	(-2.93)	(-2.61)	(-2.62)
ROA	-0.455**	-0.608***	-0.366**	-0.718***	-0.473**
	(-2.50)	(-3.45)	(-1.97)	(-3.98)	(-2.43)
Ln (Deal value)	0.084***	0.082***	0.079***	0.077***	0.077***
	(4.33)	(4.13)	(3.95)	(3.85)	(3.84)
Lockup dummy	0.510***	0.513***	0.509***	0.516***	0.514***
	(5.97)	(5.90)	(5.84)	(5.92)	(5.88)
Tender dummy	-1.428***	-1.497***	-1.489***	-1.491***	-1.487***
	(-14.50)	(-14.88)	(-14.81)	(-14.82)	(-14.79)
Termination fee dummy	0.317***	0.326***	0.330***	0.331***	0.331***
	(4.74)	(4.80)	(4.86)	(4.87)	(4.87)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	3,677	3,589	3,589	3,589	3,589
Pseudo R^2	0.270	0.273	0.276	0.275	0.277

Panel C: M&A sample, Tobit (Dependent variable: Stock payment proportion)

	(1)	(2)	(3)	(4)	(5)
Cash flow duration	0.605***		0.623***		0.533***
	(3.65)		(3.49)		(2.75)
Market-to-book		0.014*	0.006		
		(1.71)	(0.71)		
Market-to-book (firm)				0.162***	0.083
				(3.00)	(1.39)
Market-to-book (sector)				0.164	0.094
				(1.19)	(0.69)
Market-to-book (long-run)				-0.119	-0.137
				(-1.33)	(-1.55)
Ln (Total assets)	-0.279***	-0.282***	-0.278***	-0.285***	-0.281***
	(-10.42)	(-10.34)	(-10.23)	(-10.50)	(-10.36)
Past 12-month returns	0.108**	0.119**	0.105*	0.086	0.089
	(2.14)	(2.18)	(1.92)	(1.53)	(1.59)
Leverage	-0.586***	-0.630***	-0.661***	-0.594***	-0.624***
	(-3.05)	(-2.93)	(-3.11)	(-2.79)	(-2.96)
Cash-to-asset ratio	-0.173	-0.168	-0.180	-0.177	-0.171
	(-0.86)	(-0.80)	(-0.86)	(-0.84)	(-0.81)
Sales-to-asset ratio	-0.203***	-0.212***	-0.208***	-0.187***	-0.186***
	(-3.61)	(-3.66)	(-3.63)	(-3.19)	(-3.20)
ROA	-0.825***	-1.043***	-0.751***	-1.148***	-0.862***
	(-3.58)	(-4.61)	(-3.14)	(-5.03)	(-3.46)
Ln (Deal value)	0.252***	0.252***	0.249***	0.247***	0.247***
	(10.26)	(9.98)	(9.89)	(9.80)	(9.81)
Lockup dummy	0.694***	0.700***	0.693***	0.697***	0.694***
	(6.21)	(6.17)	(6.11)	(6.15)	(6.11)
Tender dummy	-2.066***	-2.127***	-2.112***	-2.111***	-2.104***
	(-17.43)	(-17.45)	(-17.49)	(-17.43)	(-17.45)
Termination fee dummy	0.492***	0.501***	0.502***	0.502***	0.501***
	(6.60)	(6.55)	(6.59)	(6.58)	(6.59)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	3,768	3,678	3,678	3,678	3,678
Pseudo R^2	0.263	0.265	0.267	0.267	0.268

Table 4. Cash Flow Duration and Acquirer Stock Price Reaction at M&A Announcements

This table presents the estimation results from the regressions of M&A announcement returns. The dependent variable is the acquirer three-day BHAR measured over day -1 to day +1 centered on the announcement date. When calculating the abnormal returns, we use Fama and French's (1993) three-factor model to estimate the normal returns. Columns (1) and (2) use all types of deals and the remaining columns use the subsamples of the deals classified by method of payment: all stock, mixed, and all cash deals, in turn. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are t-statistics based on heteroscedasticity-robust standard errors clustered by firms. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

	All		By Method of Payment					
			All stock		Mixed		All cash	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash flow duration	-0.051***	-0.051**	-0.089***	-0.086***	-0.043	-0.045	0.032	0.040
	(-2.71)	(-2.46)	(-2.81)	(-2.92)	(-1.41)	(-1.28)	(1.12)	(0.84)
Market-to-book	0.005		0.106		-0.108		-0.199	
	(0.08)		(0.98)		(-0.90)		(-1.34)	
Market-to-book (firm)		0.000		0.368		-0.443		-1.131
		(0.00)		(0.32)		(-0.45)		(-0.65)
Market-to-book (sector)		0.096		0.341		2.575		-7.933**
		(0.07)		(0.15)		(1.17)		(-2.20)
Market-to-book (long-run)		2.712***		3.539***		1.475		1.617
		(3.27)		(2.68)		(1.25)		(0.58)
Ln (Total assets)	0.001	0.001	0.008**	0.008**	0.000	0.000	-0.007***	-0.005**
	(0.69)	(0.81)	(2.06)	(2.11)	(0.03)	(0.12)	(-2.99)	(-2.12)
Past 12-month returns	-0.009*	-0.009*	-0.011	-0.010	-0.012	-0.014	0.002	0.005
	(-1.84)	(-1.83)	(-1.42)	(-1.28)	(-1.35)	(-1.54)	(0.19)	(0.42)
Leverage	0.029	0.024	-0.030	-0.032	0.077**	0.071**	0.052	0.049
	(1.42)	(1.19)	(-0.79)	(-0.85)	(2.31)	(2.22)	(1.45)	(1.43)
Cash-to-asset ratio	-0.009	-0.013	-0.008	-0.012	0.023	0.014	-0.037	-0.037
	(-0.42)	(-0.66)	(-0.22)	(-0.35)	(0.66)	(0.42)	(-1.04)	(-1.07)
Sales-to-asset ratio	-0.004	-0.007	-0.020*	-0.023**	0.009	0.008	0.002	0.000
	(-0.84)	(-1.42)	(-1.89)	(-2.22)	(1.39)	(1.20)	(0.17)	(0.01)
ROA	-0.025	-0.022	-0.064	-0.052	0.030	0.021	-0.103	-0.083
	(-0.74)	(-0.65)	(-1.46)	(-1.30)	(0.61)	(0.41)	(-0.69)	(-0.54)
Ln (Deal value)	-0.009***	-0.009***	-0.013***	-0.013***	-0.009***	-0.009***	0.002	0.001

	(-5.78)	(-5.93)	(-3.89)	(-3.83)	(-3.35)	(-3.47)	(0.72)	(0.48)
Lockup dummy	-0.016**	-0.016**	-0.027**	-0.027**	0.008	0.007	-0.004	-0.007
	(-2.48)	(-2.52)	(-2.50)	(-2.57)	(0.59)	(0.57)	(-0.36)	(-0.58)
Tender dummy	0.020***	0.020***	-0.027	-0.026	0.014	0.014*	0.011	0.013
	(3.28)	(3.24)	(-0.64)	(-0.63)	(1.61)	(1.66)	(1.46)	(1.64)
Termination fee dummy	0.001	0.002	0.013	0.012	-0.006	-0.007	0.004	0.009
	(0.16)	(0.20)	(0.89)	(0.83)	(-0.61)	(-0.64)	(0.33)	(0.68)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,669	3,669	1,303	1,303	1,332	1,332	1,034	1,034
Pseudo R^2	0.054	0.059	0.109	0.113	0.090	0.093	0.117	0.134

Table 5. Cash Flow Duration and Acquirer Long-Term Stock Performance

This table presents estimates from the regressions of post-acquisition long-term stock market performance. The dependent variables are two- and three-year BHARs of acquiring firms after deal completion in Panels A and B, respectively. We measure BHAR as the sample firm's buy-and-hold return minus that of matched firms from the same industry and of similar sizes and book-to-market ratios. The industry classification for the fixed effect is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are t-statistics based on heteroscedasticity-robust standard errors clustered by firms. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: 2-year BHAR

	All		By Method of Payment					
			All stock		Mixed		All cash	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash flow duration	-0.541**	-0.557**	-1.167**	-1.244**	-0.343	-0.258	0.118	-0.004
	(-2.38)	(-2.04)	(-2.11)	(-2.02)	(-1.52)	(-0.88)	(0.43)	(-0.01)
Market-to-book	0.133		-1.154		0.105		0.706	
	(0.23)		(-1.13)		(0.10)		(0.69)	
Market-to-book (firm)		0.908		-1.167		-5.108		7.388
		(0.15)		(-0.11)		(-0.52)		(0.80)
Market-to-book (sector)		5.095		8.824		-10.549		34.514
		(0.39)		(0.36)		(-0.62)		(1.23)
Market-to-book (long-run)		-5.733		-24.802		-19.826**		10.870
		(-0.85)		(-1.49)		(-2.06)		(0.82)
Ln (Total assets)	0.029	0.029	0.030	0.027	-0.001	-0.003	0.037	0.029
	(1.35)	(1.33)	(0.68)	(0.60)	(-0.04)	(-0.10)	(1.05)	(0.93)
Past 12-month returns	-0.027	-0.030	-0.041	-0.066	0.084*	0.096**	-0.008	-0.015
	(-0.57)	(-0.57)	(-0.44)	(-0.64)	(1.81)	(2.15)	(-0.08)	(-0.13)
Leverage	0.064	0.074	0.136	0.135	-0.006	0.072	-0.271	-0.326
	(0.39)	(0.45)	(0.38)	(0.38)	(-0.02)	(0.29)	(-0.98)	(-1.10)
Cash-to-asset ratio	0.139	0.156	0.311	0.339	-0.112	-0.016	-0.069	-0.081
	(0.57)	(0.65)	(0.55)	(0.60)	(-0.44)	(-0.06)	(-0.33)	(-0.37)
Sales-to-asset ratio	-0.064	-0.056	0.001	0.019	-0.152*	-0.131*	-0.000	-0.007
	(-1.24)	(-1.10)	(0.01)	(0.17)	(-1.92)	(-1.67)	(-0.00)	(-0.09)
ROA	0.196	0.173	-0.515	-0.615	0.821*	0.937**	0.922*	0.646
	(0.75)	(0.62)	(-1.23)	(-1.41)	(1.89)	(2.02)	(1.77)	(1.41)

Ln (Deal value)	-0.054**	-0.053**	-0.050	-0.055	-0.031	-0.025	-0.075*	-0.073**
	(-2.56)	(-2.52)	(-1.30)	(-1.42)	(-1.05)	(-0.87)	(-1.96)	(-2.00)
Lockup dummy	0.009	0.010	0.027	0.032	0.096	0.105	-0.045	-0.051
	(0.15)	(0.15)	(0.25)	(0.29)	(0.68)	(0.75)	(-0.38)	(-0.43)
Tender dummy	0.026	0.025	-0.357	-0.397	0.088	0.086	0.029	0.030
	(0.56)	(0.55)	(-1.34)	(-1.42)	(0.89)	(0.88)	(0.43)	(0.45)
Termination fee dummy	0.028	0.027	0.121	0.145	0.005	-0.010	-0.116	-0.119
	(0.28)	(0.27)	(0.42)	(0.49)	(0.07)	(-0.13)	(-1.22)	(-1.26)
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,117	2,117	724	724	747	747	646	646
Pseudo R^2	0.039	0.039	0.080	0.083	0.163	0.170	0.101	0.105

Panel B: 3-year BHAR

	All		By Method of Payment					
			All stock		Mixed		All cash	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash flow duration	-0.559**	-0.540*	-1.080**	-1.253**	-0.382	-0.078	0.038	-0.163
	(-2.42)	(-1.76)	(-2.10)	(-2.07)	(-1.32)	(-0.19)	(0.13)	(-0.46)
Market-to-book	-0.555		-1.994*		0.071		0.389	
	(-0.81)		(-1.68)		(0.05)		(0.29)	
Market-to-book (firm)		-2.970		5.019		-19.420		11.396
		(-0.37)		(0.39)		(-1.29)		(1.01)
Market-to-book (sector)		-8.984		10.478		-18.284		11.315
		(-0.41)		(0.21)		(-0.87)		(0.44)
Market-to-book (long-run)		-10.904		-23.990		-26.702**		5.896
		(-1.31)		(-1.27)		(-2.15)		(0.38)
Ln (Total assets)	0.028	0.030	0.067	0.066	-0.041	-0.040	0.007	0.003
	(1.43)	(1.43)	(1.42)	(1.33)	(-1.28)	(-1.29)	(0.25)	(0.10)
Past 12-month returns	-0.027	-0.025	-0.116	-0.183	0.108	0.149**	0.074	0.055
	(-0.48)	(-0.37)	(-0.95)	(-1.15)	(1.63)	(2.26)	(0.89)	(0.68)
Leverage	0.190	0.191	0.315	0.321	-0.135	0.028	-0.011	-0.032
	(0.82)	(0.82)	(0.59)	(0.65)	(-0.45)	(0.09)	(-0.03)	(-0.10)
Cash-to-asset ratio	0.334	0.358	1.038*	1.063*	-0.291	-0.133	-0.112	-0.097
	(1.21)	(1.33)	(1.69)	(1.71)	(-0.87)	(-0.39)	(-0.39)	(-0.34)
Sales-to-asset ratio	-0.004	0.005	0.187	0.193	-0.090	-0.065	0.005	-0.004
	(-0.06)	(0.08)	(1.16)	(1.21)	(-1.11)	(-0.80)	(0.06)	(-0.05)
ROA	0.106	0.146	-0.280	-0.397	0.546	0.833*	0.115	-0.052
	(0.45)	(0.52)	(-0.81)	(-1.03)	(1.29)	(1.73)	(0.20)	(-0.08)
Ln (Deal value)	-0.060***	-0.059***	-0.088*	-0.102*	-0.011	0.002	-0.049*	-0.049*
	(-3.04)	(-2.90)	(-1.87)	(-1.85)	(-0.35)	(0.05)	(-1.90)	(-1.92)
Lockup dummy	0.045	0.044	0.118	0.117	-0.080	-0.057	0.074	0.072
	(0.61)	(0.59)	(0.88)	(0.86)	(-0.55)	(-0.40)	(0.60)	(0.59)
Tender dummy	0.018	0.018	-0.152	-0.188	0.083	0.082	-0.047	-0.047
	(0.29)	(0.29)	(-0.64)	(-0.67)	(0.51)	(0.52)	(-0.59)	(-0.58)
Termination fee dummy	-0.003	-0.004	0.248	0.291	-0.138	-0.174*	-0.115	-0.114
	(-0.03)	(-0.04)	(1.02)	(1.21)	(-1.41)	(-1.76)	(-1.00)	(-1.00)

Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2117	2117	724	724	747	747	646	646
Pseudo R^2	0.046	0.047	0.099	0.100	0.173	0.184	0.145	0.147

Table 6. Variation with Investor Sentiment

This table examines the relation between cash flow duration and M&As following high and low levels of investor sentiment, as classified based on the median level of the index of Baker and Wurgler (2006). Panel A reports, separately for high- and low-sentiment periods, the estimation results of the probit regressions where the dependent variable, *Acquisition dummy*, equals one if a firm makes at least one acquisition announcement in a given year, and zero otherwise. Panel B reports the probit and Tobit regression results about payment method: Columns (1) and (2) estimate the probit model with the dependent variable, *All stock payment dummy*, equal to one if the payment for an M&A deal is fully in stock, and zero otherwise; Columns (3) and (4) estimate the Tobit model with a dependent variable of the percentage of stock payment. Panel C presents the estimation results from acquiring firms' abnormal stock market returns around M&A announcements and after acquisition: in Columns (1) and (2), the dependent variable is the three-day acquirer BHAR measured over day -1 to day +1 centered on the announcement date; in Columns (3) and (4), the dependent variable is three-year buy-and-hold abnormal returns of acquiring firms after the acquisition. The year fixed effect and industry fixed effects are included in all regressions. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are z-statistics for Panels A and B and t-statistics for Panel C, based on heteroscedasticity-robust standard errors clustered by firms. The last row gives the pseudo-R^2 or R^2. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: Acquisition activity

	Acquisition Dummy	
	High Sentiment	Low Sentiment
	(1)	(2)
Cash flow duration	0.237***	0.070
	(4.82)	(1.21)
Market-to-book ratio	0.207***	0.197***
	(29.22)	(21.77)
Ln (Total assets)	0.027***	0.020**
	(3.69)	(2.34)
Past 12-month returns	0.078***	0.103***
	(4.55)	(4.95)
Leverage	-0.277***	-0.221***
	(-4.42)	(-2.92)
Cash-to-asset ratio	0.148**	0.050
	(2.08)	(0.57)
Sales-to-asset ratio	-0.039**	-0.040*
	(-2.06)	(-1.67)
ROA	-0.059	-0.025
	(-1.03)	(-0.29)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	82,559	63,195
Pseudo R^2	0.108	0.109

Panel B: Method of Payment

	All Stock Payment Dummy		Stock Payment Proportion	
	High Sentiment	Low Sentiment	High Sentiment	Low Sentiment
	(1)	(2)	(3)	(4)
Cash flow duration	0.537***	-0.017	0.769***	-0.213
	(3.17)	(-0.07)	(3.54)	(-0.88)
Market-to-book ratio	0.057**	0.060*	0.055	0.072*
	(2.16)	(1.67)	(1.59)	(1.83)
Ln (Total assets)	-0.106***	-0.254***	-0.221***	-0.348***
	(-4.28)	(-7.38)	(-6.73)	(-9.10)
Past 12-month returns	0.014	0.088	0.021	0.080
	(0.25)	(1.24)	(0.29)	(1.05)
Leverage	-0.540**	-0.505*	-0.561**	-0.444*
	(-2.49)	(-1.94)	(-2.14)	(-1.72)
Cash-to-asset ratio	-0.019	-0.586**	0.094	-0.711**
	(-0.08)	(-1.98)	(0.34)	(-2.34)
Sales-to-asset ratio	-0.122**	-0.208**	-0.193***	-0.233***
	(-2.23)	(-2.30)	(-2.83)	(-2.67)
ROA	-0.172	-1.498***	-0.412	-2.027***
	(-0.80)	(-4.35)	(-1.43)	(-5.49)
Ln (Deal value)	0.046*	0.146***	0.212***	0.296***
	(1.93)	(4.22)	(6.89)	(7.92)
Lockup dummy	0.448***	0.618***	0.635***	0.655***
	(4.79)	(3.01)	(5.13)	(2.69)
Tender dummy	-1.533***	-1.384***	-2.257***	-1.662***
	(-12.41)	(-7.98)	(-14.25)	(-10.49)
Termination fee dummy	0.300***	0.359***	0.457***	0.490***
	(3.38)	(3.31)	(4.58)	(4.67)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	2,321	1,325	2,381	1,382
Pseudo R^2	0.281	0.308	0.277	0.289

Panel C: Stock Market Performance

	Acquirer BHAR(-1,+1)		3-year BHAR	
	High Sentiment	Low Sentiment	High Sentiment	Low Sentiment
	(1)	(2)	(3)	(4)
Cash flow duration	-0.054**	-0.027	-0.571**	-0.528
	(-2.18)	(-1.02)	(-2.49)	(-0.86)
Market-to-book ratio	-0.000	-0.004	-0.066**	0.074
	(-0.05)	(-0.99)	(-2.36)	(1.01)
Ln (Total assets)	-0.000	0.004*	0.029	0.032
	(-0.20)	(1.66)	(1.08)	(1.10)
Past 12-month returns	-0.009	-0.008	0.031	-0.165
	(-1.50)	(-0.94)	(0.44)	(-1.02)
Leverage	0.031	0.038	0.329	-0.083
	(1.16)	(1.42)	(1.27)	(-0.24)
Cash-to-asset ratio	-0.019	0.017	0.272	0.536
	(-0.67)	(0.65)	(0.77)	(1.08)
Sales-to-asset ratio	-0.002	-0.002	-0.063	0.073
	(-0.34)	(-0.20)	(-0.84)	(0.62)
ROA	-0.043	0.008	0.531*	-0.556
	(-0.94)	(0.17)	(1.85)	(-1.16)
Ln (Deal value)	-0.009***	-0.008***	-0.062**	-0.057
	(-4.55)	(-2.71)	(-2.45)	(-1.50)
Lockup dummy	-0.016**	-0.014	0.120	-0.175
	(-2.30)	(-0.70)	(1.46)	(-1.08)
Tender dummy	0.028***	-0.004	-0.044	0.082
	(3.41)	(-0.51)	(-0.59)	(0.72)
Termination fee dummy	0.001	-0.001	0.076	-0.116
	(0.09)	(-0.12)	(0.55)	(-1.22)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	2374	1378	1,360	777
R^2	0.068	0.084	0.065	0.091

Table 7. Variation with Institutional Ownership

This table examines the relation between cash flow duration and M&As separately for firms with different levels of institutional ownership: the bottom 30% (low) and top 30% (high). Panel A reports the estimation results of the M&A probit regressions where the dependent variable, *Acquisition dummy*, equals one if a firm makes at least one acquisition announcement in a given year, and zero otherwise. Panel B reports the probit and Tobit regression results about payment method: Columns (1) and (2) estimate the probit model with the dependent variable, *All stock payment dummy*, equal to one if the payment for an M&A deal is fully in stock, and zero otherwise; Columns (3) and (4) estimate the Tobit model with a dependent variable of the percentage of stock payment. Panel C presents the estimation results from acquiring firms' abnormal stock market returns around M&A announcements and after acquisition: in Columns (1) and (2), the dependent variable is the three-day acquirer BHAR measured over day -1 to day +1 centered on the announcement date; in Columns (3) and (4), the dependent variable is three-year buy-and-hold abnormal returns of acquiring firms after the acquisition. The year fixed effect and industry fixed effects are included in all regressions. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are z-statistics for Panels A and B and t-statistics for Panel C, based on heteroscedasticity-robust standard errors clustered by firms. The last row gives the pseudo-R^2 or R^2. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: Acquisition activity

	Acquisition Dummy	
	Low IOR	High IOR
	(1)	(2)
Cash flow duration	0.246***	0.126
	(3.62)	(1.58)
Market-to-book ratio	-0.000	0.019*
	(-0.00)	(1.65)
Ln (Total assets)	0.184***	0.219***
	(12.78)	(18.45)
Past 12-month returns	0.104***	0.101***
	(3.80)	(4.36)
Leverage	-0.448***	-0.273***
	(-4.50)	(-3.00)
Cash-to-asset ratio	0.035	0.154
	(0.30)	(1.49)
Sales-to-asset ratio	-0.025	-0.052*
	(-0.89)	(-1.86)
ROA	-0.237***	0.316**
	(-3.40)	(2.32)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	40,919	44,041
Pseudo R^2	0.089	0.098

Panel B: Method of Payment

	All Stock Payment Dummy		Stock Payment Proportion	
	Low IOR	High IOR	Low IOR	High IOR
	(1)	(2)	(3)	(4)
Cash flow duration	0.413**	0.195	0.775**	0.042
	(2.04)	(0.53)	(2.53)	(0.18)
Market-to-book ratio	0.075**	0.100**	0.083	0.113***
	(2.10)	(2.10)	(1.42)	(3.38)
Ln (Total assets)	-0.131***	-0.200***	-0.243***	-0.251***
	(-2.95)	(-3.82)	(-3.64)	(-6.93)
Past 12-month returns	-0.004	-0.111	0.109	-0.129*
	(-0.06)	(-0.99)	(0.96)	(-1.73)
Leverage	-0.581**	-0.392	-0.654	-0.174
	(-1.98)	(-1.10)	(-1.48)	(-0.76)
Cash-to-asset ratio	-0.612**	-0.106	-0.632	-0.000
	(-2.07)	(-0.27)	(-1.44)	(-0.00)
Sales-to-asset ratio	-0.158**	-0.174	-0.303**	-0.102
	(-1.98)	(-1.57)	(-2.43)	(-1.45)
ROA	-0.271	-0.846	-0.539	-1.327***
	(-1.05)	(-1.54)	(-1.30)	(-3.57)
Ln (Deal value)	0.070*	0.111***	0.191***	0.251***
	(1.74)	(2.70)	(3.02)	(8.37)
Lockup dummy	0.793***	0.482**	1.268***	0.315**
	(4.70)	(2.25)	(4.51)	(2.11)
Tender dummy	-1.387***	-1.613***	-2.456***	-1.433***
	(-6.38)	(-7.73)	(-7.45)	(-10.96)
Termination fee dummy	0.530***	0.400***	0.884***	0.355***
	(3.77)	(3.17)	(4.09)	(4.25)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	1,015	1,064	1,109	1,133
Pseudo R^2	0.259	0.341	0.283	0.352

Panel C: Stock Market Performance

	Acquirer BHAR(-1,+1)		3-year BHAR	
	Low IOR	High IOR	Low IOR	High IOR
	(1)	(2)	(3)	(4)
Cash flow duration	-0.071**	-0.020	-1.293**	0.211
	(-2.34)	(-0.85)	(-2.37)	(0.86)
Market-to-book ratio	-0.009	-0.002	0.005	-0.046
	(-1.60)	(-0.72)	(0.06)	(-1.21)
Ln (Total assets)	-0.002	0.000	0.057	-0.000
	(-0.33)	(0.08)	(0.83)	(-0.00)
Past 12-month returns	-0.010	0.010	0.059	-0.067
	(-1.13)	(1.16)	(0.44)	(-0.86)
Leverage	0.032	0.031	0.634	-0.038
	(0.76)	(1.24)	(1.23)	(-0.11)
Cash-to-asset ratio	-0.007	-0.019	0.894	0.797**
	(-0.13)	(-0.72)	(1.39)	(2.18)
Sales-to-asset ratio	-0.012	0.001	-0.209	0.060
	(-0.86)	(0.13)	(-1.48)	(0.93)
ROA	-0.097	0.093**	-0.067	-0.160
	(-1.64)	(2.24)	(-0.17)	(-0.24)
Ln (Deal value)	-0.004	-0.008***	-0.141*	-0.037
	(-0.82)	(-3.45)	(-1.89)	(-1.60)
Lockup dummy	-0.029**	0.009	-0.014	-0.051
	(-2.03)	(0.60)	(-0.07)	(-0.35)
Tender dummy	0.033	0.018***	-0.026	0.052
	(1.31)	(2.68)	(-0.10)	(0.69)
Termination fee dummy	0.009	0.003	0.120	-0.046
	(0.40)	(0.37)	(0.43)	(-0.33)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	1,098	1,133	603	651
R^2	0.107	0.119	0.132	0.154

Table 8. Variation with Analyst Coverage

This table examines the relation between cash flow duration and M&As separately for firms with different levels of analyst coverage: the bottom 30% (low) and top 30% (high) of the ranked values of the number of analysts following the firm. Panel A reports the estimation results of the M&A probit regressions where the dependent variable, *Acquisition dummy*, equals one if a firm makes at least one acquisition announcement in a given year, and zero otherwise. Panel B reports the probit and Tobit regression results about payment method: Columns (1) and (2) estimate the probit model with the dependent variable, *All stock payment dummy*, equal to one if the payment for an M&A deal is fully in stock, and zero otherwise; Columns (3) and (4) estimate the Tobit model with a dependent variable of the percentage of stock payment. Panel C presents the estimation results from acquiring firms' abnormal stock market returns around M&A announcements and after acquisition: in Columns (1) and (2), the dependent variable is the three-day acquirer BHAR measured over day -1 to day +1 centered on the announcement date; in Columns (3) and (4), the dependent variable is three-year buy-and-hold abnormal returns of acquiring firms after the acquisition. The year fixed effect and industry fixed effects are included in all regressions. The industry classification is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are z-statistics for Panels A and B and t-statistics for Panel C, based on heteroscedasticity-robust standard errors clustered by firms. The last row gives the pseudo-R^2 or R^2. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: Acquisition activity

	Acquisition Dummy	
	Low Analyst Coverage	High Analyst Coverage
	(1)	(2)
Cash flow duration	0.209***	0.074
	(3.66)	(1.02)
Market-to-book ratio	0.018*	0.002
	(1.72)	(0.17)
Ln (Total assets)	0.199***	0.184***
	(19.76)	(15.76)
Past 12-month returns	0.091***	0.119***
	(3.87)	(5.21)
Leverage	-0.201**	-0.255***
	(-2.45)	(-3.08)
Cash-to-asset ratio	0.198**	0.166*
	(2.03)	(1.70)
Sales-to-asset ratio	-0.008	-0.057**
	(-0.34)	(-2.14)
ROA	-0.271***	0.285***
	(-4.04)	(2.67)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	59,279	43,251
Pseudo R^2	0.103	0.086

Panel B: Method of Payment

	All Stock Payment Dummy		Stock Payment Proportion	
	Low Analyst Coverage	High Analyst Coverage	Low Analyst Coverage	High Analyst Coverage
	(1)	(2)	(3)	(4)
Cash flow duration	0.589***	0.112	0.865***	-0.067
	(2.71)	(0.30)	(2.62)	(-0.21)
Market-to-book ratio	0.055	0.102***	0.065	0.113***
	(1.60)	(2.81)	(1.19)	(3.29)
Ln (Total assets)	-0.109***	-0.216***	-0.233***	-0.336***
	(-2.70)	(-4.69)	(-4.02)	(-7.98)
Past 12-month returns	-0.008	-0.080	0.030	-0.157
	(-0.11)	(-0.73)	(0.26)	(-1.56)
Leverage	-0.789***	-0.520	-1.169***	-0.382
	(-2.73)	(-1.22)	(-2.66)	(-1.16)
Cash-to-asset ratio	-0.877***	0.008	-1.044**	-0.089
	(-2.89)	(0.02)	(-2.32)	(-0.28)
Sales-to-asset ratio	-0.090	0.088	-0.217*	0.008
	(-1.26)	(0.66)	(-1.92)	(0.08)
ROA	-0.206	-0.910*	-0.295	-0.978**
	(-0.80)	(-1.87)	(-0.71)	(-2.31)
Ln (Deal value)	0.033	0.142***	0.168***	0.279***
	(0.81)	(3.84)	(2.66)	(8.29)
Lockup dummy	0.784***	0.350*	1.391***	0.325*
	(4.74)	(1.92)	(4.78)	(1.95)
Tender dummy	-1.285***	-1.730***	-2.383***	-1.709***
	(-6.41)	(-8.85)	(-7.76)	(-9.71)
Termination fee dummy	0.174	0.204	0.360	0.242**
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	1,069	1,045	1,171	1,114
Pseudo R^2	0.279	0.344	0.296	0.343

Panel C: Stock Market Performance

	Acquirer BHAR(-1,+1)		3-year BHAR	
	Low Analyst Coverage	High Analyst Coverage	Low Analyst Coverage	High Analyst Coverage
	(1)	(2)	(3)	(4)
Cash flow duration	-0.057*	0.003	-1.328**	-0.079
	(-1.66)	(0.12)	(-2.25)	(-0.29)
Market-to-book ratio	-0.012*	-0.004	0.050	-0.015
	(-1.86)	(-1.34)	(0.51)	(-0.41)
Ln (Total assets)	-0.003	0.001	0.040	0.033
	(-0.58)	(0.57)	(0.61)	(1.00)
Past 12-month returns	-0.019*	0.001	-0.074	-0.145
	(-1.80)	(0.07)	(-0.45)	(-1.42)
Leverage	0.044	0.029	0.478	0.159
	(1.03)	(1.33)	(0.85)	(0.57)
Cash-to-asset ratio	-0.024	-0.010	0.160	0.042
	(-0.54)	(-0.41)	(0.26)	(0.16)
Sales-to-asset ratio	-0.011	-0.001	-0.142	0.066
	(-0.80)	(-0.15)	(-1.11)	(0.80)
ROA	-0.101	0.070*	0.247	0.536
	(-1.57)	(1.83)	(0.63)	(1.44)
Ln (Deal value)	-0.004	-0.008***	-0.161**	-0.039**
	(-0.83)	(-3.98)	(-2.04)	(-2.01)
Lockup dummy	-0.038***	0.014	0.276	0.142
	(-2.83)	(1.61)	(1.57)	(1.60)
Tender dummy	0.023	0.017***	-0.036	0.017
	(1.21)	(3.00)	(-0.15)	(0.24)
Termination fee dummy	-0.005	-0.009	0.319	-0.099
	(-0.19)	(-0.98)	(0.99)	(-1.08)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	1,161	1,114	607	684
R^2	0.108	0.140	0.119	0.159

Table 9. Valuation of Acquirers versus Targets

This table presents the mean values of overvaluation proxies for acquiring firms and their targets by method of payment. Panel A is for all stock deals, Panel B for mixed payment deals, and Panel C for all cash deals. The last column reports the difference in means between acquirers and targets and t-statistics in parentheses from a paired t-tests. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Variables	N	Acquirers	Targets	Difference
Panel A. All stock deals				
Cash flow duration	882	0.579	0.548	0.031***
				(3.015)
Market-to-book	899	4.869	3.618	1.251***
				(6.558)
Market-to-book (firm)	899	0.331	0.015	0.316***
				(10.867)
Market-to-book (sector)	899	0.162	0.129	0.033***
				(3.710)
Market-to-book (long-run)	899	0.668	0.701	-0.033*
				(-1.878)
Short interest	962	0.006	-0.001	0.007***
				(6.628)
Panel B. Mixed deals				
Cash flow duration	905	0.483	0.498	-0.015
				(-1.526)
Market-to-book	871	3.585	3.130	0.455***
				(2.605)
Market-to-book (firm)	871	0.171	-0.036	0.207***
				(7.359)
Market-to-book (sector)	871	0.105	0.095	0.010
				(0.996)
Market-to-book (long-run)	871	0.667	0.668	-0.001
				(-0.072)
Short interest	956	0.008	0.003	0.005***
				(4.305)
Panel C. All cash deals				
Cash flow duration	769	0.476	0.491	-0.015
				(-1.519)
Market-to-book	771	3.969	3.006	0.963***
				(5.586)
Market-to-book (firm)	771	0.168	-0.054	0.222***
				(7.657)
Market-to-book (sector)	771	0.193	0.114	0.079***
				(7.263)
Market-to-book (long-run)	771	0.711	0.664	0.048**
				(2.502)
Short interest	917	0.001	0.005	-0.004**
				(-2.392)

Table 10. Additional Tests for the Risk-Management Hypothesis

This table provides additional test results about the risk-management hypothesis. Panel A reports the estimation results from the regression of target firms' cash flow duration on acquirers' cash flow duration. Acquirers' cash flow duration Q2-Q5 are indicators for the second through fifth quintiles of acquirers' cash flow durations, with Q5 representing the quintile of the highest value. The industry classification for the fixed effect is based on Fama and French's (1997) 48 groupings. Numbers in parentheses are t-statistics based on heteroscedasticity-robust standard errors clustered by firms. Panel B presents acquirers' average cash flow duration before and after an M&A for the full group as well as separately for five groups divided by their pre-M&A cash flow duration. No. Obs reports the number of acquiring firms. Pre-M&A cash flow duration is measured for the fiscal year ending in the calendar year prior to M&A announcements. Post-M&A value is measured for the fiscal year ending one year after the deal completion. The last two rows report the difference between pre- and post-M&A mean values and t-statistics in parentheses from a paired t-tests. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively.

Panel A: Regression of Target Cash Flow Duration on Acquirer Cash Flow Duration

	(1)	(2)	(3)	(4)
Acquirer's cash flow duration	0.340***	0.245***		
	(13.41)	(8.88)		
Acquirer's cash flow duration Q2			0.043**	0.026
			(2.48)	(1.54)
Acquirer's cash flow duration Q3			0.118***	0.081***
			(7.05)	(4.82)
Acquirer's cash flow duration Q4			0.151***	0.098***
			(8.87)	(5.50)
Acquirer's cash flow duration Q5			0.220***	0.160***
			(12.12)	(8.19)
Intercept	0.339***	0.408***	0.405***	0.455***
	(23.83)	(8.51)	(31.03)	(9.48)
Industry fixed effect	No	Yes	No	Yes
Year fixed effect	No	Yes	No	Yes
N	2,556	2,520	2,556	2,520
R^2	0.079	0.160	0.079	0.159

Panel B: Changes in Acquirers' Cash Flow Duration Rank around M&A

		Pre-M&A Cash Flow Duration Quintiles				
	All	Q1 (Low)	Q2	Q3	Q4	Q5 (High)
No. Obs	2,904	581	581	581	581	580
Panel B.1. Acquirers' cash flow duration (Treated)						
Pre-M&A	0.508	0.189	0.379	0.519	0.636	0.816
Post-M&A	0.534	0.362	0.457	0.535	0.605	0.710
Post − Pre	0.026***	0.173***	0.078***	0.016**	-0.031***	-0.106***
(t-stat)	(6.32)	(17.22)	(10.47)	(2.21)	(-4.57)	(-10.72)
Panel B.2. Matched non-acquirers' cash flow duration (Control)						
Pre-M&A	0.507	0.192	0.378	0.520	0.635	0.813
Post-M&A	0.503	0.320	0.429	0.511	0.567	0.690
Post − Pre	-0.004	0.128***	0.051***	-0.009	-0.068***	-0.123***
(t-stat)	(-1.01)	(13.14)	(6.59)	(-1.31)	(-8.12)	(-11.72)
Panel B.3. Difference in changes between acquirers and matched non-acquirers (Treated –Control)						
Post − Pre	0.030***	0.045***	0.027**	0.025**	0.037***	0.017
(t-stat)	(5.85)	(3.67)	(2.56)	(2.51)	(3.47)	(1.23)

Appendix A. Sample Selection

No. of Obs. After Query	Query Description
	Machine search in SDC
	SDC Domestic M&As announced: 1/1/1981 to 12/31/2020
122,261	Deal type included: disclosed value M&As, leveraged buyouts, tender offers, and exchange offers
122,256	Form of the deal excluded: buyback (repurchases, self-tenders), recapitalization
113,196	Deal status included: completed and withdrawn
108,715	Percent of shares acquirer is seeking to own after transaction: 50% or higher
108,705	Target nation: United States of America
17,063	Target is public
15,013	Acquirer nation: United States of America
9,310	Acquirer is public
9,203	Deal value is $1 million or higher
8,538	Exclude all deals with hostile or unsolicited initial reception
8,135	Exclude all challenged deals
7,886	Percent of the target firm's shares held by the proposed acquirer prior to the announcement of the acquisition attempt: less than 50%
	Match up with the CRSP and COMPUSTAT
6,497	Acquirers are identified in the Center for Research in Security Prices (CRSP), matched by CUSIP, ticker and/or company name.
3,850	Cash flow duration, our key explanatory variable, is estimated for acquirers.

Appendix B. Variable Definitions

Variable	Definition
M&A deal characteristics	
Deal value	The total value of the payments that the acquirer proposed to pay for the target firm.
All stock dummy	One if a transaction is paid in 100% stock, and zero otherwise.
All cash dummy	One if a transaction is paid in 100% cash, and zero otherwise.
Stock payment %	Proportion of a deal value paid in stock.
Lockup dummy	One if the attempt includes a lockup of target shares in which the potential acquirer is granted an option to purchase shares at a fixed price, and zero otherwise.
Tender dummy	One if the attempt is structured as a tender offer, and zero otherwise.
Termination fee dummy	One if the attempt includes termination fees that the acquirer must pay to the target if the attempt is abandoned, and zero otherwise.
Acquirer/Target BHAR(-1, +1)	Buy-and-hold abnormal returns of the acquirer or target company over the trading days [-1, +1] around the M&A announcement. We calculate the abnormal returns using the Fama and French's (1993) three-factor model. We use the standard event study method of the literature (see, for example, Kothari and Warner, 2007) to estimate the beta of the model using the daily returns of the firms, daily excess market returns, high-minus-low book-to-market, and small-minus-big size factors over the trading days [-125, -26] before the announcement.
Acquirer *n*-year BHAR	*n*-year buy-and-hold abnormal returns are measured as an acquiring firm's buy-and-hold return over the *n*-year period after deal completion minus that of matched firms from the same industry and of similar sizes and book-to-market ratios.
Firm characteristics	
Market-to-book ratio	Market value of equity divided by book value of equity. Market value of equity is measured as share price times common shares outstanding. Book value of equity is computed as shareholder's equity (Compustat: SEQ) minus preferred stock value plus deferred taxes and investment tax credit (Compustat: TXDITC). Preferred stock value is measured as the first non-missing value from its liquidation value (Compustat: PSTKL), redemption value (Compustat: PSTKRV), and carrying value (Compustat: PSTK) in order. If SEQ is missing, book value of equity is measured as common equity (Compustat: CEQ) plus carrying value of preferred stock (Compustat: PSTK). If CEQ is missing, book value of equity is measured as total assets (Compustat: AT) minus total liabilities (Computat: LT).
Total assets	Total assets (Compustat: AT)
Past 12-month returns	Cumulative returns during the previous 12 months. This is measured using
Leverage	Long-term debt (Compustat: DLTT) plus debt in current liabilities (Compustat: DLC), scaled by total assets (Compustat: AT).
Cash-to-asset ratio	Cash plus marketable securities (Compustat: CHE), scaled by total assets (Compustat: AT).
Sales-to-asset ratio	Revenues scaled by total assets (Compustat: SALE/AT).
ROA	Return on assets, computed as income before extraordinary item (Compustat: IB) plus interest expense (Compustat: XINT) plus income taxes (Compustat: TXT), scaled by total assets (Compustat: AT).
Cash flow volatility	Standard deviation of operating cash flow scaled by total assets over 20 quarters. Operating cash flow is computed as sales (Compustat: SALEQ) minus cost of goods sold (Compustat: COGSQ) minus selling, administrative, and general expenses (Compustat: XSGAQ) minus changes in working

	capital (Compustat: WCAPQ). We require each observation to have a minimum of eight consecutive quarters of operating cash flow.
Short interest	The ratio of the number of shares sold short to the number of shares outstanding, measured at the 15th of a month. Monthly short interest data come from the Compustat Securities database, and the number of shares outstanding from the CRSP. Following Ben-David, Drake, and Roulstone (2015), we adjust a trend overtime by subtracting the average short interest ratio for all firms in a month from each firm's short interest ratio.

Appendix C. Distribution of M&A Sample across Years

The table presents the distribution of M&A attempts across years. The sample consists of 3,850 US M&A attempts announced over January 1, 1981 to December 31, 2020, obtained from the Thomson Financial SDC Mergers and Acquisitions database. We apply a series of data filters, which are described in detail in Appendix A. The table reports the frequencies of M&A attempts and all stock deals (i.e., transactions known to be paid in 100% stock).

Year	# attempts	% of total	# all stock deals	% all stock
1981	49	1.3%	0	0.0%
1982	64	1.7%	1	1.6%
1983	43	1.1%	0	0.0%
1984	110	2.9%	8	7.3%
1985	88	2.3%	31	35.2%
1986	80	2.1%	19	23.8%
1987	80	2.1%	26	32.5%
1988	83	2.2%	19	22.9%
1989	73	1.9%	32	43.8%
1990	58	1.5%	21	36.2%
1991	57	1.5%	27	47.4%
1992	67	1.7%	39	58.2%
1993	76	2.0%	35	46.1%
1994	132	3.4%	77	58.3%
1995	177	4.6%	101	57.1%
1996	201	5.2%	93	46.3%
1997	255	6.6%	130	51.0%
1998	261	6.8%	127	48.7%
1999	229	5.9%	109	47.6%
2000	206	5.4%	102	49.5%
2001	166	4.3%	73	44.0%
2002	95	2.5%	25	26.3%
2003	104	2.7%	34	32.7%
2004	89	2.3%	27	30.3%
2005	92	2.4%	20	21.7%
2006	98	2.5%	16	16.3%
2007	104	2.7%	14	13.5%
2008	69	1.8%	15	21.7%
2009	75	1.9%	20	26.7%
2010	67	1.7%	11	16.4%
2011	40	1.0%	6	15.0%
2012	55	1.4%	5	9.1%
2013	44	1.1%	4	9.1%
2014	55	1.4%	16	29.1%
2015	70	1.8%	14	20.0%
2016	57	1.5%	9	15.8%
2017	47	1.2%	8	17.0%
2018	63	1.6%	17	27.0%
2019	47	1.2%	18	38.3%
2020	24	0.6%	12	50.0%
Total	3,850	100%	1,361	35.4%