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Abstract

This paper examines how passive ownership affects acquisition decisions. I hypothesize that passive ownership affects the information environment of the acquirer's stock, hindering its usefulness as an acquisition currency and as a source of information for deal completion. As hypothesized, I find that acquirers with high passive ownership have less stock in their deal payment and a lower likelihood of withdrawal based on market feedback. Further, non-stock information such as proximity and industry relatedness mitigates the impact of passive ownership. The results are robust to identification through the Russell 1000/2000 index switching.

Keywords: passive ownership, M&A, mode of payment, M&A withdrawal

Word count: 7780

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1 Introduction

Recent research highlights the rise of passive ownership among U.S. firms (Chinco & Sammon (2024)) and its implications for corporate governance (Appel et al. (2016), Schmidt & Fahlenbrach (2017)), asset prices (Jiang et al. (2020)), information production (Coles et al. (2022)) and stock price informativeness (Sammon (2024), Buss & Sundaresan (2023)). Unlike active investors, passive owners face constraints on portfolio selection and trading as their investments are driven by index composition rather than private information. This investment approach reduces their incentives to gather and act on firm-specific information, potentially weakening stock price informativeness (Sammon (2024), Coles et al. (2022), DeLisle et al. (2017)).

Stock price informativeness serves as a key channel through which market expectations and firm fundamentals are communicated to managers. When stock prices accurately reflect relevant information about a firm's future prospects, managers can use this signal to guide strategic decisions, such as investment, financing, and mergers and acquisitions (Q. Chen et al. (2007)). Conversely, when stock prices are noisy or inefficient, managerial decision-making may be distorted, leading to suboptimal corporate policies (Bond et al. (2012)).

The broad implications of passive ownership for the information environment of corporate firms motivate an examination of its influence on managerial decisions that rely on this environment. In this paper, I investigate how the rise in passive ownership affects two key outcomes in mergers and acquisitions (M&A): the choice of payment method (stock versus cash) and the likelihood of deal completion. Prior research highlights the critical role of stock price informativeness and information asymmetry in shaping these M&A decisions (Eckbo et al. (2018), Ouyang & Szewczyk (2019), and C. Chen & Doukas (2022)).

In an M&A transaction, the degree of information asymmetry between the acquirer and the target influences the choice of payment method. According to the overvaluation hypothesis, acquirers are more likely to use stock as payment when they believe—based on insider information—that their shares are overvalued (Harford (2005), Rhodes-Kropf et al. (2005), Dong et al. (2006)). However, more recent evidence by Eckbo et al. (2018) suggests that information asymmetry, rather than overvaluation alone, plays a central role in this decision. Specifically, the more informed the target is about the acquirer's firm, the less willing it is to accept the acquirer's potentially overvalued stock. As a result, higher levels of information asymmetry between the two parties are associated with a

lower likelihood that the target will accept stock as the primary mode of payment.

Passive ownership can inflate stock prices due to its inelastic demand for shares, leading to potentially significant overvaluation (Jiang et al. (2020)). Under the overvaluation hypothesis, acquirers with high levels of passive ownership are therefore more likely to use stock as a method of payment in M&A transactions. However, passive ownership is also associated with a reduction in information production (Heath et al. (2022)), stock price informativeness (Sammon (2024)), and overall firm transparency (Ge et al. (2021), Xue et al. (2020)). From the perspective of the information asymmetry hypothesis, these effects imply that acquirers with higher passive ownership may face skepticism from targets, who may be less willing to accept stock as consideration. As a result, the net impact of passive ownership on the choice of payment method in M&A deals reflects the tension between these competing mechanisms. This paper empirically investigates which of these two hypotheses dominates.

In the context of deal completion decisions during M&A transactions, acquirers often initiate deals based on insider assessments of potential value creation. Once a deal is publicly announced, the market evaluates the transaction and conveys feedback through its immediate reaction. Prior research shows that managers are responsive to this feedback and may revise their decision to proceed with or withdraw from the deal accordingly (Luo (2005)). Thus, the quality of the acquirer's information environment and the effectiveness of the market's feedback mechanism play a critical role in shaping the likelihood of deal completion.

However, for acquirers with high levels of passive ownership, market feedback may be less informative. Passive investors typically have limited incentives to acquire and trade on firm- specific information, which weakens the informativeness of the stock price response to deal announcements. As a result, acquirers with greater passive ownership are likely to place less weight on market signals when deciding whether to complete or withdraw from a transaction. Accordingly, I hypothesize that the influence of market feedback on deal completion decisions diminishes as the level of passive ownership increases.

The empirical analysis is based on a sample of 8,638 M&A deals initiated by 2,820 U.S. public acquirers between 1990 and 2023, obtained from the Refinitiv SDC Platinum database. Data on passive institutional ownership are sourced from the Thomson Reuters S12 database, while firm-level financial variables are collected from Compustat and CRSP. The primary dependent variables are: (i) the fraction of stock used in the deal consideration, and (ii) a binary indicator equal to one if

the deal is withdrawn and zero otherwise. I begin by examining the relationship between passive ownership and the proportion of stock used as payment in M&A transactions.

Next, I examine how passive ownership influences the sensitivity of deal completion decisions to market feedback in M&A transactions. The empirical analysis includes a comprehensive set of control variables related to acquirer, target, and deal characteristics, following prior literature (Eckbo et al. (2018), de Bodt et al. (2022), **?**, Luo (2005)). Figure 1 presents trends in the use of stock and cash as deal consideration, as well as overall deal volume, over the period 1990–2023. Consistent with de Bodt et al. (2018), the figure reveals a notable decline in the use of stock after 2000, which coincides with the elimination of the pooling-of-interests accounting method.

The univariate analysis reveals that passive ownership is negatively associated with the fraction of stock used in deal consideration, suggesting that acquirers with higher levels of passive ownership are less likely to use stock as a method of payment. I further investigate the underlying mechanism by examining how different types of information—specifically, stock- based versus non-stock-based information—moderate the relationship between passive ownership and the mode of payment. The results indicate that stock-based information proxies amplify the negative effect of passive ownership on stock usage, while non-stock-based information proxies mitigate this effect. These findings suggest that passive ownership primarily weakens the stock-based information environment of the acquirer, as passive investors have limited incentives to gather and trade on firm-specific information. This degradation in the information environment reduces the target firm's willingness to accept stock as consideration. However, when alternative, non-stock- based information about the acquirer is available, targets are better positioned to assess deal quality and may be more inclined to accept stock, thereby offsetting the negative influence of passive ownership.

Finally, I examine the effect of passive ownership on the likelihood of deal withdrawal. The analysis shows that acquirers with higher passive ownership are less responsive to market feedback and are therefore less likely to revise or withdraw announced deals. This is consistent with the notion that managerial learning from market signals is weaker when the firm's investor base is dominated by passive owners, who contribute less to price discovery.

This study makes three key contributions to the existing literature. First, it extends the recent empirical investigation of the information environment's role in the valuation hypothesis concerning the determinants of payment method choice in mergers and acquisitions (M&A). Eckbo et al. (2018) challenge the traditional overvaluation hypothesis by demonstrating that acquirers' information envi-

ronment significantly influences the proportion of stock used as consideration in M&A transactions, as target firms' acceptance of stock payment depends on the informativeness of the acquirer's stock price. Building on this, I focus on the interplay between passive ownership and payment choice, noting that while passive ownership tends to increase stock valuation, it concurrently diminishes the informativeness of stock prices. This setting provides a compelling context to disentangle the relative impact of information asymmetry versus overvaluation in shaping payment decisions. Consistent with Eckbo et al. (2018), I find that although acquirers with high passive ownership exhibit overvalued stock, they tend to use a smaller fraction of stock in deal consideration, reflecting the reduced informativeness of their stock prices, which lowers target firms' willingness to accept stock as payment.

Second, it examines the influence of rising passive ownership on managerial decision-making. Schmidt & Fahlenbrach (2017) documents that exogenous increases in passive ownership associate with weakened monitoring, evidenced by fewer independent director appointments and a greater incidence of value-destroying M&A activity. My analysis provides complementary evidence by showing that increased passive ownership reduces the sensitivity of market feedback to M&A withdrawal decisions. This diminished market discipline may serve as a key mechanism linking passive ownership to weaker governance and the proliferation of value-destroying acquisitions. Specifically, firms with substantial passive ownership tend to engage in more value-destroying M&As because passive investors, constrained by their limited capacity for costly active monitoring, fail to provide timely feedback and private information that might otherwise prompt managers to reconsider or withdraw poor acquisition proposals.

Finally, this paper contributes to the literature on managerial learning from financial markets (Bond et al. (2012), Edmans et al. (2012), Goldstein (2023)). This paper shows that acquirers with high passive ownership exhibit a lower likelihood of deal withdrawal in response to adverse market reactions, thereby extending the understanding of the feedback channel through which managers update their decisions based on market signals. Consistent with prior arguments, the reduced incentives for passive investors to acquire and trade on private information weaken this feedback mechanism, diminishing the probability that managers will withdraw value-destroying deals. These findings also contribute to the literature on M&A withdrawal decisions driven by market feedback (Luo (2005)).

The remainder of the paper is organized as follows. Section Section 2 reviews the relevant literature and develops the hypotheses. Section Section 3 describes the data and empirical methodology

employed in the analysis. Section Section 4 presents the main empirical findings. Finally, Section Section 5 summarizes the results and concludes.

2 Related Literature and Hypothesis development

This section reviews the related literature on M&A and then formulates the main hypothesis regarding the relationship between passive ownership, mode of payment, mitigating role of stock versus non-stock information, and M&A withdrawal decisions.

2.1 Ownership Structure and M&A

The ownership structure of firms affects the M&A decisions, in terms of mode of payment, mainly due to two reasons: dilution and information. Faccio & Masulis (2005) shows that concentrated ownership among acquirers discourages stock financing during M&A transactions. Matvos & Ostrovsky (2008) shows that institutional cross-ownership in both acquirers and target compensates them during negative merger announcements returns. Anton et al. (2022) shows that the institutional owners hold positions in the rivals of the acquirer and thus make money during value-destroying M&As. Brooks et al. (2018) is more relevant to my paper in the context of ownership structure and mode of payment through the information channel. Brooks et al. (2018) shows that institutional cross-ownership increases the likelihood of a merger, and the acquirer pays with more stock, as institutional cross-ownership reduces information asymmetry and the target is more willing to share the risk. In terms of passive ownership, Schmidt & Fahlenbrach (2017) shows that passive owners, due to their ineffective high-cost monitoring, do more value-destroying M&As. I build up on this impact of passive ownership on M&A, but through the information channel, examining the impact of passive ownership on mode of payment and M&A withdrawal decisions.

2.2 Hypothesis Development

Information asymmetry between the acquirers and targets leads to adverse selection problems, impacting the mode of payment. Hansen (1987) proposed the theoretical model on the mode of payment; when the target knows more about its value than the acquirer, the acquirer will prefer to pay in stock, as stock is a contingent price mechanism. When there is a double-sided information asymmetry between the acquirer and the target, the acquirer tends to pay more in stock when they think their

stock is overvalued and by cash when they are undervalued. Most of the literature has examined the stock payment as the acquirer's opportunistic behavior, based on the stock overvaluation (Harford (2005), Rhodes-Kropf et al. (2005)). But, this overvaluation hypothesis has been challenged by Eckbo et al. (2018), arguing that the opportunistic use of overvalued stocks by acquirers will not happen when the targets know more information about the acquirer in other words, when the target knows less about the acquirer's fair value, they are less likely to accept the acquirer's shares. Now, relating these theories to the current scenario, where the acquires have high passive ownership, I develop my hypothesis that, though the passive owners disproportionately increase the acquirer's stock price, they also distort the information environment of the acquirer, making it difficult for the target to value and accept the acquirer's stock as a mode of payment. Thus, my first hypothesis on the impact of passive ownership on the mode of payment is as follows.

Hypothesis 1: Higher passive ownership of acquirer stock is associated with a lower fraction of stock payments in acquisitions.

Next, the weaker monitoring and information acquisition incentive of passive owners affects the stock-based information environment of the acquirers Heath et al. (2022), Sammon (2024)). However, if the targets use non-stock-based information, such as the acquirers' physical and industry information, it substitutes stock-based information and reduces information asymmetry between the acquirer and target. And therefore, the target is more likely to accept the acquirers' stock (Eckbo et al. (2018)). Thus, the non- stock-based information could mitigate the negative effect of PO on the mode of payment. Thus, my second hypothesis is as follows.

Hypothesis 2: The effect of passive ownership on mode of payment gets enhanced with stock-based information, while it gets mitigated by non-stock-based information.

The information and feedback from the stock prices help managers in deciding the deal outcome as well (Luo (2005)). But, as passive owners have a lower incentives to acquire and trade based on information and monitor firms (Heath et al. (2022), Schmidt & Fahlenbrach (2017)), this feedback effect and managerial learning from stock prices could be distorted for acquirers with high passive ownership. Thus, my hypothesis regarding the impact of passive ownership on deal completion is as follows:

Hypothesis 3: Higher passive ownership of acquirer stock is associated with a lower likelihood of deal withdrawal.

I empirically test these three hypotheses and document the findings in the rest of the paper.

3 Data

3.1 Data sources

3.1.1 Mergers and acquisitions

The M&A deal sample is constructed using data from the SDC Platinum database. The sample includes all completed or withdrawn transactions announced between 1990 and 2023 by non-financial acquirers, defined as firms not classified within SIC codes 6000–6999. Only deals categorized as either "merger" or "acquisition of assets" are included. The acquirer must own less than 50% of the target prior to the deal and seek to obtain a majority stake (i.e., more than 50%) upon completion.

Acquirers are restricted to U.S.-listed firms, while targets may be U.S. or non-U.S. firms and can be listed, subsidiaries, or privately held. The deal value must be at least $10 million, with both disclosed and undisclosed deal types considered. Transactions are further limited to those in which the total percentage of consideration is between 99.99% and 100.01%, and the time between deal announcement and effective date is fewer than 1,000 days.

After applying these filters, the resulting sample comprises 8,638 deals involving 2,820 unique acquirers. This dataset is then merged with CRSP for stock return data, Compustat for firm-level accounting variables, and the Thomson Reuters 13F (S12) database to measure passive institutional ownership. All continuous firm-level control variables are winsorized at the 1st and 99th percentiles by year. The detailed sample construction process is summarized in Table A1.

Table 1 presents the time-series trends for the sample of M&A transactions. Consistent with the findings of de Bodt et al. (2018), the proportion of all-stock deals declined sharply after 2001. On average, stock comprises approximately 25.41% of the total payment consideration, while cash accounts for about 67.22%. The average share of all-stock deals is approximately 16.05%, whereas all-cash deals represent around 48.70% of the sample. Figure 2 illustrates the annual number of total M&A transactions, as well as the breakdown by all-stock, all-cash, and mixed-payment structures over the sample period.

< Table 1 here >

3.2 Variables

The primary dependent variable is the percentage of the transaction consideration paid in the acquirer's stock (% Stock). This variable takes a value of 0 for all-cash deals, 100 for all-stock deals, and lies between 0 and 100 for mixed-payment deals. The main independent variable of interest is passive ownership, which is introduced below, followed by a description of the control variables included in the analysis. Definitions and construction details for all variables are provided in Table A2. All financial ratios and continuous control variables are winsorized at the 1st and 99th percentiles at the year level to mitigate the influence of outliers.

3.2.1 Passive Ownership

The measurement of passive institutional ownership follows the methodology established in Appel et al. (2016) and Hshieh et al. (2021). A fund is classified as passive if its name includes at least one of the following identifiers: Index, Idx, Indx, Ind (followed by a space), Russell, S&P, S and P, S&P, SandP, SP, DOW, Dow, DJ, MSCI, Bloomberg, KBW, NASDAQ, NYSE, STOXX, FTSE, Wilshire, Morningstar, or any of the numerical identifiers 100, 400, 500, 600, 900, 1000, 1500, 2000, or 5000.

Following this classification, Passive ownership for acquirer firm i in year-quarter t, denoted as $PO_{i,t}$, is calculated as the ratio of the total number of shares of firm i held by all passive funds to the total number of shares outstanding for firm i in the same period. Formally,

$$PO_{i,t} = \frac{\sum_{J=1}^{J} SHARES_{j,t}}{\text{Total Shares Outstanding}_{i,t}}$$

where j denotes passive fund holding stock i, $SHARES_{j,t}$, is the number of shares of firm i held by passive fund j in year-quarter t, and Total Shares Outstanding$_{i,t}$ refers to the total number of shares outstanding for firm i in the same period.

Table 2 reports summary statistics for passive ownership across different payment types. The average passive ownership across all acquirers in the sample is approximately 4.37%. Among acquirers conducting all-stock transactions, the average passive ownership is 1.75%, compared to 5.20% for all-cash deal acquirers and 4.42% for those executing mixed-payment deals.

3.2.2 Control variables

The analysis controls for a set of acquirer-specific characteristics that are standard in the M&A literature. These include firm size (measured as market capitalization), leverage (total debt scaled by total assets), cash holdings (cash and short-term investments scaled by total assets), market-to-book ratio (M/B), a dividend dummy (equal to one if the firm pays dividends in a given year), research and development (R&D) expenditures scaled by sales, and asset tangibility (net property, plant, and equipment scaled by total assets).

Table 2 reports the summary statistics for these firm-level control variables. On average, the market capitalization of acquirers is approximately $10.67 billion. The mean leverage ratio is 18%, while the average cash holding is 17%. The average M/B ratio is 3.99, and approximately 45% of acquirers pay dividends. R&D expenditures average 5% of sales, and asset tangibility averages 38%. Variable definitions and construction details are provided in Table A2.

In addition to acquirer characteristics, the analysis also controls for target firm characteristics. Given that the sample includes public, private, and subsidiary targets, the availability of target-level data is limited. Two key target indicators are included. First, a dummy variable for cash-only sellers equals one if the target is classified as a subsidiary in the SDC database. Second, a poison pill dummy equals one if the target has adopted a poison pill provision, representing a form of antitakeover defense. In a subsample analysis, the target firm's level of passive institutional ownership is also included as an additional control. As shown in Table 2, approximately 28% of the deals involve cash-only sellers, while fewer than 1% of the targets have poison pill defenses in place.

The analysis further includes controls for transaction-specific characteristics. Deal value is obtained from the SDC database, and relative deal size is calculated as the ratio of deal value to the acquirer's market capitalization. A dummy variable for large deal size equals one if the relative deal size falls within the top quartile of the sample distribution. Additional transaction-level controls include: a public target indicator (equal to one if the target is publicly listed), a toehold indicator (equal to one if the acquirer holds any equity in the target prior to the deal announcement), a cross-border indicator (equal to one if the acquirer and target are domiciled in different countries), a hostile indicator (equal to one if the deal is classified by SDC as hostile or unsolicited), and a multiple bidder indicator (equal to one if SDC reports more than one bidder involved in the transaction).

As reported in Table 2, the average deal value in the sample is approximately $873 million. Public

targets account for roughly 25% of the transactions, while multiple-bidder situations occur in about 3% of deals. Cross-border transactions represent 18% of the sample, and both toehold and hostile bids comprise approximately 2% of the deals. Among deals where acquirers held a toehold, the average pre-announcement ownership stake is approximately 33%.

Industry-level control variables are also included in the analysis. A High-Tech dummy variable equals one if the acquirer operates in an industry classified as high technology, following the classification scheme proposed by Kile & Phillips (2009). To account for time-varying merger activity, a Wave variable is included to control for merger waves, capturing periods of heightened M&A activity. Additionally, industry-level competition from private buyers is measured using Comp.Bidd, defined as the fraction of private bidders relative to the total number of merger bids in a given industry-year. This variable captures the extent of acquisition competition from private firms within each industry over time.

< Table 2 here >

To explore the relationship between passive ownership (PO) and M&A decisions—specifically regarding the mode of payment and deal withdrawal—a set of preliminary summary statistics is constructed based on the acquirer's inclusion in major equity indices. Acquirers are classified into index acquirers (firms included in either the Russell 1000 or Russell 2000 indices at the time of deal announcement) and non-index acquirers (firms not included in either index during the same period).

Table 3 presents M&A characteristics for both groups. Index acquirers exhibit significantly higher levels of passive ownership, with an average PO of 5.25%, compared to 0.97% for non-index acquirers. In terms of payment structure, index acquirers rely less on stock financing (average stock fraction of 21.3%) and more on cash (71.95%), whereas non-index acquirers have a higher average stock fraction (38.64%) and a lower cash fraction (51.97%). The incidence of withdrawn deals is also lower among index acquirers (4.35%) relative to non-index acquirers (6.2%).

These descriptive patterns suggest a potential link between passive ownership and both financing decisions and deal completion likelihood. In terms of deal activity, index acquirers account for 6,591 transactions in the sample and approximately $7 billion in total deal value.

< Table 3 here >

4 Empirical Results

4.1 The role of passive ownership on mode of payment

This section examines the role of passive ownership on the mode of payment during M&A transactions. The dependent variable is the fraction of the transaction price paid with acquirers' stock (*Fraction of Stock*). The linear specification used for the multivariate analysis is as follows:

$$Fraction\ of\ Stock_{i,t} = \alpha + \beta_1 PO_{i,t-1} + \gamma Controls_i + \theta_{Ind} + \theta_t + \epsilon_i$$

where $PO_{i,t-1}$ is the main independent variable of interest, passive ownership (lagged by one-quarter relative to the M&A transaction announcement quarter). $Controls_j$ includes a set of acquirer, deal, and industry control variables. The model includes industry (FF49) (θ_{Ind}) and time (Year-by-Quarter) (θ_t) fixed effects.

Table 4 provides the estimation results of the baseline regression on the effect of PO on the mode of payment. Column (1) provides the univariate results on the effect of PO on the mode of payment. The coefficient of PO is negative and significant (-0.021), showing that PO is negatively associated with the fraction of stock in the mode of payment. In column (2), the model includes the set of control variables at the acquirer, target, transaction, and industry levels, as discussed in Section 3.2.2, and in Column (3), the model includes time (Year-by-Quarter) and industry level fixed effects. The coefficient of PO is negative and significant in both columns (3) and (4), showing that PO is negatively associated with the fraction of stock in the mode of payment after controlling for the acquirer, target, transaction, and industry characteristics. Since the dependent variable, the fraction of stock in the deal payment, $Fraction\ of\ Stock \in [0, 1]$, we estimate the baseline regression with the Tobit model as *Fraction of Stock* is a bounded representation of the underlying function driving the true payment method choices: thus, the Tobit estimation (Maddala (1983)). Column (4) shows the results of the Tobit model regression, where the dependent variables are left and right censored at 0 and 1 (the limits of fraction of stock) with control variables and fixed effects as in column (3). In this setup, the PO coefficient is also significantly negative (-0.028). These results show that PO is negatively associated with the fraction of stock in the mode of payment. Therefore, though PO increases the stock prices and valuation drastically, their impact on the information environment of the acquirers makes it difficult for the targets to value and accept the acquirer's stock as the mode of payment.

My results align with the findings of Eckbo et al. (2018), that it is the information rather than the valuation of the acquirers that plays an important role in the determinant of the mode of payment.

< Table 4 here >

4.2 Instrumental Variable Model: PO on Payment

To address endogeneity and establish causality, I use Russell 1000/2000 index switching as an exogenous shock to passive ownership and use an instrumental variable (IV) model. Every year, the Russell Index providers reconstitute the index stocks of Russell 1000 and Russell 2000. During the reconstitution, stocks may move from Russell 1000 to 2000 and vice versa. This movement of stocks between Russell 1000/2000 indices affects the passive ownership of the stocks that move, as the index funds following these indices will also reallocate their weightage of these stocks based on the reconstituted weights. Previous studies have documented that moving from a high weightage index to a low weightage index affects the passive ownership level (Pavlova & Sikorskaya (2020)). Thus, using this mechanical movement of index switching, the two-stage instrumental variable model is as follows:

$$PO_{i,t-1} = \alpha + \beta_1\ I\{R2000 \rightarrow R1000\}_{i,t-2} + \beta_2\ I\{R1000 \rightarrow R2000\}_{i,t-2} + \gamma Controls_i + \theta_{Ind} + \theta_t + \epsilon_t \tag{4.1}$$

$$\%Stock_{i,t} = \alpha + \beta_1 \widehat{PO_{i,t-1}} + \gamma Controls_i + \theta_{Ind} + \theta_t + \epsilon_t \tag{4.2}$$

In Equation (4.1), $I\{R2000 \rightarrow R1000\}_{i,t-2}$ represents an indicator variable that takes value one if the acquirer moved from the Russell 2000 index in $t-2$ to the Russell 1000 index in $t-1$. Similarly, $I\{R1000 \rightarrow R2000\}_{i,t-2}$ represents an indicator variable that takes value one if the acquirer moved from the Russell 1000 index to the Russell 2000 index. I get the instrumented variable for passive ownership ($\widehat{PO}$) from Equation (4.1) and use it in the second stage Equation (4.2).

Table 5 shows the estimation of the IV model. Column (1) shows the results of the first stage regression. As discussed before, when the acquirer moves from Russell 2000 to Russell 1000, the passive ownership drops significantly (-0.723) and increases (0.403) when the acquirer moves from Russell 1000 to Russell 2000. In column (2), the coefficient of the instrumented PO ($\widehat{PO}$) is significantly negative (-0.263), confirming my hypothesis that the exogenous increase in passive ownership among

acquirers reduces the fraction of stock in the mode of payment. In column (3), the effect is much stronger (-0.518) for only public targets, as public targets are much more likely to be paid by stocks.

< Table 5 here >

Next, I examine the impact of passive ownership on the mode of payment during M&A transactions using a multinomial probit regression approach. In the multinomial setup, the dependent variable takes value one if the deal is a pure stock deal (100% paid in stock), zero if the deal is a mixed payment deal, and a negative one if the deal is a pure cash deal (100% paid in cash). I set pure cash deals as the base and provide results of all stock vs. all cash and mixed vs. all cash.

Table 6 provides the results of the estimation of the multinomial probit regression on the effect of PO on the mode of payment. Columns (1) and (2) show the results for the full sample, while columns (3) and (4) show the results for the public-only target sample. The main coefficient of interest is the coefficient of $\widehat{PO}$, the instrumented PO variable. For the full sample, the $\widehat{PO}$ coefficient is significantly negative for both Mixed and All-stock deals cases. The interpretation here is that acquirers with high passive ownership are more likely to do an all-cash deal than both a mixed deal and an all-stock deal. Similarly, in the public-only targets sample, the effect is much stronger that acquirers with high passive ownership are more likely to do an all-cash deal than a mixed deal and an all-stock deal. In other words, acquirers with high passive ownership are less likely to do an all-stock deal than an all-cash deal. These results again confirm the negative effects of passive ownership on the mode of payment and especially the lower likelihood of using stock as the mode of payment. Thus, I find that the exogenous increase in passive ownership due to index switching negatively affects the fraction of stock and the likelihood of using stock as the mode of payment during the M&A transactions.

< Table 6 here >

4.3 Mechanism: PO and payment consideration

In this section, I examine how passive ownership affects the faction of stock in the payment consideration. My main hypothesis is that passive ownership impacts the information environment of the acquirers making it difficult for the targets to accept the stocks of the acquirer as the mode of payment. Thus, the effect of passive ownership on the fraction of stock gets worse when the targets use stock-based information to value the acquirer's stock. This could be mitigated if the targets use

non-stock-based information, which reduces the information asymmetry and could be substituted in place of stock-based information, which will reduce the information asymmetry between the acquirers and targets. So, I use three stock-based information proxies and three non-stock-based information proxies that are known to affect the mode of payment. The stock-based information proxies include Tobin's Q, Recent M&A (an indicator variable that takes value one if the acquirer has done an M&A in the last 18 months), and Recent SEO (an indicator variable that takes value one if the acquirer has done an SEO in that last 18 months). The non-stock-based information proxies include Local deal (an indicator variable that takes value one if the physical distance between the acquirer and target is less than 100 kilometers), Same primary SIC (an indicator variable that takes value one if both acquirer and target have the same primary SIC, according to SDC) and Overlapping Ind.Acq, the ratio of the number of common SICs between the acquirer and target to the total number of acquirer's SIC.

Table 7 shows the results on the stock versus non-stock-based information proxies on the impact of passive ownership on the mode of payment. My main coefficient of interest is the interaction PO with the information proxies. The interaction coefficient of PO on stock-based information proxies (Q and Recent M&A) is negative and significant, showing that these stock-based information proxies enhance the negative effect of PO on the mode of payment. Based on the previous findings that passive ownership is negatively associated with information production and stock price informativeness, using stock-based information to decide on payment consideration worsens the effect of PO on payment consideration. The target will accept a much lower fraction of the acquirer's stock if they rely on the acquirer's stock-based information. The interaction of PO and Recent SEO is positive but not significant. On the other hand, the interactions of PO with non-stock-based information proxies, Local Deal, Same Primary SIC, and Overlapping Ind.Acq, are all positive and significant. This shows that the non-stock-based information mitigates the information asymmetry due to PO and thus mitigates the effect of PO on the mode of payment. Thus, the targets relying more on non-stock-based information about the acquirers are able to glean the true value of the acquirers' stock than using the stock-based information of acquirers and thus are more willing to accept the stock payment of the acquirers. This result shows the clear impact of passive ownership on the information environment of the acquirers, their impact on the mode of payment, and the mechanism through which the negative impact of passive ownership could be mitigated by using alternative non-stock-based information proxies.

< Table 7 here >

4.4 Sub-sample Analysis

4.4.1 Controlling for Target's Passive Ownership

In this section, I examine the effect of passive ownership of the target firm as well, on the mode of payment. For this purpose, I analyze the sub-sample, where the target is public. I measure the PO of the target firm using the similar method described in Section 3.2.1. I rerun the baseline regression by controlling for the target's passive ownership (PO_{Targ}) level. Table 8 shows the results on the estimation of the acquirer's passive ownership (PO_{Acq}) on the mode of payment, controlling for the target's passive ownership (PO_{Targ}). I run a linear model and a Tobit model in columns (1) and column (2), respectively. In both models, the target's PO coefficient PO_{Targ} is negative but insignificant. As in the baseline model, the acquirer's PO (PO_{Acq}) is still negative and significant. This shows that the acquirer's passive ownership plays an important role in determining the fraction of stock in the mode of payment. However, the target's passive ownership does not affect the stock fraction in the deal.

< Table 8 here >

4.4.2 Index Status of Acquirer and Target

In this section, I examine how the index status of both acquire and target plays a role in determining the mode of payment. For this purpose, I classify the deals into four clusters based on whether or not either the acquirer or target was present in the Russell 1000 or Russell 2000 index during the acquisition announcement year. Table 9 provides the index status of the acquirer and target and the average fraction of stock in the deal considerations. The table shows that when neither the acquirer nor the target was in an index, the average fraction of stock in deal consideration is around 58%. But, when only the acquirer is in the index, and not the target, the stock fraction is only 31%, and when both are in an index, the stock fraction is around 38%. When the target is an index, while the acquirer is not, the stock fraction is around 52%. This summary table suggests that the acquirer's index status is primarily negatively associated with the fraction of stock in the deal considerations. The target's index status does not affect the deal considerations. These results point in the direction that when the acquirer is in the index, the target is less likely to accept stock as a mode of payment.

< Table 9 here >

I run a Tobit model, with the index status of the acquirer and target as an explanatory variable on the stock fraction. The base category is where both acquirer and target are not in the index. The model includes all the control variables from the baseline regression. Table 10 shows the result of the model. Here, the table shows that, compared to the base category, the deal where only the acquirer is in an index (Acq_Index) has a significantly lower fraction of stocks in the mode of payment. Also, the deals where both the target and acquirer are in an index (Acq_Targ_Index) also have a significantly lower fraction of stock in the mode of payment. But, in deals where the acquirer is not in an index, while the target is in an index (Targ_Index), the stock fraction is not significantly different from the base category. This result confirms that the acquirers' index status is negatively associated with stock fraction in the deal considerations. These results confirm that the effect of PO, which exogenously changes during the index change, negatively affects the fraction of stock in the mode of payment.

< Table 10 here >

4.4.3 Pre and Post 2001

In this section, I examine the effect of PO on the mode of payment pre- and post-2001. In June 2001, the Financial Accounting Standards Board (FASB) abolished the "pooling of interests" accounting, leading to lower incentives for acquirers to pay completely in acquirers stock as the mode of payment for M&A transactions (de Bodt et al. (2018)). So, we examine whether the effect of PO on the mode of payment has changed due to this accounting rule. We split the sample into two sub-samples, pre, and post-2001, and re-run the baseline Tobit models. Table 11 shows the results of the estimation of PO on the mode of payment pre and post-2001. In column (1), PO is strongly negatively (-0.123) associated with the fraction of stock in deal payment. In column (2), after the abolition of the pooling rule, the effect of PO is still negative and significant (-0.022), but the degree of effect has reduced, as the total stock fraction itself has fallen after the rule change. Thus, the negative effect of PO on mode of payment persists due to its implications for the information asymmetry between the acquirer and target, even after the change in the exogenous accounting rule.

< Table 11 here >

4.5 Passive ownership and the likelihood of M&A withdrawal

This section presents results on how passive ownership affects the M&A outcomes. My aim is to evaluate how well passive ownership provides feedback to managers in terms of providing unique information that can predict the likelihood of M&A withdrawals. I estimate the impact of passive ownership on the likelihood of M&A withdrawal using the following linear probability model:

$$Withdrawn_{i,t} = \alpha + \beta_1 \times \widehat{PO_{i,t-1}} + \beta_2 \times CAR_i + \beta_3 \times \widehat{PO_{i,t-1}} \times CAR_i + \Gamma \times X_i + \alpha_t + \gamma_j + \epsilon_i \quad (4.3)$$

where $Withdrawn_i$ is an indicator variable that takes the value of one (zero) for withdrawn (completed) deals. $\widehat{PO}$ represents the instrumented variable using the Russell 1000/2000 index switching as an exogenous shock to PO, based on Equation (4.1). The main coefficient of interest is β_3, which captures how sensitive deal withdrawals are to the market reaction in the presence of passive ownership ($\widehat{PO}$). I control for the Cumulative Abnormal Return (CAR) following the M&A announcement to control for market reaction and to benchmark the effect of passive ownership in the presence of market reaction. The CARs for the acquirer are computed at two event windows(-1:1,-1:10) around M&A announcement, using the Fama-French 3-factor model and stock return data from the CRSP.[2]. Also, I compute an additional CAR ($CAR[1:t]$)in the form of a cumulative return of the acquirer stock return between the date of announcement and either date of completion/withdrawal to capture a longer time period market reaction. The empirical model includes a robust set of both deal and acquirer controls (X_i) that are known to affect M&A outcomes. The deal control variable includes a relative deal size dummy, indicator variables capturing if the acquirer is a white knight, involvement of hedge funds, a rumored deal, a hostile deal if the acquirer is in the high-tech industry, a dummy for public and private targets, multiple bidders dummy, cross-border deal dummy, and the termination fee of the target. The firm control variables include firm size, leverage, cash holding, market to book (M/B), R&D, and asset tangibility. The model also includes year-quarter-fixed effects (α_t) to control for time trends such as merger waves and the acquirer industry (FF49) fixed effects (γ_i) to account for industry differences in M&A outcomes. Standard errors are clustered at the year-quarter level. Since I want to capture the feedback effect of passive ownership on M&A withdrawals, I have removed

[2]I use an estimation period of 100 days with a minimum of 70 observations with a gap of 10 days between the end of the estimation period and the event period to compute expected and abnormal returns.

the withdrawals due to exogenous reasons, such as the intervention of regulation, defensive strategies by the target, competing bids being successful, financing reasons and a few other reasons flagged by SDC, as these withdrawals do not capture the managerial learning and feedback mechanism from the market, but are withdrawn due to exogenous conditions (Wong & O'Sullivan (2001)).

Table 12 presents the results from estimating Equation (4.3). The main coefficients of interest are the interaction between PO and CARs. Column (1) and (2) shows the results for $CAR[-1:1]$, columns (3) and (4) show the result for $CAR[-1:10]$, and columns (5) and (6) show the result for $CAR[-1:t]$. Columns (1), (3), and (5) show the first-stage result, similar to Equation (4.1), and columns (2), (4), and (6) show the results of the second-stage equation (Equation (4.3)) with the instrumented values of PO ($\widehat{PO}$). In line with the prior literature, the three windows of CARs are negatively associated with the likelihood of withdrawal. In particular, the $CAR[-1:1]$ has the highest coefficient (-17.450), while the $CAR[-1:10]$ has coefficient -11.680, and $CAR[-1:t]$ is -9.316. This shows that the major chunk of learning from the market, in terms of deciding the deal withdrawal, happens in the window of [-1:1]. Next, the main variable of interest is the coefficient of interaction of CAR and PO, which shows how much the CAR affects the deal withdrawal in the presence of PO. In column (2), this coefficient is positive and significant (1.033), which is opposite to the sign of the coefficient of CAR. The economic interpretation is that one unit increase in $CAR[-1:1]$ is associated with a 17.45% decrease in the likelihood of deal withdrawal when there is no PO (at PO =0%). But, in the presence of PO (at 4.5% (average PO level)), this likelihood comes down to 12.8% ($-17.45 + 4.5 \times 1.033$). At a higher PO (at PO = 9% (avg PO + 1 S.D)), the likelihood comes to a mere 3.5% ($-17.45 + 9 \times 1.033$). This shows that the effect of market feedback on the likelihood of withdrawal decreases with an increase in PO. Managers' weightage to the stock reaction for deciding the deal outcome decreases when there is a high PO. This result confirms my hypothesis that acquirers learn less from the stock price when there is a high PO, as the stock price does not reflect much private information that might have been useful for managers in deciding on deal outcomes. My result could be one of the mechanism that explains the findings of Schmidt & Fahlenbrach (2017), that firms with high PO do more value-destroying M&As.

< Table 12 here >

5 Conclusion

Overall, I document the impact of growth in passive ownership on M&A decisions in terms of mode of payment and withdrawal decisions. Based on my hypothesis that passive owners affect the information environment of acquirers, that could hinder the acquirer and target in making optimal decisions concerning an M&A deal. I find that acquirers with high passive ownership have a lower fraction of stock in their mode of payment as the weaker information environment of acquirers makes it difficult for targets to accept their stocks as a mode of payment. I also document that this effect of passive ownership on the mode of payment could be mitigated by using non-stock information, which compensates for weakened stock information due to passive owners and reduces the effect of PO on the mode of payment. Also, I find that the acquirer's PO level impacts the mode of payment, while the target's PO level doesn't play any role in determining the mode of payment.

I also document that acquirers with high PO give less weightage to market feedback on the M&A announcement, and thus, the likelihood of withdrawal based on the market reaction decreases with an increase in passive ownership. This weaker sensitivity to market feedback and weaker managerial learning from stock prices due to increased passive ownership during M&A transactions could be the primary mechanism why acquirers with high passive ownership do more value-destroying M&As, as documented in Schmidt & Fahlenbrach (2017).

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Figure 1: This figure displays the volume of M&A transactions in a million USD and the corresponding percentages of stock and cash used as consideration. The sample contains 8638 acquisitions of assets and merger control transactions undertaken by 2820 acquirers over the period 1990 to 2023 collected in the Refinitiv SDC database.

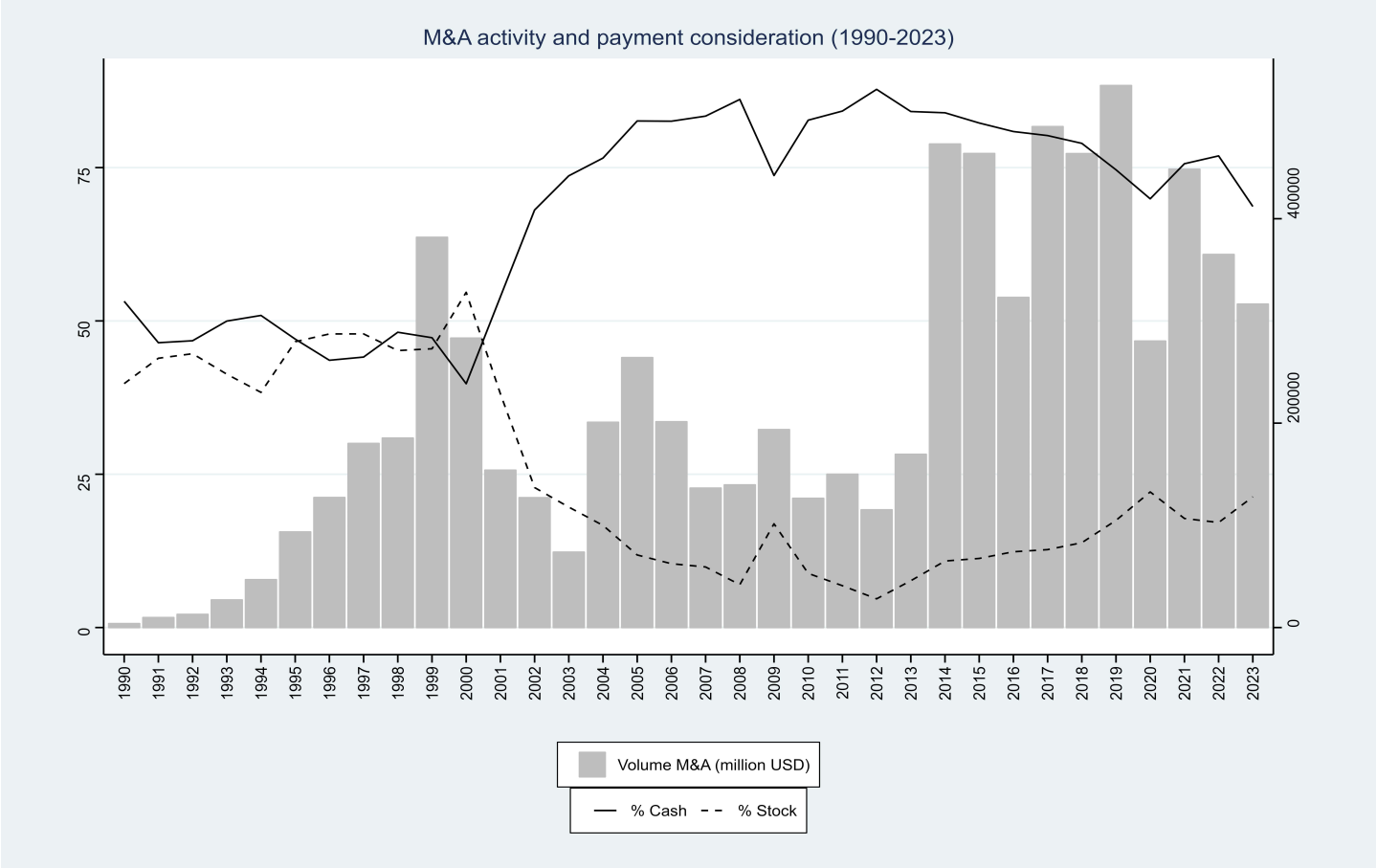

Figure 2: This figure displays the number of M&A transactions each year and the corresponding number of all-stock, all-cash, and mixed payment deals. The sample contains 8638 acquisitions of assets and merger control transactions undertaken by 2820 acquirers over the period 1990 to 2023 collected in the Refinitiv SDC database.

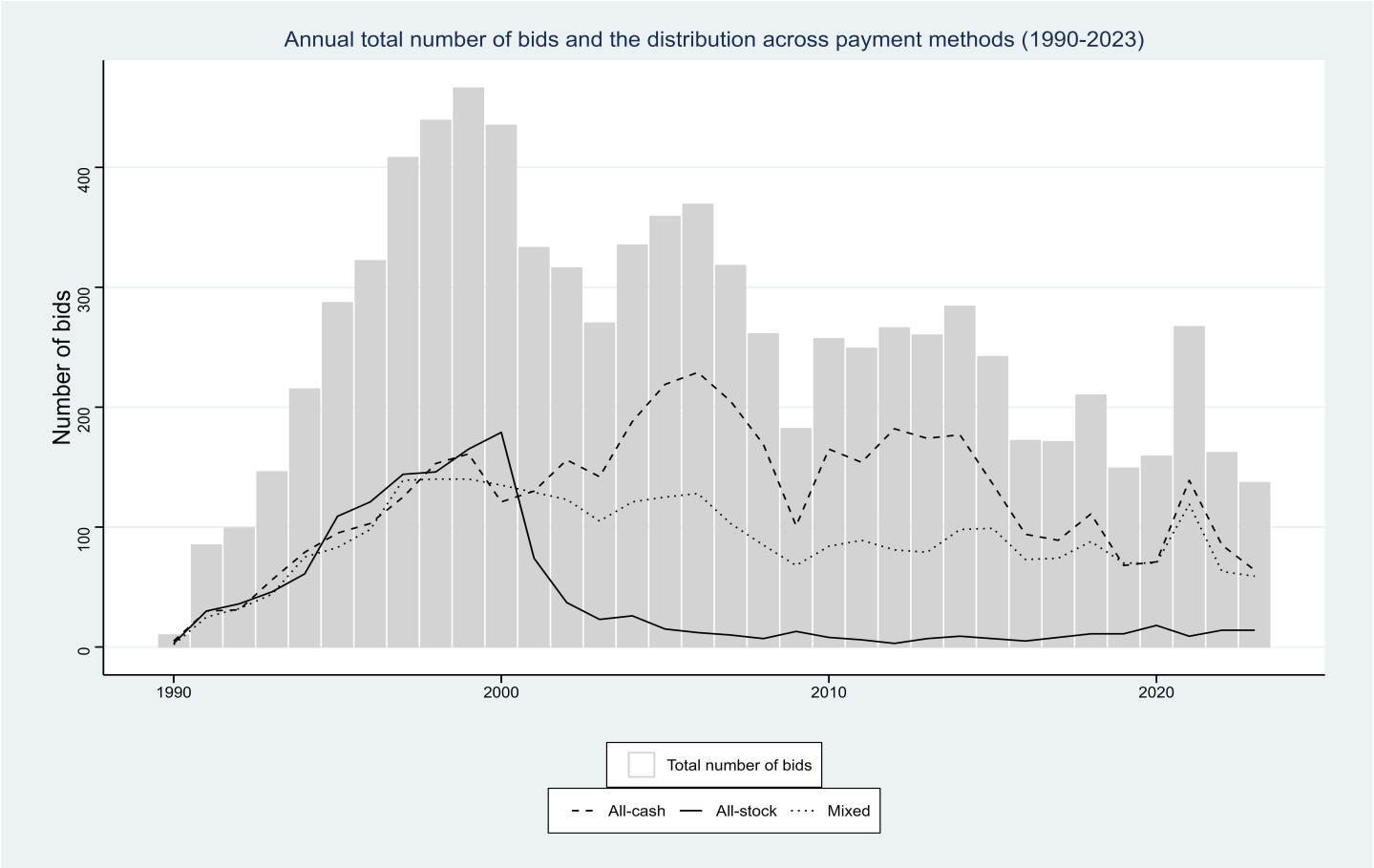

Figure 3: This figure displays the predicted probabilities of deal withdrawn based on market reaction for different levels of passive ownership.

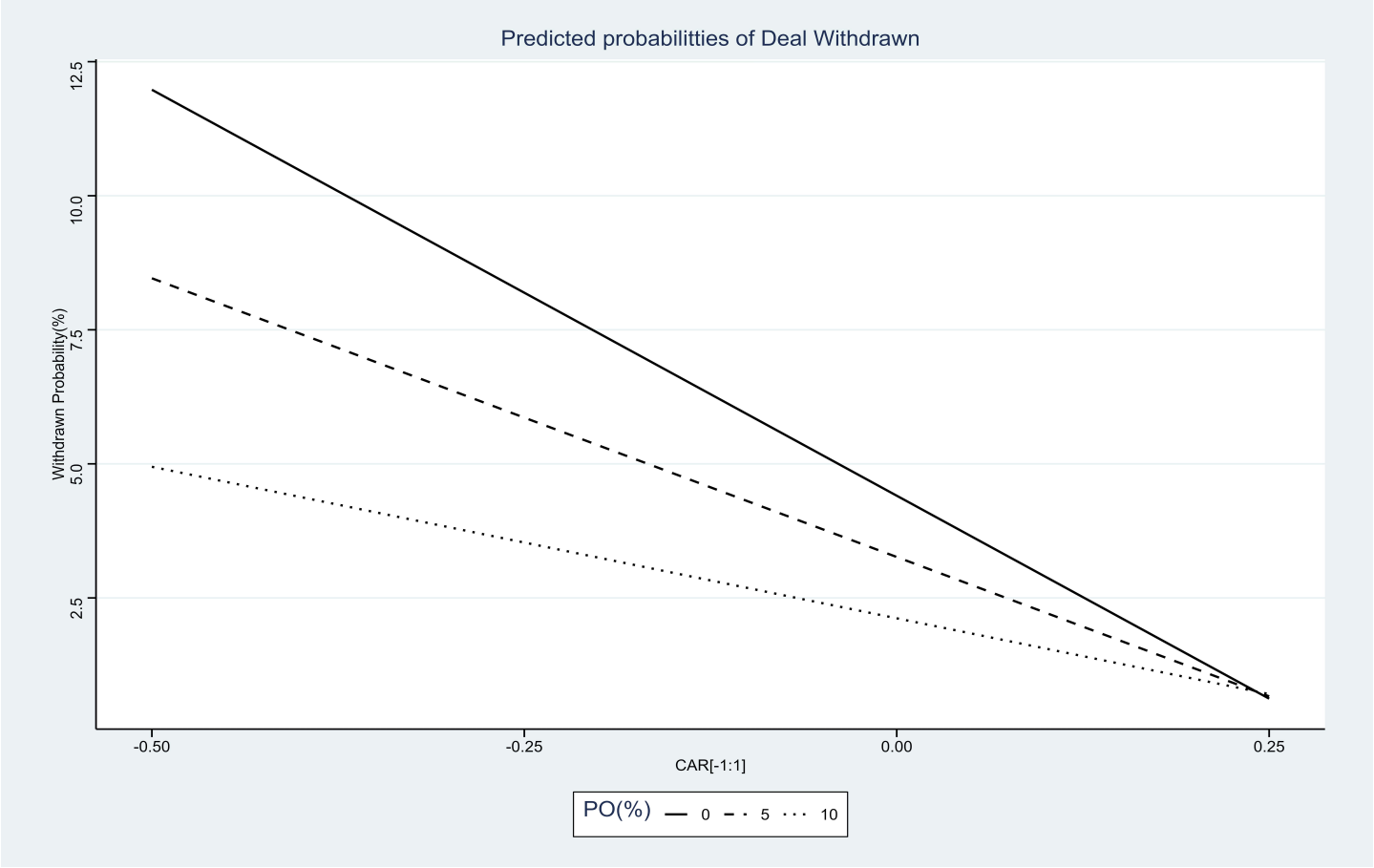

Table 1: Sample descriptive statistics by mode of payment

This table reports descriptive statistics on my sample of mergers and acquisitions of assets. The sample contains 8638 acquisitions of assets and merger control transactions, as classified in the Refinitiv SDC database, undertaken by 2820 acquirers from 1990 to 2023. Column 1 reports the number of transactions by year, and column 2 the corresponding volume in million USD. Columns 3 and 4 provide the corresponding percentages of all-stock transactions, respectively, based on the number (Column 3) and volume (Column 4) of transactions. Columns 5 and 6 display the corresponding percentages for all cash transactions. Finally, Column 7 shows the average percentage of stock used in the compensation package of these transactions, and Column 8 shows the corresponding average percentage of cash.

	All Deals		% All-stock transactions		% All-cash transactions		% Stock	% Cash
	Number	Volume	Number	Volume	Number	Volume		
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1990	10	3821	30.00	8.65	50.00	4.83	39.78	53.20
1991	85	9718	35.29	22.06	35.29	33.41	43.91	46.45
1992	99	12812	36.36	23.54	31.31	37.13	44.65	46.77
1993	146	26971	31.51	40.65	38.36	25.25	41.32	49.97
1994	215	46806	28.37	22.22	36.74	52.13	38.35	50.90
1995	287	93478	37.98	38.60	33.10	16.39	46.60	47.04
1996	322	127169	37.58	36.35	31.99	28.06	47.88	43.58
1997	407	168237	35.38	24.15	30.71	32.37	47.82	44.21
1998	439	185313	33.26	26.61	34.85	22.22	45.17	48.15
1999	466	381766	35.41	51.06	34.55	7.66	45.46	47.26
2000	435	283150	41.15	37.63	27.82	11.39	54.67	39.76
2001	333	153923	22.22	22.40	39.04	24.75	38.12	53.93
2002	316	127025	11.71	61.56	49.37	19.93	22.83	68.09
2003	270	73722	8.52	8.03	52.59	43.57	19.64	73.67
2004	335	200780	7.76	14.68	56.12	17.24	16.65	76.56
2005	359	264067	4.18	23.13	61.00	17.64	11.83	82.61
2006	369	201309	3.25	11.35	62.06	54.62	10.41	82.57
2007	318	136368	3.14	1.81	64.47	64.84	9.88	83.40
2008	261	139537	2.68	4.80	64.75	46.59	6.99	86.12
2009	182	193627	7.14	3.08	55.49	23.43	16.91	73.71
2010	257	126360	3.11	1.96	64.20	50.52	8.83	82.74
2011	249	149954	2.41	10.66	61.85	38.35	6.82	84.22
2012	266	115136	1.13	1.11	68.42	63.56	4.68	87.76
2013	260	169444	2.69	6.02	66.92	47.38	7.63	84.15
2014	284	473043	3.17	11.81	62.32	19.63	10.85	83.94
2015	242	463775	2.89	35.51	56.20	36.79	11.27	82.28
2016	172	322946	2.91	1.72	54.65	65.54	12.35	80.88
2017	171	490069	4.68	3.19	52.05	21.04	12.70	80.23
2018	209	460933	4.78	3.96	53.11	57.42	13.42	79.33
2019	149	530266	7.38	10.37	45.64	19.30	17.48	74.64
2020	159	280230	11.32	35.46	44.65	33.93	22.11	69.91
2021	267	448342	3.37	7.93	52.06	52.70	17.79	75.63
2022	162	364952	8.64	6.50	52.47	50.28	17.13	76.91
2023	137	316382	10.22	33.40	46.72	49.22	21.31	68.66
Total	8638	7541428	16.05	17.99	48.70	34.79	25.41	67.22

Table 2: Summary Statistics

This table reports descriptive statistics on passive ownership structure (Panel A), acquirer control variables (Panel B), transaction control variables (Panel C), and industry control variables (Panel D) obtained for a sample of 8638 acquisitions of assets and mergers control transactions as classified in the Refinitiv SDC database, undertaken over the period 1990 to 2023. All variable definitions are provided in Table A2. Mean, and Std.dev the corresponding arithmetic average and standard deviation (Columns 1 and 2). Arithmetic averages are also reported for all-cash transactions (Column 3), all-stock transactions (Column 4), and mixed-payment transactions (Column 5).

	All Deals (8638)		All-Stock (1386)	All-Cash (4207)	Mixed (3045)
	Mean	Std.dev	Mean	Mean	Mean
Variables	(1)	(2)	(3)	(4)	(5)
Panel A - Passive ownership measure					
PO	4.37	4.88	1.75	5.20	4.42
Panel B - Deal Variables					
% Stock	25.41	39.06	100.00	0.00	26.56
% Cash	67.22	40.65	0.00	100.00	52.51
% Withdrawn	4.79	21.36	7.43	4.21	4.40
Panel C - Acquirer Control Variables					
Size($ Billions)	10.67	28.69	9.00	14.06	6.74
Leverage	0.18	0.18	0.11	0.19	0.20
Cash holding	0.17	0.18	0.24	0.14	0.16
M/B	3.99	5.37	5.90	3.77	3.41
Dividend Dummy	0.45	0.50	0.35	0.52	0.39
R&D	0.05	0.07	0.08	0.04	0.05
Asset Tangibility	0.38	0.33	0.36	0.39	0.39
Panel D - Transaction Control Variables					
Deal Value ($ Millions)	873.05	4519.45	979.06	623.66	1169.36
Public Target	0.25	0.43	0.42	0.22	0.21
Cash-only seller	0.28	0.45	0.08	0.39	0.23
Private.Target	0.47	0.50	0.50	0.38	0.56
Multiple Bidder	0.03	0.16	0.02	0.03	0.03
Poison Pill	0.00	0.06	0.00	0.00	0.00
Cross Border	0.18	0.38	0.10	0.21	0.17
Toe Hold	0.02	0.13	0.03	0.01	0.01
Hostile	0.02	0.13	0.01	0.02	0.02
% shares held prior	0.33	3.12	0.55	0.25	0.33
Hedge Inv	0.00	0.03	0.00	0.00	0.00
Acquirer White knight	0.00	0.04	0.00	0.00	0.00
Rumor	0.04	0.19	0.03	0.04	0.04
Termination fee(Target)	0.59	1.46	1.05	0.53	0.47
Panel E - Industry Control Variables					
High-Tech Dummy	0.48	0.50	0.63	0.45	0.46
Wave	0.05	0.07	0.07	0.04	0.05
Comp.Bidd	0.16	0.09	0.13	0.17	0.16

Table 3: Sample Statistics based on Index vs Non-Index acquirers

This table provides the deal characteristics based on the index versus non-index acquirers. Index=1 refers to the acquirers that are either in the Russell 1000 or Russell 2000 index during the acquisition announcement year, and Index = 0 refers to firms that are neither in the Russell 1000 or Russell 2000 index during the acquisition announcement year.

Measures	Index=0	Index=1
No. of Deals	2047	6591
PO (%)	0.97%	5.25%
% Stock	38.64%	21.30%
% Cash	51.97%	71.95%
Withdrawn (%)	6.20%	4.35%
Deal Volume (billion USD)	519.6	7022
All-stock (Number)	26.48%	12.81%
All-stock (Volume)	34.72%	16.76%
All-cash (Number)	33.07%	53.56%
All-cash (Volume)	20.46%	35.85%

Table 4: Effect of PO on mode of payment

This table represents the results on the baseline effect of PO on the fraction stock in the mode of payment. Column (1) shows the univariate linear model results. Column (2) shows the linear model results with control variables. Column (3) shows the linear models with control variables and fixed effects. Colum (4) shows the Tobit model results with industry and year dummies. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable: Fraction of Stock			
	(1)	(2)	(3)	(4)
PO	−0.021***	−0.015***	−0.004***	−0.028***
	(0.001)	(0.001)	(0.001)	(0.006)
Size		−0.012***	−0.002	−0.036***
		(0.003)	(0.003)	(0.011)
Leverage		−0.037	−0.064**	−0.321***
		(0.027)	(0.031)	(0.120)
Cash Holding		0.178***	0.179***	0.567***
		(0.023)	(0.025)	(0.096)
M/B		0.010***	0.007***	0.027***
		(0.001)	(0.001)	(0.003)
Dividend Dummy		−0.019**	−0.034***	−0.195***
		(0.008)	(0.008)	(0.038)
R&D		0.487***	0.617***	2.160***
		(0.065)	(0.086)	(0.270)
Asset Tangibility		0.084***	−0.015	−0.068
		(0.012)	(0.017)	(0.065)
Large Relative Deal Size		0.087***	0.092***	0.508***
		(0.009)	(0.011)	(0.040)
Public Target		0.123***	0.094***	0.293***
		(0.010)	(0.013)	(0.042)
Cash-only seller		−0.126***	−0.129***	−0.723***
		(0.009)	(0.013)	(0.044)
Multiple Bidder		−0.088***	−0.079***	−0.276***
		(0.024)	(0.024)	(0.099)
Poison Pill		−0.197***	−0.173***	−0.647**
		(0.063)	(0.064)	(0.280)
Cross Border		−0.081***	−0.067***	−0.365***
		(0.010)	(0.009)	(0.045)
Toe hold		0.070**	0.030	0.175
		(0.029)	(0.039)	(0.120)
Hostile		−0.132***	−0.116***	−0.448***
		(0.031)	(0.036)	(0.129)
High-Tech Dummy		−0.023**	0.019	0.076
		(0.010)	(0.013)	(0.060)
Wave_Z		0.037***	0.020***	0.076***
		(0.004)	(0.006)	(0.018)
Comp.Bidd		−0.336***	−0.097*	−0.318
		(0.045)	(0.054)	(0.225)
Industry FE	No	No	Yes	Yes
Year-by-Quarter FE	No	No	Yes	Yes
Observations	8,895	8,705	8,638	8638
R^2	0.064	0.234	0.347	0.259

Table 5: Effect of PO on mode of payment: IV Model

This table shows the results on the estimation of IV on the effect of PO on mode of payment. Column (1) shows the first-stage regression results. Column (2) shows the second-stage regression results. Column (3) shows the second-stage results only for the sub-sample of public target deals. Standard errors reported between parentheses below coefficient estimates. *, **, and *** indicate significance at 10%, 5% and 1% respectively.

Dependent variable:	*PO*	*Fraction of Stock*	
		(Full Sample)	*(Targ=Public)*
	(1)	(2)	(3)
$R1000 \rightarrow R2000$	0.403		
	(0.306)		
$R2000 \rightarrow R1000$	−0.723***		
	(0.136)		
$\widehat{PO}$		−0.262**	−0.513**
		(0.126)	(0.251)
Size	0.062*	−0.039**	−0.054
	(0.035)	(0.017)	(0.036)
Leverage	−1.437***	−0.386	−0.379
	(0.385)	(0.239)	(0.486)
Cash Holding	−0.238	0.222	0.316
	(0.234)	(0.137)	(0.323)
MB	−0.021**	0.019***	0.019*
	(0.008)	(0.005)	(0.010)
Dividend Dummy	0.068	−0.255***	−0.115
	(0.103)	(0.050)	(0.105)
R&D	−2.379***	1.901***	2.436**
	(0.749)	(0.467)	(1.036)
Asset Tangibility	0.195	−0.035	0.055
	(0.166)	(0.088)	(0.175)
Large Relative Deal Size	0.075	0.653***	0.784***
	(0.124)	(0.053)	(0.103)
Public Target	0.109	0.301***	
	(0.086)	(0.053)	
Cash-only Seller	0.113	−0.615***	
	(0.096)	(0.058)	
Multiple Bidder	−0.396**	−0.197	−0.451***
	(0.167)	(0.122)	(0.175)
Poison Pill	0.200	−0.247	−0.301
	(0.425)	(0.321)	(0.403)
Cross Border	−0.018	−0.374***	−0.536***
	(0.079)	(0.056)	(0.128)
Toe Hold	0.213	0.670***	0.320
	(0.308)	(0.143)	(0.244)
Hostile	0.218	−0.493***	−0.609***
	(0.339)	(0.166)	(0.208)
High-Tech Dummy	−0.082	0.040	0.060
	(0.135)	(0.080)	(0.186)
Wave_Z	−0.092**	0.053**	0.046
	(0.036)	(0.026)	(0.044)
Comp.Bidd	−0.385	−0.040	0.728
	(0.484)	(0.283)	(0.579)
Industry FE	Yes	Yes	Yes
Year-by-Quarter FE	Yes	Yes	Yes
Observations	5785	5785	1536
R^2	0.767	0.231	0.223

Table 6: *PO* and mode of payment - Multinomial Probit Model

This table shows the results on the effect of PO on the mode of payment using the multinomial probit model. Columns (1) and (2) shows the results for the full sample, while Columns (3) and (4) shows the results for the sub-sample of public target deals. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

Dependent variable:	*Mixed*	*All-Stock*	*Mixed*	*All-Stock*
	(Full Sample)		*(Target=Public)*	
	(1)	(2)	(3)	(4)
$\widehat{PO}$	−0.246***	−0.616***	−0.520***	−0.768***
	(0.089)	(0.070)	(0.184)	(0.179)
Size	−0.180***	0.002	−0.077	−0.234***
	(0.025)	(0.044)	(0.064)	(0.074)
Leverage	−0.599**	−0.154	0.454	0.058
	(0.289)	(0.480)	(0.692)	(0.819)
Cash Holding	0.271	0.402	0.707	0.683
	(0.234)	(0.382)	(0.626)	(0.691)
MB	0.001	0.032***	0.001	0.052***
	(0.007)	(0.010)	(0.018)	(0.019)
Dividend Dummy	−0.282***	−0.578***	−0.100	−0.067
	(0.079)	(0.148)	(0.201)	(0.236)
R&D	1.695**	4.529***	1.275	5.463***
	(0.742)	(1.001)	(1.833)	(1.903)
Asset Tangibility	0.040	−0.123	0.369	0.050
	(0.140)	(0.252)	(0.321)	(0.395)
Large Relative Deal Size	1.258***	1.033***	1.961***	1.336***
	(0.090)	(0.152)	(0.196)	(0.232)
Public Target	−0.588***	0.703***		
	(0.094)	(0.138)		
Cash-only Seller	−1.115***	−1.656***		
	(0.084)	(0.193)		
Multiple Bidder	−0.244	−0.422	−0.775***	−0.901**
	(0.206)	(0.313)	(0.272)	(0.371)
Poison Pill	0.934*	0.182	0.653	0.346
	(0.524)	(1.227)	(0.669)	(1.270)
Cross Border	−0.062	−0.858***	−0.465**	−1.110***
	(0.083)	(0.177)	(0.229)	(0.301)
Toe Hold	0.284	1.682***	−0.857*	0.736
	(0.282)	(0.352)	(0.511)	(0.520)
Hostile	−0.618**	−2.553***	−0.794**	−3.186***
	(0.278)	(0.811)	(0.344)	(0.869)
High-Tech Dummy	−0.007	0.149	−0.056	−0.020
	(0.130)	(0.239)	(0.359)	(0.411)
Wave_Z	0.073*	0.044	0.249***	0.243**
	(0.044)	(0.061)	(0.095)	(0.101)
Comp.Bidd	0.231	−0.383	0.918	1.277
	(0.451)	(0.893)	(1.089)	(1.418)
Industry FE	Yes	Yes	Yes	Yes
Year-by-Quarter FE	Yes	Yes	Yes	Yes
Log Likelihood	-4111		-1047	
Observations	5787		1538	

Table 7: Stock versus Non-stock based Information

This table shows the results on the mechanism of stock versus non-stock based information on the effect of *PO* on the mode of payment. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable: Fraction of Stock					
	Stock-based Information			Non Stock-based Information		
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{PO} \times$ Q	−0.006***					
	(0.002)					
Q	0.133***					
	(0.014)					
$\widehat{PO} \times$ Recent M&A		−0.017*				
		(0.009)				
Recent M&A		0.151**				
		(0.063)				
$\widehat{PO} \times$ Recent SEO			0.006			
			(0.011)			
Recent SEO			0.281***			
			(0.078)			
$\widehat{PO} \times$ Local Deal				0.041**		
				(0.018)		
Local Deal				0.133		
				(0.133)		
$\widehat{PO} \times$ Same Primary SIC					0.026***	
					(0.009)	
Same Primary SIC					−0.122*	
					(0.063)	
$\widehat{PO} \times$ Overlapping Ind.Acq						0.062***
						(0.013)
Overlapping Ind.Acq						−0.233**
						(0.102)
$\widehat{PO}$	−0.188	−0.248**	−0.228*	−0.309**	−0.273**	−0.277**
	(0.125)	(0.126)	(0.125)	(0.132)	(0.126)	(0.125)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-by-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5785	5785	5087	5785	5785	5785
R^2	0.248	0.239	0.241	0.311	0.239	0.241

Table 8: Target PO and mode of payment

This table provides the results on estimating the impact of the target passive ownership (PO_{Targ}) on the mode of payment. Column (1) shows the fixed-effect linear model, and column (2) shows the Tobit model results. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable: Fraction of Stock	
	Linear Model	Tobit Model
	(1)	(2)
PO_Acq	−0.014***	−0.050***
	(0.005)	(0.013)
PO_Targ	−0.002	−0.001
	(0.004)	(0.014)
Size	−0.022**	−0.144***
	(0.009)	(0.033)
Leverage	−0.124	−0.131
	(0.086)	(0.315)
Cash Holding	0.208***	0.726**
	(0.071)	(0.327)
M/B	0.005***	0.032***
	(0.002)	(0.009)
Dividend Dummy	−0.051**	−0.185*
	(0.025)	(0.107)
R&D	0.551**	2.091**
	(0.221)	(0.878)
Asset Tangibility	0.047	0.615***
	(0.047)	(0.135)
Large Relative Deal Size	0.150***	0.631***
	(0.027)	(0.107)
Multiple Bidder	−0.102**	−0.359**
	(0.045)	(0.155)
Poison Pill	−0.128	−0.918**
	(0.086)	(0.363)
Cross Border	−0.166***	−0.378**
	(0.057)	(0.192)
Toe hold	−0.019	0.301
	(0.088)	(0.252)
Hostile	−0.148***	−0.768***
	(0.051)	(0.185)
High-Tech Dummy	−0.016	−0.180
	(0.054)	(0.121)
Wave_Z	0.025**	0.142***
	(0.011)	(0.034)
Comp.Bidd	0.143	−0.651
	(0.155)	(0.536)
Industry FE	Yes	No
Year-by-Quarter FE	Yes	No
Observations	1207	1217
R^2	0.422	0.503

Table 9: Index Status of Acquirers and Target and mode of payment
This table provides the deal characteristics based on the index status of both acquirers and stocks. Yes refers they are either in the Russell 1000 or Russell 2000 index during the acquisition announcement year, and No refers they are neither in the Russell 1000 or Russell 2000 index during the acquisition announcement year.

Index Status			
Acquirer	Target	*Fraction of Stock*	No.of Deals
No	No	0.579	439
Yes	No	0.313	1173
Yes	Yes	0.385	574
No	Yes	0.519	40

Table 10: Index Status of Acquirers and Target and mode of payment
This table provides Tobit model estimates of the effect of the index status of both acquirers and stocks on mode of payment. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable:
	Fraction of Stock
	(1)
Acq_Index	−0.635***
	(0.114)
Acq_Targ_Index	−0.319**
	(0.135)
Targ_Index	−0.019
	(0.296)
Controls	Yes
Industry FE	Yes
Observations	2167
R^2	0.161

Table 11: *PO* and mode of payment: Pre and Post 2001

This table provides the results on estimating the impact of *PO* on the mode of payment pre and post-2001. Column (1) shows the results for the sample period till 2001, and column (2) shows the results for the sample period post-2001. Standard errors are reported between parentheses below coefficient estimates. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable: Fraction of Stock	
	(Pre-2001)	(Post-2001)
	(1)	(2)
PO	−0.123**	−0.022***
	(0.050)	(0.005)
Size	0.080***	−0.072***
	(0.026)	(0.011)
Leverage	−0.738***	−0.025
	(0.233)	(0.118)
Cash Holding	0.833***	0.343***
	(0.196)	(0.095)
M/B	0.039***	0.006**
	(0.006)	(0.003)
Dividend Dummy	−0.179**	−0.183***
	(0.074)	(0.038)
R&D	2.605***	1.833***
	(0.540)	(0.268)
Asset Tangibility	−0.292**	0.024
	(0.131)	(0.063)
Large Relative Deal Size	0.328***	0.535***
	(0.077)	(0.039)
Public Target	0.145*	0.357***
	(0.081)	(0.042)
Cash-Only Seller	−1.267***	−0.376***
	(0.088)	(0.042)
Multiple Bidder	−0.610***	−0.062
	(0.200)	(0.093)
Poison Pill	−1.819***	−0.011
	(0.612)	(0.253)
Cross Border	−0.535***	−0.221***
	(0.094)	(0.043)
Toe hold	−0.222	0.382***
	(0.230)	(0.118)
Hostile	−0.530**	−0.324***
	(0.257)	(0.122)
High-Tech Dummy	0.242*	0.002
	(0.124)	(0.057)
Wave_Z	0.054*	0.055**
	(0.030)	(0.022)
Comp.Bidd	−0.217	−0.163
	(0.483)	(0.210)
Industry FE	Yes	Yes
Year-by-Quarter FE	Yes	Yes
Observations	3245	5395
R^2	0.230	0.231

Table 12: Effect of PO on likelihood of M&A Withdrawal.

This table estimates the impact of passive ownership on the M&A withdrawal decision. The dependent variable, Withdrawal, is a dummy variable that takes one if the deal is withdrawn and zero if it is completed (For legibility purposes, I multiply this variable by 100). All specifications include year-quarter and industry-fixed effects. Standard errors are clusters at the year-quarter level and reported between parentheses below coefficient estimates. Adj. R^2 is for adjusted r-squared. * indicates statistical significance at the 10 % confidence level, ** at the 5 % confidence level and *** at the 1 % confidence level.

	Dependent variable:					
	PO	$Withdrawn$	PO	$Withdrawn$	PO	$Withdrawn$
	(1)	(2)	(3)	(4)	(5)	(6)
$R1000 \rightarrow R2000$	0.432		0.426		0.428	
	(1.409)		(1.392)		(1.398)	
$R2000 \rightarrow R1000$	-0.746^{***}		-0.745^{***}		-0.732^{***}	
	(-5.574)		(-5.497)		(-5.417)	
$\widehat{PO}$		-2.417		-3.615^{*}		-2.420
		(-1.271)		(-1.882)		(-1.263)
$CAR[-1:1]$	-0.770	-17.450^{***}				
	(-1.385)	(-3.289)				
$\widehat{PO} * CAR[-1:1]$		1.033^{*}				
		(1.957)				
$CAR[-1:10]$			-0.256	-11.680^{***}		
			(-0.771)	(-3.235)		
$\widehat{PO} * CAR[-1:10]$				0.921^{**}		
				(2.476)		
$CAR[1:t]$					0.192	-9.316^{***}
					(1.042)	(-3.636)
$\widehat{PO} * CAR[1:t]$						0.782^{***}
						(3.260)
$CAR[-5:-1]$	-0.423	5.087	-0.525	3.217	-0.566	1.823
	(-0.770)	(1.606)	(-0.966)	(0.972)	(-1.043)	(0.592)
Large Relative Deal Size	0.068	1.988^{***}	0.071	2.086^{***}	0.073	1.994^{***}
	(0.557)	(2.651)	(0.575)	(2.811)	(0.598)	(2.623)
% shares held prior	0.027^{*}	0.008	0.027^{*}	0.039	0.027^{*}	0.008
	(1.838)	(0.129)	(1.844)	(0.611)	(1.841)	(0.132)
Hedge Inv	0.616^{*}	-1.503	0.594^{*}	-0.860	0.591	-1.632
	(1.832)	(-0.704)	(1.711)	(-0.410)	(1.652)	(-0.793)

Acquirer White knight	0.614	−15.880*	0.615	−15.180	0.616	−15.960*
	(1.263)	(−1.715)	(1.268)	(−1.637)	(1.282)	(−1.735)
Hostile	0.134	63.510***	0.135	63.690***	0.143	63.380***
	(0.557)	(11.130)	(0.568)	(11.150)	(0.601)	(11.150)
Rumor	−0.513**	−2.289*	−0.517**	−2.924**	−0.524**	−2.328*
	(−2.471)	(−1.698)	(−2.489)	(−2.131)	(−2.516)	(−1.675)
High-Tech Dummy	−0.074	−0.450	−0.075	−0.522	−0.075	−0.470
	(−0.560)	(−0.472)	(−0.566)	(−0.545)	(−0.571)	(−0.493)
Public Target	0.047	4.471***	0.058	4.649***	0.060	4.841***
	(0.385)	(3.696)	(0.475)	(3.808)	(0.491)	(3.951)
Private Target	−0.128	−1.159***	−0.124	−1.261***	−0.120	−1.125***
	(−1.342)	(−3.165)	(−1.298)	(−3.413)	(−1.260)	(−3.195)
Multiple Bidder	−0.435**	24.010***	−0.439**	23.430***	−0.434**	23.860***
	(−2.420)	(5.689)	(−2.440)	(5.579)	(−2.412)	(5.649)
Termnation fee(Target)	−0.029	−0.805**	−0.029	−0.846**	−0.029	−0.850**
	(−1.011)	(−2.217)	(−1.018)	(−2.338)	(−0.996)	(−2.367)
Cross Border	−0.053	−0.555	−0.049	−0.548	−0.046	−0.576
	(−0.684)	(−1.095)	(−0.636)	(−1.105)	(−0.593)	(−1.173)
Size	0.083**	−0.160	0.085**	−0.044	0.087***	−0.128
	(2.488)	(−0.747)	(2.528)	(−0.198)	(2.640)	(−0.570)
Leverage	−1.279***	−1.728	−1.287***	−3.413	−1.312***	−1.295
	(−3.481)	(−0.554)	(−3.505)	(−1.080)	(−3.583)	(−0.409)
Cash Holding	−0.192	1.710	−0.195	1.301	−0.194	1.674
	(−0.840)	(1.241)	(−0.855)	(0.933)	(−0.846)	(1.217)
M/B	−0.023***	0.011	−0.023***	−0.021	−0.023***	0.001
	(−2.750)	(0.188)	(−2.759)	(−0.362)	(−2.773)	(0.012)
Asset Tangibility	0.172	0.642	0.169	0.821	0.164	0.672
	(1.074)	(0.676)	(1.056)	(0.856)	(1.028)	(0.705)
R&D	−2.613***	−12.120*	−2.574***	−14.790**	−2.573***	−10.140
	(−3.571)	(−1.709)	(−3.504)	(−2.079)	(−3.497)	(−1.454)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-by-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,749	5,749	5,749	5,749	5,749	5,749

R^2	0.769	0.338	0.769	0.339	0.769	0.342

6 Appendix

Table A1: Primary Sample Selection:

Request	Criteria	No. of Obs.
Panel A. Sample screening of withdrawal M&As from SDC		
Acquirer Nation	United States of America	434,096
Acquirer public status	Public	182,518
Date Announced	1 Jan 1990 - 22 Jul 2024	165,395
Deal Type	Disclosed Value, Undisclosed Value	127,625
Deal Status	Completed, Withdrawn	108,800
Form of the Deal	Acquisition Of Assets, Merger	99,872
% of Shares Held by Acquiror 6 Months Prior to Announcement	<=49	99,822
% of Shares Acquiror is Seeking to Own after Transaction	>50	98,841
Deal Value	>= 10 million	37,050
Target public status	Public, Private, Subsidiary	37,260
Database	Requirements	No. of Obs.
Panel B. Merging SDC data to data from other databases		
Compustat, CRSP and S12	Sufficient financial and ownership data available in these databases	8638

Table A2: Variables Definition

Variable	Definition
PO	Passive Ownership: the percentage of shares held in December of year t by passive mutual funds
Size	Market value (PRC * SHROUT) of the acquirer 42 days before the deal announcement.
Leverage	Long term debt plus current liabilities divided by the sum of the market value of equities, long-term debt, and current liabilities ((DLTT + DLC) ((PRCC_C * CSHO) + DLTT+ DLC))).
Cash Holding	Cash holding divided by total assets (CHE / AT).
M/B	Market-to-book ratio of equities ((PRCC_C * CSHO)/ (AT-LT)).
Dividend	Indicator variable equals one if total dividend (DVT) exceeds zero.

R&D	Research and development expense divided by total assets (XRD / AT).
Asset Tangibility	Property plant and equipment divided by total assets (PPGT / AT).
Transaction Control Variables	
Large Relative Deal Size	Indicator variable equal to one if the ratio of deal value to market value of acquirer is in the sample top quartile.
Public Target	Indicator variable equal to one if the target is a listed firm.
Cross-border Deal	Indicator variable equal to one if the target is a foreign firm.
Horizontal Deal	Indicator variable equal to one when the bidder and the target share the same 2- digit SIC code as reported in SDC.
Toehold	Indicator variable equal to one if the percentage of target shares own by the acquirer at the deal announcement is greater than zero according to SDC.
Hostile	Indicator variable equal to one if the deal is hostile or unsolicited according to SDC.
Multiple bidder	Indicator variable equal to one if the number of bidders is greater than one according to SDC.
Acq. White Knight	Indicator variable that takes the value of one if the acquiror is a White Knight (as classified by SDC), and zero otherwise.
Hedge Fund Involved	Indicator variable that takes the value of one if any party involved in the deal is a hedge fund, and zero otherwise. This includes Target, Acquiror, Seller, Investor, or any of their immediate or ultimate parents, according to SDC.
Rumoured Deal	Indicator variable that takes the value of one if the transaction is currently or originally began as a rumor, according to SDC.
Local Deal	Dummy=1 if the distance between the target and acquirer is less than 100 kilometers (Uysal et al. (2008)).
Same Primary SIC	Dummy = 1 if the bidder primary four-digit SIC is similar to target primary four-digit SIC, SDC.
Overlapping Ind.Acq	Number of overlapping four-digit SIC codes between the bidder and target scaled by the number of bidder four-digit SIC codes, SDC.

Overlapping Ind.Targ	Number of overlapping four-digit SIC codes between the bidder and target scaled by the number of target four-digit SIC codes, SDC.
	Industry Control Variables
Wave_Z	Maksimovic et al. (2013) Z-score M&A wave variable, computed as the normalized aggregate volume of M&A transactions in the bidder Fama and French 49 industry divided by the aggregate total assets of all firms in the corresponding industry.
High-Tech Dummy	Indicator variable equals one if the acquirer SIC code is classified as High tech according to Kile & Phillips (2009).
Comp.Bidd	Fraction of all merger bids in the target's Fama and French 49 (FF49) industry and the year in which the bidder is private.

Table A3: Effect of PO on mode of payment: Controlling for Active Ownership (AO)

Dependent variable:	*PO*	*Fraction of Stock*	
		(Full Sample)	*(Targ=Public)*
	(1)	(2)	(3)
$R1000 \rightarrow R2000$	0.335		
	(0.308)		
$R2000 \rightarrow R1000$	−1.020***		
	(0.154)		
$\widehat{PO}$		−0.225**	−0.404**
		(0.094)	(0.187)
AO	0.057***	0.010*	0.021*
	(0.006)	(0.005)	(0.011)
Size	0.043	−0.043***	−0.068**
	(0.036)	(0.015)	(0.033)
Leverage	−1.256***	−0.303	−0.156
	(0.380)	(0.197)	(0.403)
Cash Holding	−0.397*	0.207	0.278
	(0.234)	(0.139)	(0.326)
MB	−0.022***	0.020***	0.021**
	(0.008)	(0.004)	(0.010)
Dividend Dummy	0.253**	−0.226***	−0.056
	(0.103)	(0.056)	(0.114)
R&D	−1.701**	2.110***	2.969***
	(0.690)	(0.401)	(0.917)
Asset Tangibility	0.432***	0.000	0.124
	(0.164)	(0.094)	(0.188)
Large Relative Deal Size	0.096	0.655***	0.784***
	(0.120)	(0.053)	(0.103)
Public Target	0.107	0.298***	
	(0.089)	(0.052)	
Subsidiary Target	0.084	−0.624***	
	(0.092)	(0.057)	
Multiple Bidder	−0.400**	−0.183	−0.411**
	(0.161)	(0.118)	(0.162)
Poison Pill	0.091	−0.280	−0.372
	(0.426)	(0.320)	(0.398)
Cross Border	0.005	−0.371***	−0.525***
	(0.077)	(0.056)	(0.128)
Toe hold	0.437	0.699***	0.378
	(0.299)	(0.146)	(0.251)
Hostile	0.117	−0.521***	−0.672***
	(0.341)	(0.164)	(0.204)
High-Tech Dummy	0.013	0.058	0.106
	(0.134)	(0.080)	(0.186)
Wave_Z	−0.109***	0.053**	0.049
	(0.036)	(0.025)	(0.043)
Comp.Bidd	−0.529	−0.050	0.708
	(0.477)	(0.283)	(0.580)
Industry FE	Yes	Yes	Yes
Year-by-Quarter FE	Yes	Yes	Yes
Observation	5787	5787	1538
R2	0.778	0.231	0.223