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EPS Sensitivity and Mergers

Sudipto Dasgupta
Chinese University of Hong Kong Business School, CEPR, and ABFER
s.dasgupta@cuhk.edu.hk

Jarrad Harford
University of Washington Foster School of Business
jarrad@uw.edu

Fangyuan Ma
Peking University HSBC Business School
fangyuanma@phbs.pku.edu.cn (corresponding author)

Abstract

Announcements of mergers very often discuss the immediate impact of the deal on the acquirer's earnings per share (EPS). We argue that the focus on EPS reflects the difficulty of evaluating and communicating deal synergy in mergers and acquisitions (M&A) practice and provide supporting evidence. We show that the acquirer's EPS focus affects how deals are structured, the premium that is paid, and the types of deals that are done. EPS-driven M&A decisions are also associated with costly distortions in the acquirer's financial and investment policies.

I. Introduction

Market participants pay close attention to the impact on earnings per share (EPS) of mergers and acquisitions (M&A). Deal announcements routinely discuss the combined firm's EPS, for example, whether a deal is immediately accretive or dilutive to the acquirer's EPS, and, if dilutive, how quickly it would turn accretive. Investment bankers are usually asked to conduct an EPS analysis when advising a deal, and managers frequently quote EPS accretion as a favorable feature of the deal.[1] In contrast, forecasts of deal synergy are rarely provided by managers around deal announcements. However, finance theories mainly focus on deal synergies,

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[1] A Factiva search reveals 309,505 results when the keywords of "mergers" along with "EPS accretion" and "EPS dilution" are used. Phrases that frequently occur include "immediately accretive," "slightly accretive," "no material impact on EPS," "slightly dilutive in the first year but turn accretive in 3 years," "minimizes dilution and builds shareholder value," and close variants of these.

and do not assign any particular benefit to immediate EPS accretion, which is largely mechanical and uninformative about value creation. This disconnect between theory and practice motivates us to study the extent to which EPS sensitivity affects M&A decisions, as well as the associated economic distortions.

While some previous studies have argued that managers care about EPS because their compensation is typically tied to it, or that analysts care about EPS (see Almeida (2018) for a survey), our focus is somewhat different. We argue that in mergers, managers emphasize EPS as it is easier for them to make the case for a deal via a readily understood metric than via deal synergy. Deal synergies are typically uncertain, difficult to forecast, and realized only over the longer term. Providing detailed synergy forecasts exposes management to legal risk: Investors can sue the management for misleading synergy disclosure and may even ask managers to disclose the basis of their synergy estimates in court (e.g., Hewlett-Packer's merger with Compaq).[2] The commonly considered EPS number is based on the current year's EPS forecasts of the target and the acquirer that are made before deal announcement. We find evidence consistent with the premise that when evaluating the EPS impact of a deal, investors ignore deal synergies' contribution to EPS.

If managers consistently emphasize the EPS impact of deals (particularly when it is favorable), investors get primed to evaluate deals on that basis. This matters because shareholder approval is required by the listing rules for deals involving new issuance of 20% or more of the acquirer's stock, and about 50% of the deals in our sample of deals between U.S.-listed companies for the 1991–2017 period would have triggered a shareholder vote if they were done entirely in stock. Even when shareholder approval is not formally required, investor reaction to deal announcements is material for managers (e.g., the possibility of shareholder lawsuits is inversely related to the acquirer announcement return).

Since mergers are among the most significant economic transactions, the emphasis on the impact of a deal on acquirer's EPS at the expense of synergy has potentially major consequences for value creation. Both type I and type II errors in deal selection can occur: Bad (i.e., low or negative synergy) deals may be done because of their favorable impact on the acquirer's EPS,[3] and good deals may not be done because of their likely adverse impact on EPS. Despite the importance of this issue, however, previous literature provides little consensus on the importance of EPS for merger transactions. While Lys and Vincent (1995) and Andrade (1999) recognize EPS as an important factor for merger decisions and market reactions, the former focuses on a case study and the latter does not establish causal evidence. On the other hand, Hazelkorn, Zenner, and Shivdasani (2004) find that EPS accretion is only marginally relevant for stock returns, and Rau and Vermaelen (1998) do not find short-term EPS to be related to the post-merger performance. More recently, Garvey, Milbourn, and Xie (2021) suggest that EPS matters for the matching between targets and acquirers, but do not examine other dimensions of merger decisions.

[2]Based on a Factiva search, Bernile and Bauguess (2011) and Dutordoir, Roosenboom, and Vasconcelos (2014) report that only about 20% of all deals are accompanied by a management forecast of synergy, and only 2% actually provide an NPV number.

[3]This could happen if managers obtain private benefits from doing deals.

We fill the gap by examining the impact of EPS concerns on the deal structures, the premiums paid, and the set of deals done. The widely calculated mechanical impact of a merger on the combined EPS in the short term is largely driven by the shares issued to target investors in deals in which the consideration is paid at least in part with the acquirer's stock. Relative to issuing stock, paying cash is generally friendlier to EPS. As long as the interest cost of financing the cash (or the forgone opportunity costs of cash) is not too high, paying cash leads to a relatively higher combined EPS since it avoids issuing additional shares. However, paying cash incurs additional economic costs, as it triggers immediate tax liabilities and additional flotation costs for financing the cash. The need to finance the cash payment may further distort the acquirer's other cash-using activities. Therefore, we hypothesize that deal structures are determined by balancing the cosmetic benefit of EPS accretion and the cost of paying cash. Cash is more likely to be used as payment for mergers when a deal would incur mechanical EPS dilution if paid in stock.

To test this intuition, we make use of a novel measure of the acquirer's potential change in EPS if a deal were fully paid with stock. This measure ignores any deal synergy and relies on the preannouncement EPS forecasts of the target and the acquirer. We first show, in an empirical setting that is based on the presence of discontinuities in the frequency of how deals are structured around critical EPS accretion/dilution thresholds for the acquirer, that EPS considerations are important for managers and affect how deals are structured. The identification relies on two assumptions. First, even a small magnitude of dilution would reduce the attractiveness of stock payments. Second, any factor other than the EPS concern should not affect the choice between paying cash and stock in a "discontinuous manner" around the zero threshold of potential change in EPS. We further emphasize that while a myriad of factors could contribute to the consideration decision, none of the alternative explanations predict a discontinuity at the dilution/accretion barrier.

By exploiting discontinuities in deal structuring around voting thresholds that would trigger mandatory shareholder votes, we provide evidence that shareholder approval is an important consideration for structuring deals so that the EPS impact is favorable. Based on similar discontinuity analysis, we show that deals that are slightly accretive to EPS are associated with more favorable stock market reaction for the acquirer than deals that are slightly dilutive.

All these results together support the conclusion that a positive EPS impact is a major determinant of how deals are structured, and obtaining shareholder approval is an important reason why managers pay attention to the EPS impact of a deal. We next establish that EPS-driven deal structure is associated with distortions to the acquirer's investment policy. We find that prior to announcing a deal in which they use cash to counter potential dilution, firms preserve financial flexibility by cutting investments to increase their cash holdings. This implies that the market's focus on EPS can divert cash from other potentially value-enhancing corporate decisions and can pose a challenge to acquirers in maintaining their financial flexibility.

Finally, we discuss the connection between EPS sensitivity and relative valuation of the target and the acquirer and show that when cash is not used, the deal premium is adjusted to accommodate the acquirer's preference for EPS accretion.

We contribute to the literature on how merger decisions are affected by the non-fundamental consideration of EPS. Andrade (1999) and Garvey et al. (2021)

argue that EPS bootstrapping may have contributed to the merger wave in the late 1990s (related research shows that the accounting rules in place until 2001 that affected the post-merger earnings reporting had a material impact on the method of payment; see Lys and Vincent (1995), Aboody, Kasznik, and Williams (2000), and de Bodt, Cousin, and Roll (2017)).[4] We add to the literature by proposing novel tests to capture the EPS sensitivity of deal structures and showing that the sensitivity remained significant and, if anything, increased after 2001. We argue that EPS sensitivity potentially explains why cash payments have become the major means of payment during this period, when "low-buys-high" deals became more common and cash payments were necessary to mitigate dilution while paying a positive premium. More importantly, the extent to which deals are influenced by the mechanical accretion considerations sheds light on the extent of distortion that EPS focus creates in the market for corporate control.

We also address the literature on the distortions that concern for EPS has on corporate decisions. Hribar, Jenkins, and Johnson (2006) show that firms tend to repurchase stock to meet analysts' EPS forecasts, and Almeida, Fos, and Kronlund (2016) find that managers are willing to trade off investment and employment for EPS-driven stock repurchases. Bennett, Bettis, Gopalan, and Milbourn (2017) find that firms take actions, such as perturbing accounting accruals and cutting R&D expenditures, to meet the EPS goals specified in their CEOs' incentive plans. Cheng, Harford, and Zhang (2015) find that when the CEO's bonus is tied to EPS, the company is likely to conduct share repurchases, and that these repurchases are not followed by long-run abnormal returns, unlike other repurchases. Terry (2017) estimates that there is a significant cost at the macroeconomic level due to distortions to R&D caused by EPS targets. We add to the literature by showing that EPS sensitivity has a major influence on firms' M&A decisions, the acquirers' financial and investment decisions around mergers, and shareholder value gains from the deal.

II. Empirical Design

A. Exclusion of Synergies from the "Combined EPS"

A merger's mechanical impact on EPS can be measured by comparing the acquirer's pre-merger EPS with a "combined EPS" that simply adds up the current earnings of the merging companies, and then scales the sum by the total number of shares of the combined entity (that can be calculated using deal terms and pre-deal share numbers). The combined EPS, which ignores any merger-related synergies and expenses, is widely cited in M&A practice. Often, discussions of EPS impact

[4]Prior to 2001, the pooling method of accounting was allowed for stock deals but not for cash deals. All else equal, pooling accounting is friendlier to EPS than the purchasing accounting, as the former does not require recognizing goodwill. It has been argued that stock was the more popular form of payment in the 1990s because deals were structured to qualify for pooling accounting (Lys and Vincent (1995), Aboody et al. (2000)). de Bodt et al. (2017) further argue that the abolition of pooling accounting in 2001 has contributed to the switch to cash as the more favorable form of payment after 2001.

specifically mention that such merger-related revenues and expenses are excluded. For example, in the report of the merger between U.S. Bancorp and Firstar Corporation, it says "the transaction … is expected to be 3.7 percent accretive to Firstar earnings per share in 2001… These accretion numbers … do not include increased earnings from revenue enhancements, or the reinvestment of excess capital."[5] Another example is Kroger's report regarding its acquisition of Roundy's, which mentions that "Kroger expects the merger to be slightly accretive to earnings in the first full year after closing, excluding merger-related expenses."[6] Managers and analysts seem to focus on the combined EPS that excludes synergies since the synergy forecasts would involve managers' private information that is difficult for outsiders to verify, and could lead to future lawsuits if they fail to materialize.

B. All-Stock Change in EPS

We now propose a measure to investigate the sensitivity of deal decisions to the potential EPS impact. As discussed, a merger's mechanical impact on EPS is primarily driven by the number of shares issued to target investors. Paying for the deal in cash can mitigate such a dilutive effect. Whereas paying cash incurs additional interest expense on the debt used to finance the deal, as long as such expenses are not too sizable, adding cash is less dilutive than its equivalent stock payment (more details to be discussed in Appendix B of the Supplementary Material). However, cash (especially, paying for the entire deal in cash for the larger deals) is unlikely to be the preferred method of payment unconditionally. This is because paying cash may require additional borrowing, reduce the acquirer's financial flexibility, and cause economic distortions, and would also trigger immediate tax liabilities for target shareholders. Therefore, we hypothesize that cash is more likely to be added to the deal consideration if i) paying entirely in stock instead would have resulted in EPS dilution and ii) holding the acquisition premium constant, using cash rather than stock, would improve the EPS. The second condition is met unless the financing cost of cash is high.

We construct a measure of the potential change in EPS if the deal were paid fully in stock. For any transaction not done entirely in stock, this measure reflects the pressure of EPS dilution if the deal had been done entirely in stock. First, for each deal paid with cash, we construct an "all-stock exchange ratio" that is the offer price per share (p_O)[7] scaled by the acquirer's stock price 2 days before the deal announcement ($p_{B,t-2}$).

$$x_{\mathrm{AS}} = \frac{p_O}{p_{B,t-2}}. \tag{1}$$

This all-stock exchange ratio captures what the exchange ratio would have been set at had the entire deal consideration been paid in stock (and for all-stock deals, it is the observed exchange ratio).

[5]Source: Capital IQ.

[6]Source: Capital IQ.

[7]Consider a deal that pays "c dollars and x shares of the combined firm stock per target firm's common stock." $p_o = xP_B + c$, where P_B is the acquirer's share prices prior to deal announcement.

Next, we measure the all-stock combined EPS using the all-stock exchange ratio as follows:

$$e_{\mathrm{AS}} = \frac{e_T n + e_B m}{(n \times x_{\mathrm{AS}}) + m}, \tag{2}$$

where n and m refer to the target's and acquirer's number of common shares outstanding before the deal, and e_T and e_B are the analysts' consensus forecasts for the target's and acquirer's current-year EPS (i.e., the median forecasts of annual EPS that were made within 180 days before deal announcements). Our choice of the analysts' consensus forecast is motivated by the fact that these forecasts are widely available and followed in the market.[8] Moreover, the earnings forecasts from analysts, commonly referred to as "street earnings," typically ignore special and nonrecurring items that are difficult to forecast. Therefore, given that the merger announcements often are associated with little quantitative guidance from managers regarding merger synergies and costs, it is reasonable to assume that shareholders (and security analysts) also pay attention to these street forecasts and use these to evaluate the EPS impact of merger deals.[9]

Last, we measure the potential impact of a merger on EPS in terms of the change from the acquirer's pre-deal EPS to the all-stock EPS (this difference is called $\Delta\mathrm{EPS}_{\mathrm{AS}}$). To make the magnitude comparable across firms, we construct the following "standardized" measure that scales the all-stock change in EPS by the acquirer's stock price 2 days before the deal announcement:

$$\mathrm{S\_}\Delta\mathrm{EPS}_{\mathrm{AS}} = \frac{\mathrm{e}_{\mathrm{AS}} - e_B}{p_{B,t-2}}. \tag{3}$$

Our method of constructing the all-stock exchange ratio and the associated EPS constructs implicitly assumes that from the target shareholders' perspective, the focus is on the acquisition premium.[10] If synergy considerations played a major role, the premium would be sensitive to the relative importance of cash and stock payment per target share. We show below that our major results remain unaffected if we allow variations in the value of the offer (i.e., the cash offered per share plus the value of any stock component at the acquirer's preannouncement price) within a range of $\pm 5\%$ of the offer price when an all-cash or a mixed offer hypothetically converts to an all-stock offer.

C. Empirical Setting

Our EPS-sensitivity hypothesis implies that, all else equal, the more negative $\mathrm{S\_}\Delta\mathrm{EPS}_{\mathrm{AS}}$ is, the more likely it is that a deal is paid in cash rather than stock.

[8]Liu, Nissim, and Thomas (2002) find that the forecasted EPS predicts stock returns better than historical EPS and other accounting metrics.

[9]Although managers may be able to manage analysts' expectations and influence their forecasts (He, Liu, Netter, and Shu (2020)), this does not invalidate using analysts forecasts for our study, since these forecasts represent the market beliefs that managers need to pay attention to when structuring the deal.

[10]The acquisition premium for a deal that is widely reported at deal announcement is $xP_B + c - P_T$, where x is the exchange ratio, c is the cash paid per target share, and P_B and P_T are the acquirer and target share prices prior to deal announcement. Since these are preannouncement prices, they do not reflect deal synergies or at best do so imperfectly.

Moreover, managers, analysts, and investors care about whether a deal could be called "dilutive" or "accretive" according to the simplest and most objective combined EPS calculation. Therefore, they are concerned about even a small magnitude of dilution, which makes a cash payment disproportionately more likely to be made when $S\_\Delta EPS_{AS}$ is slightly negative as opposed to being slightly positive. We test this conjecture by estimating the following regression that is in the spirit of a regression discontinuity design (RDD):

$$\text{CASH} = (\alpha \times \text{DILUTIVE}_{AS}) + (\beta_1 \times S\_\Delta EPS_{AS}) + (\beta_2 \times \text{DILUTIVE}_{AS} \times S\_\Delta EPS_{AS}) + X + \eta + t + \varepsilon. \quad (4)$$

The dependent variable is either the proportion of cash in deal consideration or an indicator variable for cash and mixed deals.[11] DILUTIVE_{AS} is a dummy indicator that the all-stock change in EPS (what we call *potential change*) is negative. The regression controls for up to the third-order polynomial terms of $S\_\Delta EPS_{AS}$ and their interactions with DILUTIVE_{AS}. We also control for an extensive set of deal and firm characteristics that are known from the literature to be relevant to the choice of payment method, such as deal size, deal premium, market-to-book ratio of both the acquirer and the target, the relative P/E ratio of target over acquirer, target size, cash holding, leverage, and tangibility of assets, as well as industry and year fixed effects or industry-year paired fixed effects (see the Appendix for descriptions of the variables). The latter is to capture industry merger waves which could be associated with a particular method of payment. We expect the coefficient on DILUTIVE_{AS} to be positive and significant.

Our setting differs from the typical RDD, as our running variable is constructed rather than directly observed. However, as argued before, the running variable, $S\_\Delta EPS_{AS}$, for deals not done entirely in stock captures the counterfactual of what the EPS impact would have been had the deal been done in stock, based on an EPS metric that is transparent and straightforward to calculate and has been the focus of both the managers and market participants. As such, it captures a deal's EPS dilution pressure in the case of hypothetical stock payment.

A positive estimate of α would reflect a discontinuous sensitivity of deal consideration to the dilution pressure at the threshold of zero, which can be driven by three effects. First, it could reflect the acquirers' tendency to substitute stock with cash as payment when the former would result in dilution. Second, a cash-constrained acquirer, unwilling to complete a dilutive all-stock deal and unable to add a significant amount of cash, may bargain with the target for a lower premium, and settle on an exchange ratio that just renders the deal accretive. Third, some stock deals that incur small dilution might have been forgone if the acquirer is unwilling (or unable) to pay cash and, at the same time, the target is unwilling to accept a lower premium. All of these effects reflect EPS-sensitivity distortions to merger decisions that can all be present in the data, and we do not focus on disentangling them.

[11] As discussed, depending on the relevant interest costs or the opportunity cost of cash, we would also expect these cash and mixed deals to have a more favorable impact on EPS than if done entirely in stock. This is discussed further in the next section.

Our identifying assumption is *not* that $S\_\Delta EPS_{AS}$ is exogenous to the choice of payment method, but rather that any correlation that is not due to EPS sensitivity should not display a discontinuous pattern around the zero threshold of $S\_\Delta EPS_{AS}$. Also, we do not attempt to argue that the variation in $S\_\Delta EPS_{AS}$ around 0 is exogenously determined. Rather, we argue that it is strong evidence of EPS sensitivity if we find that there is a discontinuous change in the association between the method of payment and $S\_\Delta EPS_{AS}$ from the positive side to the negative side of $S\_\Delta EPS_{AS}$.

Last, our measurement of $S\_\Delta EPS_{AS}$ is based on analysts' forecasts, which may contain noise in terms of reflecting what EPS number is in managers' mind when making decisions. Such noise could bias us toward finding no discontinuity. To minimize the problem, we make use of the full sample of data, which resembles the global RD design, as our baseline setting. We also report the results using a smaller set of deals with $S\_\Delta EPS_{AS}$ close to 0, adopting both parametric and nonparametric estimations. Finding significant results in the smaller sample would suggest that measurement noise is limited.

D. EPS-Friendly Cash

If cash payment is financed through debt, the interest expenses of financing the cash would decrease the numerator of the combined EPS. Even if external financing is not involved, the opportunity costs of using cash should be considered as a factor that reduces the combined earnings. We examine such a "numerator effect" by estimating the intended EPS for each cash and mixed deal according to the actual deal terms, taking into account the expected interest expenses associated with financing the deal with cash. We will examine whether the baseline discontinuity results are driven by the cash payments associated with relatively low level of financing costs, or in other words, whether our conclusion remains after considering the "numerator effect." The details are provided in Appendix B of the Supplementary Material.

Before moving forward, we highlight an important difference between our notion of EPS sensitivity in M&A and EPS-driven repurchases (e.g., Hribar et al. (2006), Almeida et al. (2016)). While the previous literature finds that a stock repurchase could be launched to avoid missing analysts' EPS expectations, we do *not* argue that cash-paid acquisitions are primarily driven by the need to meet analysts' EPS forecasts. Rather, we argue that cash, as opposed to stock, is likely to be paid to target investors to alleviate dilution, when the deal could no longer be called accretive in the case of stock payment.

III. Data

We obtain the merger events from SDC and impose the following restrictions on our sample: i) both the target and the acquirer are U.S. public firms; ii) deal size is at least 1 million U.S. dollars;[12] iii) the acquirer owns less than 50% of the target before the deal and intends to own 100% after the deal; iv) the form of the

[12] We also use 5 million and 10 million dollars threshold for robustness check. Details are provided in Section IV.A.

transaction is "Merger," "Acquisition of Majority Interests," or "Acquisition of Assets";[13] v) the deal announcement occurs between 1991 and 2017;[14] vi) the deal transaction value accounts for at least 1% and no more than 150% of the acquirer's capitalization; vii) both the acquirer and the target can be matched to CRSP; viii) the deal is paid with common stock, cash, or a mixture of those;[15] and ix) the deal status is either "Completed" or "Withdrawn." There are 3,799 mergers in our sample, 3,319 of which are completed. Our baseline analysis focuses on the sample of completed deals. We classify the deals in our sample into three types (all stock, all cash, and mixed deals) based on the method used to pay the target firm's common shareholders.[16] The SDC M&A data are further matched with the IBES data for the annual forecasts of EPS, with CRSP for stock prices and returns, and with Compustat for financial data.

For deals with cash consideration, we calculate the all-stock exchange ratio, using the offer price per share for a cash or mixed deal and scaling it by the acquirer's stock price 2 days before the deal announcement.[17] Our results are robust to using the price 1 day before or 1 month before (untabulated). To measure the combined EPS, we focus on analysts' forecasts of annual EPS for the first year ending after the deal announcement. We require the forecasts to be made within 180 days before the deal announcements. We adjust for any stock splits that take place between the forecast reporting date and 2 days before the deal announcement date. We use the median value of annual forecasts; when it is missing, we use the historical (last 12-month) EPS reported in SDC. We find robust results without filling up the missing values (untabulated).

As reported in Table 1, 71.4% of the completed merger deals would be dilutive to EPS if executed using stock only. The percentage is the highest among cash deals (81%), followed by mixed deals (75.4%), and is the lowest among stock deals (64.5%).[18] These statistics are consistent with the argument that cash is preferred to

[13]We keep the deals coded A, AP, AA, AC, AM, AR, and M, and exclude buyout and repurchase deals.

[14]We exclude the deals announced before 1991 because the deal consideration information is not available in SDC.

[15]We exclude the deals involving noncash and nonstock consideration ("other consideration" hereafter). "Other consideration" includes convertible bonds, preferred stock, profit-sharing unit, choice between different types of considerations, and assumption of liability. The assumption of liability is the most common form of "other consideration." When the acquirer assumes target liability, there is usually a wealth transfer between the target's shareholders and debtholders. Thus, the value paid to target common stockholders in such deal is unlikely to be comparable with that in a deal without assumption of liability.

[16]We rely on both the SDC variable "consideration structure" and manual examination to classify deal types. The SDC "consideration structure" does not always reflect the payment method to the holders of target firms' common shares. For instance, if the common shareholders receive stock and preferred stock holders receive cash, the deal may be classified as "mixed deal" according to the SDC "consideration structure." We reclassify such a deal as a pure stock deal.

[17]For a few deals with collars, the exchange ratio is not fixed at announcement. The EPS implication of such deals is then determined by the eventual number of shares issued. In our baseline, we leave out the stock deals with collars. As a robustness check, we also explore an "adjusted exchange ratio," which is the number of shares issued scaled by the target's number of shares outstanding. Our results are robust to using the adjusted exchange ratio (untabulated).

[18]The deals with missing value on $S\_\Delta EPS_{AS}$ are left out of the sample. The missing values are mainly driven by the lack of information related to the target.

TABLE 1

Summary Statistics

Panel A of Table 1 reports the number and fraction of if-stock dilutive (accretive/neutral) deals that are paid in cash, stock, and a mixture of these. (Since we have rounded EPS numbers to the nearest cent, there are some deals with zero change in the all-stock EPS, which are referred to as the if-stock neutral deals.) It shows that the fraction of if-stock dilutive deals is the highest among cash deals followed by mixed deals, and is the lowest among stock deals. Panel B reports the summary statistics of standardized change in all-stock EPS, as well as the unstandardized change in all-stock EPS among the three types of deals. The all-stock EPS is our measure of the potential EPS if the entire deal were paid in stock (construction details in Section II).

Panel A. The Fraction of If-Stock Dilutive Deals

	If-Stock Dilutive $S\_\Delta EPS_{AS} < 0$	If-Stock Accretive/Neutral $S\_\Delta EPS_{AS} \geq 0$	Total
CASH_DEALS	624 (81.04%)	146 (18.96%)	770
MIXED_DEALS	221 (75.43%)	72 (24.57%)	293
STOCK_DEALS	797 (64.48%)	439 (35.52%)	1,236
All deals	1,642 (71.42%)	657 (28.58%)	2,299

Panel B. The Change in All-Stock EPS

	Mean	P25	Median	P75
Sample	Variable: $S\_\Delta EPS_{AS}$			
CASH_DEALS	−0.0048	−0.0055	−0.0018	−0.0004
MIXED_DEALS	−0.0082	−0.0086	−0.0026	−0.0003
STOCK_DEALS	−0.0055	−0.0059	−0.0012	0.0006
All deals	−0.0056	−0.0060	−0.0016	0.0000
Sample	Variable: ΔEPS_{AS}			
CASH_DEALS	−0.1331	−0.1500	−0.0600	−0.0100
MIXED_DEALS	−0.1858	−0.2400	−0.0800	−0.0100
STOCK_DEALS	−0.1159	−0.1500	−0.0400	0.0200
All deals	−0.1306	−0.1700	−0.0500	0.0000

stock when stock payment implies EPS dilution. However, while the fraction of potentially dilutive deals is higher for cash and mixed deals than for stock, we also see that stock deals are often dilutive. This reflects the trade-off managers face between the dilutive impact of a stock deal and the cost of financing deals (especially those that are larger relative to acquirer size) with cash. As discussed later, we find that the deals done in stock are larger, and acquirers doing deals entirely in stock are likely to be more financially constrained and incur higher interest cost of financing. In the latter scenario, if the effect of interest costs on earnings is considered, adding cash need not mitigate EPS dilution.

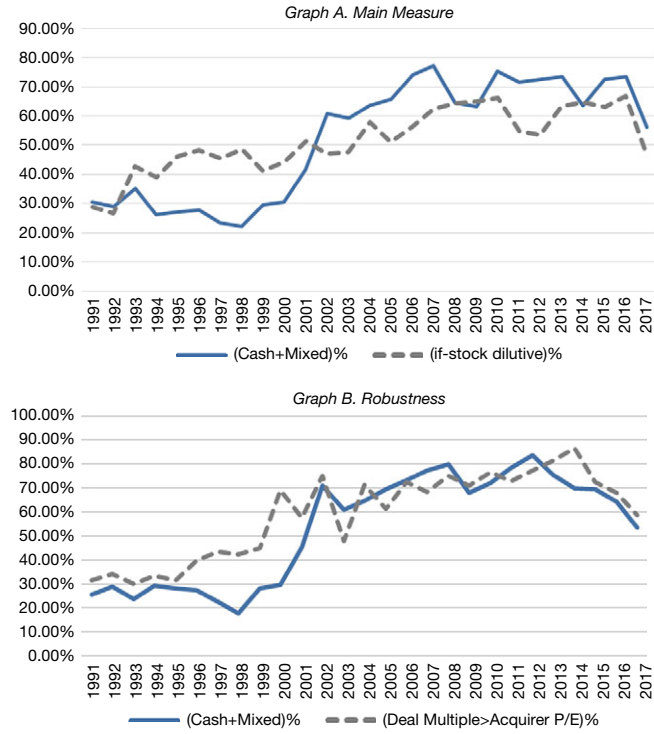
In the time series, we show in Figure 1 that there is an increasing trend for cash as the method of payment. The fraction of cash and mixed deals was around 30% in the early 1990s, and it increased to about 70% in recent years.[19] Notably, we find that there has also been an increasing trend in the fraction of potentially dilutive deals (i.e., deals that would be dilutive if entirely done in stock). The trends provide suggestive evidence that EPS dilution concerns have had a material aggregate effect on the method of payment in M&A deals. Last, we note that the association between the two fractions has been stronger after 2000 than before.

[19]Such a pattern has been documented in the literature. de Bodt et al. (2017) argue that the 2001 abolition of pooling accounting in takeovers contributed to lowering (earnings-based) managerial incentives to make stock payments. Eckbo, Makaew, and Thorburn (2018) suggest that the potential competition for the target from cash-paying private bidders may have driven the increasing popularity of cash deals.

FIGURE 1

The Trend of Cash Payment and If-Stock Dilution

Graphs A and B of Figure 1 plot the proportions of M&A deals that are paid fully in cash or a mixture of cash and stock (solid lines) and the fractions of if-stock dilutive deals (dashed lines). In Graph A, if-stock change in EPS is measured in terms of our main measure as described in Section II; the full sample of completed deals between two U.S. public firms are included. In Graph B, we report an alternative measure of if-stock change in EPS as robustness check, which is an indicator of deals with deal multiple (offer price per share over target's last 12-month EPS) higher than acquirer P/E ratio (stock price 1 day before deal announcement over acquirer's last 12-month EPS); the sample includes all the completed deals with positive past-12-month EPS numbers.



IV. Empirical Results

A. Baseline Result

We estimate equation (4) and report the results in Table 2. We find that the coefficient on $DILUTIVE_{AS}$ is positive and significant throughout different specifications, indicating a disproportionately higher tendency of paying cash when $S\_\Delta EPS_{AS}$ crosses 0 from the positive to the negative side. In the first 4 columns on the left, we use the full sample of completed deals, controlling for the higher-order polynomial terms of $S\_\Delta EPS_{AS}$ and their interaction terms with $DILUTIVE_{AS}$. In columns 2–4, we further control for different sets of the deal and firm characteristics and fixed effects.[20] In the last 3 columns on the right, we focus on a smaller set of deals with $S\_\Delta EPS_{AS}$ within the range of $[-0.002, 0.002]$. The significant

[20]The P/E ratio of the target and the acquirer is only well defined when both firms have positive EPS. Including this variable in column 4 reduces the sample size by about 350 deals.

coefficient on $DILUTIVE_{AS}$ is robust to different samples and control variables. In terms of the economic magnitude, the fraction of cash in the deal consideration is larger by 5–17 percentage points (depending on the specification) for a slightly if-stock dilutive deal than for a slightly if-stock accretive deal. Figure 2 provides

TABLE 2

Baseline Regression: Paying Cash and If-Stock Dilution

Table 2 reports OLS regression results. The dependent variables are the fraction of cash as payment (in Panel A) and a dummy indicator of cash and mixed deals (in Panel B). The main independent variable is $DILUTIVE_{AS}$, an indicator of if-stock dilution (i.e., $S\_\Delta EPS_{AS} < 0$). The 4 columns on the left use the full sample of completed deals, whereas the 3 columns on the right use the completed deals with $S\_\Delta EPS_{AS}$ within a small band around 0. In the 4 columns on the left (3 on the right), we control for up to the third-order (first-order) polynomial terms of $S\_\Delta EPS_{AS}$ and their interactions with the if-stock dilutive dummy. We also control for deal and firm characteristics, industry fixed effects, year fixed effects, and the interacted fixed effects (column 3). Column 4 further controls for the ratio of the target's and acquirer's P/E ratios, which is non-missing only when both firms have positive EPS. Each variable is winsorized at 1 percentile on both sides. *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. OLS Regression

	Proportion of Cash in Deal Consideration						
Sample	Full Sample				$S\_\Delta EPS_{AS}$ in [−0.002, 0.002]		
	1	2	3	4	5	6	7
$DILUTIVE_{AS}$	0.130***	0.098***	0.047**	0.066**	0.170***	0.130***	0.130***
	(5.02)	(4.04)	(2.44)	(2.66)	(3.96)	(2.86)	(3.02)
$S\_\Delta EPS_{AS}$	−7.37	−3.80	−4.56	0.46	−8.60	54.00	60.40**
	(−1.39)	(−0.64)	(−0.86)	(0.07)	(−0.25)	(1.70)	(2.08)
$DILUTIVE_{AS} \times S\_\Delta EPS_{AS}$	12.10**	3.31	2.39	−9.52	84.00*	−32.40	−10.70
	(2.23)	(0.54)	(0.46)	(−1.27)	(1.90)	(−0.74)	(−0.27)
DEAL_VALUE/ACQ_MKTCAP		−0.29***	−0.26***	−0.32***		−0.42***	−0.39***
		(−8.11)	(−8.00)	(−6.76)		(−8.33)	(−7.40)
DEAL_PREMIUM		0.089**	0.062*	0.074*		0.043	0.059
		(2.77)	(1.91)	(1.83)		(0.92)	(1.16)
P/E_RATIO (TAR/ACQ)				0.011			0.043***
				(1.25)			(3.24)
MTB_ACQ		−0.039***	−0.023**	−0.040***		−0.031**	−0.032**
		(−4.85)	(−2.21)	(−4.18)		(−2.74)	(−2.52)
LEVERAGE_ACQ		0.089	−0.021	0.066		0.093	0.040
		(1.46)	(−0.28)	(0.81)		(0.65)	(0.27)
CASH_HOLDING_ACQ		−0.064	−0.077	0.014		0.036	0.066
		(−1.16)	(−1.11)	(0.20)		(0.70)	(1.47)
TANGIBILITY_ACQ		−0.076	−0.027	−0.100		−0.093	−0.150
		(−0.70)	(−0.23)	(−0.84)		(−0.63)	(−0.96)
FIRM_SIZE_TAR		−0.013	−0.026***	−0.022**		−0.019	−0.014
		(−1.51)	(−2.97)	(−2.38)		(−1.51)	(−1.25)
MTB_TAR		−0.012	−0.013	−0.024**		−0.017	−0.030**
		(−1.38)	(−1.49)	(−2.32)		(−1.61)	(−2.42)
LEVERAGE_TAR		0.050	0.120*	0.130*		0.150**	0.170**
		(0.88)	(1.94)	(1.95)		(2.12)	(2.57)
CASH_HOLDING_TAR		0.048	0.062	0.100**		0.100	0.130*
		(1.13)	(1.26)	(2.09)		(1.38)	(1.74)
TANGIBILITY_TAR		−0.0160	0.0080	−0.0110		0.0860	0.1000
		(−0.16)	(0.07)	(−0.09)		(0.44)	(0.51)
CONSTANT	0.33***	0.57***	0.64***	0.60***	0.36***	0.56***	0.49***
	(18.55)	(10.29)	(12.06)	(10.82)	(15.56)	(7.61)	(7.61)
Polynomials of $S\_\Delta EPS_{AS}$	3-Order with Interactions				1-Order with Interaction		
Industry FE and year FE	Yes	Yes	No	Yes	Yes	Yes	Yes
ACQSIC1 × TARSIC1 × year	No	No	Yes	No	No	No	No
No. of obs.	2,294	1,969	1,969	1,607	934	825	792
Adj. R^2	0.231	0.332	0.536	0.372	0.287	0.385	0.391

(continued on next page)

TABLE 2 (continued)

Baseline Regression: Paying Cash and If-Stock Dilution

Panel B. Linear Probability Regression

Sample	Dummy Indicator for Paying Cash						
	Full Sample				$S\_\Delta EPS_{AS}$ in [−0.002, 0.002]		
	1	2	3	4	5	6	7
$DILUTIVE_{AS}$	0.1200***	0.0950***	0.0500	0.0620**	0.1200***	0.0880*	0.0960**
	(4.15)	(3.30)	(1.66)	(2.09)	(2.79)	(1.83)	(2.11)
$S\_\Delta EPS_{AS}$	−6.30	−3.86	−4.42	−1.69	−16.6	41.00	48.10
	(−1.11)	(−0.61)	(−0.72)	(−0.26)	(−0.39)	(1.00)	(1.24)
$DILUTIVE_{AS} \times S\_\Delta EPS_{AS}$	8.13	2.28	1.11	−7.29	58.50	−53.20	−36.50
	(1.22)	(0.31)	(0.16)	(−0.87)	(1.22)	(−1.09)	(−0.76)
DEAL_VALUE/ ACQ_MKTCAP		−0.24***	−0.23***	−0.27***		−0.36***	−0.34***
		(−6.36)	(−6.09)	(−5.90)		(−6.31)	(−5.62)
DEAL_PREMIUM		0.092**	0.055	0.072		0.030	0.050
		(2.39)	(1.40)	(1.64)		(0.63)	(0.96)
P/E_RATIO (TAR/ACQ)				0.013			0.038***
				(1.23)			(3.00)
MTB_ACQ		−0.035***	−0.024	−0.037***		−0.027*	−0.030**
		(−2.96)	(−1.64)	(−3.33)		(−1.94)	(−2.07)
LEVERAGE_ACQ		0.0670	−0.0320	0.0020		−0.0024	−0.0480
		(1.11)	(−0.42)	(0.02)		(−0.02)	(−0.31)
CASH_HOLDING_ACQ		−0.018	−0.050	0.068		0.089	0.140**
		(−0.26)	(−0.62)	(0.80)		(1.45)	(2.10)
TANGIBILITY_ACQ		−0.024	0.024	−0.033		0.019	−0.018
		(−0.21)	(0.19)	(−0.28)		(0.13)	(−0.12)
FIRM_SIZE_TAR		−0.0100	−0.0190*	−0.0160*		−0.0140	−0.0110
		(−1.16)	(−1.95)	(−1.90)		(−1.25)	(−0.94)
MTB_TAR		−0.016*	−0.014	−0.028**		−0.020*	−0.031**
		(−1.86)	(−1.50)	(−2.49)		(−1.79)	(−2.27)
LEVERAGE_TAR		0.00091	0.06700	0.11000		0.14000*	0.16000**
		(0.02)	(1.08)	(1.68)		(2.01)	(2.44)
CASH_HOLDING_TAR		0.015	0.063	0.099*		0.087	0.110
		(0.35)	(1.13)	(1.85)		(1.05)	(1.37)
TANGIBILITY_TAR		0.0020	0.0170	0.0160		0.0940	0.1100
		(0.02)	(0.14)	(0.14)		(0.56)	(0.60)
CONSTANT	0.41***	0.61***	0.67***	0.62***	0.44***	0.58***	0.53***
	(19.68)	(9.97)	(8.99)	(10.22)	(15.49)	(8.36)	(7.79)
Polynomials of $S\_\Delta EPS_{AS}$	3-Order with Interactions				1-Order with Interaction		
Industry FE and year FE	Yes	Yes	No	Yes	Yes	Yes	Yes
ACQSIC1 × TARSIC1 × year	No	No	Yes	No	No	No	No
No. of obs.	2,294	1,969	1,969	1,607	934	825	792
Adj. R^2	0.231	0.302	0.490	0.349	0.279	0.340	0.345

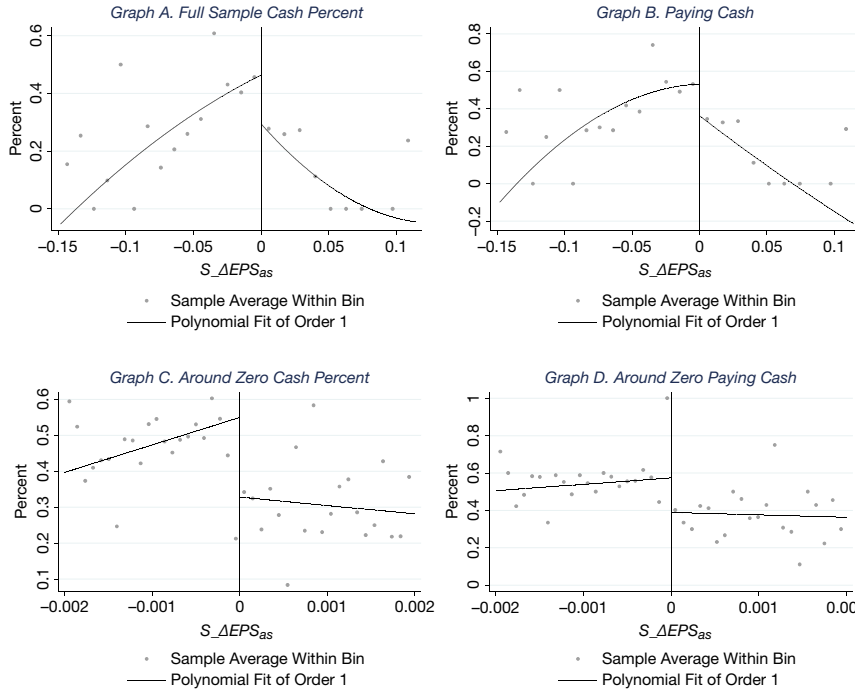
visual evidence. In addition to the discontinuity, we also see from the upper two graphs (which make use of the full sample) that the propensity of adding cash decreases both as the deals become more deeply accretive as well as more potentially deeply dilutive if done entirely in stock (the latter is likely to reflect the fact that it becomes costly to raise the amount of cash needed to convert some deeply dilutive deal to accretive).

We next directly check whether the deals on both sides of zero $S\_\Delta EPS_{AS}$ are comparable with each other. We report in Table OA1 in the Supplementary Material the mean values of each variable of the deal and firm characteristics among the deals

FIGURE 2

Discontinuity

Figure 2 shows visual evidence on the discontinuous propensity of paying cash around the zero threshold of S_ΔEPS$_{AS}$ (i.e., the standardized change from the acquirer's pre-deal EPS to the all-stock EPS; details described in Section II.B). The bin size is optimally chosen using the mimicking variance evenly spaced method available from Stata. Graphs A and B show the full sample of deals with non-missing values of S_ΔEPS$_{AS}$ (2,299 deals in total). Graphs C and D show the deals within a small range of S_ΔEPS$_{AS}$ around 0 (937 deals in this range). The curves in each graph show the local polynomial regression fits on both sides of 0.



with S_ΔEPS$_{AS}$ in [−0.002, 0), at 0, and in (0, 0.002].[21] To make sure that the distributions of acquirer, target, or deal characteristics do not change discontinuously around the zero S_ΔEPS$_{AS}$ threshold, we conduct a local RD test for each variable. In particular, we take the deals with S_ΔEPS$_{AS}$ in [−0.002, 0.002] and regress each variable on the dummy indicator of DILUTIVE$_{AS}$, S_ΔEPS$_{AS}$, and their interaction terms, controlling for the other characteristics and industry and year fixed effects. In the last 2 columns of Table OA1 in the Supplementary Material, we report the point estimates and *t*-statistics of the coefficients on DILUTIVE$_{AS}$. We find that except for deal size, none of the other characteristics shows a disproportionate difference between the negative and positive sides of zero S_ΔEPS$_{AS}$. To make sure that the discontinuous distribution of deal size does not drive our baseline result in Table 2, we further control for the interaction of deal size and the if-stock dilutive dummy, and find our results are robust (untabulated).

[21] There are some deals with exactly zero all-stock change in EPS because both the all-stock EPS and the acquirer EPS are rounded to the nearest cent.

Our cutoff of $1 million for deal size possibly admits some small deals. To check whether our results are robust when we focus attention on deals that are economically more important, we conduct robustness analysis by requiring the minimum deal size to be no less than 5 or 10 million U.S. dollars. As reported in Table OA2 in the Supplementary Material, the results are robust to requiring a larger minimum deal size, despite the smaller sample size.

In Figure OA1 in the Supplementary Material, we plot the distribution of the running variable. In Graph A, we show the histogram of $S\_\Delta EPS_{AS}$ among all the completed deals along with a fitted smooth density. In Graph B, we test whether the actual number of deals in each bin of the histogram is significantly different from the estimated smooth density. We find that there is an abnormally larger number of deals in the two bins just to the left and right of zero.[22] This possibly reflects the tendency of two firms with the similar level of valuation to merge with each other (and "like-buys-like" hypothesize discussed by Rhodes-Kropf and Robinson (2008)) and to set the deal multiple close to the acquirer's P/E level.[23] When we fit densities from both sides of zero $S\_\Delta EPS_{AS}$, we do not find the densities to be significantly different from each other as shown in Graph C. Overall, the evidence shows that there is no discontinuous distribution of $S\_\Delta EPS_{AS}$ around 0. However, there is an abnormally large clustering of deals with $S\_\Delta EPS_{AS}$ close to 0. The latter feature is favorable to our RD test, as it guarantees a relatively large sample of deals within the small neighborhood of zero $S\_\Delta EPS_{AS}$.

We examine the robustness of our baseline result by estimating the regressions in an even smaller range of $S\_\Delta EPS_{AS}$ in $[-0.001, 0.001]$. As reported in Panel A of Table OA3 in the Supplementary Material, the coefficient on $DILUTIVE_{AS}$ remains positive and generally significant throughout the specifications, although there are fewer than 600 deals in this sample. In Panel B of Table OA3 in the Supplementary Material, we further find the result to remain significant using nonparametric estimation techniques.

B. EPS-Friendly Cash Payments

One might be concerned that since using cash has a numerator effect on EPS, our results are affected by ignoring this cost of using cash to avoid EPS dilution. To investigate this, we compare the intended EPS, which takes the interest expenses of financing the cash into account, with the potential EPS that would result had the entire deal been paid with stock. We are particularly interested in the cash and mixed deals that would be slightly dilutive to EPS according to $S\_\Delta EPS_{AS}$. If cash is indeed paid to alleviate dilution for these deals, we should find the majority of these deals having an intended EPS higher than the all-stock EPS. This is indeed what we find in Panel A of Table OB1 in the Supplementary Material. In Panel B, we show

[22] If $S\_\Delta EPS_{AS}$ is exactly 0, the deal is included in the bin just right to 0, to keep consistency with our cutoff point for $DILUTIVE_{AS}$ in the regressions.

[23] The difference between the combined EPS and the acquirer's EPS for a deal done entirely in stock is proportional to $\frac{P_B}{e_B} - (1+\pi)\frac{P_T}{e_T}$, where π denotes the acquisition premium $x\frac{P_B}{P_T} - 1$, and x is the exchange ratio. Thus, if the acquirer's P/E ratio is somewhat higher than that of the target, the implied $S\_\Delta EPS_{AS}$ would be small.

that the baseline discontinuity effect from Table 2 is driven by "EPS-friendly" cash payment that is associated with low financing costs and limited numerator effects.

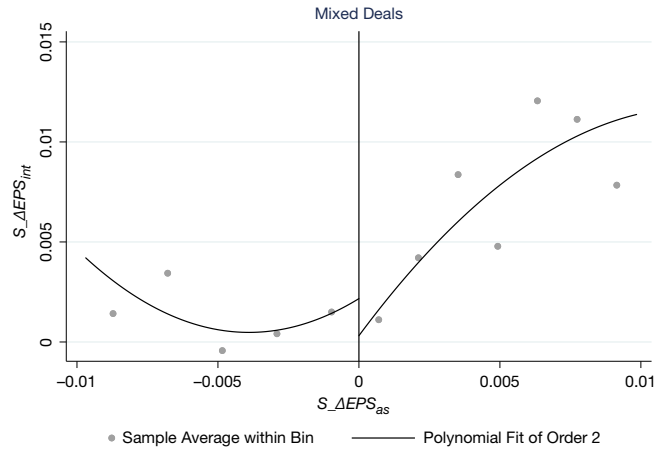
C. Mixed Deals

For some firms, adding cash to mitigate dilution does not necessarily mean it is optimal to pay the entire consideration with cash. These acquirers will balance the cosmetic benefit of EPS accretion and the costs associated with cash payment when determining the composition of the deal consideration.

We test this intuition using a sample of mixed deals that are likely to be structured as such out of concern for the potential EPS impact. In particular, we focus on a subset of mixed deals with the $S\_\Delta EPS_{AS}$ within a small region around 0. In Figure 3, we plot the standardized intended change in EPS ($S\_\Delta EPS_{INT}$)[24] against the standardized if-stock change in EPS ($S\_\Delta EPS_{AS}$). If all the mixed deals involved the same composition of cash and stock, we should observe a positive correlation between $S\_\Delta EPS_{INT}$ and $S\_\Delta EPS_{AS}$.[25] However, if cash is costly and

FIGURE 3
Mixed Deals

Figure 3 plots the relationship between the standardized change in the intended EPS (according to actual deal terms and using the treasury rate as the interest expense for financing the cash payment) and the standardized change in all-stock EPS (the hypothetical EPS if the deal were fully paid in stock) in the sample of mixed deals with $S\_\Delta EPS_{AS}$ within the range of −0.01 and 0.01 (187 deals in this range). The bin sizes are optimally chosen using the mimicking variance evenly spaced method. The dots show the average value of each group of deals. The curves show the local polynomial regression fits on both sides of 0.



[24]This is calculated using the intended EPS, which takes the interest expenses of financing the cash into account. The construction details are described in Appendix B of the Supplementary Material.

[25]If cash accounts for λ proportion of offer price per share, that is, $\frac{C}{n} = \lambda \times x_{AS} p_B$, we have $x = (1-\lambda)x_{AS}$ or $x_{AS} = (1+\delta)x$. Holding the other parameters (including λ and δ) constant, when x increases, ΔEPS_{AS} and ΔEPS_{INT} both decrease, since $e_{as} - e_B = \frac{n(e_T - x_{AS} e_B)}{m + n x_{AS}} = \frac{n(e_T - (1+\delta)x e_B)}{m + n(1+\delta)x}$ and $e_{INT} - e_B = \frac{n(e_T - x e_B) - (1-\tau)E(R) n \delta x}{m + nx}$. Therefore, ΔEPS_{AS} and ΔEPS_{INT} move in the same direction and have a positive correlation.

used primarily to alleviate EPS dilution, S_ΔEPS_{INT} should be managed to be just above 0 when S_ΔEPS_{AS} is negative.

In Figure 3, we first find that on the positive side of S_ΔEPS_{AS}, there is a positive association between S_ΔEPS_{INT} and S_ΔEPS_{AS}, which reflects a mechanical relationship between two measures in the case of a fairly stable composition of cash and stock. However, on the negative side of S_ΔEPS_{AS}, the intended change in EPS remains slightly above 0, and is strikingly flat and insensitive to the amount of potential dilution. This strongly suggests that the fraction of cash for these deals has been carefully set to achieve essentially the same small magnitude of EPS accretion across the range of potential dilution. The evidence highlights the potential costs associated with EPS-friendly cash payments.

However, we do not expect all the slightly if-stock dilutive deals to be paid with a combination of cash and stock, since compared with all-cash deals, the structure of mixed deals is more complicated and flotation cost of such deals is likely higher. A cash-rich acquirer is more likely to choose the all-cash deal structure rather than the mixed structure to alleviate the dilution. In Table OA4 in the Supplementary Material, we examine this conjecture and find that the acquirers of mixed deals are more likely to be financially constrained than those for pure cash deals; the acquirers (targets) in mixed deals are relatively smaller (larger) in size than those in pure cash deals. We also find that the proportion of acquirers in the mixed deals that have positive excess cash holding is smaller than the corresponding proportion in all-cash deals, although the difference is not statistically significant. Overall, the evidence suggests that the high costs of financing cash payments are an important reason for paying for a deal with a mixture of cash and stock rather than entirely with cash.

D. Perturbations in the Offer Price

We implicitly assume that the offer price is not sensitive to the form of payment when we convert the offer price in a deal involving cash to an all-stock exchange ratio, creating the hypothetical all-stock EPS. Such an assumption is appropriate when target shareholders are focused on the deal premium per se, and largely ignore deal synergies.[26] However, we show that our results remain unchanged even when we accommodate random perturbations in the offer price within a $\pm 5\%$ range as deal composition changes from one involving cash to an all-stock offer. Details are discussed in Appendix C of the Supplementary Material, and the results are reported in Table OC1 in the Supplementary Material.

E. Shareholder Voting

We now examine why managers are concerned about the EPS impact of a deal, and structure deals to mitigate an adverse EPS impact. As argued before, if acquirer shareholders consider the mechanical EPS change as an indicator of their gain or

[26]The widely reported acquisition premium is $xP_B + c - P_T$, where x is the exchange ratio, c is the cash payment per target share, and P_B and P_T are the acquirer and target share prices prior to deal announcement. Different combinations of x and c offering the same premium are not value-neutral for the target and the acquirer when deal synergy is considered.

loss from the deal, they will perceive an EPS-dilutive deal as value-destroying and object to it. Anticipating this, managers tend to structure the deal in an "EPS-friendly" way to secure shareholder support. We hypothesize that the need to obtain voting support from shareholders is among the channels through which investors' preference over EPS accretion affects deal terms.

We first examine whether cash is more likely to be paid to counter EPS dilution, when paying stock would have triggered shareholder voting. NYSE and Nasdaq listing rules require acquirer shareholder approval when a deal is associated with share issuance of more than 20% of the acquirer's shares outstanding. For mixed deals, we calculate the total number of shares that would have been issued had the entire deal been paid with stock (called the "all-stock issuance" hereafter), and conduct our test using the combined sample of pure stock deals and mixed deals.[27]

Panel A of Table 3 reports that for if-stock dilutive deals, the fraction of mixed deals is about 5% higher if the 20% threshold is crossed than if it is not, compared with a 0.5% difference for if-stock accretive deals. This stark difference suggests that many mixed deals arise from the desire to avoid the combination of dilution and required shareholder approval. Panel B presents regression results. The dependent variable is the proportion of the payment made in cash. Column 1 shows that potentially dilutive deals involve 3.5% more cash payment in relation to the total payment. Since mixed deals only account for 19.2% of our sample, the estimate of 3.5 translates to 18.2 percentage point increase in cash proportion conditional on being a mixed deal, which is likely to have a substantial impact on the EPS. In column 2, we find that while the cash percentage is (mechanically) lower in deals that require more all-stock issuance as a fraction of the acquirer's outstanding shares, this effect is mitigated if the deal is potentially dilutive. This result is consistent with the idea that deals that involve more share issuance are more likely to receive shareholder attention or require a shareholder vote. Finally, in column 3, we note that deals that require mandatory shareholder voting if done entirely in stock would involve on average 4% higher cash payment if they would be dilutive when done entirely in stock. Again, this translates to 19.3% more cash payment for the mixed deals, given that they constitute 20.75% of the deals requiring mandatory shareholder approval. We find similar results using the indicator of EPS-friendly cash as the dependent variable (untabulated). Overall, the evidence suggests that the prospect of required shareholder voting in an all-stock dilutive deal increases the likelihood that managers substitute in cash to counter EPS dilution.

Next, we examine whether the EPS dilution concern has anything to do with the managers' tendency to avoid voting by changing the cash–stock composition in deal consideration around the voting threshold. As established by Li, Liu, and Wu (2018), acquirer management tends to use cash when the all-stock issuance would exceed the 20% threshold. In other words, deals can be (and are) structured to avoid giving the acquirer's shareholders an opportunity to vote. If, as argued, shareholders dislike EPS dilution even though it is minor, they may reject a dilutive deal through

[27]The pure cash deals are excluded, as they typically would not breach the 20% threshold if done in stock.

TABLE 3

Voting Pressure and Cash Payment

In Panel A of Table 3, we report the number and percentage of mixed and stock deals in four subsamples that are defined according to whether the deal is if-stock dilutive and whether the all-stock issuance exceeds 20% (in which case shareholder voting is required). In Panel B, we take the sample of mixed and stock deals and estimate regressions as follows: The dependent variable is the percentage of cash in deal consideration. The main independent variables are the indicator of an if-stock dilutive deal, the all-stock share issuance percentage (or the indicator of all-stock issuance exceeding 20%), and their interaction term. The same set of control variables and fixed effects as in column 4 of Table 2 are included but not reported. *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Number and Percentage of Mixed and Stock Deals

	If-Stock Dilutive			If-Stock Accretive/Neutral			All Deals		
All-Stock Issue%	Mix	Stock	Total	Mix	Stock	Total	Mix	Stock	Total
≤20%	85 (18.97%)	363 (81.03%)	448	32 (13.73%)	201 (86.27%)	233	117 (17.18%)	564 (82.82%)	681
>20%	136 (23.86%)	434 (76.14%)	570	40 (14.39%)	238 (85.61%)	278	176 (20.75%)	672 (79.25%)	848
Total	221 (21.71%)	797 (78.29%)	1,018	72 (14.09%)	439 (85.91%)	511	293 (19.16%)	1,236 (80.84%)	1,529

Panel B. Regression Results

	Proportion of Cash in Deal Consideration		
Sample	Stock and Mixed Deals		
	1	2	3
$DILUTIVE_{AS}$	0.035** (2.23)	−0.002 (−0.18)	0.014 (1.36)
ALL_STOCK_ISSUE_PCT		−0.113*** (−3.44)	
$DILUTIVE_{AS}$ × ALL_STOCK_ISSUE_PCT		0.108*** (3.73)	
D[ALL_STOCK_ISSUE>20%]			−0.038* (−1.90)
$DILUTIVE_{AS}$ × *D*[ALL_STOCK_ISSUE>20%]			0.040* (1.86)
Firm and deal characteristics	Yes	Yes	Yes
Industry FE and year FE	Yes	Yes	Yes
No. of obs.	1,049	1,049	1,049
Adj. R^2	0.238	0.244	0.239

voting. Therefore, the managers have the strongest incentive to avoid shareholder voting by adjusting deal structures when a deal would be dilutive if entirely paid with stock. Paying cash rather than stock can reduce the chance of being required to have a vote and at the same time mitigate the EPS dilution effect.

We find evidence supporting the hypothesis that "vote avoidance" is more likely to take place when a deal would be EPS-dilutive if fully paid with stock. We measure the gap between the stock issuance percentage if a deal were entirely paid in stock (the "all-stock issue") and the 20% threshold, and regress the fraction of cash in deal consideration on this gap, controlling for its polynomial terms and their interactions with the dummy indicator of the all-stock issue exceeding 20%. As reported in the left 3 columns of Table 4, we find that among the if-stock dilutive deals, the dummy indicating that an all-stock issue would exceed 20% has a positive and significant coefficient. This means that the fraction of cash increases disproportionately when the share issuance required by full stock payment crosses the

TABLE 4

Vote Avoidance and If-Stock Dilutive Deals

Table 4 reports the regression results for the proportion of cash in deal consideration. We calculate the all-stock issuance percentage as the product of the all-stock exchange ratio and the target's number of shares outstanding, scaled by the acquirer's shares outstanding. The main independent variables are an indicator of all-stock issue exceeding 20%, in which case shareholder voting would be required had the deal been paid in stock. We control for up to the third-order polynomial terms of the gap between all-stock issue and 20% (ALL_STOCK_ISSUE_MINUS_20%), their interaction terms with the dummy indicator, deal and firm characteristics as in columns 1, 2, and 4 of Table 2, industry and year fixed effects. In the left (right) 3 columns, we report the results in the subsample of if-stock dilutive deals (if-stock non-dilutive deals). *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Proportion of Cash in Deal Consideration					
Sample	If-Stock Dilutive			If-Stock Accretive/Neutral		
	1	2	3	4	5	6
D[ALL_STOCK_ISSUE>20%]	0.130*	0.130**	0.110*	−0.073	−0.053	−0.062
	(1.77)	(2.11)	(1.76)	(−0.76)	(−0.45)	(−0.52)
ALL_STOCK_ISSUE_PCT_MINUS_20%	−6.05**	−5.30**	−4.48	8.93***	8.12**	9.29**
	(−2.28)	(−2.27)	(−1.69)	(3.06)	(2.48)	(2.46)
D[ALL_STOCK_ISSUE>20%] × (ALL_STOCK_ISSUE_PCT_MINUS_20%)	6.00**	5.12**	4.44	−9.57***	−8.66***	−10.30**
	(2.28)	(2.13)	(1.63)	(−3.32)	(−2.79)	(−2.75)
DEAL_VALUE/ACQ_MKTCAP		−0.120	−0.051		−0.240***	−0.130
		(−1.40)	(−0.59)		(−2.96)	(−1.08)
DEAL_PREMIUM		0.110***	0.110*		0.053	0.082
		(3.22)	(2.03)		(1.43)	(1.54)
P/E_RATIO (TAR/ACQ)			0.0064			0.0610
			(1.05)			(0.87)
MTB_ACQ		−0.043***	−0.071***		−0.016*	−0.010
		(−4.50)	(−5.90)		(−1.81)	(−1.03)
LEVERAGE_ACQ		0.065	0.044		0.081	0.160
		(0.79)	(0.49)		(0.71)	(1.17)
CASH_HOLDING_ACQ		−0.130**	0.011		0.027	0.078*
		(−2.58)	(0.12)		(0.66)	(1.72)
TANGIBILITY_ACQ		−0.0450	0.0071		0.0330	−0.0590
		(−0.36)	(0.05)		(0.19)	(−0.42)
FIRM_SIZE_TAR		0.0068	−0.0085		−0.0330**	−0.0440***
		(0.80)	(−0.76)		(−2.44)	(−2.98)
MTB_TAR		−0.0076	−0.0190*		−0.0250*	−0.0400**
		(−0.85)	(−1.79)		(−1.82)	(−2.75)
LEVERAGE_TAR		−0.036	0.051		0.200***	0.270***
		(−0.53)	(0.60)		(3.10)	(3.82)
CASH_HOLDING_TAR		0.058	0.096		−0.020	0.076
		(1.16)	(1.60)		(−0.21)	(0.91)
TANGIBILITY_TAR		0.0390	−0.0074		0.0420	0.1000
		(0.42)	(−0.06)		(0.30)	(0.86)
CONSTANT	0.29***	0.36***	0.47***	0.45***	0.67***	0.67***
	(4.62)	(4.31)	(5.79)	(7.03)	(5.72)	(4.76)
Polynomials of ALL_STOCK_ISSUE_PCT_MINUS_20%	3-Order with Interactions					
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,873	1,628	1,264	751	632	548
Adj. R^2	0.270	0.333	0.382	0.189	0.217	0.247

20% threshold from below. In other words, these deals have been structured to avoid shareholder voting. In contrast, we do not find significant evidence of such voting avoidance in the subsample of if-stock accretive/neutral deals as reported in the right 3 columns of Table 4. This confirmatory evidence around the 20% threshold supports our assumption that managers proceed as if shareholders view EPS dilution as a negative signal of deal quality.

Last, we provide evidence that when a stock deal is dilutive to EPS, shareholder voting is associated with a higher chance of deal failure. As reported in Table OA5 in the Supplementary Material, the completion likelihood of the dilutive stock deals involving more than 20% share issuance is disproportionately lower than those issuing less than 20% new shares, as would be the case if shareholder voting increases the likelihood of rejecting an EPS-dilutive deal.[28] In contrast, we do not find a significant effect for the accretive stock deals. We also find that among the pure stock deals, if S_ΔEPS is more negative than the median level, there is an 11.8% chance of deal failure. However, for the stock deals with S_ΔEPS higher than the median level, the deal failure rate is lower at 9.9%. Overall, the evidence suggests that dilutive deals are under greater scrutiny by shareholders than the accretive ones. This further implies that some dilutive deals might have been rejected/forgone because shareholders' accretion preference could not be satisfied.

F. Market Reactions

We next examine the acquirer's market reactions to the announcement of EPS-accretive and EPS-dilutive deals. Although managers tend to structure the deals to mitigate dilution, many dilutive stock deals are still done, possibly because acquirers are cash-constrained or the interest costs of financing the cash payment are high.[29]

Although the announced deal structures result from trade-offs of cosmetic EPS impact and real economic effects, investors' immediate perception of the dilutive deals may still differ from that of the accretive deals. We test this conjecture in Table 5 by comparing the stock deals that incur a small magnitude of EPS accretion with the stock deals incurring small dilution using our standardized all-stock EPS change measure. As reported in Panel A, the former group is associated with a significantly more positive CAR in a 3-day window around the deal announcements than the latter. This suggests that investors form more favorable perceptions about the accretive stock deals at least in the short window around deal announcement. On the other hand, in Panel B, we find the return difference vanishes by the time of deal completion. A plausible explanation is that when dilution is unavoidable, managers spend more time post-deal announcement to explain the value proposition of the

[28]The sample for this test is limited to the stock deals for which we can find the number of shares registered with the stock exchanges from the S-4 filings and proxy statements. As illustrated by Li, Liu, and Wu (2018), the voting requirement is based on the number of shares registered, which is subject to factors out of managers' control. Thus, the test result could be explained as the causal impact of voting on deal completion. However, our test has the caveat that it is lack of statistical power due to the small sample size.

[29]As shown in Table A1, compared with the acquirers of the cash and mixed deals, the acquirers of stock deals are relatively smaller, are involved in deals with larger deal size to acquirer size, and more likely to be financially constrained. Although they are more likely to hold excess cash, they face higher borrowing cost (measured by both the treasury rate and the implied interest rate). If the entire stock consideration were paid with cash, 49.2% of these acquirers would end up with an even lower EPS after we deduct the interest costs (estimated using the implied interest rates) than the all-stock EPS. In other words, the acquirers of many stock deals face high costs of raising cash, so that paying cash may not actually be friendlier to EPS than paying stock. This possibly explains why many dilutive deals are eventually paid with stock.

deal to analysts and investors. This also implies that the mechanical combined EPS measure mainly captures the cosmetic EPS impact and has little to do with deal fundamentals. These results are robust to choosing different ranges of EPS changes for the test sample (columns 1–3), to controlling for deal and firm characteristics and S_ΔEPS polynomial terms (columns 2 and 3), as well as including the deal premium as a control variable (columns 4–6).

TABLE 5

Acquirers' Market Reaction for Pure Stock Deals

Table 5 reports the results of acquirer's market reaction regressed on the indicator of EPS accretion. The dependent variable is the 3-day cumulative abnormal return, that is, CAR [−1, +1], in Panel A, and the cumulative abnormal return from day −1 to deal completion date, that is, CAR [−1, *C*], in Panel B. The main independent variable is a dummy indicator of EPS accretion ($\Delta EPS_{AS} > 0$). The sample includes the completed pure stock deals with ΔEPS_{AS} limited to a range around 0 as follows: For columns 1 and 4, the sample includes the deals with ΔEPS_{AS} within [−0.001, 0.001]. For columns 2 and 5, the sample includes deals with ΔEPS_{AS} within [−0.002, 0.002], and we control for ΔEPS_{AS} and its interaction with the accretion dummy. For columns 3 and 6, the sample imposes no restriction on ΔEPS_{AS}, and we control for up to the third-order polynomial terms of ΔEPS_{AS} and their interactions with the accretion dummy. Each variable is winsorized at 1 percentile on both sides. *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. 3-Day CAR Around the Announcement Dates

	Acquirer CAR [−1, +1]					
Sample: |S_ΔEPS| ≤	0.001	0.002	Full	0.001	0.002	Full
	1	2	3	4	5	6
ACCRETIVE	0.020***	0.020***	0.019**	0.018***	0.019**	0.016*
	(4.58)	(2.85)	(2.43)	(3.83)	(2.75)	(1.86)
DEAL_PREMIUM				−0.020	−0.027**	−0.035***
				(−1.29)	(−2.20)	(−3.46)
HIGH_BUY_LOW	−0.015**	−0.012*	−0.019***	−0.015**	−0.011	−0.014***
	(−2.22)	(−1.73)	(−4.56)	(−2.11)	(−1.41)	(−3.05)
DEAL_VALUE/ACQ_MKTCAP	−0.067**	−0.033*	−0.016	−0.065**	−0.033*	−0.017
	(−2.51)	(−1.85)	(−1.24)	(−2.50)	(−1.91)	(−1.40)
P/E_RATIO (TAR/ACQ)	0.0015	0.0210***	0.0060***	−0.0036	0.0180**	0.0053***
	(0.10)	(2.82)	(4.25)	(−0.21)	(2.41)	(3.66)
MTB_ACQ	0.00090	0.00150	−0.00039	0.00094	0.00170	0.00012
	(0.35)	(0.71)	(−0.25)	(0.39)	(0.86)	(0.08)
LEVERAGE_ACQ	−0.0180	0.0070	−0.0017	−0.0230	0.0045	−0.0046
	(−0.72)	(0.30)	(−0.09)	(−0.98)	(0.17)	(−0.27)
CASH_HOLDING_ACQ	−0.018	−0.015	−0.022	−0.016	−0.014	−0.023
	(−0.61)	(−0.72)	(−1.59)	(−0.55)	(−0.63)	(−1.60)
TANGIBILITY	−0.046	−0.011	−0.048**	−0.055*	−0.021	−0.054**
	(−1.66)	(−0.35)	(−2.25)	(−1.99)	(−0.62)	(−2.42)
FIRM_SIZE_TAR	0.00028	0.00055	−0.00020	−0.00094	−0.00074	−0.00110
	(0.08)	(0.23)	(−0.11)	(−0.27)	(−0.29)	(−0.64)
MTB_TAR	0.000840	0.000400	−0.000990	−0.000063	−0.000430	−0.001500
	(0.30)	(0.22)	(−0.51)	(−0.02)	(−0.24)	(−0.79)
LEVERAGE_TAR	−0.00830	0.01300	−0.00150	−0.00770	0.01600	0.00073
	(−0.41)	(0.83)	(−0.20)	(−0.39)	(0.95)	(0.09)
CASH_HOLDING_TAR	−0.063*	−0.048**	−0.032	−0.062*	−0.046**	−0.029
	(−1.91)	(−2.47)	(−1.52)	(−1.91)	(−2.44)	(−1.37)
TANGIBILITY_TAR	0.082*	0.048	0.043**	0.090**	0.054	0.051**
	(1.97)	(1.40)	(2.26)	(2.28)	(1.64)	(2.75)
CONSTANT	0.0018	−0.0370	−0.0050	0.0220	−0.0190	0.0088
	(0.04)	(−1.69)	(−0.34)	(0.54)	(−0.91)	(0.60)
Polynomials of S_ΔEPS	No	1-order	3-order	No	1-order	3-order
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	257	399	829	256	398	822
Adj. R^2	0.194	0.152	0.104	0.199	0.160	0.116

(continued on next page)

TABLE 5 (continued)
Acquirers' Market Reaction for Pure Stock Deals

Panel B. CAR from 1 Day Before Announcement Until Deal Completion

	Acquirer CAR [−1, *C*]					
Sample: |S_ΔEPS| ≤	0.001	0.002	Full	0.001	0.002	Full
	1	2	3	4	5	6
ACCRETIVE	0.0094 (0.32)	−0.0190 (−0.50)	−0.0130 (−0.50)	0.0068 (0.21)	−0.0220 (−0.61)	−0.0200 (−0.72)
DEAL_PREMIUM				−0.014 (−0.17)	−0.053 (−0.91)	−0.060 (−1.39)
HIGH_BUY_LOW	0.01400 (0.34)	−0.00340 (−0.09)	−0.00390 (−0.21)	0.01300 (0.32)	−0.00089 (−0.02)	0.00350 (0.18)
DEAL_VALUE/ACQ_MKTCAP	−0.100 (−1.69)	−0.120** (−2.52)	−0.074** (−2.38)	−0.100* (−1.74)	−0.120** (−2.53)	−0.077** (−2.51)
P/E_RATIO (TAR/ACQ)	0.065 (0.84)	0.023 (0.43)	−0.012 (−1.02)	0.060 (0.62)	0.016 (0.29)	−0.014 (−1.07)
MTB_ACQ	0.0100 (0.65)	0.0130 (1.14)	0.0038 (0.30)	0.0110 (0.70)	0.0130 (1.27)	0.0048 (0.39)
LEVERAGE_ACQ	−0.051 (−0.34)	−0.052 (−0.54)	−0.013 (−0.24)	−0.061 (−0.41)	−0.063 (−0.61)	−0.018 (−0.31)
CASH_HOLDING_ACQ	0.0530 (0.52)	−0.0057 (−0.08)	−0.0420 (−1.11)	0.0520 (0.50)	−0.0039 (−0.05)	−0.0450 (−1.22)
TANGIBILITY	0.3300** (2.39)	0.0072 (0.05)	−0.0960 (−0.94)	0.3200** (2.37)	−0.0110 (−0.08)	−0.1100 (−1.08)
FIRM_SIZE_TAR	0.0017 (0.11)	0.0044 (0.49)	0.0044 (0.62)	0.0019 (0.10)	0.0025 (0.25)	0.0028 (0.38)
MTB_TAR	−0.032 (−1.41)	−0.028 (−1.30)	−0.021 (−1.37)	−0.032 (−1.26)	−0.030 (−1.28)	−0.022 (−1.40)
LEVERAGE_TAR	0.0026 (0.03)	0.0190 (0.24)	−0.0086 (−0.15)	0.0070 (0.07)	0.0280 (0.32)	−0.0030 (−0.05)
CASH_HOLDING_TAR	−0.200** (−2.38)	−0.110** (−2.14)	−0.051 (−0.85)	−0.200** (−2.48)	−0.110** (−2.12)	−0.044 (−0.75)
TANGIBILITY_TAR	−0.3000 (−1.66)	0.0170 (0.13)	−0.0049 (−0.04)	−0.2900* (−1.80)	0.0320 (0.25)	0.0076 (0.06)
CONSTANT	−0.0690 (−0.32)	−0.0530 (−0.57)	0.0062 (0.10)	−0.0600 (−0.21)	−0.0210 (−0.19)	0.0330 (0.46)
Polynomials of S_ΔEPS	No	1-order	3-order	No	1-order	3-order
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	259	399	828	258	398	822
Adj. R^2	0.151	0.153	0.088	0.145	0.152	0.089

We do not intend to argue that the EPS changes around 0 are exogenous to market reactions, since the EPS change is determined by deal terms that are chosen by managers who likely take stock returns into consideration. However, our results suggest that investors do not take into account the managers' trade-offs underlying the deal terms immediately upon deal announcements, especially if the magnitude of dilution or accretion is small. Therefore, we can infer investors' preference over EPS accretion versus dilution from the short-term stock reactions. We further argue that the results in Table 5 are unlikely to be driven by the alternative explanation that investors learn about the acquirer's financial constraints from the announcement of a slightly dilutive deal. Because the financial conditions are unlikely to experience a dramatic change by the time of deal completion, this alternative explanation does not predict the non-result in Panel B. We also confirm in Table OA6 in

the Supplementary Material that the stock deals incurring small dilution and small accretion are comparable (most of the deal and firm characteristics do not present discontinuous patterns around the zero threshold of EPS change). These characteristics are also controlled for in the regressions in Table 5, and therefore do not drive the results.

G. Distortions to Financial and Investment Policies

As discussed, sensitivity to the EPS impact of a deal can cause both type I and type II errors in deal selection. Since it is difficult to identify the counterfactual deals that could have been done based on the net present value (NPV) of a deal alone, it is challenging to directly test such an implication. However, the cash payments driven by EPS sensitivity could introduce other distortions such as affecting financial flexibility and investment policy. For example, doing a deal in cash can cause firms to become over-levered relative to target leverage (Harford, Klasa, and Walcott (2009)), and the need to build up a cash buffer could cause firms to underinvest prior to their M&A deals, a possibility we now consider.

Details are provided in Appendix D of the Supplementary Material and summarized here. We find that EPS-driven cash payment is mainly financed by issuing debt, and prior to the deal announcement, the acquirer preserves financial flexibility by saving cash. These effects are only found in situations where cash is used for "if-stock-dilutive" deals, that is, the deal would have been dilutive if paid for with stock only. We also find that managers preserve cash by reducing capital expenditures and R&D prior to such deals.

Last, the value distortion of paying cash should also be reflected in shareholders' total gain from the deal. If cash paid to counter dilution is associated with real costs, such deals should be associated with a lower net value creation in the long term than the deals that are paid in stock and remain dilutive. We measure the deal's value creation in terms of the acquirer's and target's combined cumulative stock returns (CAR) from 42 trading days before the deal announcement to completion date following Schwert (2000), Gaspar, Massa, and Matos (2005), and so forth.[30] In Table 6, the combined CAR $[-42, C]$ is regressed on an indicator for if-stock dilution, proportion of cash in deal consideration (or a dummy indicator of cash and mixed deals), and their interactions, controlling for the deal and firm characteristics (excluding deal premium) and industry and year fixed effects. We find that while shareholders' combined returns are higher when the deal involves cash payment, the interaction of cash payment and the dummy of if-stock dilutive is significantly negative. Thus, conditional on facing dilution pressure in the case of all-stock payment, the deals that are eventually paid with cash are associated with a lower combined shareholder gain than the ones paid in stock. Moreover, when we break down the combined CAR $[-42, C]$ into the acquirer's and target's CAR, the result is mainly driven by the acquirer's return; the target's return goes the

[30]The preannouncement period is included to capture the run-up of target stock prices due to information leakage about the deal (Schwert (1996)). It is the conventional practice to measure target shareholders' value gain (or acquisition premium) by CAR $[-42, C]$ (see Bargeron, Schlingemann, Stulz, and Zutter (2008), Fu, Lin, and Officer (2013)), and acquirer shareholder' value gain in the same window (see Schwert (2000), Gaspar et al. (2005)).

TABLE 6

Total Shareholder Gains and Cash Payment in If-Stock Dilutive Deals

Table 6 reports the results of cumulative abnormal returns from 42 trading days before the deal announcement to the completion date, that is, CAR [−42, *C*], regressed on an indicator for an if-stock dilutive deal, the proportion of cash in deal consideration (or the indicator of cash and mixed deals), and the respective interaction terms. The sample includes all the completed deals. We control for deal and firm characteristics, and the year and industry fixed effects. *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	CAR [−42, *C*] Combined		CAR [−42, *C*] Acquirer		CAR [−42, *C*] Target	
	1	2	3	4	5	6
$DILUTIVE_{AS}$	0.0170	0.0120	0.0047	−0.0014	0.0420	0.0370
	(1.01)	(0.71)	(0.26)	(−0.07)	(1.53)	(1.36)
CASH%	0.095***		0.098***		−0.017	
	(3.44)		(3.39)		(−0.36)	
$DILUTIVE_{AS}$ × CASH%	−0.074**		−0.079**		0.061	
	(−2.64)		(−2.65)		(1.19)	
PAYING_CASH		0.044*		0.041		−0.048
		(1.92)		(1.53)		(−1.20)
$DILUTIVE_{AS}$ × PAYING_CASH		−0.041*		−0.041		0.071
		(−1.92)		(−1.63)		(1.65)
DEAL_VALUE/ACQ_MKTCAP	0.0790**	0.0700**	0.0030	−0.0062	−0.1100***	−0.1200***
	(2.44)	(2.08)	(0.08)	(−0.16)	(−4.16)	(−4.53)
P/E_RATIO (TAR/ACQ)	0.0032	0.0032	0.0035	0.0035	0.0046	0.0048
	(0.49)	(0.47)	(0.52)	(0.50)	(0.53)	(0.55)
MTB_ACQ	−0.015	−0.016	−0.019	−0.019	0.020	0.019
	(−0.93)	(−0.98)	(−1.06)	(−1.12)	(1.52)	(1.45)
LEVERAGE_ACQ	0.052	0.055	0.084	0.087	−0.120*	−0.120*
	(0.99)	(1.06)	(1.53)	(1.59)	(−2.00)	(−2.00)
CASH_HOLDING_ACQ	−0.062	−0.063	−0.081	−0.082	−0.026	−0.025
	(−1.36)	(−1.38)	(−1.58)	(−1.60)	(−0.42)	(−0.40)
TANGIBILITY_ACQ	−0.082	−0.087	−0.088	−0.094	−0.031	−0.033
	(−0.99)	(−1.05)	(−1.01)	(−1.06)	(−0.33)	(−0.35)
FIRM_SIZE_TAR	−0.0058	−0.0067	−0.0058	−0.0068	−0.0140	−0.0140
	(−1.13)	(−1.28)	(−0.98)	(−1.11)	(−1.44)	(−1.51)
MTB_TAR	−0.0100	−0.0110	−0.0063	−0.0074	−0.0560***	−0.0570***
	(−1.03)	(−1.11)	(−0.58)	(−0.67)	(−4.39)	(−4.42)
LEVERAGE_TAR	0.0390	0.045	0.0041	0.0100	0.2400***	0.2400***
	(0.91)	(1.04)	(0.09)	(0.23)	(4.46)	(4.48)
CASH HOLDING_TAR	0.026	0.029	0.042	0.045	0.032	0.035
	(0.68)	(0.77)	(0.97)	(1.04)	(0.58)	(0.64)
TANGIBILITY_TAR	0.033	0.033	0.029	0.029	−0.038	−0.037
	(0.50)	(0.50)	(0.39)	(0.39)	(−0.47)	(−0.46)
CONSTANT	0.021	0.043	0.016	0.041	0.400***	0.420***
	(0.49)	(0.96)	(0.29)	(0.71)	(6.07)	(6.70)
Year FE and Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,580	1,580	1,582	1,582	1,612	1,612
Adj. R^2	0.065	0.061	0.056	0.052	0.119	0.119

other way, although the interaction terms are statistically insignificant. Taken together, deals structured to alleviate the acquirer's EPS dilution are not associated with superior shareholder gains in the long run, although the EPS-friendly structure helps with gaining shareholder support in the shorter term following deal announcement.[31]

[31]It is possible that only deals with relatively weak value propositions are done partially in cash to mitigate dilution, while managers may prefer to avoid the distortionary effects of cash when the value propositions can be communicated to shareholders prior to deal completion. This could also contribute to poorer performance of cash-financed dilutive deals than those done in stock.

V. Further Evidence and Discussion

A. Relative P/E Ratio and Subperiod Analysis

We now discuss which types of deals are most likely to be done given the EPS sensitivity. A deal that combines a positive premium and is at the same time EPS-accretive for the acquirer is most likely to receive the approval of both target and acquirer shareholders. Focusing on the all-stock deals, EPS accretion requires the acquirer's P/E ratio to exceed deal multiple $\left(\frac{p_B}{e_B} > \frac{p_O}{e_T}\right)$, while positive premium implies deal multiple to be higher than the target's P/E $\left(\frac{p_O}{e_T} > \frac{p_T}{e_T}\right)$. Taken together, a stock deal involving a high P/E acquirer buying a low P/E target $\left(\frac{p_B}{e_B} > \frac{p_T}{e_T}\right)$ would satisfy both "requirements" that the deal offers a positive premium to the target and is also accretive for the acquirer (see the illustrative graph in Graph A of Figure A1). This implies that most of the all-stock deals that take place should be associated with a higher acquirer's P/E than the target's P/E. On the other hand, if the acquirer's P/E is lower than the target's P/E, it is not possible for an all-stock deal to offer a positive premium and still be accretive for the acquirer (see Graph B of Figure A1). To avoid EPS dilution, the latter type of deal is more likely to be paid in cash or a combination of cash and stock, and may have to be forgone if the acquirer is averse to dilution but is cash-constrained. In Table 7, we find consistent evidence. Among the deals with a higher acquirer P/E than the target P/E (the "high-buys-low" type), 61.25% are paid entirely with stock. For the deals with a lower acquirer P/E than target P/E (the "low-buys-high" type), only 47.65% are all-stock deals. A majority of stock deals (54.45%) belong to the "high-buys-low" type, whereas most of the cash deals (61.08%) belong to the "low-buys-high" type.

These findings are also in line with the idea that overvalued acquirers tend to use stock as currency to buy target assets (Shleifer and Vishny (2003), Rhodes-Kropf, Robinson, and Viswanathan (2005), Ang and Cheng (2006), and Dong, Hirshleifer, Richardson, and Teoh (2006)). "EPS sensitivity" and "misvaluation"

TABLE 7

Relative P/E Ratios and Deal Type

Table 7 reports the number and proportion of cash, mixed, and stock deals based on the relative P/E ratio of acquirer and target. P/E is measured as the ratio of stock price 2 days before the deal announcement date and the median forecast of annual EPS before the announcement. When both the target and the acquirer have a positive P/E, we separate them into two groups according to their relative levels. The numbers in the parentheses are the row percentages, and the numbers in the brackets are the column percentages.

	Both Positive P/E		Non-Positive or Missing P/E	Total
	High-Buys-Low (P/E_ACQ > P/E_TAR)	Low-Buys-High (P/E_ACQ ≤ P/E_TAR)	P/E_ACQ ≤ 0 and/or P/E_TAR ≤ 0	
CASH_DEALS	246 (38.92%) [26.48%]	386 (61.08%) [38.64%]	375 [26.96%]	1,007 [30.34%]
MIXED_DEALS	114 (45.42%) [12.27%]	137 (54.58%) [13.71%]	208 [14.95%]	459 [13.83%]
STOCK_DEALS	569 (54.45%) [61.25%]	476 (45.55%) [47.65%]	808 [58.09%]	1,853 [55.83%]
Total	929 (48.18%)	999 (51.82%)	1,391	3,319

TABLE 8

Subsample: Before and After 2001

Table 8 reports the regression results using the sample of deals announced before and after 2001 (in Panels A and B, respectively). The dependent variables are the fraction of cash payment, the dummy indicator of cash and mixed deals, and the dummy indicator of cash and mixed deals with the intended EPS higher than the all-stock EPS. The regression settings resemble columns 1, 2, and 4 of Table 2 and columns 1, 2, and 4 of Panel B of Table OB1 in the Supplementary Material. The corresponding control variables are included but not reported. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Cash Percentage			Paying Cash Dummy			Paying EPS-Friendly Cash Dummy		
Panel A. 1990–2001									
$DILUTIVE_{AS}$	0.092***	0.057**	0.029	0.096**	0.065*	0.024	0.077**	0.033	0.022
	(3.63)	(2.39)	(1.28)	(2.55)	(1.87)	(0.75)	(2.51)	(1.18)	(0.91)
Polynomials of $S\_\Delta EPS_{AS}$	3-Order with Interactions								
Control variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other control (P/E ratio)	No	No	Yes	No	No	Yes	No	No	Yes
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	1,310	1,048	878	1,310	1,048	878	1,310	1,048	878
Adj. R^2	0.060	0.154	0.168	0.056	0.153	0.175	0.059	0.135	0.172
Panel B. 2002–2017									
$DILUTIVE_{AS}$	0.16***	0.12***	0.10***	0.12**	0.11**	0.098**	0.16***	0.12**	0.12**
	(3.22)	(3.03)	(3.57)	(2.77)	(2.28)	(2.80)	(4.05)	(2.75)	(2.67)
Polynomials of $S\_\Delta EPS_{AS}$	3-Order with Interactions								
Control variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Other control (P/E ratio)	No	No	Yes	No	No	Yes	No	No	Yes
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	984	921	729	984	921	729	984	921	729
Adj. R^2	0.327	0.416	0.476	0.198	0.243	0.280	0.192	0.252	0.260

are not mutually exclusive. The acquirer management can appeal to "EPS accretion" to justify a deal paid in overvalued stock, since communicating "overvaluation" is problematic.

Moreover, we emphasize that our results cannot be fully attributed to the "misvaluation" idea, since the latter does not predict a discontinuity around the zero threshold of $S\_\Delta EPS_{AS}$. Further, we conduct a subperiod analysis and find in Table 8 that the discontinuity result remains and, if anything, is even stronger after the significant market decline in 2000. One reason for the weaker results for the earlier subperiod has to do precisely with the misvaluation theory. As reported in Table OA7 in the Supplementary Material (also noticeable from the vertical distance between the dashed and solid lines in Figure 1), prior to 2001, a large proportion (67.2%) of dilutive deals were done in stock, in contrast to the later subperiod when only 27.46% dilutive deals were done in stock. The former could have been because acquirers were more willing to accept dilution since they were able to offer overvalued stock. In other words, the EPS-accretion constraint did not bind as tightly during this period, but mattered more in the later period, once market-wide overvaluation disappeared.[32]

B. Deal Premium

As noted in Section IV.F, the evidence in Table A1 shows that stock-paying acquirers would incur higher interest cost associated with cash payments, and the

[32]We also find that the pattern in Table 7 holds across the two subperiods (Table OA8 in the Supplementary Material). The proportion of stock (cash) deals among the "high-buys-low" subsample is persistently higher (lower) than that among the "low-buys-high" sample.

acquirers of stock deals are more likely to be financially constrained than the acquirers of cash and mixed deals. We now show that the inability to pay cash can result in distortions of the deal premia for some all-stock deals to satisfy the acquirer's preference of EPS accretion.

As discussed before, when a high P/E acquirer is buying a low P/E target, a stock-paid deal can be accretive to the acquirer and at the same time offer a positive deal premium to the target. If the initial negotiation results in a deal multiple slightly higher than the acquirer's P/E ratio (so that the deal would be slightly dilutive to the acquirer's EPS), a cash-constrained acquirer can credibly threaten to walk away from the deal if the premium is not lowered to achieve accretion.

Consistent with this hypothesis, we find in Figure 4 that among the stock deals involving "high-buys-low," there is an abnormal clustering of stock deals that are slightly accretive. The frequency of S_ΔEPS is abnormally high in the first bin to the right of 0, and the fitted density from the left of zero S_ΔEPS is significantly higher than that from the right of 0. The discontinuous distribution is only found among the "high-buys-low" sample where accretion can be achieved without asking the target to accept a negative premium. As shown in Figure OA2 in the Supplementary Material, we do not observe the same pattern in the full sample of stock deals.

Next, we confirm in Table 9 that the cluster of stock deals with "high-buys-low" and small accretion to EPS is associated with a significantly lower premium compared to the deals incurring small dilution. In the left 3 columns of Table 9, deal premium (the percentage premium of offer price per share to the target's stock price 2 days before deal announcement) is regressed on a dummy indicator for EPS accretion (S_ΔEPS > 0), controlling for deal and firm characteristics and industry and year fixed effects. Deals with different ranges of S_ΔEPS are taken as the test sample from column 1 to column 3. Since premium and S_ΔEPS are negatively correlated, we control for polynomial terms of S_ΔEPS and their interaction with the accretion dummy when the range of S_ΔEPS is widened in columns 2 and 3. We find a negative coefficient on the accretion dummy, which is robust throughout different samples and specifications. In the right 3 columns of Table 9, the dependent variable is the target's cumulative abnormal return within a $[-1, +1]$ window of the deal announcement. We find that target share prices react negatively to the announcement of slightly accretive stock deals in a 3-day window, consistent with the abnormally low premium.

Thus, even after we control for the relative valuation of the acquirer and target (by focusing on the subsample of stock deals involving "high-buys-low"), the results regarding deal premium still show evidence of EPS sensitivity. Notably, the regressions also control for the relative valuation (the P/E ratio of the target to that of the acquirer), which has an expected negative effect on the deal premium and the target cumulative abnormal returns. Moreover, the premium result holds in both the 1991–2001 and 2002–2017 subperiods, as reported in Table OA9 in the Supplementary Material. Under the misvaluation argument, accretion could be a manifestation of high valuation of the acquirer (relative to the target), which may lead to a higher premium paid to the target. However, we find negative coefficient on the Accretive dummy even for the 1991–2001 subperiod, which is more consistent with

FIGURE 4

Distribution of S_ΔEPS Among Stock Deals Involving "High-Buys-Low"

Figure 4 shows the distribution of S_ΔEPS among stock deals with the acquirer's P/E ratio higher than the target's. In Graph A, we choose the optimal bin size following Bollen and Pool (2009) and report the histogram and a fitted smooth density function. In Graph B, we report the *t*-statistics for the difference between the actual number of observations in each bin and the estimated number of observations from the smooth density curve as shown in Graph A. The dashed lines indicate the 95% confidence interval for the *t*-tests. It shows that the first bin of deals to the right of 0 contains a significantly larger number of observations than implied by the smooth density estimation. In Graph C, we show the local polynomial density estimation following Cattaneo, Jansson, and Ma (2019). We report in the subtitle the bandwidth used for estimation and the number of observations within the bandwidth on both sides of 0. The shaded area indicates the 95% confidence interval calculated using bias-corrected robust errors. For the histogram, the running variable has been truncated at 5 percentiles on both sides; for the tests in Graphs B and C, the running variable is winsorized at 2.5 percentiles on both sides, but the outlier bins are not shown in the graph.

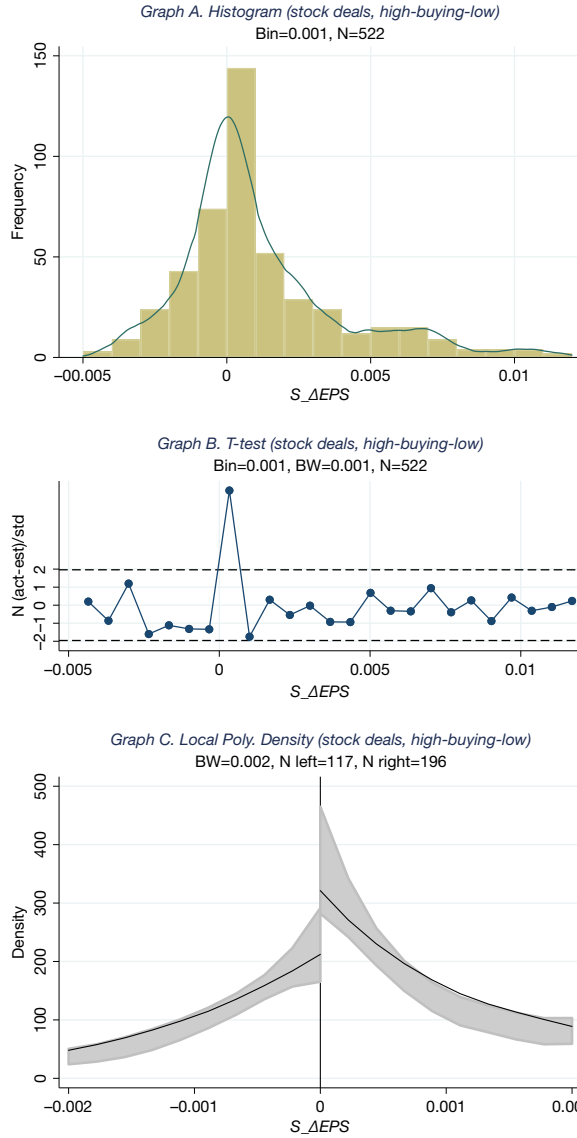


TABLE 9

Premium for Stock Deals Involving "High-Buys-Low"

Table 9 reports the results of deal premium and the target's 3-day CAR around deal announcement dates regressed on the indicator of EPS accretion. The sample includes the completed pure stock deals with acquirer's P/E ratio higher than the target's P/E and ΔEPS_{AS} limited to a range around 0 specified as follows: For columns 1 and 4, the sample includes deals with ΔEPS_{AS} within [−0.001, 0.001]; for columns 2 and 5, the sample includes ΔEPS_{AS} within [−0.002, 0.002], and we control for ΔEPS_{AS} and its interaction with the accretion dummy; and for columns 3 and 6, we impose no restriction on the value of ΔEPS_{AS}, and control for up to the third-order polynomial terms of ΔEPS_{AS} and their interactions with the accretion dummy. Each variable is winsorized at 1 percentile on both sides. *t*-statistics are reported in parentheses, using robust standard errors clustered on years. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Premium			Target CAR [−1, +1]		
Sample: $\lvert S\_\Delta EPS\rvert \leq$	0.001	0.002	Full	0.001	0.002	Full
	1	2	3	4	5	6
ACCRETIVE	−0.180***	−0.130**	−0.140***	−0.120***	−0.094***	−0.090***
	(−7.07)	(−2.50)	(−5.81)	(−7.06)	(−3.31)	(−4.47)
DEAL_VALUE/ACQ_MKTCAP	0.1200	0.1300*	0.0790**	−0.0160	0.0024	−0.0250
	(1.59)	(1.92)	(2.20)	(−0.32)	(0.06)	(−0.88)
P/E_RATIO (TAR/ACQ)	−0.80***	−0.83***	−0.67***	−0.59***	−0.57***	−0.43***
	(−5.30)	(−7.32)	(−11.95)	(−5.19)	(−5.70)	(−9.69)
MTB_ACQ	0.0076	0.0075	−0.0051	0.0075	0.0057	−0.0019
	(0.64)	(0.83)	(−0.40)	(0.81)	(0.77)	(−0.34)
LEVERAGE_ACQ	−0.310**	−0.100	−0.053	−0.210**	−0.140*	−0.120
	(−2.29)	(−0.93)	(−0.86)	(−2.28)	(−1.87)	(−1.67)
CASH_HOLDING_ACQ	−0.0100	0.0350	−0.0210	0.0011	0.0085	−0.0110
	(−0.08)	(0.32)	(−0.38)	(0.01)	(0.11)	(−0.34)
TANGIBILITY_ACQ	−0.52***	−0.21*	−0.17*	−0.35**	−0.23*	−0.18*
	(−3.11)	(−1.72)	(−1.79)	(−2.21)	(−1.92)	(−2.02)
FIRM_SIZE_TAR	−0.02300	−0.01900**	−0.0150**	−0.01100	−0.00210	0.00066
	(−1.56)	(−2.57)	(−2.10)	(−1.20)	(−0.31)	(0.09)
MTB_TAR	−0.0360***	−0.0390***	−0.0160*	−0.0310**	−0.0250***	−0.0080
	(−3.83)	(−4.57)	(−1.88)	(−2.83)	(−3.61)	(−0.84)
LEVERAGE_TAR	0.0690	0.0290	0.0340	0.0065	−0.0032	0.0120
	(0.49)	(0.28)	(0.51)	(0.07)	(−0.09)	(0.32)
CASH_HOLDING_TAR	0.1200	0.0790	0.1000**	−0.0420	−0.0450	0.0031
	(1.57)	(1.04)	(2.13)	(−0.68)	(−1.37)	(0.11)
TANGIBILITY_TAR	0.52*	0.17	0.18*	0.32**	0.15	0.18**
	(2.07)	(1.26)	(1.99)	(2.13)	(1.33)	(2.12)
CONSTANT	1.20***	1.16***	0.99***	0.89***	0.80***	0.63***
	(8.15)	(8.74)	(11.71)	(9.59)	(7.77)	(8.83)
Polynomials of S_ΔEPS	No	1-order	3-order	No	1-order	3-order
Industry FE and year FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	189	274	454	190	273	456
Adj. R^2	0.410	0.390	0.360	0.382	0.355	0.286

EPS sensitivity than misvaluation. Therefore, EPS sensitivity cannot be explained by the misvaluation argument discussed in the previous section.[33]

C. Accounting Rules

Our arguments about the importance of EPS sensitivity also raise the issue of the possible role of an important accounting change that occurred in 2001. In the

[33]We further examine the tests regarding market reactions reported in Tables 5 and 6 for the two subperiods. As reported in Table OA10 in the Supplementary Material, acquirer's positive market reaction to accretive deals holds in the pre-2001 period, which further confirms that EPS sensitivity is independent of the misvaluation argument. As reported in Table OA11 in the Supplementary Material, the lower gain of acquirer shareholders from if-stock dilutive cash deals is more prominent after 2001 when cash deals have become more popular.

case of the pooling method of accounting (only available for pure stock deals prior to 2001), the book values of the target and the acquirer could be combined and there was no amortization of goodwill. In contrast, in the case of the "Purchase" method, target assets and liabilities were recognized at fair value. The gap between acquisition price and recognized fair value (the step-up) would be recorded as goodwill and amortized. Thus, the pooling method was much more EPS-friendly and was the overwhelming method of choice for pure stock deals. It has been argued (de Bodt et al. (2017)) that the popularity of stock deals prior to 2001 was largely due to the availability of the pooling method for such deals only. SFAS 141 and 142 were adopted in June 2001. SFAS 141 essentially abolished the pooling method of accounting for M&A transactions, so that the purchase method would apply to all transactions. SFAS 142 abolished the goodwill amortization principle and replaced it with a yearly impairment test procedure. de Bodt et al. (2017) argue that this rule change greatly contributed to the subsequent rapid decline of stock deals.

The accounting rule change no doubt contributed to the decline in the popularity of stock deals after 2001. However, we find in Table 8 that methods of payment are even more sensitive to if-stock dilution after goodwill amortization was essentially abolished after 2001. It is worth pointing out that the EPS sensitivity we document is fundamentally distinct from the accounting treatment of goodwill. Specifically, we highlight that the forms of payment affect post-merger EPS through new shares issued (a "denominator" effect), while goodwill treatment is essentially a "numerator effect" on the EPS metric. As far as we know, we are the first to show that EPS sensitivity is stronger in recent years after accounting rules created a more level playing field between cash and stock deals.

VI. Conclusion

Merger announcements are typically accompanied by discussions of the impact of the deal on the acquirer's EPS, even though this is not a proper measure of value creation. We argue that in the absence of hard information about deal synergy, the EPS impact of a deal is an easy-to-communicate metric that managers can use to convince shareholders about the merits of a deal. As a result, focus on EPS has become part of M&A practice. We show that this focus not only affects how deals are paid for, but also the acquisition premium and the types of deals that occur. We find that cash payment is generally friendlier to EPS compared with stock payment, and the former is likely used to alleviate the dilution that might occur with the latter. We further establish evidence on the costs associated with the EPS-driven cash deals.

Our results do not imply that EPS accretion is the primary driver of mergers; indeed, many dilutive deals are proposed and completed. Rather, we show that while efficiency would require that the NPV of the acquisition, as determined by the total synergies created and the bargaining split between the acquirer and the target, should be the only consideration in determining which deals get done, the EPS impact of the deal is also an important factor, and this factor distorts merger decisions.

Appendix. Variable Definitions

CASH_DEALS/STOCK_DEALS/MIXED_DEALS: A merger or acquisition deal in which the holders of common stocks in target firm receive cash, stock, or a combination of cash and stock from the acquirer.

CASH%: Proportion of cash in deal payment. It equals 1 for pure stock deal, 0 for pure cash deal, and is between 0 and 1 for mixed deals.

x: Exchange ratio (the number of shares in the combined company per legacy target share).

x_{AS}: All-stock exchange ratio (the exchange ratio if the entire deal consideration had been paid in stock). For a cash or mixed deal, it is measured by the ratio of "offer price per share" (dollar value per target common stock) and the acquirer's stock price 2 days before deal announcement. For a pure stock deal, it is the same as the actual exchange ratio.

ALL_STOCK_EPS: The combined EPS using all-stock exchange ratio, $e_{AS} = \frac{(e_t \times n) + (e_b \times m)}{(n \times x_{AS}) + m}$. Detailed descriptions are in Section II.B.

INTENDED_EPS: The intended EPS according to deal terms, $e_{INT} = \frac{(e_t \times n) + (e_b \times m) - (1-\tau)E(R)C}{(n \times x) + m}$. Detailed descriptions are in Section II.D.

S_ΔEPS$_{AS}$: The standardized change from the acquirer's pre-deal EPS to the all-stock EPS, $S\_\Delta EPS_{AS} = \frac{e_{AS} - e_B}{p_{B,t-2}}$. Detailed descriptions are in Section II.B.

ΔEPS$_{AS}$: The absolute change from the acquirer's pre-deal EPS to the all-stock EPS, $\Delta EPS_{AS} = e_{AS} - e_B$.

DILUTIVE$_{AS}$: An indicator of deals with S_ΔEPS$_{AS} < 0$.

S_ΔEPS$_{INT}$: The standardized intended change in EPS according to deal terms, $S\_\Delta EPS_{INT} = \frac{e_{INT} - e_B}{p_{B,t-2}}$.

EPS_FRIENDLY_CASH: An indicator of cash and mixed deals with $e_{INT} > e_{AS}$. Construction details are described in Appendix B of the Supplementary Material.

EPS_UNFRIENDLY_CASH: An indicator of cash and mixed deals with $e_{INT} < e_{AS}$. Construction details are described in Appendix B of the Supplementary Material.

TREASURY_RATE: The 3-month treasury rate at the deal announcement, which proxies investors' perceived interest cost of financing the cash payment.

IMPLIED_INTEREST_RATE: A proxy of the acquirer's borrowing cost constructed as follows: If the acquirer is holding excess cash (defined below), we assume that the opportunity cost of not holding cash is the 3-month treasury bill rate at deal announcement. If the excess cash does not fully cover the deal value, we assume that the uncovered component is financed with debt at the implied interest rate of the acquirer, which is estimated using total interest expenses scaled by lagged total debt. When the acquirer has a missing value on the implied interest rate, we substitute the median value of firms in the same (Fama–French 49) industry and size quintile.

EXCESS_CASH: The excess cash holding is defined as the residual term of OLS regression of cash holding on firm characteristics controlling for the industry and year fixed effects following the specification in Pinkowitz, Stulz, and Williamson (2015).

C: The amount of cash payment paid to the target investors.

ALL_STOCK_ISSUE: The share issuance if a deal were fully paid with stock as percentage of the acquirer's number of shares outstanding before deal announcement, $\frac{n \times x_{AS}}{m}$.

FIRM_SIZE: The natural logarithm of total assets.

LEVERAGE: The book leverage ratio (the sum of short-term and long-term liabilities scaled by lagged total assets).

MTB: The market-to-book ratio of equity.

CASH_HOLDING: Cash and equivalents scaled by lagged total assets.

TANGIBILITY: The property, plant, and equipment (PPENT) scaled by lagged total assets.

DEAL_VALUE/ACQ_MKTCAP: The ratio of deal transaction value and the market capitalization of the acquirer before announcement.

PREMIUM: The percentage premium of the "offer price per share" relative to the target's stock price 2 days before deal announcement.

P/E_RATIO (TAR/ACQ): The ratio of the target's and acquirer's price-to-earnings ratio before deal announcements. The ratio is non-missing for the deals with positive earnings for both the target and the acquirer.

CASH_INCREASE/CASH_DECREASE: Cash and cash equivalents increase/decrease (CHECH), scaled by the lagged total assets. The information comes from the quarterly statements of cash flows. We back out the quarterly flows from the year-to-date numbers.

NET_DEBT_ISSUE: Long-term debt issuance (DLTIS) minus long-term debt reduction (DLTR) plus changes in current debt (DLCCH), and then scale it by the lagged total assets. The information comes from the quarterly statements of cash flows. We back out the quarterly flows from the year-to-date numbers.

NET_EQUITY_ISSUE: Sale of common and preferred stock (SSTK) minus purchase of common and preferred stock (PRSTKC), and then scale it by the lagged total assets. The information comes from the quarterly statements of cash flows. We back out the quarterly flows from the year-to-date numbers.

STOCK_VALUE $[q + x, q + y]$: The total value of the stock (component of) deals announced from quarter $q + x$ to the quarter of $q + y$ (x and y could be negative), scaled by the total assets of quarter q.

CASH_VALUE $[q + x, q + y]$: The total value of cash (component of) deals announced from quarter $q + x$ to the quarter of $q + y$ (x and y could be negative), scaled by the total assets of quarter q.

CAPITAL_EXPENDITURE: Capital expenditure scaled by lagged PPENT. The information comes from the quarterly statements of cash flows. We back out the quarterly capital expenditure from the year-to-date numbers.

R&D_EXPENDITURE: R&D expenditure (filled up as 0 when missing) scaled by lagged total assets.

TOBINS_Q: The market value of assets scaled by the book value of assets.

ln(MKTCAP): The natural logarithm of market capitalization.

EXCESS_RET: The firm's stock return minus the market return of the same period.

SALES_GROWTH: The growth rate of revenue.

ROA: The return on assets.

CAR $[-1, +1]$: The cumulative abnormal return during a 3-day event window (from 1 day before to 1 day after deal announcement). We estimate the parameters of the market model using the CRSP value-weighted index returns from 253 trading days to 43 trading days before deal announcement. We then compute the daily abnormal returns and sum them up over the event window.

CAR $[-1, C]$: The cumulative abnormal return from 1 day before the deal announcement to the completion date. We estimate the parameters of the market model using the CRSP value-weighted index returns from 253 trading days to 43 trading days before deal announcement. We then compute the daily abnormal returns and sum them up over the event window.

CAR $[-42, C]$: The cumulative abnormal return from 42 trading days before announcement to deal completion. We estimate the parameters of the market model using the CRSP value-weighted index returns from 253 trading days to 43 trading days before deal announcement. We then compute the daily abnormal returns and sum them up over the event window.

TABLE A1

Deal and Acquirer Characteristics of the Cash and Mixed Deals Versus Stock Deals

Panel A of Table A1 reports the mean values of each variable for the cash and mixed deals in column 1 and for stock deals in column 2. The last 2 columns report the average difference between columns 1 and 2 and the *t*-statistics of the difference. FIRM_SIZE is the natural logarithm of total assets before deal announcement. The HP_INDEX (WW_INDEX) are the financial constraint index following Hadlock and Pierce (2010) (Whited and Wu (2006)). FINANCIAL_CONSTRAINED% refers to the proportion of the acquirers that are associated with a financial constraint index value higher than the median level for the SIC 2-digit industry in the year before the deal announcement. [EXCESS_CASH>0]% is the proportion of deals with the acquirer having a positive level of excess cash holding before the deal announcement. TREASURY_RATE is the 3-month treasury rate at deal announcement. IMPLIED_INTEREST_RATE is assumed to be the treasury rate if the acquirer's excess cash holding exceeds the deal's cash amount; for the (component of) cash consideration that exceeds the acquirer's excess cash holding, the implied interest rate is the ratio of acquirer's interest expense and total lagged debt during the year before the deal announcement. Panel B reports the number of stock deals based on the relationship between the all-stock EPS and the "intended EPS," which is the hypothetical EPS assuming that the entire considerations were paid with cash. All variables are winsorized at 1 percentile on both sides. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Deal and Firm Characteristics

	Cash and Mixed Deals	Stock Deals	Difference	
	1	2	1–2	*t*-Stat
DEAL_VALUE/ACQ_MKTCAP	0.253	0.353	−0.100***	(−8.802)
FIRM_SIZE_ACQ	7.818	7.412	0.407***	(5.680)
FIRM_SIZE_TAR	5.760	5.807	−0.048	(−0.645)
FINANCIAL_CONSTRAINED% (HP_INDEX)	25.7%	28.5%	−0.028*	(−1.826)
FINANCIAL_CONSTRAINED% (WW_INDEX)	20.7%	27.4%	−0.067***	(−4.317)
[EXCESS_CASH>0]%	37.1%	44.9%	−0.078***	(−4.549)
TREASURY_RATE	2.8%	4.1%	−0.013***	(−17.996)
IMPLIED_INTEREST_RATE	6.5%	7.9%	−0.014***	(−6.630)
No. of obs.	1,466	1,853	3,319	

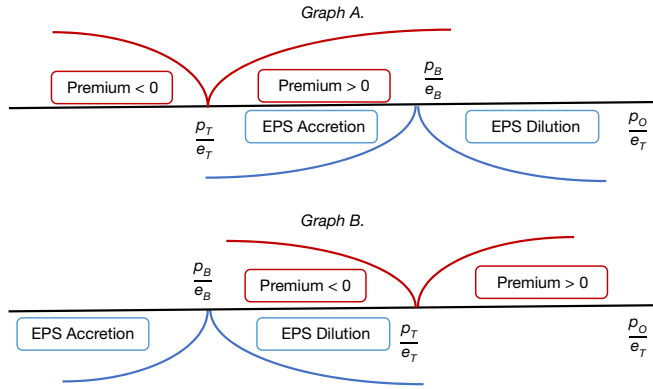
Panel B. Distribution of Stock Deals

	EPS-Unfriendly	EPS-Neutral	EPS-Friendly	Total
INTEREST_RATE_PROXY	$e_{INT} < e_{AS}$	$e_{INT} = e_{AS}$	$e_{INT} > e_{AS}$	(Nonmissing)
TREASURY_RATE	342	50	824	1,216
	(28.13%)	(4.11%)	(67.76%)	
IMPLIED_INTEREST_RATE	553	32	539	1,124
	(49.2%)	(2.85%)	(47.95%)	

FIGURE A1

Deal Premium and the Feasibility of EPS Accretive in Pure Stock Deals

Graph A of Figure A1 shows the scenario where the acquirer has a higher P/E ratio than the target. As illustrated, there is a range of deal multiple, $\frac{p_O}{e_T}$, between the target's and acquirer's P/E ratios that allow for a positive premium paid to the target and at the same time EPS accretion to the acquirer in the case of pure stock deals. Graph B shows the other scenarios where the acquirer has a lower P/E ratio than the target. As illustrated, paying a positive premium to the target would imply EPS dilution to the acquirer in the case of pure stock deal.



Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109023000108.

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