Share Buybacks and Earnings Management: Replication and Extension

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ABSTRACT

We find that the average impact of an EPS-boosting or accretive buyback on quarterly street EPS is very small (two-tenths of one cent), and less than fifteen percent of firms with accretive buybacks experience an EPS boost of more than one cent per share. In addition, the trend of the EPS impact of a buyback has not budged. Possibly due to these minimal effects, we find that analysts do not anticipate the expected impact of a buyback in their earnings estimates. Together, this evidence indicates that the EPS boost from buybacks does not explain the asymmetric shift of street earnings surprises–from substantially fewer earnings surprises just below zero to many more well above zero. The motivations for increasingly large buybacks may be many and diverse, but the use of buybacks to exceed analysts' earnings benchmarks–as alleged or assumed in some prior research–is not one of them.

KEYWORDS. Street earnings surprise; Positive trend; Impact of buybacks; Earnings management.

JEL Classification. G10, G14, M41, M48

1. Introduction

This paper addresses two research questions: (i) whether the increased use and size of accretive share buybacks explains the growing trend of firms with positive street earnings surprises, an issue uninvestigated in prior research (Bradshaw & Sloan, 2002; Chen et al., 2010; Griffin & Lont, 2021), and (ii) whether accretive share buybacks serve as an earnings management device, a belief supported in several studies (Almeida et al., 2016; Bens et al., 2003; Burnett et al., 2012; Farrell et al., 2014; Hribar et al., 2006; Myers et al., 2007). Our inquiry is pivotal in that buyback trends may provide a more logical explanation of the growth in large positive earnings surprises than a trend attributable to managers' and analysts' arguable excessive use of positive non-GAAP adjustments (Brown et al., 2023; Guest et al., 2020;

Usvyatsky & Coleman, 2018). Managers' reliance on positive non-GAAP adjustments has been vigorously decried by the financial media as unsustainable and harmful to investors in the long run (Maurer, 2023; Roberts, 2020; Zweig, 2018). Our research questions also raise a policy concern. Regulatory justification for SEC Release 34-97424, effective for reports filed after October 1, 2023, requiring among other items that firms file daily quantitative data in a new Form SR within one day of each buyback transaction (SEC, 2023), seemingly aligns with the view that firms use buybacks to manage earnings or otherwise engage in opportunistic behavior to achieve accounting metrics. Yet, if the factual basis for this SEC policy is incorrect, this could produce faulty regulation.[1] Third, as a corollary to our two research questions, we assess whether share buybacks matter to financial analysts by estimating whether they include the expected EPS boost from a buyback in forming their EPS forecasts.[2] Only progressively larger and unanticipated EPS boosts from buybacks could possibly explain the growing trend in positive street earnings surprises and whether they might be used to manage earnings. If minor, analysts would not care.

We adopt a replication and extension methodology to study these questions–an approach increasingly discussed and supported in the accounting and finance literature (e.g., Harvey, 2019; Linnainmaa & Roberts, 2018; Salterio et al., 2022; Serra-Garcia & Gneezy, 2021). Specifically, we replicate Griffin and Lont (2021) on the trend in street earnings surprises and then update it with more recent data to test whether their results are robust to the alternative explanation of an explosion in share buybacks over the past two decades. We then extend that

[1] Consistent with this contention, the United States Court of Appeals for the Fifth Circuit on October 31, 2023, found fault with SEC Release 34-97424 and issued a decision to remand and for the SEC to correct the rule's defects based on its opinion that the release was arbitrary and capricious, in particular, that "… opportunistic or improperly motivated buybacks are not genuine problems …" (Chamber of Commerce et al. v. SEC, 88 F 36002 (5th Cir. 2023), p. 22).

[2] Buybacks create an instant boost to EPS and are considered accretive when the firm's earnings-to-price ratio exceeds the interest rate on the foregone funds spent on the buyback Bens, D. A., Nagar, V., Skinner, D. J., & Wong, M. H. F. (2003). Employee stock options, EPS dilution, and stock repurchases. *Journal of Accounting and Economics*, *36*(1), 51-90. https://doi.org/https://doi.org/10.1016/j.jacceco.2003.10.006 . Until recently, the gap between a firm's price-earnings ratio and the interest rate on the foregone funds had been increasing, amplifying the propensity for EPS accretive buybacks, especially by large U.S. companies L

study to reconsider prior findings on whether managers act as if they use buybacks as an earnings management device to inflate street earnings surprise and, relatedly, whether financial analysts take notice of the EPS boost from buybacks in forming their street forecasts.

We identify all firms in the I/B/E/S earnings dataset as of July 2020 with quarterly street earnings surprises. For these firm-quarters, we extract share buyback (Compustat item *cshopq*) and other financial and market data from the Compustat Quarterly dataset. Compustat computes *cshopq* from disclosures required by an amendment to SEC Rule 10b-18 (SEC, 2003). These two steps establish a maximum sample size of 154,090 firm-quarter observations over 2004–2019 for 7,126 different firms with and without buybacks in the same quarter.

We perform five types of analysis. We first assess whether the prior results of firms' use of buybacks as an earnings management device to generate small positive earnings surprises (Almeida et al., 2016; Hribar et al., 2006) are robust to a more recent time period. Earnings management to produce small positive earnings surprises has declined in recent years (Brown & Caylor, 2005; Gilliam et al., 2015). This may also apply to buybacks. The earlier work also relies in part on estimated rather than actual quarterly buybacks, the latter available only after the SEC rule change in 2004. Estimated buybacks based on pre-2004 Compustat definitions, and used in much prior research (Section 2), are prone to bias, with some estimates understating annual buyback amounts by more than 50 percent (Banyi et al., 2008, p. 468). Second, following the method of the prior studies, we calculate and examine the trend of the estimated EPS boost each quarter associated with accretive (i.e., EPS-increasing under the Bens et al. (2003) formula) and non-accretive buybacks. Third, we estimate how much of the EPS boost explains street earnings surprise. If none were anticipated at the time of analysts' EPS estimates, street earnings surprise would be higher by exactly the same amount as the EPS boost. If the full amount were incorporated into analysts' EPS estimates at the time of the buyback, street earnings surprise would bear no relation to the EPS boost from a buyback.

Fourth, we reproduce the trend and magnitude of positive street earnings surprises in Griffin and Lont (2021) and then, assuming that analysts do not anticipate the EPS boost, assess whether the trend and magnitude of the EPS boost from buybacks in general and accretive buybacks in particular matches to the former trend. Fifth, to explore whether the use of buybacks to manage earnings associates with extreme or outlier cases only, we identify "suspect" firms defined in two ways by the prior work: (i) buybacks that occur when street earnings surprise without the buyback is just below zero and the street earnings surprise after the buyback is just above zero (Burnett et al., 2012) and (ii) buybacks that occur when the firm reports a net income decrease and an EPS increase at the same time (Myers et al., 2007). In the latter case, despite a decrease in net income, these firms may have purposefully reduced their outstanding shares to achieve a positive street earnings (EPS) surprise. We assess whether these subsamples increasingly repurchase more shares and generate higher EPS boosts from buybacks than other firms over 2004–2019.

The following findings emerge. First, we are able corroborate the finding of prior earnings management research (e.g., Burgstahler & Chuk, 2017) of a discontinuity just below zero in the distribution of street earnings surprises before an EPS boost from a buyback. While this suggests that earnings management has already occurred without a buyback (i.e., for other reasons), an EPS boosting buyback could still have the additional effect of changing what would have been a small negative street earnings surprise without the buyback to a higher small positive street earnings surprise.

Second, the amount of the EPS boost from an accretive buyback is minimal across almost the entire distribution of EPS boosts, with a mean of two-tenths of one cent per share. Only a minority (less than fifteen percent) of accretive buybacks generate an EPS boost of one cent or more per share. Moreover, only a small portion of the fifteen percent occurs in situations where the buyback might have made a difference (e.g., shifted a small negative EPS before the

buyback to a small positive EPS). In addition, of these, an even smaller portion may have intentionally used a buyback to manage earnings–as buybacks are made for many other reasons (Vermaelen, 2005). As such, the potential use of buybacks by managers to generate a positive street earnings surprise is far from a widespread activity.[3]

A further insight from our analysis relates to the method used in the prior research (Almeida et al., 2016; Burnett et al., 2012; Hribar et al., 2006) to establish a counterfactual distribution, that is, the distribution of EPS without a buyback. The method used "creates" a discontinuity in the without-buyback EPS distribution just below zero by subtracting the actual or expected EPS boost from the actual earnings surprise. But our analysis and other research (e.g., Burgstahler and Dichev (1997)) indicate that the largest bin of the actual earnings surprise distribution is the one just above zero. In other words, the shift to small positive earnings surprises hypothesized as induced by earnings management from the use of buybacks could simply be the manifestation of this mechanical adjustment. Adding plausibility to this view, we find that the earnings surprise discontinuity patterns around zero for accretive (more likely to relate to earnings management) and non-accretive buybacks (less likely to relate to earnings management) are statistically different for our 2004–2019 sample of I/B/E/S forecasts. In particular, we find that the concentration of earnings surprises without a buyback in the bins just below zero is greater for non-accretive buybacks than accretive buybacks. This is the opposite of the result in Hribar et al. (2006, p.16).

Third, the EPS boost from a buyback carries over approximately one-to-one to street earnings surprise. In theory, if I/B/E/S analysts were to make no forecast of the EPS boost, the coefficient for the EPS boost in a regression of street earnings surprise on EPS boost would be one. Put differently, a one-to-one correspondence is consistent with the view that analysts do

[3] Similar statements have been made about earnings management in general. See Ball, R. (2013). Accounting informs investors and earnings management is rife: Two questionable beliefs. *Accounting Horizons, 27*(4), 847-853. https://doi.org/10.2308/acch-10366

not anticipate the expected impact of a buyback in their EPS estimates. By contrast, with 100 percent anticipation by analysts, the correspondence between the EPS boost from a buyback and street earnings surprise without the buyback would be zero. We confirm these two expectations. Given that the average (unanticipated) EPS boost from a buyback is a fraction of one cent per share for most of the firms in our I/B/E/S sample, it is difficult to envisage why analysts would expend costly effort to process this information except for a few instances of large preannounced, clearly accretive buybacks.

Fourth, the average impact of a buyback on street earnings surprise without an EPS boost does not increase over 2004–2019 and is still less than one percent of the earnings surprise without a buyback. This is noteworthy because the cost of a buyback (e.g., the cost of borrowing) dropped considerably during the study period. Meanwhile, the average earnings-to-price ratio remained stable. In combination, this should have increased the proportion of buybacks that are accretive. Yet, despite observing a higher proportion of accretive buybacks, the average EPS boost from share buybacks and the percentage of the EPS boost to street earnings surprise without the EPS boost remain low with no upward trend. Moreover, even in the most recent years of the sample, only a minority of firms receives a boost to pre-buyback EPS of at least one cent per share and, hence, an equivalent shift in street earnings surprise assuming no anticipation. Lastly, building on the definitions of "suspect" buybacks in Burnett et al. (2012) and Myers et al. (2007), our analysis of these subsamples also indicates no upward trend in the ratio of shares repurchased to shares outstanding. Together, these results indicate that the boost from accretive share buybacks to EPS does not explain the asymmetric shift in the pattern of street earnings surprises–from substantially fewer earnings surprises just below zero to many more and larger ones well above zero (Griffin & Lont, 2021; Yardeni & Abbott, 2023). Moreover, this absence of a result occurs after recognizing analysts' lack of anticipation of the EPS boost.

Hence, we can reliably conclude that the growing proportion of firms with large street earnings surprises over the last two decades cannot be explained by an equivalent increase in street earnings surprises from an upward trend in share buybacks. Despite their growing use, larger size, and higher propensity for being accretive in recent years, their boost to EPS remains minimal. Possibly for this reason, we also find that analysts disregard the expected effects of buybacks in their EPS estimates. The motivations for share buybacks and the reasons to regulate buybacks may be many (e.g., to distribute profits, signal undervaluation, increase share price, increase executive compensation, lower shareholder taxes) (Vermaelen, 2005). Based on the results in this paper, however, the use of buybacks to beat an earnings benchmark is not one of them. In sum, the finding in the prior literature that managers use buybacks to manage earnings to beat benchmarks based on accounting metrics does not hold up to scrutiny in light of more recent data on analysts' estimates.

Section 2 discusses the related literature and develops testable propositions. Section 3 describes the sample and data and specifies the relations examined on the effects of buybacks on street earnings surprise. Section 4 presents the evidence. Section 5 concludes.

2. Related Literature and Testable Propositions

One strand of literature relates to studies of the motivations for and consequences of positive street earnings surprise. Managers and analysts contend that street and/or non-GAAP EPS are better measures of future firm performance (Chan et al., 2007; de Jong et al., 2014; Graham et al., 2005). Many investors agree and value the firm on the basis of future street or non-GAAP EPS rather than GAAP EPS (Athanasakou et al., 2011; Bhattacharya et al., 2003; Brown et al., 2023). Not all studies support this finding, however (Abarbanell & Park, 2017). Manager compensation also associates more with street or non-GAAP than GAAP earnings measures (Guest et al., 2022). Three additional findings are reported in the literature. The proportion of firms with positive earnings surprises has increased in recent years (Bradshaw &

Sloan, 2002; Brown & Caylor, 2005; Chen et al., 2010); the proportion of firms with small positive earnings surprises has decreased (Gilliam et al., 2015; Koh et al., 2008); and the proportion of firms with large positive earnings surprises has increased (Griffin & Lont, 2021; Yardeni & Abbott, 2023) (also this paper).

A second strand examines the mechanisms managers and analysts use to generate a positive street earnings surprise. These include: (i) The use of positive accruals and discretionary item adjustments to increase pre-managed GAAP EPS, which then carry over to street EPS (Burgstahler & Chuk, 2017; Burgstahler & Dichev, 1997; Cohen et al., 2008). (ii) The use of positive non-GAAP adjustments to increase street or non-GAAP EPS to a higher amount (Black et al., 2017). (iii) The use of share buybacks to reduce the denominator more than the numerator in the EPS calculation to generate a higher EPS (Almeida et al., 2016; Hribar et al., 2006; Myers et al., 2007). (iv) The downward adjustment of analysts' estimates of EPS prior to earnings announcement to "guarantee" a positive street earnings surprise (Bradshaw et al., 2016; Richardson et al., 2004; Veenman & Verwijmeren, 2018). These mechanism can involve different channels or techniques of communication (e.g., earnings guidance, conference call) to achieve the same result (Christensen et al., 2011; Cotter et al., 2010; García Osma et al., 2023).

While much literature discusses each of these four mechanisms to generate positive street earnings surprises, a smaller literature examines the *trends in street earnings surprise* potentially achieved by these mechanisms, especially the third and fourth. The trend of the first mechanism–positive accruals and discretionary item adjustments–since the Sarbanes-Oxley Act of 2002 has been documented as largely negative (Gilliam et al., 2015). By contrast, the trend of the second mechanism–the use of positive non-GAAP adjustments–has been shown as substantially positive (Usvyatsky & Coleman, 2018). At least three studies using different samples and different study periods have documented an upward trend in the use of positive

non-GAAP adjustments (Black et al., 2017; Cohen et al., 2008; Zang, 2012). Missing from this second strand of literature to our knowledge are studies of trends in the third or fourth mechanisms. The main goal of this study is to understand the trend of the third mechanism. Hence, as our first testable proposition, we expect that our analysis of street earnings surprises conditional on whether a share buyback occurs will either show that share buybacks (or the growing trend in buybacks) explain or partially explain the trend in positive street earnings surprises or do not explain the trend (Proposition 1).

To understand the contribution of share buybacks to street earnings surprise–the third mechanism–we use the same definitions and methods as in the prior research (Almeida et al., 2016; Burnett et al., 2012; Hribar et al., 2006; Myers et al., 2007). However, we do not expect to reproduce their findings for at least three reasons. First, if buyback impacts were to have become a more important component of EPS, we would expect analysts to increasingly build that component into their estimates. Accordingly, as our second proposition, we test for a relation between street earnings surprise and the EPS boost from a buyback. If fully anticipated at the time of an EPS estimate, street earnings surprise would bear no relation to the amount of the EPS boost. Only if ignored by the analyst at the time of an EPS estimate, would the relation be positive and possibly one-to-one (Proposition 2). Second, most earlier studies use *estimates* of share buybacks. Buyback estimates have been shown to contain substantial error (Banyi et al., 2008), mainly by understating the number and dollar value of shares repurchased. Actual share buyback data, which we use in this study, were not available until 2004. Third, as a GAAP adjustment, the intentional use of buybacks to manage earnings may have become costlier. Costs may arise from additional required disclosure (SEC 2003), the loss of better investment opportunities (Almeida et al., 2016), additional audit scrutiny (Burnett et al., 2012), and more attention to the agency costs of share buybacks (Divine, 2019). Given these critical factors (and building on the second proposition), our third proposition is that reexaminations

based on more recent data of the prior studies showing evidence of buybacks as an earnings management device may generate different results and conclusions (Proposition 3).

3. Method and Sample

3.1 Method

We rely on several metrics to assess whether the EPS boost from an accretive share buyback explains the asymmetric shift of street earnings from substantially fewer earnings surprises just below zero to many more well above zero. We follow Hribar et al. (2006) and others to estimate the change in quarterly EPS from a buyback in the same quarter. We specify the EPS effect of a buyback as $EPS\_BOOST_{it} = (EPS_{it} - ASIF\_EPS_{it}) = (niq_{it}/cshprq_{it}) - [(niq_{it} + c_{it})/(cshprq_{it} + 0.5*cshopq_{it})]$. Using Compustat nomenclature, *niq* = quarterly net income before extraordinary items, *cshprq* = weighted average common shares for the quarter, and *cshopq* = common share repurchases during the quarter. The variable *c* represents the after-tax quarterly return on funds that would have been earned without the buybacks. Specifically, we calculate the variable $c = (wgs10yr_t * prccq_{it-1} * cshopq * 0.25 * 0.65)$, where *wgs10yr* = ten-year treasury constant maturity rate and *prccq* = share price at the end of a quarter. We calculate other versions of the EPS change (e.g., the expected EPS change) from a buyback as a sensitivity check.

Only accretive buybacks, however, increase pre-buyback EPS. A buyback is accretive if the earnings-to-price ratio absent the buyback exceeds the opportunity rate of return applicable to funds use to finance the buyback (Bens et al., 2003). We, thus, require an accretive buyback in a quarter to satisfy the condition that $niq_{it} / prccq_{it-1} \geq wgs10yr_t$. A non-accretive buyback would not satisfy this condition.[4] We also define large accretive buybacks as those that satisfy two conditions, namely, that (i) $niq_{it} / prccq_{it-1} \geq wgs10yr_t$ and (ii) $EPS_{it} - ASIF\_EPS_{it} >$ \$0.01.

[4] This condition assumes that the 10-year Treasury rate proxies for the cost of funding the buyback, and that the timing of a buyback occurs at the midpoint of a quarter. To the extent that these assumptions do not hold, some accretive buybacks in fact may be identified as non-accretive and vice-versa. Our tests, however, indicate that the EPS boost from accretive buybacks always significantly exceeds the EPS boost from non-accretive buybacks.

In other words, a large buyback is one that is accretive and the quarterly EPS boost from the buyback is greater than one cent per share.

Second, we compute quarterly street earnings surprise as follows. ES_{it} = EPS_{it} minus consensus *EPS* based on analysts' most recent forecasts within 30 days of quarterly earnings announcement. We then calculate $ASIF\_ES_{it} = ES_{it} - (EPS_{it} - ASIF\_EPS_{it})$. This is an estimate of what the street earnings surprise would have been without the occurrence of a buyback in the same quarter. However, this is an upper bound of the street surprise effect because it does not consider that analysts may anticipate the effects of known or expected buybacks in their earnings forecasts. Actual buybacks are reported monthly to the SEC under Rule 10b-18. So, analysts would have access to some of the actual amounts before they make their forecasts.

A key question, then, is whether analysts adjust their EPS forecasts for expected buyback effects? We estimate the following regression to answer this question. The equation is ES_{it} or $ASIF\_ES_{it} = \alpha + \beta\,(EPS_{it} - ASIF\_EPS_{it}) + \Sigma_j X_{jit} + \varepsilon$, where $\Sigma_j X_{jit}$ represent j control variables and fixed effects and ε_{it} is random error. If analysts were to anticipate fully and unbiasedly the EPS effects of buybacks, we predict $\beta = 0$ for $ASIF\_ES_{it}$ as the dependent variable. Moreover, this expectation would be likelier to hold for large-effect accretive buybacks. By contrast, if totally ignored by analysts in forming expectations, we predict $\beta = 1$ for ES_{it} as the dependent variable, that is 100 percent of the (unbiasedly estimated) EPS effect of the buyback would be passed on into street earnings surprise. This expectation should be likelier for small-accretive or non-accretive buybacks. That is, we reasonably assume that if the EPS boost from accretive buybacks is small (e.g., a fraction of one cent), it would simply be not worth the cost and effort of estimating its impact. *ES* measured in dollars and cents would not change appreciably.

Fourth, we investigate the use of share buybacks as a potential earnings management device. While large accretive buybacks can increase street EPS for multiple reasons, analysts serving as monitors may not be interested in generating additional amounts of positive street

earnings surprise attributable to a questionable earnings management practice (Christensen et al. 2020; Yu 2008). As our analysis, we compare the bins of the *ES* distribution close to zero with the counterfactual distribution of *ASIF_ES* for accretive buybacks and non-accretive buybacks. In keeping with the theory underlying the earnings discontinuity literature (e.g., Burgstahler & Dichev, 1997), if earnings management to achieve a small positive street earnings surprise were a substantive activity, we would expect a greater discontinuity in the bin just below zero *ASIF_ES* for accretive buybacks than for firms with non-accretive buybacks. Two reasons, however, suggest that our analysis of more recent buybacks may not corroborate the prior finding that buybacks are used to manage earnings. First, estimates of share buybacks, as used in the earlier studies, have been shown to contain error (Banyi et al., 2008). The use of actual buyback data may weaken those earlier results. Second, additional SEC-required disclosure, concern for the loss of investment opportunities, stricter audit scrutiny, and more attention to the agency costs may have made the intentional use of buybacks to manage earnings an unprofitable activity (Larcker, 2003).

Fifth, we use the identification methods in Burnett et al. (2012) and Myers et al. (2007) to investigate the potential use of "suspect" buybacks to manage earnings. In the first case, we identify suspect buybacks as those that satisfy the following condition: that $-.01 \geq ASIF\_ES < 0$ and $0 \geq ES < 0.01$. In the second case, we identify firms with dollar net income decreases and EPS increases. Myers et al. (2007) contend that firms in this second subsample may have purposefully reduced their outstanding shares to achieve an EPS increase despite a drop in net income. This method, though, assumes that to engage in a buyback to generate an increase in EPS, a manager would have to know that quarterly earnings would drop months before the announcement date. A buyback late in the quarter would have very little impact on the weighted average shares outstanding denominator for EPS. We assess whether these subsamples increasingly repurchase more shares than other firms over 2004–2019 to achieve this outcome.

3.2 Sample

We begin with all firms in the I/B/E/S earnings dataset as of July 2020 with quarterly street earnings surprises. To avoid stale forecasts, we use the consensus I/B/E/S street earnings forecast within 30 days before earnings announcement. We then identify firms with share buybacks based on the Compustat item *cshopq*. Compustat computes *cshopq* from disclosures required by an amendment to SEC Rule 10b-18 (SEC, 2003). This rule requires SEC 10-Q and 10-K filings to report the per-month volume of shares repurchased. Compustat totals the three months of shares repurchased and reports it as *cshopq*. These two steps establish a maximum sample of 154,090 firm-quarter observations of street earnings surprises with *cshopq* and other data in the same quarter. Our study period extends from 2004 (the first year of *cshopq*) to 2019 (the last fiscal year in our I/B/E/S dataset).

As indicated by Table 1, Compustat records 67,324 buyback transactions in the quarters based on 10-K and 10-Q disclosures (SEC, 2003) (col. 2). This number excludes buybacks of more than 20 percent of outstanding common shares. This exclusion is trivial for our sample, amounting to less than 0.2 percent of the total number of buybacks. On average, 43.70 percent of the sample of earnings surprise firm-quarters experience a buyback transaction (col. 3). The sample of 67,324 firm-quarter buyback observations also increases over time in the likelihood that a buyback is accretive. This is because the ratio of EPS/P_{t-1} to the 10-year Treasury rate (a proxy for the quarterly return on funds that would have been earned without a buyback) increasingly exceeds one (Hribar et al. 2006, Eq. 2). The sample also consists of 7,126 different firms over 2004–2019. Firms with accretive buybacks also have lower market-to-book ratios (col. 10 vs. col. 8), consistent with lower expected growth of internal funds. Lastly, as indicated by the mean total assets of $13.2 billion versus the median ($1.3 billion) (cols. 12 and 13), the sample comprises a small number of very large firms. In later tests, we partition the sample on accretive versus non-accretive buybacks and on large (S&P 500) versus other firms.

4. Findings

4.1 Characteristics of the EPS boost

Table 2 summarizes the level and trend of buybacks and the amount of increase in EPS from buybacks over the study period, that is, the difference of (EPS_{it} - $ASIF\_EPS_{it}$) or EPS_BOOST_{it} as per our earlier calculation.[5] We focus in particular on accretive buybacks. An increasing trend in *EPS_BOOST* if carried over into *ES* would offer potential evidence of an upward trend in *ES*. Table 2 reveals the following. The dollar value of buybacks rises to approximately $800 billion per year (2019) (col.1) even though the percentage of shares repurchased (*cshopq*) to outstanding shares (*chshq*) drops slightly (col. 2). At the same time, Treasury yields drop substantially (col. 3), making more buybacks accretive to earnings per share (col. 4). Despite this increase, the average boost to *ASIF_EPS*, while increasing over time, is trivial, averaging 0.057 of one percent (col. 5). The average *EPS_BOOST* is also small, less than one percent of *ES* (col. 6). For most years, the *EPS_BOOST* for non-suspect accretive buybacks (cols. 7 and 8) is greater than the *EPS_BOOST* for suspect accretive buybacks ($-.01 \leq ASIF_ES < 0$) (cols. 9 and 10). In short, of the trillions spent on buybacks in recent years (Kahle & Stulz, 2017; Yardeni et al., 2023), only a small fraction potentially has the effect of increasing street EPS by more than one cent. In addition, the mean percentage of common shares repurchased ranges from 1.045 percent per quarter in 2004 to 0.899 percent in 2019. This represents a slight decline in the percentage repurchased over the study period.

Perhaps the most telling observation from Table 2 relates to cols. 9–10. While the mean difference of *EPS_BOOST* for accretive buybacks (col.1) is 0.4238 cents per share (col. 10), the median difference of *EPS_BOOST* for all accretive buybacks is even less at 0.1273 cents per share (col. 9). As such, based on the numbers of buybacks (Table 1), most buybacks have

[5] This calculation of *EPS_BOOST* relies on Compustat item *cshopq,* which comprises all buybacks in a quarter. While it is unlikely that the results would change, a more detailed alternative would be to calculate *EPS_BOOST* monthly based on firm's monthly reports of buybacks in SEC filings and monthly estimates of the cost of funds.

almost no impact of earnings per share. Moreover, EPS is normally rounded up or down to the nearest one cent (Malenko et al., 2022).[6] In addition, despite the growth in buybacks (Table 1), the trends in the mean EPS effects for all (col. 5) and accretive buybacks (cols. 7–10) do not increase over time. In addition, we compute the ratio of the number of accretive buybacks (based on the requirements that the ratio of EPS/P_{t-1} to the 10-year treasury rate exceeds one and Compustat records a buyback in that quarter) to total buybacks (col. 4). Because the treasury rate is falling, the trend of this ratio is positive. Yet, despite this trend, we observe no equivalent positive trend in the mean difference of *EPS_BOOST* for accretive buybacks or all buybacks in the sample.

4.2 The expected EPS effects of share buybacks

Prior studies (e.g., Burnett et al., 2012; Hribar et al., 2006) indicate that their results are robust to whether or not analysts include the expected EPS effects of buybacks in their earnings forecasts. They do not, however, test directly whether analysts adjust their forecasts for these effects. For a large accretive buyback early in the quarter, it would be logical to make an adjustment. Firms are required to report these data monthly to the SEC under Rule 10b-18. For a small accretive buyback of a fraction of one cent per share shift in EPS_BOOST_{it}, however, it may not be worth the effort. To test this idea, we estimate the following regression.

$$ES_{it} \text{ or } ASIF\_ES_{it} = \alpha + \beta(EPS\_BOOST_{it}) + \Sigma_j \delta_j X_{jit} + \varepsilon_{it}, \quad (1)$$

where X_{jit} represent j control variables and fixed effects and ε_{it} is random error. With full anticipation of the EPS boost, $\beta = 0$ for Eq. (1) with $ASIF\_ES_{it}$ as the dependent variable. With no anticipation, $\beta = 1$ with ES_{it} as the dependent variable, that is, the street earnings surprise reflects 100 percent of the EPS effect of the buyback. With partial anticipation, $0 < \beta \leq 1$. We specify X_{jit} to include the quarterly return on funds that would have been earned without the buybacks (*Treasury*), market-to-book ratio, an indicator variable for whether the firm issues

[6] We discuss the effects of EPS rounding error in Section 4.6.

earnings guidance (*Guidance*), and indicator variables for an accretive or non-accretive buyback (*Accretive*) and whether the buyback potentially might be used to manage earnings under two different definitions (*Suspect*, *Myers*).

Table 3 summarizes the panel regressions of street earnings surprise (*ES*) or street earnings surprise excluding the EPS boost from a buyback (*ASIF_ES*) on *EPS_BOOST*, control variables, and year and industry (GICS) fixed effects. Standard errors are clustered by year and firm. We focus first on the full sample. The coefficients for the control variables are consistent with the prior literature. The *Guidance* coefficient is positive (firms with guidance have higher street earnings surprises) (García Osma et al., 2023). The *Accretive* coefficient is positive (firms with accretive buybacks versus non-accretive buybacks have higher street earnings surprises). Treasury return coefficient is positive (lower interest rates increase street earnings surprise by making more buybacks accretive). The market-to-book coefficient is positive (growth firms have stronger incentives for positive street earnings surprises). The main result from Regr. 1 is that the coefficient for *EPS_BOOST* is 1.0632 (*t*-stat. = 2.16, $p<0.05$). Thus, on average, approximately, 100 percent of *EPS_BOOST* is carried over into *ES*. By contrast, if analysts fully anticipated the *EPS_BOOST* from a buyback and included it in their earnings forecasts, *ASIF_ES* would bear no relation to *EPS_BOOST* (i.e., because there is no surprise element of the *EPS_BOOST*). The results of Regr. 2 bear this out. The coefficient for *EPS_BOOST* is essentially zero, or 0.0633 (*t*-stat. = 0.13, ns). These results also hold for large firms (Regr. 3, 4), and across the different quarters. In short, while the coefficients for *EPS_BOOST* when the dependent variable is *ES* are mostly significantly positive, the coefficients for *EPS_BOOST* when the dependent variable is *ASIF_ES* are always much smaller and/or hover around zero. In addition to Table 3, we regress *ES* or *ASIF_ES* on *EPS_BOOST*, *Accretive*, *Suspect,* and *Myers*, plus the interaction of *Accretive* x *Suspect* or *Accretive* x *Myers* to check whether *ES* is incrementally higher for suspect accretive buybacks.

This does not appear to be the case, as indicated in Table 4. The coefficients for *Accretive* x *Suspect* and *Accretive* x *Myers* are both negative. This is the reverse of what one would expect if suspect buybacks were those likelier to increase *ES*.

Taken together, the results in Tables 3 and 4 reject the proposition that financial analysts incorporate the expected effects of the EPS boost to earnings in their earnings forecasts. To the contrary, the evidence indicates that analysts ignore the expected effects of buybacks in their forecasts. As we have suggested, one reason for this is that the EPS boost for accretive buybacks is trivial (Table 2). However, there could also be a second reason that analysts ignore the EPS boost, namely, that analysts view the EPS boost to earnings as the result of earnings manipulation and ignore it in forecasting earnings because it has no bearing on the economic performance of the firm (i.e., the ability of the firm to generate future operating earnings and cash flow). Analysts may actually deter earnings management (Christensen et al. 2020; Yu 2008). We investigate the potential link between the EPS boost to earnings from a buyback and earnings management in the next section.[7]

4.3 Share buybacks to manage earnings

To understand whether firms use buybacks to manage earnings, most prior studies (Almeida et al., 2016; Burnett et al., 2012; Farrell et al., 2014; Guest et al., 2022; Hribar et al., 2006; Liu & Chen, 2015; Lobo et al., 2020; Myers et al., 2007; Vafeas et al., 2003) examine discontinuities in the bin just below zero of the distribution of pre-buyback street earnings surprise, that is, the street earnings surprise without a possible EPS boost from the buyback. This is a counterfactual distribution induced by subtracting the EPS boost from a buyback from the actual earnings surprise. Note that by subtracting 100 percent of the EPS boost from a buyback this is tantamount to assuming analysts do not incorporate any of the expected EPS

[7] Another way to investigate whether analysts incorporate the *EPS_BOOST* in their forecasts would be to align analysts' forecast revisions to each date in a month (within a quarter) indicating a buyback transaction. This option was not pursued because the *EPS_BOOST* from monthly buybacks on quarterly earnings would be even smaller than the already small effects of buybacks considered quarterly.

boost from a buyback in their estimates.[8] However, this subtraction mechanically creates a discontinuity in the bin just below zero of the counterfactual distribution, as the largest bin of actual street ES is typically the one cent bin just above zero. A mechanically induced discontinuity is not evidence of earnings management behavior. To overcome this challenge, a researcher needs to construct a counterfactual distribution of pre-managed earnings surprises where the incentives to manage earnings are weaker or non-existent. One candidate is the distribution of pre-managed earnings surprises for non-accretive buybacks. By definition, managers could not use non-accretive buybacks to shift pre-buyback-managed EPS or ES to a higher amount.

Following (Almeida et al., 2016, Figure 1), we plot the distribution of pre-buyback managed street earnings surprise for accretive and non-accretive buybacks. Pre-buyback managed street earnings surprise equals street earnings surprise less the boost in EPS from buybacks in the same quarter. Because the average EPS boost is a fraction of one cent, we use a bin width of one-tenth of one cent for this purpose. Potentially inconsistent with earnings management behavior, Fig. 3a does not show that accretive buybacks have the discontinuity of a higher proportion in the $-1 \leq ES < 0$ cent bin (5 obs.) versus the $0 \leq ES < 1$ cent bin (6 obs.) or the $1 \leq ES < 2$ cent bin (6). Fig. 3c shows that non-accretive buybacks also have a lower proportion in the $-1 \leq ES < 0$ cent bin (7 obs.) versus the $0 \leq ES < 1$ cent bin (9 obs.) or the $1 \leq ES < 2$ cent bin (8). Because the difference between accretive and non-accretive buybacks in the $-1 \leq ES < 0$ cent bin is so small, earnings management behavior is unlikely to be the cause of the difference. Rather, the shift could simply result from the mechanical subtraction of *EPS_BOOST* to generate measures of pre-buyback managed street earnings surprise for accretive and non-accretive buybacks.

[8] Given our earlier analysis, this seems reasonable, although some error is introduced because we cannot guarantee that our *EPS_BOOST* calculation is 100 percent accurate (e.g., we use an estimate of the cost of funds and assume a 35% tax rate and that buybacks occur halfway through a quarter).

We also conduct an analysis following the arguments of Hribar et al. (2006), who state that for accretive buybacks "if managers use stock repurchases to meet or beat analysts' quarterly EPS targets then we should observe an abnormally *large concentration* of accretive repurchases among firms that, absent the stock buyback, would have fallen short of the EPS target that quarter." They also state that for non-accretive buybacks, "if analysts' EPS targets influence firms' repurchase decisions, we should find an *abnormally low concentration* of EPS decreasing repurchases among firms that would otherwise meet or exceed the benchmark" Hribar et al. (2006, p. 6). Hence, following the above, the difference of large concentration minus low concentration just below $ASIF\_ES = 0$ should be positive.

Figure 4 plots this difference for our sample of 2004–2019 buybacks. The graph shows that the concentration of *ASIF_ES* in the bins just below zero is greater for non-accretive buybacks versus accretive buybacks. This is opposite to the result in Hribar et al. (2006, p. 16). In addition, we repeat graphs of *ASIF_ES* for $EPS\_BOOST \geq$ one cent, again looking for an abnormally *large concentration* of accretive repurchases in the bin just below zero. The graph in Appendix B1 shows no indication of an abnormally *large concentration* of accretive repurchases in the bin just below zero. We note that 29 buybacks are in the minus one cent bin and 29 are in the plus one cent bin. We do, however, observe a spike of 22 observations in the $-0.20 \leq ASIF\_ES < -0.15$ bin but no other bins just below zero. It is unlikely, though, that such a small number of observations (22 buybacks out of a sample of many thousands) could credibly support the view that managers use buybacks to manage earnings.

4.4 EPS boost from a buyback and street earnings surprise

A further analysis is to track the EPS boost from a buyback as a percentage of street earnings surprise. While very small for most firms, the EPS boost from a buyback may still partially explain the upward trend in positive street earnings surprises. Fig. 5 plots the trends of $|(EPS_{it} - ASIF\_EPS_{it})|$ divided by pre-buyback-managed *ES* and the trends of ES in different bins of the ES distribution. Fig. 5 indicates the following. First, the percentages of *ES_BOOST* to *ASIF_ES* (the green columns) are reasonably steady over 2004–2019. By contrast, consistent with prior research (Brown & Caylor, 2005; Gilliam et al., 2015), the percentages of small positive or negative *ES* have decreased over 2004–2019 (orange and grey lines), whereas the percentage of large positive *ES* has increased (blue line). These trends are inconsistent with the view that the upward trend in large positive street earnings surprises is explained by an increase in the frequency and size of share buybacks.

We also test whether the coefficient for *Year* is significantly negative when we control for trends in the other variables in the regression, in particular, *Treasury return* (Table 1, col. 5). The regression is:

$$|(EPS_{it} \text{ less } ASIF\_EPS)/(\text{pre-buyback-managed } ES)|_{it} = \alpha + \beta_1 Year_t + \beta_2 Guidance_{it} + \beta_3 Accretive_{it} + \beta_4 Year_t * Guidance_{It} + \beta_5 Year_t * Accretive_{it} + \beta_6 Treasury_t + \beta_7 EPS/P_{t-1,it} + \varepsilon_{it}. \quad (3)$$

The variable definitions are the same as those for Eq.(1). Table 5 summarizes the results. The coefficients for *Year* are -0.0046 (*t*-stat. = -5.57), -0.0167 (*t*-stat. = -4.77), -0.0042 (*t*-stat. = -5.21) for all accretive buybacks, those with an EPS boost ≥ $0.01, and those with an EPS boost < $0.01, respectively. As such, the trend in the EPS boost from a buyback as a percentage of street earnings surprise remains negative after adjusting for the trends in the other variables.

4.5 Earnings changes and EPS changes

Rather than rely on the theory of earnings surprise discontinuities as the basis to infer earnings management around buybacks, we examine the empirical strategy in Myers et al.

(2007). Their test of potential earnings management is whether firms whose GAAP earnings (Compustat *niq*) decrease (-Δ*E*) and GAAP EPS (Compustat *epsfxq*) increases (+Δ*EPS*) compared to the prior quarter are those more likely to have a higher percentage of repurchases to common shares outstanding. Firms in this group may have used a buyback to generate an increase in EPS (*epsfxq*) even though earnings (*niq*) decreased compared to the previous quarter. Myers et al. (2007) find that net stock repurchases are significantly greater in those quarters when they posit that earnings management occurs. Table 6 shows the level of shares repurchased as a percentage of common shares for four groups: (i) (-Δ*E,* -Δ*EPS*), (ii) (-Δ*E,* +Δ*EPS*), (iii) (+Δ*E,* -Δ*EPS*), and (vi) (+Δ*E,* +Δ*EPS*). The test is whether the (-Δ*E,* +Δ*EPS*) group has a highest level of shares repurchased as a percentage of common shares outstanding and/or EPS boost from buybacks. While the table indicates that the -Δ*E*+Δ*EPS* group has the highest level of buybacks (*cshopq/cshoq*) (col. 1), the EPS boosts to *EPS* and *ES* (cols. 2–4) and the ratio of accretive buybacks to total buybacks (col. 5) are not the highest for -Δ*E*+Δ*EPS* of the four groups. In sum, we cannot reproduce the Myers et al. (2007) result for a sample of recent buybacks that potentially could have the effect of increasing EPS consistent with earnings management.

4.6 EPS rounding Error

Das and Zhang (2003) and Malenko et al. (2022) present evidence that managers round up EPS calculations to generate positive *ES*. Das and Zhang (2003, p. 46), however, find that EPS rounding up does not associate with a reduction in the number of shares outstanding from buybacks. To investigate further whether firms with accretive buybacks are likelier to round up EPS to the next one cent, we compare the percentage of the digit 4 in the distribution of the third decimal point of EPS calculated as *niq/cshprq*. As before, we classify buybacks as potentially used to generate positive *ES* if they associate with (i) small negative *ASIF_StreetES* (Hribar et al., 2006), (ii) the condition that $-.01 \geq ASIF\_ES < 0$ and $0 \geq < ES < 0.01$ (Burnett et

al., 2012), and/or (iii) the condition that $\Delta E<0$ and $\Delta EPS>0$ (Myers et al., 2007). Table 7 shows that for each of these three conditions the percentage of the digit 4 in the distribution of earnings per share is similar to the other third decimal place digits. We note one exception, however, namely, accretive buybacks with EPS boosts greater than one cent per share (i.e., *EPS_BOOST* > \$0.01). Thus, while there is no evidence that suspect buybacks contain rounding error on the average such that suspect buybacks are used to generate positive *ES*, a small number of accretive buybacks with *EPS_BOOST*>0.01 (90 out of the sample-wide count of many thousands) are rounded up by one cent.[9]

4.7 Cumulative excess stock returns

In recognition of research indicating that investors reflect the full range of firms' motivations for a buyback and price them efficiently (Busch & Obernberger, 2017), as a further analysis, we investigate whether the market responses at earnings announcement date differ for accretive buybacks, ostensibly used to manage analysts' earnings surprises, versus other buybacks. We measure excess return as the market adjusted CRSP return on day *t* relative to the quarterly earnings announcement (Compustat item *rfd*) on day 0. We cumulate those returns at the firm level from days -20 to 20 (CAR -20, 20) and -1 to 1 (CAR -1,1).

Appendix C summarizes the results. Appendix C1 shows the distribution of mean CAR (-20, 20) (light green) and CAR (-1,1) (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks. The distributions are similar for accretive and non-accretive buybacks. Appendix C2 shows the distribution of number of observations of CAR (-20, 20) (light green) and CAR (-1,1) (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks. The number of accretive buybacks in the bins close to zero

[9] The results in Table 7 are also consistent with the distribution of *EPS_BOOST* from accretive buybacks in Fig. 2a, which shows that very few *EPS_BOOST* observations would be rounded up to one cent, i.e., *EPS_BOOST* in the bins from 0.005–0.006 and above.

is very small. Appendix C3 shows the distribution by the third significant digit of the EPS calculation of the number of observations of CAR (-20, 20) (light green) and CAR (-1,1) (dark green). The distribution is approximately uniform for firms without (top graph) and with (bottom graph) accretive buybacks. Appendix C4 shows the distribution by the third significant digit in the EPS calculation of CAR (-20, 20) (light green) and CAR (-1,1) (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks. While accretive buyback firms have higher slightly excess returns across the *ES* bins in general, we find no evidence of higher excess returns in the bin of the third significant digit equal to 4.[10] In short, just as analysts do not care about accretive buybacks in generating forecasts, investors also do not recognize and respond to accretive buybacks that have the potential to manage *ES* or earnings per share any differently from other buybacks. Thus, based on more recent data, we find no evidence to support the view that "investors assign significantly less value to repurchase-induced EPS surprises when stock repurchases are likely to be used to meet or beat analysts' forecasts." (Hribar et al., 2006, p.22).

5. Conclusion

Share buybacks continue to surge in dollar value in part because, until recently, of a decline in the cost of funds used to finance buybacks. These trends have caused the percentage of accretive share buybacks to total buybacks to increase. However, the percentage of common shares repurchased to outstanding common shares has declined. Moreover, the mean boost from a share buyback to EPS and the EPS boost as a proportion of earnings per share have also declined. Building on a methodology that replicates and extends the prior research in several directions, we find no support for the use of share buybacks as a tool for managers to achieve positive street earnings surprises. For the average sample firm, the ability of buybacks to boost

[10] We also explore the same distributions in Appendix C for large (EPS_BOOST>\$0.01) versus small accretive buybacks but find no evidence of a more positive or negative investor response to large accretive buybacks versus small accretive buybacks in any bin of the *ES* distribution.

pre-buyback EPS is inconsequential. Even in the case of significant accretive buybacks, we discover no evidence of an irregular shift in street earnings surprises in the bins just below zero to the bins just above zero that would support the use of accretive buybacks for earnings management. Our tests further reveal that analysts act as if they ignore the EPS impact of buybacks when formulating their street earnings predictions, and investors do not seem to care. While managers may favor buybacks for many reasons, their deployment as a means to manage earnings is not among them. Our findings thus offer no support to justify the belief in SEC Release 34-97424 (SEC, 2023) that regulation is needed to curb the use of share buybacks as a tool of earnings management. Moreover, our findings are fully consistent with the recent opinion of the U.S Court of Appeals (Chamber of Commerce et al. v. SEC, 88 F 36002 (5th Cir. 2023) that the SEC acted "arbitrarily and capriciously" because there is no rational basis for the SEC's assumption that "opportunistic or improperly motivated buybacks" are "genuine problems" (p. 22). Our findings also demonstrate that the EPS boost to pre-buyback EPS from accretive share buybacks does not explain the asymmetric shift of street earnings surprises– from significantly fewer earnings surprises just below zero to a considerably higher number above zero.

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Figure 1. Trend of Buyback Variables over 2004–2019

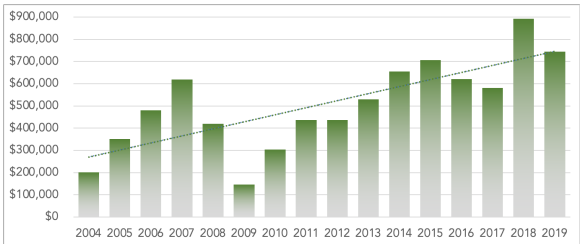

Fig. 1a. The dollar value of buybacks has increased.

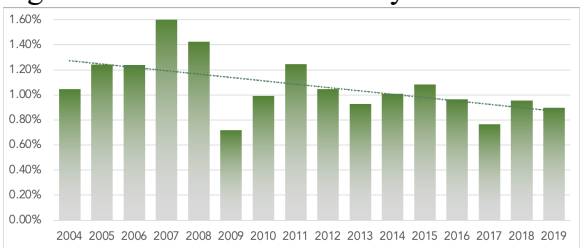

Fig. 1b. But the percentage of common stock (# shares) repurchased has decreased.

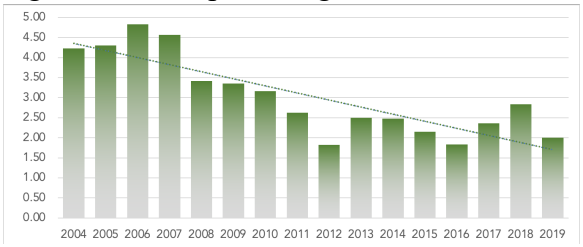

Fig. 1c. The opportunity cost of funds used for a buyback has also decreased making accretive buybacks more attractive.

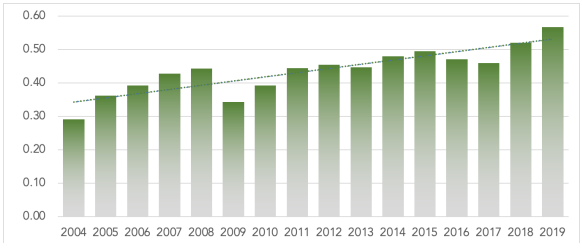

Fig. 1d. As a result, the percentage of accretive versus non-accretive buybacks has increased.

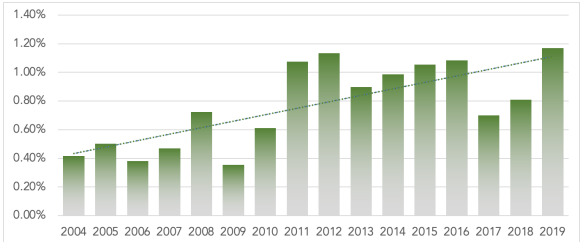

Fig. 1e. However, the average impact of a buyback on street earnings surprise before the EPS boost of a buyback (*ASIF_ES*) while increasing is less than one percent of *ASIF_ES.*

Together, these graphs indicate that despite the trends in favor of buybacks, the increment to *EPS* or *ES* is probably too small to attract the attention of analysts. This amount is probably too small to be used by firms to manage earnings per share to create a more positive *ES*.

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Figure 2. Distribution of the EPS boost from Buybacks

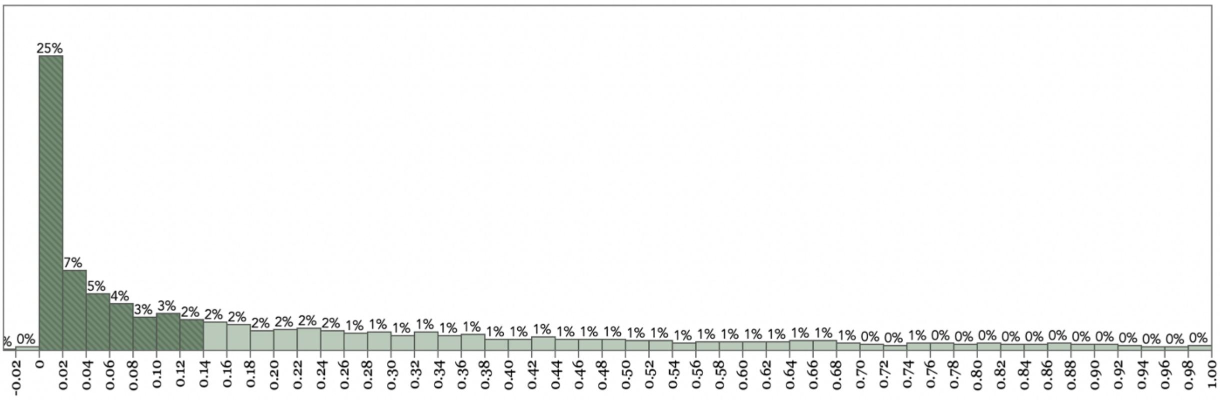

Fig. 2a. Accretive Buybacks

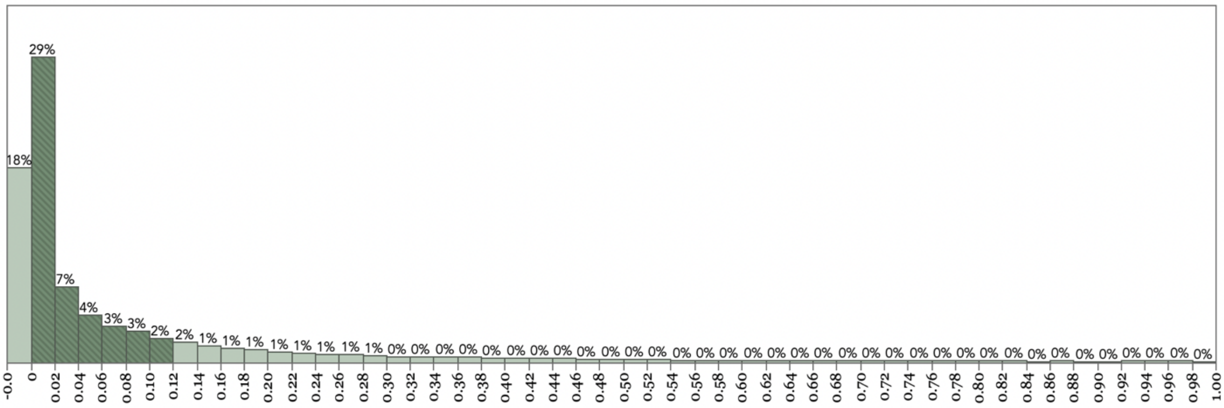

Fig. 2b. Non-accretive Buybacks

This figure shows the distribution of the EPS boost (in cents) from buybacks for the full sample split by accretive and non-accretive buybacks as per the definition in Hribar (2006), namely, a buyback is accretive if the earnings-to-price ratio absent the buyback exceeds the opportunity rate of return applicable to funds use to finance the buyback. The distribution is restricted to EPS boosts of less than one dollar.

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Figure 3. Distribution of *ASIF_ES* in cents

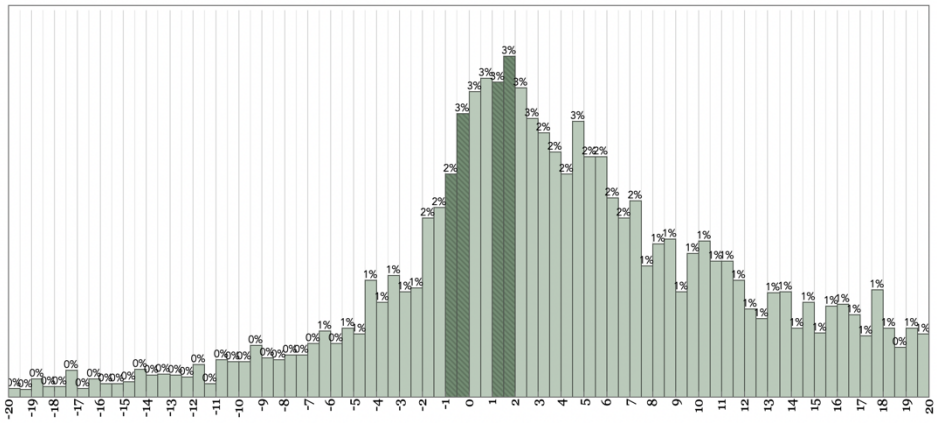

Fig. 3a. Distribution of *ASIF_ES* for accretive buybacks. The graph shows no indication of substantially *more* negative *ASIF_ES* just below zero. But there is a clear indication that *ASIF_ES* is subject to earnings management in the bins just below zero.

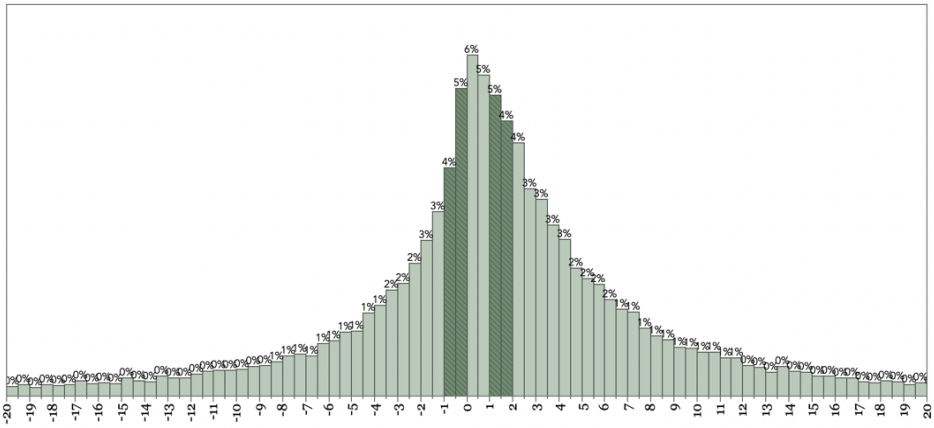

Fig. 3b. Distribution of *ASIF_ES* for non-accretive and no-buyback firms. The graph shows no indication of substantially *fewer* negative *ASIF_ES* just below zero.

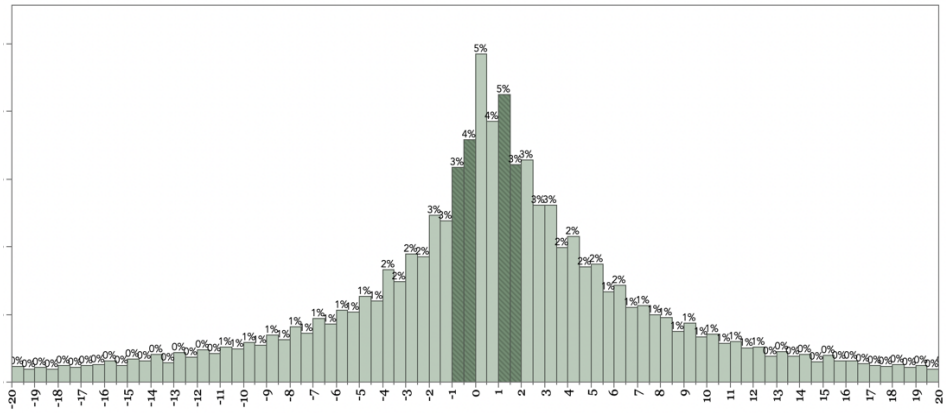

Fig. 3c. Distribution of ASIF_ES for non-accretive buyback firms. The graph shows no indication of substantially *fewer* negative *ASIF_ES* just below zero.

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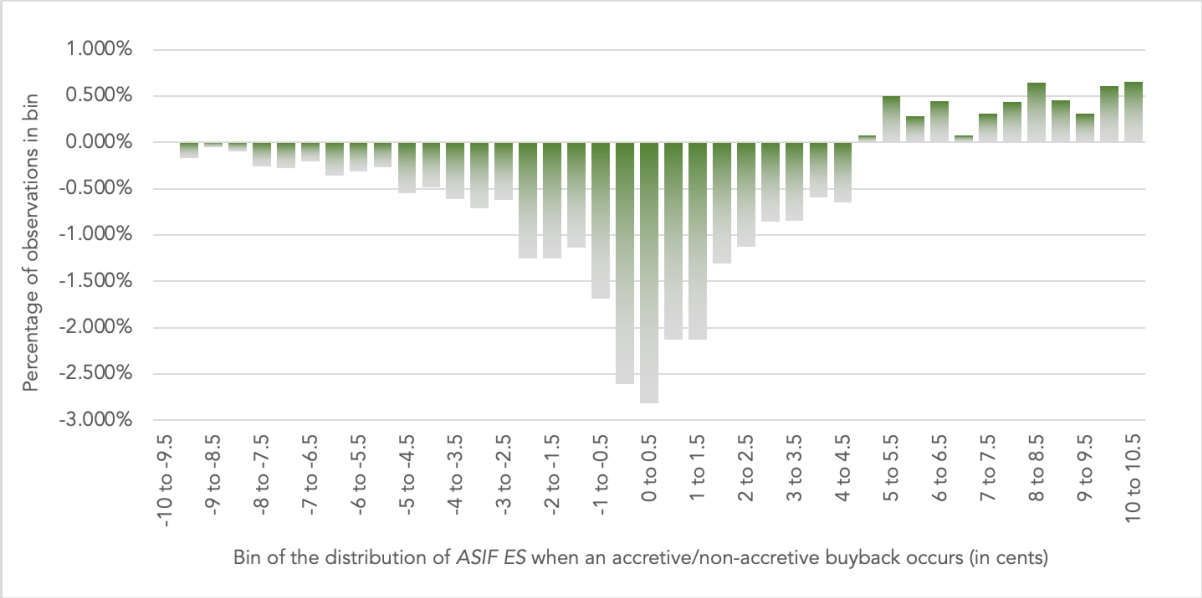
Figure 4. *ASIF_ES* for accretive buyback firms minus *ASIF_ES* for non-accretive buyback firms

Accretive BB: "If managers use stock repurchases to meet or beat analysts' quarterly EPS targets then we should observe an abnormally *large concentration* of accretive repurchases among firms that, absent the stock buyback, would have fallen short of the EPS target that quarter." Hribar et al. (2006, p.6)

Non-accretive BB: "If analysts' EPS targets influence firms' repurchase decisions, we should find an *abnormally low concentration* of EPS decreasing repurchases among firms that would otherwise meet or exceed the benchmark" Hribar et al. (2006, p.6)

Hence, following the above, the difference of large minus low concentration just below *ASIF_ES*=0 should be positive.



This graph shows that the concentration of *ASIF_ES* in the bins just below zero is greater for non-accretive buybacks versus accretive buybacks. This is the opposite result in Hribar et al. (2006, p.16).

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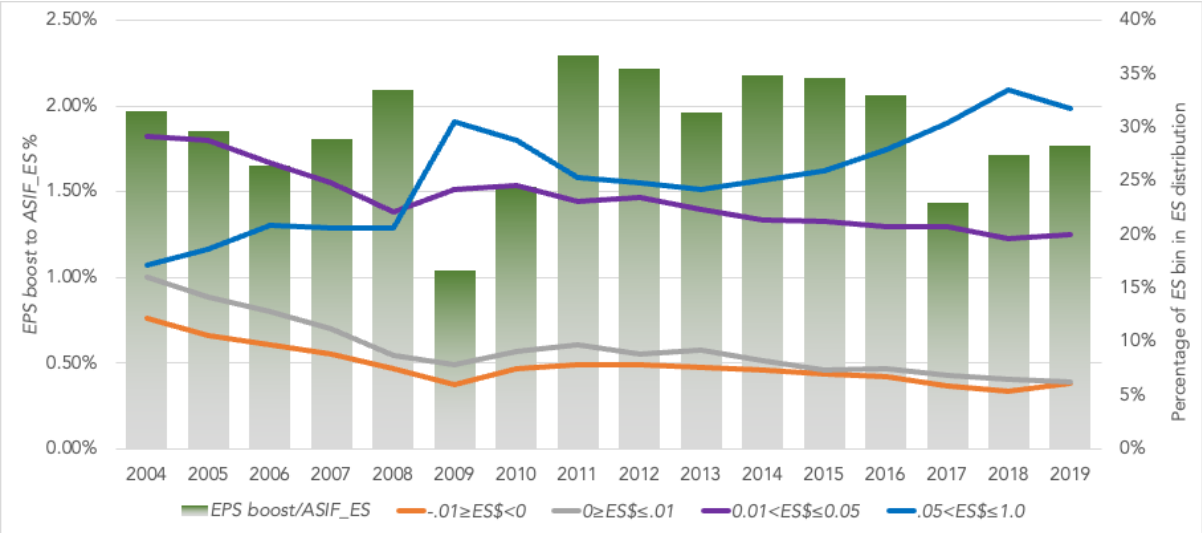
https://drive.google.com/file/d/1YqSMDHouC3EFxCyxHaDYQ8VVKTaMJNn1/view?usp=sharing

Figure 5. Trend of Earnings Surprise and Buyback Variables over 2004–2019



This figure compares the percentage of EPS boost from accretive buybacks to earnings surprise without a buyback (*ASIF_ES*) (left-hand axis) with the percentage of street earnings surprise in a bin of the earnings surprise distribution (right-hand axis). The takeaway is the following. The percentages of *ES_BOOST* to *ASIF_ES* (the green columns) are reasonably steady over 2004–2019. By contrast, the percentages of small positive or negative earnings surprises have decreased over 2004–2019 (orange and grey lines), whereas the percentage of large positive earnings surprises has increased (blue line). These trends are inconsistent with the view that the upward trend in large positive street earnings surprises is explained by an increase in the frequency, size, and earnings-per-share boost from share buybacks.

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Table1. Sample Characteristics

Year	No. *ES*	No. Buybacks	Buybacks-%of *ES*	-.01≤*ES*<00 % of obs.	0≤*ES*<.01 % of obs.	.05 % of obs.	Days to Actual	*Mkt-to-Book Ratio* All	*Non-Accret.*	*Accret*	*Lev-erage*	*Total assets* Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2004	8,601	2,502	29.1	12.2	16.0	29.1	13.3	na	na	na	0.60	$7,601	$780
2005	9,373	3,382	36.1	10.5	14.1	28.8	12.9	3.1	3.4	2.3	0.57	$7,944	$789
2006	9,617	3,768	39.2	9.7	12.9	26.7	10.9	3.2	3.3	2.0	0.55	$8,557	$856
2007	9,864	4,213	42.7	8.9	11.2	24.9	10.9	3.4	3.4	1.9	0.57	$10,015	$872
2008	9,534	4,224	44.3	7.5	8.8	22.2	11.5	2.6	2.9	1.7	0.61	$10,099	$945
2009	9,393	3,220	34.3	6.0	7.8	24.2	11.7	2.3	2.8	1.4	0.62	$10,435	$974
2010	9,716	3,804	39.2	7.5	9.0	24.6	11.7	2.7	3.1	2.0	0.53	$11,479	$1,060
2011	9,628	4,271	44.4	7.9	9.7	23.1	12.1	2.8	3.2	2.1	0.52	$12,473	$1,236
2012	9,657	4,381	45.4	7.9	8.8	23.4	12.4	2.9	3.4	2.2	0.56	$13,127	$1,350
2013	9,858	4,393	44.6	7.6	9.2	22.3	12.6	3.5	3.6	2.3	0.58	$15,723	$1,426
2014	10,200	4,883	47.9	7.4	8.2	21.3	13.2	3.7	3.9	2.2	0.60	$14,577	$1,449
2015	10,696	5,295	49.5	7.0	7.3	21.3	13.2	3.6	4.0	2.6	0.67	$15,074	$1,556
2016	10,673	5,022	47.1	6.8	7.4	20.7	13.3	3.6	4.2	2.5	0.70	$16,144	$1,696
2017	9,872	4,533	45.9	5.9	6.9	20.7	13.2	3.9	4.4	2.8	0.69	$17,008	$1,940
2018	9,268	4,820	52.0	5.4	6.5	19.6	13.2	3.8	4.2	2.3	0.67	$18,881	$2,202
2019	8,140	4,613	56.7	6.1	6.3	20.0	13.4	3.8	5.0	2.1	0.82	$21,120	$2,539
All	154,090	67,324	43.7	7.8	9.3	23.3	12.5	3.3	3.7	2.2	0.62	$13,186	$1,278

The sample consists of 154,090 firm-quarter observations of street earnings surprise (*ES*) from the I/B/E/S earnings dataset as of June 30, 2020, with 67,324 quarterly buyback transactions and other financial data from Compustat based on 10-K and 10-Q disclosures required under SEC Rule 10b-18 (SEC 2003). On average, 43.7 of the I/B/E/S sample experience a buyback transaction. This table also shows that the percentages of small negative (-.01≤*ES*<0) and small positive (0≤*ES*<.01) *ES* have decreased over 2004–2019. The sample consists of 7,126 different firms. As indicated, the mean forecast horizon (mean days to actual = 12.5 days), market-to-book ratio (3.3), and debt-to-common equity ratio (0.62) are reasonably stable over 2004–2019. Firm size has increased over 2004–2019. The distribution of firm size is highly skewed to the right (mean = $13.19 billion versus median = $1.28 billion. Appendix A defines the variables.

Table 2. Time-Series of Buyback Dollars and EPS Boost from a Buyback

Year	Total Buyback Dollars, mm	*cshopq/ cshoq*	Treasury 10 Year	Accretive Buybacks % of total	*EPS_BOOST ASIF EPS*	*EPS_BOOST ASIF ES*	*EPS_BOOST* Accretive Median	*EPS_BOOST* Accretive Mean	*EPS_BOOST* Accretive Median	*EPS_BOOST* Accretive Mean
							Not small Neg. *ES* (cents)		Small Neg. *ES* (cents)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2004	$201,252	1.045	4.23	2.06	0.022	0.415	0.2964	0.9804	2.2233	2.2233*
2005	$350,216	1.242	4.30	2.34	0.027	0.501	0.3679	0.8772	5.2926	5.2926*
2006	$480,211	1.240	4.83	1.20	0.023	0.380	0.2994	0.9209	0.1774	0.1774*
2007	$619,544	1.610	4.56	1.62	0.032	0.469	0.9990	1.4065	1.0837	1.1635
2008	$419,325	1.425	3.42	6.48	0.051	0.723	0.1836	0.9095	0.0414	0.1929
2009	$146,618	0.717	3.35	14.47	0.030	0.354	0.0250	0.3685	0.1320	0.2755
2010	$302,761	0.991	3.16	13.54	0.050	0.612	0.1317	0.6466	0.1022	0.4318
2011	$437,352	1.247	2.62	22.14	0.075	1.075	0.1582	0.5692	0.1319	0.5685
2012	$435,693	1.048	1.82	39.08	0.086	1.133	0.1176	0.4258	0.0869	0.3524
2013	$529,310	0.927	2.50	16.32	0.061	0.899	0.1137	0.5006	0.1009	0.3922
2014	$655,443	1.008	2.48	10.93	0.064	0.986	0.2090	0.7498	0.0912	0.3955
2015	$705,687	1.084	2.15	13.88	0.079	1.054	0.2288	0.6765	0.3428	0.4827
2016	$619,948	0.966	1.83	29.29	0.082	1.083	0.1659	0.5046	0.0893	0.3750
2017	$580,989	0.766	2.36	14.54	0.052	0.700	0.1642	0.5856	0.2787	0.6629
2018	$892,057	0.954	2.84	8.47	0.060	0.808	0.2781	0.6130	0.0764	0.3375
2019	$744,511	0.899	2.00	31.79	0.085	1.169	0.2028	0.5249	0.1475	0.3105
All	$8,120,917	1.070	3.01	14.90	0.057	0.797	0.1562	0.5587	0.1273	0.4238

This table outlines the narrative of the paper. The dollar value of buybacks has risen to approximately $800 billion per year (2019) (col.1) even though the percentage of shares repurchased (*cshopq*) to outstanding shares (*cshoq*) has dropped slightly (col. 2). At the same time, Treasury yields have dropped substantially (col. 3), making more buybacks accretive to earnings per share (col. 4). Despite this increase, the average boost to *ASIF_EPS*, while increasing over time, is trivial, averaging 0.057 of one percent (col. 5). The average *ES* boost is also small, less than one percent of *ES* (col. 6). For most years, the *EPS_BOOST* for non-suspect accretive buybacks (cols. 7 and 8) is greater than the *EPS_BOOST* for suspect accretive buybacks (-.01≤*ASIF_ES*<0) (cols. 9 and 10). *: sample size = 2. Appendix A defines the variables.

Table 3. Regression of Earnings Surprise on the EPS Boost from a Buyback

Earnings Surprise	*ES*			*ASIF_ES*			*ES*			*ASIF_ES*		
Sample	1. All obs.			2. All obs.			3. S&P 500 obs.			4. S&P 500 obs.		
Dep.variable	Coeff.	t-stat	sig.	Coeff.	t-stat	sig.	Coeff.	t-stat	sig.	Coeff.	t-stat	sig.
Intercept	0.0074	3.00	***	0.0074	3.00	***	0.0123	3.04	***	0.0123	3.04	***
EPS_BOOST	1.0632	2.16	**	0.0633	0.13		1.1862	1.42		0.1862	0.22	
Guidance	0.0059	2.88	**	0.0059	2.88	**	0.0057	2.09	*	0.0057	2.09	*
Accretive	0.0819	12.50	***	0.0819	12.50	***	0.0756	9.44	***	0.0756	9.44	***
Suspect	-0.0223	-8.47	***	-0.0223	-8.47	***	-0.0340	-7.66	***	-0.0340	-7.66	***
Myers	-0.0159	-3.38	***	-0.0159	-3.38	***	-0.0264	-4.60	***	-0.0264	-4.60	***
Mkt-to-book	0.0023	4.17	***	0.0023	4.17	***	0.0027	3.37	***	0.0027	3.37	***
Treasury	0.0167	4.37	***	0.0167	4.37	***	0.0036	0.56		0.0036	0.56	
Leverage	-0.0138	-4.38	***	-0.0138	-4.38	***	-0.0153	-2.75	**	-0.0153	-2.75	**
Adjusted R2	7.16			6.14			6.46			5.56		
F ratio	57.33			57.36			58.77			49.73		
N obs.	31,084			31,084			9,980			9,980		
Sample	5.Q1 All obs.			6. Q1 All obs.			7. Q2 All obs.			8. Q2 All obs.		
Intercept	0.0106	2.61	**	0.0106	2.61	**	0.0054	2.28	**	0.0054	2.28	**
EPS_BOOST	1.4655	1.29		0.4655	0.41		2.0221	2.43	**	1.0221	1.23	
Guidance	0.0046	1.82	*	0.0046	1.82	*	0.0086	2.65	**	0.0086	2.65	**
Accretive	0.0876	9.92	***	0.0876	9.92	***	0.0766	7.84	***	0.0766	7.84	***
Suspect	-0.0160	-3.39	***	-0.0160	-3.39	***	-0.0259	-6.28	***	-0.0259	-6.28	***
Myers	-0.0051	-0.98		-0.0051	-0.98		-0.0179	-2.40	**	-0.0179	-2.40	**
Mkt-to-book	0.0020	2.88	**	0.0020	2.88	**	0.0023	4.40	***	0.0023	4.40	***
Treasury	0.0091	1.15		0.0091	1.15		0.0052	0.50		0.0052	0.50	
Leverage	-0.0068	-1.15		-0.0068	-1.15		-0.0096	-1.73		-0.0096	-1.73	
Adjusted R2	7.47			6.14			6.58			6.58		
F ratio	26.98			25.51			25.75			25.75		
N obs.	8,020			8,020			7,924			7,924		
Sample	9. Q3 All obs.			10. Q3 All obs.			11. Q4 All obs.			12. Q4 All obs.		
Intercept	0.0059	1.44		0.0059	1.44		0.0065	1.49		0.0065	1.49	
EPS_BOOST	0.6870	0.83		-0.3130	-0.38		0.9723	0.97		-0.0277	-0.03	
Guidance	0.0037	0.92		0.0037	0.92		0.0070	2.26	**	0.0070	2.26	**
Accretive	0.0887	10.30	***	0.0887	10.30	***	0.0839	7.39	***	0.0839	7.39	***
Suspect	-0.0284	-5.06	***	-0.0284	-5.06	***	-0.0123	-2.73	**	-0.0123	-2.73	**
Myers	-0.0282	-4.39	***	-0.0282	-4.39	***	-0.0070	-0.90		-0.0070	-0.90	
Mkt-to-book	0.0027	2.88	**	0.0027	2.88	**	0.0020	2.68	**	0.0020	2.68	**
Treasury	0.0342	3.23	***	0.0342	3.23	***	0.0125	1.09		0.0125	1.09	
Leverage	-0.0192	-4.44	***	-0.0192	-4.44	***	-0.0225	-4.36	***	-0.0225	-4.36	***
Adjusted R2	8.81			7.94			8.27			7.33		
F ratio	50.71			45.97			24.73			22.24		
N obs.	7,786			7,786			7,298			7,298		

This table summarizes panel regressions of street earnings surprise (*ES*) or street earnings surprise excluding the *EPS_BOOST* from a buyback (*ASIF_ES*) on *EPS_BOOST*, control variables , and year and industry (GICS) fixed effects. Standard errors are clustered by year and firm. In theory, if I/B/E/S analysts made no forecast of *EPS_BOOST* prior to earnings announcement, the coefficient for *EPS_BOOST* in the *ES* regressions would be one. ***, **, and * indicate statistical significance at the 1, 5, and 10 two-tail levels, respectively. Appendix A defines the variables.

Table 4. Regression of Earnings Surprise on the EPS Boost with Interactions

Earnings surprise	*ES*			*ASIF_ES*		
Suspect interaction	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Intercept	0.0073	4.17	***	0.0073	4.17	***
EPS_BOOST	1.0608	2.16	**	0.0608	0.12	
Guidance	0.0059	2.88	**	0.0059	2.88	**
Accretive	0.0823	12.50	***	0.0823	12.50	***
Suspect	-0.0108	-3.74	***	-0.0108	-3.74	***
*Accretive*Suspect*	-0.0675	-7.75	***	-0.0675	-7.75	***
Myers	-0.0158	-3.35	***	-0.0158	-3.35	***
Mkt-to-book	0.0023	4.17	***	0.0023	4.17	***
Treasury	0.0167	4.37	***	0.0167	4.37	***
Leverage	-0.0138	-4.37	***	-0.0138	-4.37	***
Adjusted R2	7.18			6.16		
F ratio	59.52			54.51		
N obs.	31,084			31,084		
Meyers interaction						
Intercept	0.0072	4.18	***	0.0072	4.18	***
EPS_BOOST	1.0592	2.16	**	0.0592	0.12	
Guidance	0.0059	2.86	**	0.0059	2.86	**
Accretive	0.0826	12.59	***	0.0826	12.59	***
Myers	-0.0124	-3.02	***	-0.0124	-3.02	***
*Accretive*Myers*	-0.0224	-1.70		-0.0224	-1.70	
Suspect	-0.0220	-8.67	***	-0.0220	-8.67	***
Mkt-to-book	0.0023	4.18	***	0.0023	4.18	***
Treasury	0.0167	4.41	***	0.0167	4.41	***
Leverage	-0.0137	-4.37	***	-0.0137	-4.37	***
Adjusted R2	7.17			6.15		
F ratio	50.06			49.68		
N obs.	31,084			31,084		

This table summarizes panel regressions of street earnings surprise (*ES*) or street earnings surprise excluding the EPS_BOOST from a buyback (*ASIF_ES*) on *EPS_BOOST*, the interaction of *Suspect* or *Myers* times *Accretive*, control variables, and year and industry (GICS) fixed effects. The sample consists of all observations. Standard errors are clustered by year and firm. The main takeaway from this table is that the coefficients for *Accretive*Suspect* or *Accretive*Myers* are negative. Thus, in addition to our main result in Table 3–that the coefficient for *EPS_BOOST* in the ES regressions is close to one and that the coefficient for *EPS_BOOST* in the *ASIF_ES* regressions is close to zero–the coefficients for the interaction terms are negative. This indicates that for accretive buybacks conditional on $-.01 \leq ASIF\_ES < 0$ (suspect) or when $\Delta EPS < 0$ *and* $\Delta Earnings > 0$ (Meyers) have a lower measure of *ES* or *ASIF_ES* compared to the other *ES* or *EPS* conditions. This is the opposite of what one would predict if firms with suspect or Myers buybacks managed earnings with accretive buybacks. ***, **, and * indicate statistical significance at the 1, 5, and 10 two-tail levels, respectively. Appendix A defines the variables.

Table 5
Regression of Buyback Ratio on Year and Control Variables

Dep. variable |*EPS_BOOST* to *ASIF_ES* |	Coeff.	t-stat	sig.	Coeff.	t-stat	sig.
Sample	All			S&P 500		
Intercept	1.1514	2.55	**	1.5148	2.64	**
Year	-0.0006	-2.50	**	-0.0007	-2.58	**
Accretive	0.0081	8.66	***	0.0096	5.25	***
Guidance	0.0006	0.82		0.0020	3.12	***
Mkt-to-book	0.0007	2.49	**	0.0010	3.15	***
Leverage	-0.0014	-2.06	*	-0.0016	-0.82	
Treasury	-0.0040	-4.67	***	-0.0080	-7.81	***
Adjusted R2	2.30			3.72		
F ratio	41.59			29.60		
N obs.	21,749			7,386		
Sample	Q1			Q2		
Intercept	1.8331	2.28	**	0.7966	1.50	
Year	-0.0009	-2.25	**	-0.0004	-1.46	
Accretive	0.0070	4.73	***	0.0071	3.84	***
Guidance	0.0010	1.16		0.0002	0.22	
Mkt-to-book	0.0006	1.61		0.0006	1.64	
Leverage	-0.0022	-1.31		-0.0023	-1.95	*
Treasury	-0.0059	-5.35	***	-0.0031	-3.59	***
Adjusted R2	2.68			1.40		
F ratio	9.98			8.97		
N obs.	5,311			5,491		
Sample	Q3			Q4		
Intercept	1.3407	2.13	*	0.5453	0.69	
Year	-0.0007	-2.09	*	-0.0003	-0.66	
Accretive	0.0064	3.50	***	0.0107	6.26	***
Guidance	-0.0009	-0.87		0.0016	1.26	
Mkt-to-book	0.0007	1.93	*	0.0008	1.68	
Leverage	-0.0008	-0.44		0.0002	0.10	
Treasury	-0.0045	-2.95	**	-0.0024	-1.59	
Adjusted R2	2.05			2.05		
F ratio	18.83			12.17		
N obs.	5,677			5,270		

This table regresses the ratio of the boost to pre-buyback EPS from buybacks to pre-buyback street earnings surprise (|*EPS_BOOST* to *ASIF_ES* |) on *Year*, *Accretive*, other control variables, and industry (GICS) fixed effects for all buybacks, S&P 500 firm buybacks, and Q1–Q4 observations. Standard errors are clustered by year and firm. The table shows that after controlling whether the buyback is accretive or the firm issues guidance, the coefficient for *Year* is significantly negative. Thus, the trend in *EPS_BOOST* to *ASIF_ES* over the study period is negative. ***, **, and * indicate statistical significance at the 1, 5, and 10 two-tail levels, respectively. Appendix A defines the variables.

Table 6. Change in Net Income versus Change in Earnings per Share

	cshopq/ cshoq	*EPS_ BOOST÷ ASIF EPS*	*EPS_ BOOST÷ ASIF ES*	*EPS_BOOST ASIF Accretive* cents	Ratio of Accretive to all Buybacks
	(1)	(2)	(3)	(4)	(5)
Group	Mean	Mean	Mean	Mean	Mean
-Δ*E*-Δ*EPS*	1.066	0.048	0.670	0.1094	8.784
-Δ*E*+Δ*EPS*	1.622	0.058	1.113	0.1329	15.663
+Δ*E*-Δ*EPS*	1.206	0.034	0.671	0.0940	4.575
+Δ*E*+Δ*EPS*	1.061	0.067	0.887	0.4173	21.174

This table compares the buyback characteristics of the four earnings change time EPS change groups. According to Myers et al. (2007), the -Δ*E*+Δ*EPS* group is likeliest to have used buybacks to manage earnings. While the table indicates that the -Δ*E*+Δ*EPS* group has the highest level of buybacks (*cshopq/cshoq*) (col. 1), the EPS boosts to EPS and ES (cols. 2–4) and the ratio of accretive buybacks to total buybacks (col. 5) are not the highest of the four groups.

Table 7. Buybacks and Rounded-Up EPS

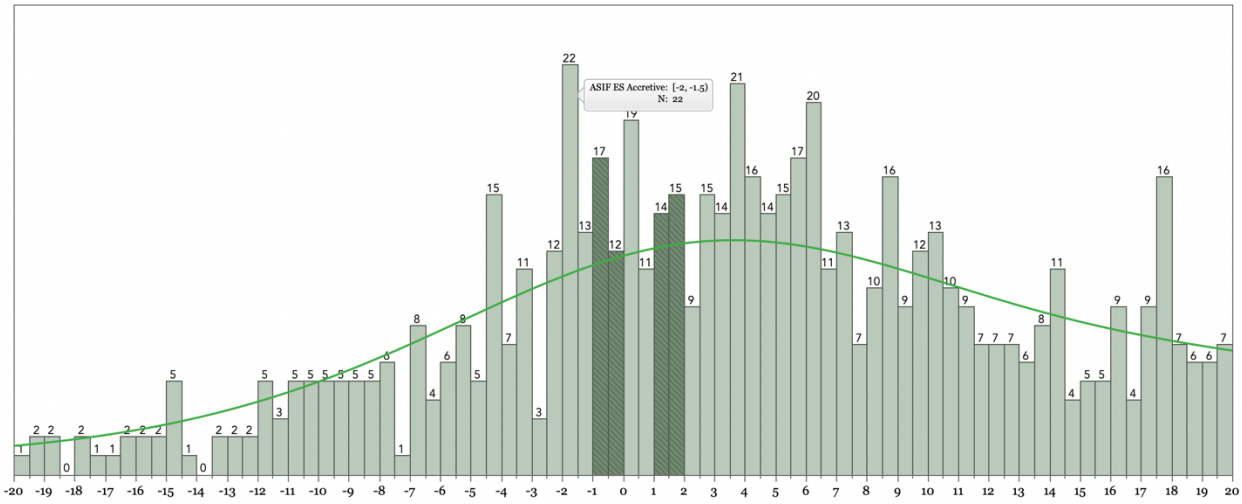
Third Digit in EPS calculation	0	1	2	3	4	5	6	7	8	9
Buyback as EM device	%	%	%	%	%	%	%	%	%	%
Small negative *ASIF_StreetES*										
No	10.3	10.4	10.2	9.9	9.9	10.0	10.1	9.8	9.9	9.6
Yes	10.6	10.9	10.2	9.6	9.6	9.9	9.7	9.9	10.1	9.5
Suspect										
No	10.3	10.4	10.3	9.9	10.0	10.0	10.0	9.8	9.8	9.6
Yes	10.6	10.7	10.2	10.1	9.3	9.8	10.3	9.3	10.1	9.6
Accretive										
No	10.3	10.2	9.8	9.7	9.9	9.9	10.2	9.9	10.1	9.9
Yes	9.3	9.7	9.8	10.1	9.8	10.0	10.5	10.2	10.3	10.2
Myers										
-Δ*E*-Δ*EPS*	10.4	10.5	10.3	9.9	10.0	10.0	9.8	9.6	9.9	9.6
-Δ*E*+Δ*EPS*	10.0	11.0	9.8	11.1	9.8	10.5	9.7	9.3	9.6	9.4
+Δ*E*-Δ*EPS*	11.2	10.4	9.8	9.7	9.6	10.5	10.9	9.3	9.5	9.2
+Δ*E*+Δ*EPS*	10.2	10.4	10.3	9.9	9.8	9.9	10.2	9.9	9.8	9.6
Accretive, EPS_BOOST, Year										
< 1 cent *Early*	9.6	9.0	10.3	10.8	10.4	9.6	10.9	10.0	9.5	10.0
< 1 cent *Late*	9.2	10.1	9.8	9.7	10.1	9.8	10.5	10.1	10.3	10.4
≥ 1 cent *Early*	11.4	7.1	9.7	11.1	6.0	13.8	7.4	11.1	13.4	9.1
≥ 1 cent *Late*	9.5	12.0	10.2	10.7	7.7	9.3	10.0	10.7	10.4	9.5
N obs. *Accretive*, *EPS_BOOST*										
< 1 cent	654	687	694	689	717	688	745	710	708	718
≥ 1 cent	117	128	121	133	90	126	111	127	133	113

This table shows the distribution of the third decimal place for EPS calculated as *niq/cshprq*. Small negative *ASIF_StreetES* = Yes if -0.01 ≤ *ASIF_StreetES* < 0. Suspect = 1 if (-.01 ≥ *ASIF_ES* < 0) and (0 ≥ <*ES* < 0.01), otherwise No. Accretive = Yes if *cshopq* > 0 and *epsfxq/prccq* t-1 ≥ Treasury, otherwise No. *Early* = 2004–2012, otherwise *Late*. The main takeaway from this table is that the percentage of "4s" in the distributions of EPS is similar to the other third decimal place digits except for a small number of accretive buybacks with EPS boosts of greater than one cent per share. As such, large accretive buybacks are likelier to reflect more rounding error than other buybacks.

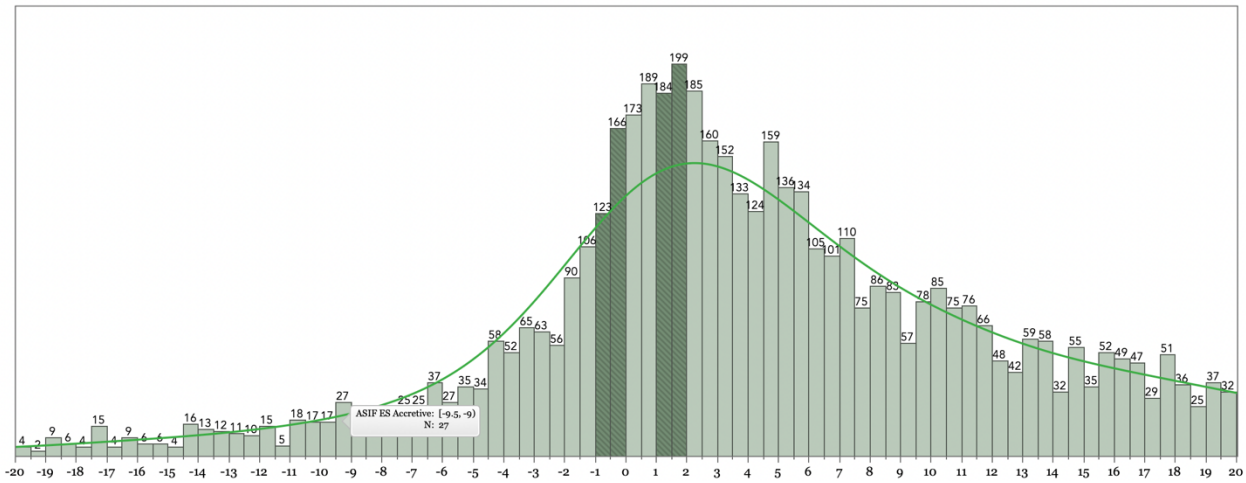
Appendix A. Variable definitions

Variable	Definition (Compustat variables in lowercase italics)
Accretive Buyback	Accretive if *cshopq*>0 and *epsfxq/prccq* t-1 ≥ *Treasury*, otherwise non-accretive.
ASIF_EPS	*EPS - EPS_BOOST.*
ASIF_ES	*ES - EPS_BOOST.*
Buyback	*cshopq* > 0.
Days to Actual	Average number of days from date of analysts' forecasts to quarterly earnings announcement date.
EPS	*epsfxq.*
EPS_BOOST	*niq/cshprq* - (*niq* + c)/(*cshprq* + 0.5***cshopq*), where c = (Treasury**prccq* t-1**cshopq**0.25*0.65).
EPS_BOOST_ASIF_EPS	(*epsfxq* - EPS_BOOST)/*ASIF_EPS.*
EPS_BOOST_ASIF_ES	(*epsfxq* - EPS_BOOST)/*ASIF_ES.*
ES	Consensus street earnings surprise over all I/B/E/S analyst forecasts at most 30 days before quarterly earnings announcement.
Guidance	Firm issues earnings guidance in quarter, otherwise 0.
Leverage	*dlttq/ceq.*
Mkt-to-book	*mkvalq/ceq.*
Myers	1 if Δ*epsfxq* ≥ 0 and Δ*niq* < 0, otherwise 0.
Suspect	1 if (-.01 ≥ *ASIF_ES* < 0) and (0 ≥ <*ES* < 0.01), otherwise 0.
Total assets	*at.*
Treasury	*wgs10yr* = ten-year treasury constant maturity rate .
X1 ≤ *ASIF_ES* < X2	Bin of *ASIF_ES* distribution from equal to or greater than *ASIF_ES* = X1 to less than *ASIF_ES* = X2.
X1 ≤ *ES* < X2	Bin of *ES* distribution from equal to or greater than *ES* = X1 to less than *ES* = X2.
X1 ≤ *ES%* < X2	Percentage of all *ES* observations to observations in the bin from equal to or greater than *ES* = X1 to less than *ES* = X2.

Appendix B. Distribution of *ASIF_ES* in cents for Accretive Buybacks with EPS Boost ≥ One Cent



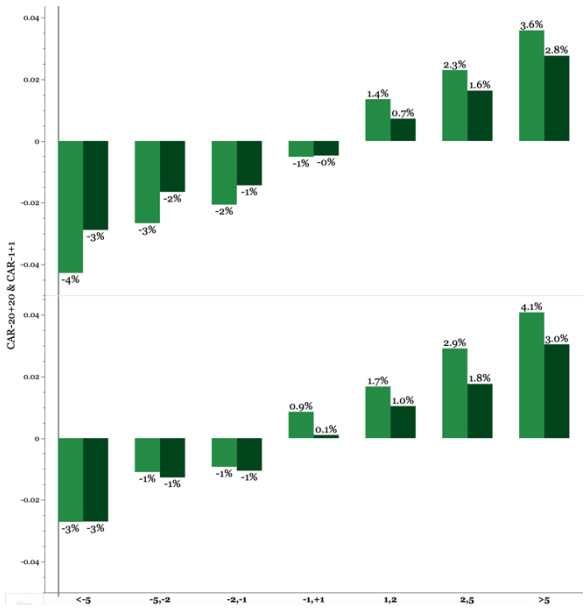
Appendix B1. Distribution of *ASIF_ES* for accretive buybacks with an EPS boost of at least one cent per share. The graph shows no indication of substantially *more* negative *ASIF_ES* just below zero. 29 buybacks are in the minus one cent bin and 29 are in the plus one cent bin. The curve is also right skewed, which is suggestive of earnings management without the use of buybacks.



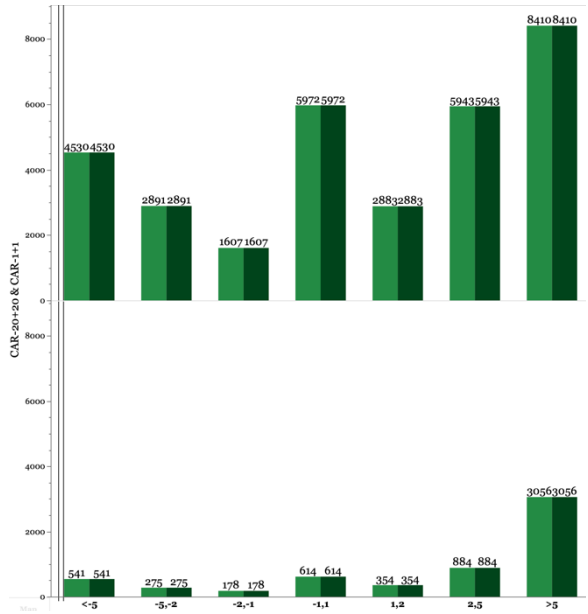
Appendix B2. Distribution of *ASIF_ES* for accretive buybacks with an EPS boost of less than one cent per share. The graph shows no indication of substantially *more* negative *ASIF_ES* just below zero. 288 buybacks are in the minus one cent bin and 383 are in the plus one cent bin. The curve is also right skewed, which is suggestive of earnings management without the use of buybacks.

Enlarge https://drive.google.com/file/d/1sK44Y6QcbOVPS1Wh6NLkbphEBJhtMSQG/view?usp=sharing

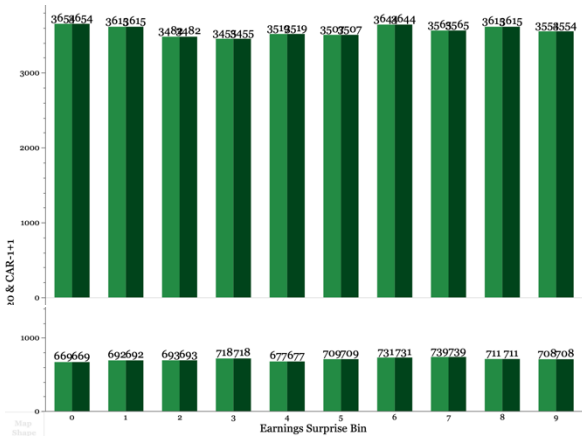
Appendix C. Distribution of Excess Returns for Accretive and Non-Accretive Buybacks



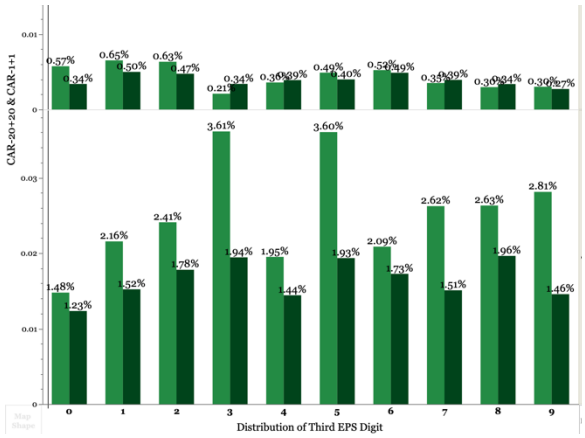
Appendix C1. Distribution of mean cumulative average excess return (market-adjusted model) over days -20 to 20 (light green) and days -1 to 1 (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks. The distributions are similar for accretive and non-accretive buybacks.



Appendix C2. Distribution of the *number of observations* of cumulative average excess return (market-adjusted model) over days -20 to 20 (light green) and days -1 to 1 (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks. The number of accretive buybacks in the bins close to zero is very small.



Appendix C3. Distribution of the *number of observations* of cumulative average excess return (market-adjusted model) over days -20 to 20 (light green) and days -1 to 1 (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks by the third significant digit of the EPS calculation. The distribution is approximately uniform.



Appendix C4. Distribution of cumulative average excess return (market-adjusted model) over days -20 to 20 (light green) and days -1 to 1 (dark green) around the quarterly earnings announcement date for firms without (top graph) and with (bottom graph) accretive buybacks by the third significant digit in the EPS calculation. While accretive buyback firms have higher mean excess returns in general, there is no evidence of higher mean excess returns in the bin of the third significant digit equal to 4.

Enlarge.
C1 & C2. https://drive.google.com/file/d/1mR1bqMgpQOAPh79gSmJMWZjkicKLk9Mc/view?usp=sharing
C3 & C4. https://drive.google.com/file/d/1CTCTx-rgiNw_SiUBWR0GHpP8W3eTxBtC/view?usp=sharing