Do managers provide misleading earnings guidance before stock repurchases?

Abstract

We question previous evidence that managers mislead investors by releasing overly negative information before stock repurchases. Past research relies on the measured market reaction to management guidance, which suffers from endogeneity concerns. Focusing instead on frequencies of management guidance, forecast updates, and closeness of forecasts to actual earnings, we find insignificant differences between repurchase firms and matching firms. However, market reaction to guidance is 1.5% lower for repurchase firms than for rival firms. We conclude that repurchases occur as managers exploit overly negative investor reaction to management guidance, not that managers mislead investors before this dominant form of shareholder returns.

Keywords: Stock repurchases; earnings guidance; voluntary disclosure

JEL classification: G34, M41

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1. Introduction

Stock repurchases are currently the leading form of cash returned by US firms to their outside shareholders. Aggregate repurchases by US firms exceeded aggregate dividends for the first time in 1999 (Grullon and Michaely 2002). More recently, S&P 500 firms paid out $1,828 billion in the form of repurchases during 2011 to 2014, which exceeded $1,278 billion that they paid out in the form of dividends.[1] Given the importance of stock repurchases to capital formation in the economy, it would be a matter of serious concern if the managers of repurchase firms provide voluntary earnings guidance to purposely mislead some of their investors into selling their stock for too cheap. In this paper, we examine a comprehensive sample of stock repurchases during 2003 to 2012 and document evidence that is inconsistent with such a conclusion reached in earlier literature.

Most stock repurchases in recent years have been structured as open market operations. Unlike dividends, open market repurchases are ad-hoc in nature and carried out at such times as chosen by the firms. The managers usually opt out of repurchases, which means that the value of their own stock and option holdings is linked to the long-run stock prices. Thus, they have an incentive to repurchase stock from outside shareholders at bargain prices. It is also reasonable to assume that they can tell when their stock is likely to be underpriced. That is shown by previous studies of superior long-term returns after repurchases (Ikenberry, Lakonishok, and Vermaelen 1995; Peyer and Vermaelen 2009) and the timing of repurchases (Netter and Mitchell 1989; Ben-Rephael, Oded, and Wohl 2014; Dittmar and Field 2015). These arguments raise the question of whether the managers sometimes actively create such underpricing or whether they only react to underpricing created by other factors.

Brockman, Khurana, and Martin (2008) examine stock repurchases during 1994 to 2005 and conclude that managers do not just exploit the market-driven underpricing of their stock from time to time, but that they also actively create such opportunities. In particular, they show that management earnings forecasts (or guidance) are biased downward during a 30-day period before the start of repurchasing but unbiased during a similar period after the end of repurchasing. Thus, they reinforce the

[1] These numbers are obtained from quarterly reports of buybacks and dividends published by FactSet Research Systems, Inc.

evidence of Gong, Louis, and Sun (2008), who conclude that firms manage earnings to push down their stock prices before repurchases.[2] In this paper, we focus on earnings guidance.

We start by analyzing managers' incentives to manipulate prices through biased guidance. Lowering stock price before a planned repurchase program can transfer wealth from selling shareholders to remaining shareholders, which includes the managers. However, we find that this incentive effect is likely to be small, and it ignores many costs to managers of lower stock prices. First, let us measure the wealth transfer. Open market stock repurchase programs are spread out over long periods (average 468 days), which makes it difficult to sustain price manipulation. On average, firms repurchase 7.98% of their outstanding shares, of which only 3.26% are repurchased during segments that start within three months of a guidance date. Since subsequent earnings announcements should correct any misinformation conveyed by management guidance, this 3.26% is likely to be an upper bound on how many shares could have been repurchased at the manipulated prices. If we assume further that the misinformation lowered the stock price by 5% for illustration, the wealth of remaining shareholders would have increased by at most $5.0\times3.26/(100-3.26) = 0.17\%$ of what it would have been in the absence of manipulation. Note that the percent wealth increase does not depend on the ownership level of any long-term shareholder or manager. Thus, a manager owning $10 million of his firm's stock would be richer by at most $17,000, and a manager owning $100 million of stock would be richer by at most $170,000.

Now consider the costs to the manager of lowering his or her own firm's stock price. First, lower stock prices mean lower current compensation for management. Using estimates from Aggarwal and Samwick (1999), we calculate that a 5% decline in stock price would reduce current compensation by an average (median) of $206,000 ($43,000).[3] Second, lower stock prices mean higher chances of being fired from the current job due to board action. Using estimates from Fee and Hadlock (2004), we calculate that the (annual) probability of job loss due to this mechanism would rise by 0.40% for a 5% lower stock

[2] Daniel, Denis, and Naveen (2008) find that firms manage earnings upward when their earnings would otherwise fall short of expected dividend levels. Thus, previous literature documents that there is some type of manipulation before both major forms of cash returns to shareholders, which underlines the importance of re-examining this issue.

[3] Aggarwal and Samwick (1999) find that the CEO's "flow compensation" (which includes compensation for this year and unrelated to existing stock and option holdings, such as salary, bonus, perquisites, and incentive awards) changes by $512 for $1 million change in shareholder wealth (see their Table 6). We later show that the repurchase firms have an average (median) market value of equity of $8,049 ($1,661) million, which implies a shareholder wealth loss of $402 ($83) million for a 5% lower stock price. Multiplying the shareholder wealth loss in millions by $512 explains our calculated amounts.

price, from 5.11% to 5.55%, which is a 9% increase in probability.[4] Third, Edmans, Goldstein, and Jiang (2012) document a strong effect of lower stock prices on the probability of a firm being taken over, which usually means a job loss for the manager. Using their estimates, we calculate that the (annual) probability of being taken over would increase by 0.70% for a 5% lower stock price, from 6.20% to 6.90%, which is an 11% increase in probability.[5] Finally, even for the entrenched manager who does not fear a job loss, there is still the reputation loss, the accompanying higher cost of capital, possible legal action, and shareholder activism. While we do not offer a model that combines these discrete effects of hurting one's own stock price, our arguments question the incentives of managers to do so.

We next report several tests of whether managers mislead shareholders with biased forecasts. To measure the information content of earnings guidance, we follow a procedure similar to the traditional earnings surprise measure. Specifically, we define an EPS update measure as the difference between the EPS (earnings per share) number provided by the managers and the prevailing analyst consensus estimate, all scaled by the stock price. We sometimes simply refer to this measure as update (or EPS update). Before 2003, the I/B/E/S (Institutional Brokers Estimate System) Guidance database does not include the analyst consensus estimate prevailing at the time of management guidance. Perhaps due to missing such data for a large part of their sample, Brockman, Khurana, and Martin used an alternate measure employed by Cheng and Lo (2006) that measures the content of management guidance by the accompanying market reaction. They find that this market reaction is more negative before stock repurchases than at other times for the same firms and conclude that managers provide overly negative guidance before repurchases. However, this market-reaction based measure leads to a substantial bias in their results. Using regression analysis, we show that the market reaction to repurchase firms for a certain update implied by management guidance is significantly lower than the market reaction to industry and size matched rival firms for an equal update implied by their own management guidance around the same time. This raises a

[4] Fee and Hadlock (2004) document a fitted 8.02% (annual) probability of firing in Quartile 1 of stock performance and a 2.68% probability in Quartile 4 (see their Table 4). These bottom and top quartiles have industry-adjusted stock returns of -30.78% and 29.79% (see their Table 3). That translates into an incremental probability of firing equal to 5.34% for a 60.57% lower return. Thus, a 5% lower stock price would increase probability of firing by 0.44%, relative to an average probability of 5.11%.

[5] Edmans, Goldstein, and Jiang (2012) show that 1% increase in discount from the true firm value leads to a 0.12% to 0.16% increase in (annual) takeover probability (see their Table III). We take the average value of 0.14% and multiply by 5. Notice they model firm value using fundamental variables of firm age, asset turnover, stock beta, sales growth, market share, R&D expense, sales rank, liquidity, diversification, institutional holdings, debt ratio, and dividend payout. Their model of firm value does not include current earnings forecasts.

serious endogeneity concern with using market reaction as the only measure of management guidance and intent in prior research. The market reaction to any corporate event is necessarily noisy. Prior literature suggests that managers can detect when stock values are too low and initiate repurchase programs at such times in the best interests of long-term shareholders. Thus, analysis of market reaction alone cannot tell whether overly negative investor reaction to guidance motivated some firms to start repurchase programs, or the planned repurchase programs of those firms motivated their managers to mislead investors. In comparison, our more direct EPS update measure is not subject to such endogeneity concerns.

A careful assessment of EPS updates and market reactions also requires proper benchmarking. We find that there are strong time trends in the market reaction to guidance events for all firms, from very negative returns during 1990s to mildly negative returns during 2000s and even mildly positive returns during 2009 to 2012. To control for such market-wide trends in guidance and returns as well as industry-specific trends in profitability, forecasts, and investor sentiment, we match every repurchase firm in calendar time with another firm from the same industry that is the closest in firm size. We then compare the EPS updates and the market reactions to guidance events around the same time for repurchase firms and rival firms to establish whether the stock underpricing before repurchases is caused by the managers' earnings guidance. This approach differs from that followed by Brockman, Khurana, and Martin. They compare the market reactions to guidance during pre-repurchase windows and other times by the same firm, which ignores the possible time trends in guidance content and returns.

Finally, we describe the pre-repurchase window over which we look for evidence on potentially misleading management guidance. Previous literature shows that in a large number of cases, the earnings guidance is provided at the same time as an actual earnings announcement (Cheng and Lo 2006; Hirst, Koonce, and Venkataraman 2008; Acito 2014). In addition, earnings announcements are the times when investors reinterpret all previous guidance in view of the actual performance. In short, it is fair to say that earnings announcements are important and mandatory milestones in corporate disclosure. We therefore examine variable-length search windows that start on the last earnings announcement date preceding the repurchase and end on the last calendar day before the first repurchase date. We next carefully construct the parallel search windows for rival firms that are of exactly the same length as the windows for the repurchase firms and, in both cases, start with the respective earnings announcement dates.

Our results are as follows. In a matched-pairs sample of 3,181 repurchase firms and rival firms during 2003 to 2012, we find that 1,802 repurchase firms and 1,692 rival firms provide one or more management guidance related to future earnings during the pre-repurchase windows. The difference between these frequencies is significant in univariate tests, but becomes insignificant in multivariate tests using a minimum required significance level of 5% (employed throughout this paper). Looking further, repurchase firms are significantly less likely to provide guidance on days other than when they announce actual earnings, or to issue guidance on multiple days during the same pre-repurchase window. Both observations paint a picture of greater restraint on their part. These initial results are inconsistent with the proposition that repurchase firms actively mislead the markets, which would imply a greater frequency of future guidance, with or without earnings announcements.

We next compare the EPS updates for the repurchase firms and the rival firms (i.e., the difference between the guidance and the prevailing analyst consensus estimate). Once again, we find little difference between annual or quarterly EPS updates. There is a significant difference in the market reactions, however. In cases where guidance about future earnings is provided at the same time as an earnings announcement, the average market-adjusted excess return equals -1.11% for the repurchase firms and 0.48% for the rival firms. These constitute the majority of our cases. Similarly, in the minority of cases where guidance is provided at times other than an earnings announcement, the corresponding excess returns are -1.30% and -0.19%. The difference between returns remains significant in several regressions that control for other variables, in particular the earnings surprise, and employ different specifications of the determinants. The repurchase firms continue to earn an excess return that is one to one-and-a-half percent lower than the corresponding return for the rival firms. Overall, given the insignificant difference in guidance updates of repurchase firms and rival firms but the significant difference in their market returns, our evidence suggests managers react to undervaluation rather than actively create undervaluation through misguidance.

Finally, and most importantly, if managers of repurchase firms paint an unreasonably pessimistic picture of their future earnings, then one would expect a more negative difference between their guidance and the corresponding actual earnings announced at a later date than for rival firms. We find that, on average, the difference between guidance and actual earnings is significantly negative for both sets of

firms, suggesting that managers are generally conservative in their outlook. However, the difference between differences for repurchase firms and rival firms is insignificant, suggesting that in both instances the managers are equally conservative. Since this is the most direct test of managerial bias, comparing predicted with actual, we examine the evidence within partitions formed by whether the update news was positive or negative. In addition, we examine statistics related to the accuracy of guidance (as distinct from bias) and compare all evidence during pre-repurchase windows with similar windows at other uneventful times for the same firms. The differences remain insignificant in all tests except one. That test shows that the difference between guidance and actual earnings for repurchase firms is significantly smaller before repurchases than at other times in their own past. This suggests that the managers are in fact more careful before repurchases in not issuing an unusually low guidance.

In summary, we find no evidence to suggest that the managers of repurchase firms mislead investors by providing too many or too negative earnings guidance during a pre-announcement period that starts with the last earnings announcement date (an average length of 49 days). Our results should help in alleviating foul-play concerns affecting this dominant form of cash returns from corporations to investors. We next report a few supplemental tests to confirm our conclusions. First, we compare the EPS updates provided by the repurchase firms during the post-repurchase window with those provided by rival firms at the same time, or those provided by the repurchase firms during the pre-repurchase window. We find no systematic and significant difference between the annual and quarterly EPS updates in either comparison. In addition, there is no significant difference between the market reactions to repurchase firms and rival firms during the post-repurchase window in the first comparison. However, the market reactions to the same repurchase firms during the post-repurchase and pre-repurchase windows in the second comparison differ by a significant 1.5%. Second, we repeat our analysis with an alternate fixed 30-day window before the first repurchase date for both repurchase firms and rival firms as in Brockman, Khurana, and Martin (2008). Our evidence remains the same. These additional tests affirm the connection between unduly negative market reaction to management guidance events and the initiation of stock repurchases.

In the last section, we discuss the correspondence between our results and previous literature on stock repurchases. Previous theoretical work argues that repurchases are an effective method of signaling undervaluation (Ofer and Thakor 1987), and previous empirical work confirms that undervaluation is a

prime reason for stock repurchases (Dittmar 2000; Brav et al. 2005; D'Mello and Shroff 2000). More importantly, we cite definitive evidence that managers have the ability to see through such underpricing and exploit it to the advantage of their long-term shareholders. In particular, Netter and Mitchell (1989) show that there was a sharp increase in repurchase activity after the October 1987 crash that was related to managers' recognition of investor pessimism about stock prices.

The remaining paper proceeds as follows. Section 2 describes data and methods. Section 3 reports our key tests of whether managers mislead shareholders with earnings guidance before stock repurchases. Section 4 reports several additional (or supplemental) tests. Section 5 explains our results with reference to a large literature on stock repurchases, and Section 6 concludes.

2. Data, methods, and preliminary evidence

Our sample of repurchases starts with the Securities Data Company (SDC) Repurchases data, and our sample of management earnings guidance comes from the I/B/E/S Guidance data. The only other significant data used in this study include stock prices and returns from Center for Research in Security Prices (CRSP) and firm accounting data from Compustat.

2.1. Management earnings guidance data

The I/B/E/S Guidance database combines management guidance of expected firm performance originating from media sources and First Call with analyst earnings forecasts originating from I/B/E/S. However, this combined information is only available since 2003. During 1993 to 2002, the database contains management guidance but not the analyst forecasts. Thus, we start our study with stock repurchases for which the first repurchase date (FRD) occurs after May 1, 2003. (Appendix 1 spells out the full names of frequently used abbreviations in this paper for easy reference.) This allows at least 120 days during which we can search for the pre-FRD earnings guidance dates in all cases. We include all stock repurchases for which the FRD occurs by December 2012.

Earnings (or EPS) guidance is the most common but not the only type of guidance provided by managers to analysts and stockholders. Firms also issue guidance related to accounting items such as sales and capital expenditure. However, previous literature on voluntary corporate disclosure tends to focus almost entirely on earnings guidance. For several reasons that follow, we retain the same focus in our main analysis. First, unlike earnings, the stock price effects of some of the other accounting items are

unclear. For example, one does not know whether a higher capital expenditure has a positive or a negative effect on stock price. In order to understand its precise effect one has to look at other firm characteristics that determine whether it increases or decreases the bottom-line earnings. Second, in a related spirit, some or all of the effects of these additional items may be subsumed by the earnings guidance, in which case including both the earnings and the additional items in our models will lead to double counting. Third, given that EPS numbers are the most commonly understood numbers tracked by analysts and investors, it would be hard to argue that managers intend to misguide the shareholders, but not by using EPS information. For these reasons, we focus on earnings guidance in our main analysis. However, later we also analyze sales and capital expenditure, which are updated less frequently than earnings.

Table 1 shows the yearly distribution of the frequency of earnings guidance and the associated market reactions during 1993 to 2012. Earnings guidance may be issued for annual or quarterly periods into the future, and sometimes at the same time management may issue guidance for multiple periods. There are 124,467 earnings guidance in the database, each on a separate record, which collapse to 88,855 unique firm-MGDs (firm-management guidance dates). Of these, we can find stock market information to calculate the cumulative abnormal (or excess) returns (CARs) in 85,144 cases. The CARs are calculated over a three-day period centered on the MGD, and these equal the sum of the difference between the stock return and the CRSP value-weighted market return on each day.

Table 1 shows a large variation in yearly mean CARs and mean absolute CARs. Excluding 1993 with 26 observations, mean CAR ranges between -7.02% during 1994 and 0.97% during 2009. Similarly, mean absolute CAR ranges between 4.87% during 2010 and 13.09% during 2000. Mean CAR is a signed measure of the mean market reaction, and mean absolute CAR is a measure of only the magnitudes of market reaction. The mean market reaction is very negative during 1993 to 2000 when there are relatively fewer disclosures. There is a sharp increase in disclosure frequency during 2001 to 2012, and during the 2003 to 2012 period of our study, mean CAR is in a relatively small range of -0.42% to 0.97%.

There can be several reasons behind the large variation in market reaction over time, such as the difference between management guidance and analyst forecast, the relative propensity to disclose good vs. bad news, simultaneous events like earnings announcements, the time variation in earnings response coefficients of both actual news and future guidance, changes in legal framework, and investor sentiment.

While a full investigation of such reasons is beyond the scope of this paper, we point out an important implication for our study design. Given the strong time trends in market reaction and industry performance, it becomes necessary to pair every repurchase firm with an industry and size-matched firm in calendar time and contrast their experiences.

Table 2 shows the information content of earnings guidance for the aggregate sample of earnings guidance to make a few more points. Similar to the traditional measures of earnings surprise, we calculate the updates to annual and quarterly EPS as the difference between the EPS guidance and the prevailing analyst consensus estimate, divided by the stock price on MGD-2 and multiplied by 100. In cases where the EPS guidance is given as a range of values, we use the range midpoint.[6] Finally, if there are multiple annual or quarterly periods included on one MGD, we separately sum the updates to calculate the total annual update and the total quarterly update.[7] Approximately 75% of all MGDs provide earnings information for one or more annual periods, and the total annual update for these cases has a mean value of -0.084%. For a $40 stock, that equals -3.4 cents. We calculate net percent positive frequency as the difference between percent positive and percent negative frequencies (thus ignoring the percent zero frequency), which equals -6% for the aggregate sample. Moving to quarterly updates, we find that approximately 54% of all MGDs provide earnings information for one or more quarterly periods, and that the quarterly updates tend to be more negative. The mean quarterly update equals -0.195%, which is -7.8 cents for a $40 stock, and the net percent positive frequency of quarterly updates equals -27%.

Table 2 shows clear evidence that, for the aggregate sample spanning our study period, the earnings guidance provided by managers is more often negative than positive. Still, the mean CAR has a value of 0.00%. This finding has two implications. First, earnings guidance per se is not bad news. Previous literature argues that firms provide regular guidance to reduce their information asymmetry and cost of capital (Coller and Yohn 1997; Verrecchia 2001; Brown, Hillegeist, and Lo 2004) and to reduce litigation cost (Skinner 1994), all of which positively affect the stock price. In fact, Chen, Matsumoto, and Rajgopal (2011) show that firms that announce they will no longer provide earnings guidance earn an

[6] Jensen and Plumlee (2015) point out that in virtually all studies that include management range forecasts in the analysis, the midpoint of the range is employed to capture the news provided by the forecast. For example, see Pownall, Wasley, and Waymire (1996) and Rogers and Stocken (2005).

[7] The annual and quarterly updates, earnings surprise, and a few other noisy variables are winsorized at the 1% and 99% levels as described in the concerned tables.

excess announcement return of -5.3%. Second, this finding also points out the existence of a simultaneous event, which is the earnings announcement. We later show that, in our sample, in nearly three-fourths of all cases managers provide earnings guidance for future periods at the same time as they make earnings announcements for previous periods. This makes it necessary to control for earnings surprise before making inferences about the market reaction to earnings guidance issued by repurchase firms.

2.2. Samples of repurchase firms and rival firms and search windows

Stock repurchases account for a large portion of cash returned by U.S. firms to their shareholders. Thus, there are a large number of them every year, including during the years of financial crisis. We begin with 6,130 repurchases from the SDC Platinum database that have non-missing FRD between May 2003 and December 2012. From these, we retain 3,222 firms that appear at least once in the I/B/E/S Guidance database. We next subset to 3,211 repurchase firms that have contemporaneous information in the CRSP and Compustat files. We match each repurchase firm with a rival firm using the procedure described below, which gives a final sample of 3,181 repurchase firms, or about 320 firms per year. The SDC database gives other useful details, such as the last repurchase date (LRD), percent shares repurchased, and the repurchase technique, which are discussed below with summary statistics.

To identify a rival firm for each event, we start with the sample of all CRSP and Compustat firms that appear at least once in the Guidance database and do not initiate a repurchase of their own from one year before to one year after the FRD of the repurchase firm. To control for size and industry effects, we first look for a rival firm with the same 4-digit SIC code and closest in size (market value of equity) provided the size is not less than half or more than twice of the size of the repurchase firm. If no firm meets this requirement, we look for a 3-digit SIC match and use the same size criteria. If we are still unable to match, then we look for a 2-digit SIC match but without the size restriction. Overall, 2,493 repurchase firms are matched at the 4-digit SIC level, 269 at the 3-digit SIC level, and 419 at the 2-digit level. This allows us to conduct matched-pairs experiments.

The last issue in sampling concerns the identification of search windows for EPS guidance. Recall our earlier discussion that we want to start our search window with the preceding earnings announcement date for two reasons: first, that on EAD there is actual earnings information that makes the previous guidance less relevant, and, second, that in a large majority of cases the EPS guidance is

provided simultaneous with earnings announcement. We therefore identify the search windows for each pair of repurchase and rival firms as follows. For the repurchase firm, we work our way backward from the FRD to the last earnings announcement date (EAD) or the beginning of the current fiscal quarter, whichever comes later, in cases where the FRD is more than 60 days from the beginning of the current fiscal quarter. However, if the FRD is less than 60 days from the beginning of the current fiscal quarter, then we work our way back to the last EAD or the beginning of the previous fiscal quarter, whichever comes later. This date becomes the beginning date of the search window while the ending date is fixed at FRD-1. For the rival firm, we follow the same procedure to identify the beginning date of the search window, and then identify the ending date so that the search windows for the repurchase firm and the rival firm are of exactly the same length.[8] The length of the search windows thus varies across the 3,181 pairs of repurchase firms and rival firms, but our procedure ensures that in the large majority of cases (over 95%), the search windows for both repurchase firms and rival firms begin with the previous EAD and are approximately matched in calendar time. As robustness check, we later report our results with a fixed 30-day window before FRD that is employed by Brockman, Khurana, and Martin (2008).

2.3. Sample description

Panel A of Table 3 shows that our sample of repurchases is well distributed over the years 2003 to 2012. Panel B describes main features of the repurchase programs. The usual repurchase period is long, with a mean (median) length of 468 (298) calendar days. This feature distinguishes stock repurchases from other corporate events such as stock offerings. Since there are multiple news releases/events as well as voluntary and involuntary disclosures over such a long period for most firms, the effectiveness of one misleading disclosure before FRD is questionable.[9] The mean (median) firm repurchases 7.98% (5.38%)

[8] Our two-step procedure of identifying search window for repurchase firms is motivated by the SEC requirement that firms with a public float of $75 million release earnings within 35 days of a fiscal quarter-end or 60 days of a fiscal year-end. We find that 97% of our sample firms have market value of equity exceeding $75 million, which is a proxy for public float. This explains why we stop our search within the current (previous) quarter if FRD is greater (less) than 60 days from the beginning of the current quarter. Sometimes an earnings announcement date is missing from data, which is why we stop the backward search with the beginning of the current or the previous quarter as appropriate. As a practical matter, in 3,027 (3,070) cases the search window for repurchase (rival) firm starts exactly with the last earnings announcement date. Further, in 101 (61) cases the window starts with the beginning of current fiscal quarter, and in 53 (50) cases it starts with the beginning of the last fiscal quarter.

[9] Brockman, Khurana, and Martin (2009) state that in case of repurchase programs divided into multiple segments they find downward biased guidance before the initiation of a repurchase segment and upward biased guidance after

of its outstanding shares during a repurchase program. However, assuming a constant repurchase rate during the program, only 1.97% (0.89%) shares would have been repurchased by the mean (median) firm before the earnings announcement date for the nearest period covered by the earnings guidance. If the supposed management misguidance pushes down the stock price by 5%, in the average case it would have increased the value of remaining shares by 5×1.97/(100-1.97) = 0.10%, or four cents for a $40 stock. We note that 3.26% of outstanding shares are repurchased during segments that start within three months of a guidance date (regardless of when these repurchase segments end). Because earnings announcements are made every quarter, the maximum shares that could have been repurchased before the next earnings announcement date is 3.26%. This upper bound on repurchase percentage corresponds to an increase in the value of remaining shares by 0.17%, or less than seven cents for a $40 stock. Intuitively speaking, that does not seem to be a sufficient incentive considering the costs of lowering stock prices discussed before.

The last row in Panel B of Table 3 shows that firms adopt different repurchase techniques, but open market repurchases are dominant accounting for 2,859, or 90%, of all cases. Tender offers are rare, 34 cases, Dutch auction repurchases are only slightly more numerous, 84 cases, and all other techniques (such as "Accelerated", "Negotiated", and "Odd lot") account for the remaining 206 cases. It can be argued that each technique offers some incentive to push down the stock price, so we retain all of them.

2.4. Summary statistics of repurchase firms and rival firms

Table 4 compares several miscellaneous statistics for repurchase firms and rival firms. Panel A shows that there are 1,481 unique repurchase firms and 1,487 unique rival firms in the 3,181 matched-pair events. More importantly, regardless of uniqueness, 1,802 repurchase firms and 1,692 rival firms provide one or more earnings guidance during the pre-FRD search window. The difference has a *p*-value of 0.006 based on the univariate chi-square test. However, below we show that in multivariate tests this difference is explained by differences in firm characteristics. Looking further, rival firms that provide earnings guidance do so 1.278 times per event, which exceeds 1.209 times per event for repurchase firms. As a result, the total number of guidance dates at 2,178 for repurchase firms and 2,163 for rival firms are a virtual tie. Further, repurchase firms provide earnings guidance for future periods at the same time as when they make an actual earnings announcement in 77.2% of these cases, which is significantly more

its completion. While plausible, such interpretation would raise questions about the rationality of stock investors. We re-examine this issue later in Section 4.3.

often than rival firms that do so in 72.5% of cases. Alternately, 473 rival firms provide earnings guidance on at least one date other than an earnings announcement, which is significantly more than 398 repurchase firms that do the same. Thus, even though a higher number of repurchase firms provide earnings guidance, compared to rival firms these are more likely to issue guidance only once and to do so at the time of an earnings announcement. This paints a picture of greater restraint in their guidance policy.

Panel B of Table 4 compares many characteristics of repurchase firms and rival firms. Despite our attempts at industry and size matching, repurchase firms tend to be somewhat bigger, with a mean (median) market value of equity of $8,049 ($1,661) million. That compares with a mean (median) market value of $6,492 ($1,587) million for rival firms. Repurchase firms also have similar market-to-book ratio, but higher return on equity compared to rival firms. The earnings surprise during the guidance quarter is similar for both groups of firms. However, the prior market-adjusted excess return over a 90-day window ending two days before the start of search window equals -1.24% for repurchase firms and -0.04% for rival firms. The difference is statistically significant, pointing to the generally lower returns surrounding repurchase firms over an extended period. Finally, repurchase firms have lower risk measured by the standard deviation of prior daily returns, but comparable beta to rival firms. The calculation of all these variables is described in the legend of Table 4.

2.5. Regression tests of the guidance frequency

In Table 5, we report a few logistic model tests of the inclination of the managers of repurchase firms vs. rival firms to provide earnings guidance. In Models (5.1) and (5.2), the dependent variable equals one if a firm had one or more MGDs during the pre-FRD search window at any time, and zero otherwise. The sample starts with 3,181 repurchase firms and 3,181 rival firms, for a total 6,362 firms. It reduces to 6,015 firms in multivariate tests that include six control variables for which data are not available in some cases. The main variable of interest is a Repurchase dummy, which equals one for repurchase firms and zero for rival firms in this pre-FRD experiment. The control variables include the following firm characteristics that may be related to the decision to provide guidance: log market value of equity (because large firms are followed by more analysts and investors who care about guidance), market-to-book ratio (because earnings surprises for growth firms have a proportionally higher price impact and increase the need for guidance), return on equity (because more profitable firms attract more

analysts and investors), earnings surprise during the contemporaneous or last earnings announcement (because higher earnings increase the need to communicate whether the trend will continue), prior return over a 90-day period (because declining prices may increase the need for guidance), and standard deviation of prior returns (because higher uncertainty makes it difficult to provide useful guidance).

Model (5.1) presents univariate logistic results that are similar to the chi-square results in Table 4. It shows that repurchase firms are more likely to issue guidance than rival firms are. However, Model (5.2) presents multivariate logistic results in which the Repurchase dummy becomes insignificant. Among control variables, the coefficients of log market value of equity, market-to-book ratio, and earnings surprise are positive while the coefficient of the standard deviation of prior returns is negative, in each case consistent with the conjectured reason for its inclusion. The coefficients of return on equity and prior return are insignificant.[10]

Models (5.3) and (5.4) in Table 5 employ a slightly different dependent variable that equals one if a firm had one or more MGDs during the pre-FRD search window that did not coincide with an earnings announcement, and zero otherwise. In these models, the Repurchase dummy is significantly negative in both univariate and multivariate settings. The combined evidence of Table 5 suggests that the managers of repurchase firms are not necessarily more inclined to provide earnings guidance than the managers of rival firms are. In addition, they are less inclined to provide such guidance at times other than an earnings announcement. This evidence is different from previous literature, which suggests that managers actively mislead investors by painting a gloomy picture of firm prospects before repurchases. Of course, a full assessment requires looking at the information conveyed by the guidance and testing whether that information is downward biased relative to the actual earnings for the periods covered by the guidance.[11]

[10] We try a few variations on control variables, such as replacing earnings surprise by the absolute value of earnings surprise, which captures both large positive and large negative surprises, replacing standard deviation of prior returns by the standard deviation of last 12 quarters of earnings surprises, and dropping variables that are insignificant in Model (4.2). These changes do not alter our main result that the Repurchase dummy is insignificantly related to the firm's decision to provide earnings guidance in the presence of control variables.

[11] Although not reported in a table, we find that there is hardly any difference between the basic repurchase program parameters of firms that do and firms that do not provide earnings guidance. Firms that provide guidance repurchase an average 8.00% of their shares spread over an average 474 days, compared to 7.96% over 461 days for firms that do not provide guidance.

3. Main results

In this section we describe our main results related to the magnitude of EPS guidance for repurchase firms vs. rival firms, the market reaction to guidance events, and the unbiasedness of such voluntary disclosure as judged by the difference between the guidance and subsequent actual earnings. The entire analysis is carried out over the pre-FRD search window.

3.1. Information content of EPS guidance during the pre-FRD search window

Panel A of Table 6 shows that 1,802 repurchase firms and 1,692 rival firms had at least one MGD during the pre-FRD search window. Panel B.1 shows that 1,440 repurchase firms and 1,339 rival firms provide at least one annual EPS guidance, and Panel B.2 shows that 981 repurchase firms and 940 rival firms provide at least one quarterly EPS guidance.

Panel B.1 of Table 6 further analyzes the magnitude of annual EPS guidance within the samples of 1,440 repurchase firms and 1,339 rival firms. The statistics reported in this panel are calculated by first aggregating the numbers over all annual periods covered for one firm (or one search window), and then averaging the aggregate numbers across all firms (or all search windows). The mean number of annual periods equals 1.255 for repurchase firms and 1.356 for rival firms. The updates tend to be somewhat more negative for repurchase firms. Recall that we measure the information content of management guidance by the annual EPS update (later also the quarterly EPS update), which is defined in Section 2.1 as the difference between the EPS guidance and the analyst consensus estimate prevailing before MGD, divided by the stock price on MGD-2 and multiplied by 100. The third row of Panel B.1 shows that the aggregated annual EPS updates provided during each window have a mean value of -0.100% for repurchase firms and -0.048% for rival firms (expressed as % of stock price). Individually, both numbers are significantly less than zero. However, the difference between the mean values for the two groups of firms equals -0.052% with a *p*-value of 0.062, which is not significant at the minimum 5% confidence level employed in this paper. The last row of Panel B.1 shows that the corresponding median values are closer to zero, -0.011% for repurchase firms and 0.000% for rival firms. The difference between median values equals -0.011% and is statistically significantly different from zero at the 1% level.[12]

[12] We should clarify a slight difference in terminology and the associated concept with regard to EPS updates. The terms "total annual EPS update" and "total quarterly EPS update" are employed in Tables 2, 7, 8, and 11. These quantities are calculated by summing up the EPS updates over all annual (or quarterly) periods covered as part of

Table 6 shows some evidence that, on average, repurchase firms provide more negative annual EPS guidance than rival firms do. This may be either because they have news that is more negative or because they paint an overly negative picture. We attempt to disentangle these two explanations in subsequent tests. The mean and median tests show that the annual EPS update for repurchase firms is on the order of 0.01% to 0.05% lower than for rival firms (regardless of statistical significance), so we can choose 0.03% for a representative estimate. That amounts to 1.2 cents for a $40 stock price. The likely price effects of such difference would depend on a "guidance response coefficient (GRC)", similar to an "earnings response coefficient (ERC)", and equal to the coefficient of annual EPS update in a regression of announcement excess returns. We address this question after presenting regression analysis in Table 8.

Panel B.2 of Table 6 extends the above analysis to quarterly EPS guidance. Individually, the aggregated quarterly EPS updates for both repurchase firms and rival firms are significantly negative, similar to the evidence for the entire guidance database presented in Table 2. However, the differences between mean and median values of the aggregated quarterly EPS updates for repurchase firms and rival firms are relatively small and statistically insignificant.

3.2. Market reaction to earnings guidance during the pre-FRD search window

Table 7 shows the mean market-adjusted excess return, or CAR, during a three-day period centered on MGD for various cuts of the sample. Notice the sample in this table consists of individual MGDs and not search windows as in Table 6 (where a search window may contain more than one MGD). Panel A shows that the mean CAR is a significantly negative -1.15% for all 2,178 MGDs for repurchase firms and an insignificant 0.30% for all 2,163 MGDs for rival firms. The difference between mean CARs equals -1.45%, with a *p*-value of 0.000. Panel B next focuses on the subsample of MGDs that coincide with an EAD (earnings announcement date). We further divide this subsample into good news, mixed news, and bad news cases. Good news (bad news) cases are those where the total annual EPS update and the total quarterly EPS update given on one MGD are both positive (both negative), or one of them is

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one disclosure made on one MGD (management guidance date). This procedure is appropriate whenever the focus is on market returns. In comparison, the terms "aggregated annual EPS update" and "aggregated quarterly EPS update" are employed in Tables 6 and 10. These latter quantities are calculated by summing up EPS updates over all annual (or quarterly) periods covered during one search window that may contain one or more MGDs. This latter procedure is appropriate whenever the focus is on aggregate disclosure made prior to one repurchase program.

positive (negative) while the other is zero or missing. A small number of cases that cannot be classified as either good news or bad news cases are classified as mixed news cases.

Panel B of Table 7 shows that the mean CAR calculated for 867 bad news MGDs for repurchase firms is -4.00% while the mean CAR for 768 bad news MGDs for rival firms is -2.00%, amounting to a difference between mean CARs of -2.00% (*p*-value 0.000). The corresponding differences for good news and mixed news MGDs are -0.84% (*p*-value 0.027) and -1.19% (*p*-value 0.099). We find similar evidence in Panel C of Table 7, which reports CARs for the minority sample of MGDs that do not coincide with an EAD. Regardless of the type of news, the market reaction to MGDs for repurchase firms is more negative than for rival firms. The difference varies across subsamples, but seems to be around one and a half percent in univariate comparisons.

Table 8 reports a multivariate regression analysis to test whether this difference can be explained by the difference in annual and quarterly EPS updates or the simultaneous earnings surprise. Models (8.1) to (8.4) analyze cases where the MGD and EAD are the same. The dependent variable is CAR, and the key independent variable is the Repurchase dummy that takes the value of one for repurchase firms and zero for rival firms. The key control variables are the earnings surprise, the total annual EPS update, and the total quarterly EPS update. The last footnote in the text and the legend to Table 8 provide some necessary clarifications on the calculation of annual and quarterly EPS update variables.

Model (8.1) reports a univariate regression as a starting point. The coefficient of Repurchase dummy equals -1.59%, same as the difference between CARs across all MGDs for repurchase firms and rival firms in Table 7. Model (8.2) reports the first multivariate regression in which only the linear forms of earnings surprise and update variables are included as control variables. All variables are highly significant, and the Repurchase dummy has a coefficient of -1.49%. The coefficients of earnings surprise and update variables are all in the neighborhood of three, which are low because we ignore nonlinearities in the market reaction to earnings surprise or updates. It is well known since Freeman and Tse (1989) that there is an S-shaped relation between CAR and earnings surprise. Subramanyam and Wild (1996) and Wilson (2008) capture this nonlinearity by including both a linear term that equals earnings surprise and a signed quadratic term that equals earnings surprise multiplied by the absolute value of earnings surprise.

We include similar nonlinear terms to capture the relation between CAR and annual and quarterly EPS updates as well.

Model (8.3) next reports a regression of CAR that includes the Repurchase dummy and the three linear as well as nonlinear terms to capture the effects of mandatory and voluntary disclosures. This nonlinear model gives a better fit with an adjusted-R^2 of 0.209 relative to 0.147 with the all-linear specification of the previous model. The coefficient of the Repurchase dummy variable equals -1.39%. The earnings response coefficient, defined as the coefficient of the linear earnings surprise term, equals 10.02, which means that a 0.01% earnings surprise leads to an approximately 0.10% price reaction. The annual guidance response coefficient (GRC), which we define as the coefficient of the linear total annual EPS update term, equals 4.40. The similarly defined quarterly guidance response coefficient equals 8.45. The higher coefficient of quarterly update is not surprising as a one-cent change in quarterly earnings implies a greater change in stock price than a one-cent change in annual earnings if a part of the change is expected to be permanent. The nonlinear terms are all negative, consistent with an S-shaped pattern, and statistically significant in two out of three cases. Finally, following Subramanyam and Wild (1996) and Wilson (2008), Model (7.4) includes additional control variables of predict, persist, market-to-book, beta, log market value of equity, and loss dummy (defined in the table), and the interactions of each variable with earnings surprise. This increases the adjusted-R^2 further to 0.229, but the inferences remain qualitatively similar to those from Model (8.3).

Models (8.1) to (8.4) show that in the majority subsample of 3,250 MGDs confounded with a simultaneous EAD, the repurchase firms earn an incremental return of between -1.15% and -1.59% after accounting for several different specifications of control variables. Models (8.5) to (8.7) further show that in the minority subsample of 1,091 MGDs not confounded with an EAD, the repurchase firms continue to earn an incremental return of between -0.93% and -1.11%. What is the reason behind this more negative reaction to repurchase firms? It could be unreasonable pessimism about repurchase firms, which would be tautologically true. However, we conjecture that there may not be any reason in particular. It may simply be that investors necessarily react to all news with an error, and that error may be positive or negative. If we further assume that managers can detect when that error is negative and that they are motivated to increase their stock price to the advantage of their long-term shareholders, it follows that they would be

likely to announce repurchase programs at such times. Later in Section 5, we cite evidence from previous literature that this is a likely explanation of the results in Table 8.[13]

We note that the coefficients of control variables are reasonably similar and stable across all seven models, which adds credibility to our results and the above explanation. Finally, note that the annual guidance response coefficient varies between 3 and 6 in different regressions of Table 8. This suggests that minor differences in annual EPS updates for repurchase firms and rival firms documented in Section 3.1 of around 0.03% explain only a minor part of the difference between their CARs, somewhere between 3×0.03 = 0.09% and 6×0.03 = 0.18%. That is why the Repurchase dummy is relatively robust to the inclusion of different control variables.

3.3. Bias and accuracy of EPS guidance of repurchase firms and rival firms

One may argue that the most direct way to test for bias in management guidance is to compare the guidance with the actual earnings announced on a later date. If earnings guidance from repurchase firms unduly understates the actual earnings relative to that from rival firms, then the managers of repurchase firms can be accused of misleading investors. Using rival firms as a control sample in this test becomes necessary since Hirst, Koonce, and Venkataraman (2008) report that, on average, managers have provided systematically conservative (or pessimistic) guidance in recent years. They also report that the future guidance behavior of managers is influenced by their past guidance behavior to some extent, so we test whether guidance provided by repurchase firms during the pre-FRD window unduly understates earnings relative to their own guidance provided one year before FRD.

We measure the guidance bias as the EPS guidance minus the actual earnings, divided by the stock price on MGD-2 and multiplied by 100. We measure the guidance accuracy by the absolute value of bias. This is an inverse measure, the lower the absolute difference between the EPS guidance and actual earnings, the more accurate the guidance. We measure both the bias and the accuracy for the earliest quarter covered by the management guidance. On average, the earnings announcement date for this

[13] One may ask whether price decreases of the order of one and a half percent create a sufficient incentive to accomplish a repurchase. We address this issue as follows. There are many known reasons for repurchases, such as returning cash to shareholders in a tax-efficient form, reducing agency costs of free cash, and altering the capital structure. Stock undervaluation is an important reason, but not in every case. We have shown one source of undervaluation, which is the three-day market reaction to management guidance. There may be other sources of undervaluation, such as the average -1.24% excess returns over a prior 90-day window as shown in Table 3.

quarter occurs 60 days after FRD (first repurchase date). There are several reasons for this choice. First, guidance for farther-out periods is necessarily less accurate, so analysts and investors may attach less importance to it. Second, the actual EPS for the farther-out periods is affected by subsequent events, including the actual EPS for the earlier periods that we analyze. Third, the ongoing repurchases also affect the actual EPS in an unpredictable manner, depending on the price-to-earnings ratio and interest rates during the intervening period (Hribar, Jenkins, and Johnson 2006). All these reasons favor examining the nearest period covered by the guidance.

Table 9 reports univariate tests of guidance bias and accuracy. The test sample includes 962 repurchase firms and 921 rival firms, which is 98% of all firms that provide some quarterly EPS guidance. Panel A shows that the mean bias in management guidance provided immediately before FRD equals -0.068% for repurchase firms and -0.085% for rival firms. Both values are significantly different from zero with a *p*-value of 0.000, which shows that managers are systematically conservative in their forecasts. However, the difference between the mean biases for repurchase firms and rival firms is insignificant. Thus, we cannot reject the null hypothesis that, on average, the managers of repurchase firms and rival firms are equally conservative in their guidance. We next compare the mean bias in guidance provided immediately before FRD with similar bias from a year before. We find that there is no difference between current and lagged guidance for rival firms, but there is a significant difference for repurchase firms in the opposite direction to what one would expect if managers mislead investors. More specifically, the bias in management guidance provided by repurchase firms has a mean value of -0.068% for the pre-FRD window and -0.115% for the one-year before window. This shows that, if anything, the managers of repurchase firms provided a less conservative outlook before stock repurchase than at other times from their own record.

Panel B of Table 9 shows tests of guidance accuracy. The mean absolute difference between guidance and actual earnings during four windows – for repurchase firms and rival firms, before FRD and before FRD minus one year – all are in the range of 0.223% and 0.248%. The differences between repurchase and rival firms, or repurchase firms currently versus the year before, are all insignificantly different from zero. Thus, there is no evidence to suggest that managers of repurchase firms were misleading investors by providing less accurate guidance before repurchase.

Table 10 shows multivariate tests of bias and accuracy of guidance. The key independent variable continues to be the Repurchase dummy. We use the same set of control variables for bias and accuracy, based on Ajinkya, Bhojraj, and Sengupta (2005) and Brockman, Khurana, and Martin (2008). This includes the log market value of equity, market-to-book ratio, a litigation dummy, a loss dummy, and earnings volatility (defined in the table). Regressions (10.1) and (10.5) analyze the bias and accuracy in the combined sample of all repurchase and rival firms and show that the coefficient of repurchase dummy is statistically insignificant. The remaining regressions test the bias and accuracy in the subsamples of all good-news firms ((10.2) and (10.6)), bad-news firms ((10.3) and (10.7)), and mixed-news firms ((10.4) and (10.8)). We report these subset results because one may argue that the alternate hypothesis that managers mislead investors is more applicable to bad news firms (i.e., cases where the guidance is lower than the analyst consensus as defined in Table 7). The Repurchase dummy is insignificant in tests of bias within all three subsamples, and insignificant in tests of accuracy in good news and bad news subsamples. It is only significant in tests of accuracy in the mixed news subsample, but in the direction that shows that, if anything, repurchase firms provide more accurate guidance than rival firms do.

The combined evidence of Tables 6 to 10 is inconsistent with the notion that managers of repurchase firms purposely mislead their investors into selling back their stock to the firm for cheap. The earnings guidance provided by repurchase firms is only marginally lower than that provided by rival firms in some of the tests. Yet, the market reaction is more negative in the case of repurchase firms. The managers of negative-reaction firms may be responding rationally to the resulting underpricing by repurchasing some of their outstanding shares, which distributes their surplus cash to short-term departing shareholders and increases their long-term stock price to the benefit of sustaining long-term shareholders and themselves. The final tests of bias and accuracy of guidance relative to actual earnings show that managers of repurchase firms were behaving no differently from managers of rival firms or their own behavior in the previous year.

4. Additional tests (robustness checks)

4.1. Guidance and market reaction post-LRD (last repurchase date) vs. pre-FRD (first repurchase date)

If managers mislead investors into selling their stock for cheap with downward biased guidance pre-FRD, perhaps to increase the value of their own stock and option holdings, then they may also issue

upward biased guidance post-LRD to further increase the stock price. In any case, they would have no continued incentive to issue downward biased guidance post-LRD. Thus, the post-LRD earnings guidance becomes an important benchmark to infer the potential bias in the pre-FRD guidance.

We define the post-LRD window for examining earnings guidance as follows. For each repurchase firm, we identify the ending date of the window as the first EAD after LRD or the end of next quarter, whichever comes first. Ending the window this way is a natural choice as the majority of MGDs coincide with an EAD. The starting date of the window is LRD+1. Next, for each rival firm, we identify the ending date the same way, and work backwards to identify the starting date such that the post-LRD search windows for the repurchase firm and the rival firm are of the same length.

Table 11 presents two sets of comparisons using select measures introduced earlier in Tables 3 to 8. The first comparison is between post-LRD repurchase firms and post-LRD rival firms, and the second comparison is between pre-FRD repurchase firms and post-LRD (the same) repurchase firms. Panel A of Table 11 shows that 1,760 out of 3,181 repurchase firms provide one or more guidance during the post-LRD window, which is much more than 978 rival firms that do the same. The difference between frequencies of repurchase firms and rival firms that provide guidance post-LRD dwarfs the corresponding difference pre-FRD in Table 4. Notice that 1,802 repurchase firms provide guidance during the pre-FRD window, so the difference in their frequencies pre-FRD and post-LRD is insignificant.

Looking further, Panel B of Table 11 shows that the aggregated annual EPS updates during a search window for post-LRD repurchase firms are comparable to that for post-LRD rival firms as well as pre-FRD repurchase firms. Further, the aggregated quarterly EPS updates for post-LRD repurchase firms are, in fact, lower than for both post-LRD rival firms and pre-FRD repurchase firms. The quarterly evidence goes against the manipulation story, which suggests that the managers are interested in a higher stock price after the end of a repurchase program. We infer that the decision to start or stop repurchasing was not related to the news content as measured by the earnings updates. Perhaps the answer lies in the changed market reaction to earnings guidance for repurchase firms and rival firms from what we saw during the pre-FRD period. We next explore this possibility.

Panel C of Table 11 shows that mean CAR for all MGDs during the post-LRD window equals 0.34% for repurchase firms and 0.30% for rival firms, insignificantly different from each other, despite

some evidence in Panel B that overall the updates are more negative for repurchase firms. In addition, mean CAR for the post-LRD repurchase firms is 1.49% higher than for the pre-FRD repurchase firms, which is significant at 1% level. This suggests that the negative market reaction to repurchase firms dissipates after the repurchase. We explore this issue further in multivariate CAR regressions shown in Table 12. Our focus is again on the Repurchase dummy that takes the value of one for repurchase firms and zero for rival firms in this post-LRD analysis. The coefficient of this dummy variable is positive in five regressions, negative in two, and insignificant in all seven cases. This post-LRD evidence contrasts with the pre-FRD evidence in Table 8, which showed that the coefficient of the Repurchase dummy variable is always significantly negative. It strengthens our belief that the market reacts overly negatively to management guidance during the pre-FRD period, which fuels the repurchase decision.

4.2. Evidence based on a fixed 30-day pre-FRD search window

As discussed before, the last EAD before an FRD is the natural place where to begin the pre-FRD search window. As a robustness check, however, we repeat our experiment using a fixed 30-day window before FRD for both repurchase firms and rival firms. On average, this window is 19 days shorter than the window examined in the main tests of this paper, although in some cases it can be longer. Still, we are left with 972 MGDs for repurchase firms and 919 MGDs for rival firms, representing 893 unique repurchase firms and 847 unique rival firms. The evidence on annual and quarterly EPS updates for this much-reduced sample of guidance is similar to that for the main sample of this paper. However, the evidence on overly negative market reaction to earnings guidance provided by repurchase firms is somewhat stronger. For the aggregate sample of all MGDs, the market-adjusted excess return for repurchase firms is 2.01% lower than that for rival firms (*t*-statistic 4.98, *p*-value 0.000). The corresponding difference for the main sample of this paper is 1.45% in Table 6 (*t*-statistic 5.99, *p*-value 0.000). There is considerable overlap between the two samples, so we do not report tests of the difference between differences. Overall, our conclusions in this paper are not sensitive to the definition of the pre-FRD search window.

4.3. Evidence based on other components of management guidance: Sales and capital expenditure

Our analysis thus far has been focused on the earnings part of management guidance. We discussed several reasons for this choice in Section 2.1, in particular, that EPS summarizes the effects of other accounting items and determines the stock price. However, two other accounting items are

frequently included in management guidance: sales and capital expenditure (capex). For completeness, we examined statistics on sales and capex updates during the pre-FRD search window for repurchase firms and rival firms (not reported in a table, but available from the authors on request). We defined aggregated annual sales update, aggregated annual capex update, aggregated quarterly sales update, and aggregated quarterly capex update in a parallel manner to aggregated annual EPS update and aggregated quarterly EPS update that were presented in Table 6. None of the differences between the mean values of these four statistics for repurchase firms and rival firms was significantly different from zero.

We further expanded the pre-FRD regression analysis of market reaction to MGDs in Table 8 by including relevant statistics for sales and capex updates. This did not change any of our results. In Models (8.2) to (8.4) the coefficient of Repurchase dummy changed by only between 0.01% and 0.05%.

4.4. Earnings guidance during the period between FRD and LRD (first and last repurchase dates)

Open market repurchases are long drawn-out programs, averaging 463 days (1.27 years) between FRD and LRD. This period may consist of multiple repurchase segments. In most cases, these segments are adjacent to each other, but in a few cases may be separated by periods of inactivity. We find that out of 3,181 matched pairs of firms in our sample, 1,988 repurchase firms and 1,896 rival firms provide earnings guidance at least once but possibly multiple times (average 6.5 times) during this period. Since the in-between MGDs occur after some repurchase activity and before other repurchase activity, the directional incentives of managers under the alternate hypothesis that they mislead investors before stock repurchases are not clear. Still, for completion, we examine the information content of earnings guidance and the accompanying market reactions during the in-between periods. We find that all basic variables analyzed before in this study are of similar magnitudes for the two groups of firms. Specifically, the annual updates average -0.057% and -0.067% for the repurchase firms and rival firms (insignificantly different), the quarterly updates average -0.123% and -0.149% (significantly less negative for repurchase firms in statistical terms, but by a small amount), and the excess returns average 0.134% and 0.188% (insignificantly different). Overall, we find no evidence of a systematic difference between the disclosure practices of repurchase firms and rival firms between FRD and LRD.

5. Explaining our results: Excessively negative market reaction and stock repurchases

In this paper, we have shown that investors react excessively negatively to earnings guidance before stock repurchases. It is relatively easy to argue why the resulting underpricing may cause managers to repurchase their stock by making the following assumptions: 1. Market reaction to any corporate announcement is necessarily noisy, consisting of a true change in valuation component, μ, and a noise component, ϵ. 2. Managers possess more accurate information than outside investors possess and can assess whether ϵ is positive or negative. 3. Managers are motivated to increase the long-term value of their firms to the benefit of their long-term shareholders, which also includes them, as they typically do not participate in share repurchases. It follows that managers will be more likely to repurchase shares following excessively negative market reaction to their earnings guidance.

Netter and Mitchell (1989) provide supporting evidence for this argument by analyzing repurchase announcements surrounding the market crash of October 19, 1987. Presumably, managers are less sure of the sign and magnitude of ϵ following macro events than following micro (or firm-specific) events. Yet, Netter and Mitchell document that this stock market crash ignited an unprecedented rush by firms to announce open market repurchase programs. During the two weeks following the crash, almost 600 publicly traded firms announced repurchase programs, compared to 350 that announced from January 1987 to the crash date. To assert that this sharp spike in repurchase activity was related to managers' recognition of excessive investor pessimism, they further document that 1,913 officers and directors bought stock during this two-week period while 256 officers and directors sold stock. In contrast, from January 1 to October 19, 1987, twice as many officers and directors sold stock than bought stock in their companies. Netter and Mitchell conclude: "Examination of insider transactions reveals that, even in the highly uncertain time around the crash, insiders were able to determine whether their firms' stock prices were undervalued or overvalued relative to the risk-adjusted relationship with the market." It should therefore come as no surprise that in the firm-specific setting of our paper the managers are able to detect and act upon the excessively negative market reaction to their stocks following their earnings guidance.

Peyer and Vermaelen (2009) test a version of the overreaction hypothesis, according to which repurchases are driven by the fact that the management believes the market has overreacted to some publicly available information in the recent past. Consistent with this overreaction hypothesis, they find

strong evidence of negative stock returns over several months leading to the repurchase announcement. The average prior 6-month excess return is a highly significant -9.05% for their aggregate sample of firms that announced an open market repurchase during 1991 to 2001. In addition, they document evidence of significant analyst downgrades and overly pessimistic forecasts of long-term earnings during the month before repurchase announcements. If anything, it appears that the managers were unhappy about the resulting undervaluation. Peyer and Vermaelen analyze the reasons given for repurchase and find that in as many as 49% cases the firms give "undervaluation" or "best use of money", or both, as the reasons for repurchase. The prior 6-month return is more negative and the subsequent long-term return more positive in such cases, which suggests that they were truthful in calling their stock as undervalued or the best use of their money. The market does react more positively on the announcement date in such cases, but the magnitude of announcement return pales in comparison with the long-term return, suggesting only partial correction, or continued pessimism.

Numerous other studies also cite and support undervaluation as a chief motivation for stock repurchases. For brevity, we mention only a few of these studies. First, Dittmar (2000) examines several potential explanations for repurchases, including excess capital, optimal debt ratio, management incentives, takeover deterrence, and undervaluation. She finds the strongest support for the undervaluation hypothesis. Second, Brav et al. (2005) report the results of a survey of corporate managers on their reasons behind dividends and stock repurchases. The most commonly cited reason for repurchases is again undervaluation, mentioned by 86.4% of all respondents. If managers were indeed guilty of purposely manipulating the price downward, it appears unlikely that they would cite undervaluation as the primary reason for repurchases. Third, Ofer and Thakor (1987) examine alternate payment forms in an integrated model in which mispricing can be signaled with dividends or stock repurchases. Using the exclusion of management from the tendering process as a key pivot, Ofer and Thakor show that small undervaluation will be rectified with dividends while managers that perceive a relatively large undervaluation will undertake stock repurchases. Fourth, Stephens and Weisbach (1998) and Chan et al. (2010) present a "cheap talk" hypothesis according to which managers of some firms announce repurchases to prop up their sagging stock prices. Such managers do not follow up on these announcements with actual repurchases, which interestingly does not fool the investors. While cheap talk

may also be regarded as manipulative, it is in a direction opposite to that implied by Brockman, Khurana, and Martin (2008) and Gong, Louis, and Sun (2008). More importantly, their evidence shows that the investors are not easily misled. Finally, our evidence based on the actual news content of earnings guidance provided by managers also suggests that investors undervalue repurchase stocks and ties in with a large literature that suggests the same.

6. Conclusion

Previous research suggests that managers release overly negative information before stock repurchases in order to buy back stock cheaply, thereby transferring wealth from the selling shareholders to the surviving long-term shareholders. In this paper, we point out a few conceptual and methodological concerns with previous evidence. On the first point, we question the incentives of managers to reduce their stock price for the substantial duration of repurchase programs. We assume a generous scenario and calculate that the wealth transfer is a small fraction of one percent of their total firm-specific wealth, while lowering one's own stock price reduces current compensation and increases the risk of job loss due to board action, shareholder activism, and external takeover threat. On the second point, previous evidence in favor of management misguidance rests primarily on stock market reactions to earnings guidance announcements. We show that these stock market reactions suffer from an endogeneity concern and are biased measures of the information content of management guidance.

We directly measure the information content of management guidance as the difference between the EPS (earnings per share) number provided by the managers and the prevailing analyst consensus estimate, all scaled by the stock price. We compare EPS guidance for 3,181 repurchase firms during 2003 to 2012 with similar guidance for an industry and size matched sample of 3,181 rival firms. We find that repurchase firms and rival firms have similar frequency of EPS guidance, and there is no significant difference between the earnings updates implied by the management guidance for repurchase firms and rival firms. More importantly, we examine the difference between the earnings guidance and the corresponding actual earnings announced on a later date for repurchase firms and rival firms. This difference is negative for both sets of firms, but it is no different across repurchase firms and rival firms. In other words, both repurchase firms and rival firms are equally conservative in their outlook. There is some evidence that, if anything, repurchase firms are less conservative than in their previous year. These

tests of bias do not reveal any evidence that repurchasing firms attempt to mislead the market through the release of overly negative information ahead of stock repurchases.

On the other hand, despite similar information content of guidance provided by repurchase firms and rival firms, we show that the market reaction to repurchase firms is significantly more negative than to rival firms during the pre-repurchase period. The evidence holds up in several tests after controlling for differences in future earnings updates implied by the management guidance as well as the surprise part of the simultaneous announcement of last quarter's earnings. This overly negative market reaction could be due to any reason or no reason in particular, just that investors react to all information with some error. We cite evidence from previous literature that managers can detect when their stocks are undervalued and initiate repurchase programs at such times. In summary, our evidence suggests that managers do not purposely mislead investors before stock repurchases, instead they take advantage of depressed stock prices to the benefit of their long-term shareholders.

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Appendix 1

Below we spell out the full names of frequently used abbreviations in this paper for easy reference.

Dates:	
EAD	Earnings Announcement Date
FRD	First Repurchase Date
LRD	Last Repurchase Date
MGD	Management Guidance Date
Others:	
CAR	Cumulative Abnormal (or Excess) Return
CRSP	Center for Research in Security Prices
EPS	Earnings per Share
GRC	Guidance Response Coefficient (similar to ERC, Earnings Response Coefficient)
I/B/E/S	Institutional Brokers Estimate System
SDC	Securities Data Company

Table 1

Yearly distribution of management earnings guidance data and market reactions

We start with the original I/B/E/S Guidance database and examine management guidance issued between 1993 and 2012. We retain only guidance issued for earnings per share (EPS). 124,467 EPS guidance are issued, both annual and quarterly. These 124,467 guidance observations collapse to 88,855 unique firm-MGDs (management guidance dates). Thus, in many cases, managements issue guidance for multiple years and quarters on the same day. From these, we retain 85,144 MGDs for which the cumulative excess (or abnormal) returns (CARs) can be calculated from the CRSP database. The CARs are calculated over a three-day period centered on the MGD as the sum of the differences between the stock return and the value-weighted market return on each day.

		Cumulative excess returns (CAR)			Absolute value of cumulative excess returns (ABS(CAR))	
Year	Number of unique firm-MGDs	Mean (%)	Median (%)	Percent positive	Mean (%)	Median (%)
1993	26	-10.25	-7.59	35	12.27	8.71
1994	124	-7.02	-2.90	31	10.18	5.42
1995	541	-2.88	-1.08	41	7.04	4.22
1996	834	-5.18	-1.81	38	9.67	5.39
1997	1,155	-5.19	-1.92	39	9.52	5.98
1998	2,042	-7.06	-3.45	35	11.58	6.86
1999	2,329	-5.42	-2.77	37	11.53	7.25
2000	2,900	-6.19	-2.88	39	13.09	8.33
2001	6,230	-1.71	-0.74	46	9.06	5.48
2002	6,496	-0.81	0.29	52	8.19	5.01
2003	6,668	0.00	0.10	51	6.30	4.04
2004	7,627	-0.42	0.16	51	5.81	3.60
2005	6,887	-0.26	0.01	50	5.57	3.69
2006	7,140	-0.07	0.02	50	5.64	3.85
2007	6,501	-0.15	0.02	50	5.55	3.80
2008	6,269	-0.16	0.34	52	7.73	5.33
2009	5,118	0.97	0.47	53	6.99	4.86
2010	5,530	0.42	0.24	53	4.87	3.12
2011	5,293	0.25	0.31	53	5.35	3.37
2012	5,434	0.04	0.14	51	5.49	3.38
All years	85,144	-0.85	-0.09	49	6.96	4.29

Table 2

Yearly distribution of mean updates to annual and quarterly EPS implied by management guidance

The initial sample of 85,144 firm-MGDs between 1993 and 2012 which includes guidance for EPS and for which the cumulative excess returns (CARs) can be calculated is described in Table 1. In this table, we further subset this sample to 60,015 observations between 2003 and 2012 for which the prevailing analyst consensus estimate is available. We calculate the updates to annual and quarterly EPS as the difference between the EPS guidance and the analyst consensus estimate, divided by the closing stock price on MGD-2 and multiplied by 100. In cases where the EPS guidance is given as a range of values, we use the range midpoint. We winsorize the annual and quarterly update variables at the 1% and 99% levels in the aggregate sample included in this table. Finally, if there are multiple annual or quarterly periods included on one MGD, we separately sum the updates to calculate the total annual update and the total quarterly update. Net percent positive frequency is calculated as the difference between percent positive and percent negative frequencies. The percent zero frequency ranges between 1% and 6% for annual updates and 1% and 11% for quarterly updates during different years and does not enter the calculation of net percent positive frequency.

			Total annual update				Total quarterly update			
Year	N	Mean CAR (%)	N	Mean %	Median %	Net percent positive %	N	Mean %	Median %	Net percent positive %
2003	6,191	0.00	4,169	-0.033	0.000	5	4,019	-0.191	-0.028	-25
2004	7,228	-0.48	5,074	-0.059	0.000	-3	4,536	-0.152	-0.022	-22
2005	6,615	-0.28	4,802	-0.047	0.000	-4	3,973	-0.154	-0.032	-27
2006	6,873	-0.09	5,156	-0.099	-0.013	-8	3,859	-0.149	-0.034	-27
2007	6,314	-0.14	4,854	-0.098	-0.018	-12	3,284	-0.196	-0.044	-35
2008	6,103	-0.23	4,714	-0.187	-0.016	-9	2,954	-0.386	-0.065	-36
2009	4,938	0.96	3,622	-0.077	0.017	7	2,365	-0.252	-0.046	-21
2010	5,351	0.41	4,142	-0.044	-0.019	-10	2,463	-0.077	-0.012	-10
2011	5,134	0.22	4,018	-0.076	-0.022	-12	2,322	-0.201	-0.039	-29
2012	5,268	0.05	4,161	-0.113	-0.028	-18	2,346	-0.251	-0.064	-42
All years	60,015	0.00	44,712	-0.084	-0.010	-6	32,121	-0.195	-0.035	-27

Table 3

Sample of repurchase events

We begin with 6,130 repurchases from SDC Platinum with non-missing FRD (first repurchase date) between May 2003 and December 2012. From these, we retain 3,222 repurchase firms that appear at least once in the I/B/E/S Guidance database. We next subset to 3,211 repurchase firms that have contemporaneous information in the CRSP and Compustat files. We match each repurchase firm with a rival firm using the procedure described in Table 4, which gives a final sample of 3,181 repurchase programs or events. Most sample statistics given below are obtained from SDC, but the earnings announcement dates are retrieved from Compustat.

Panel A: Sample distribution over time (based on first repurchase date)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	**All**
Repurchase initiations	143	334	439	417	511	428	160	281	328	140	**3,181**

Panel B: Sample statistics for repurchase programs

	Mean	Q1	Median	Q3
Days between repurchase initiation and completion	468	129	298	578
Total shares repurchased (%)	7.98	2.66	5.38	9.74
Days between FRD (first repurchase date) and EAD (earnings announcement date) for the nearest period for which guidance is provided on MGD (management guidance date)	60	35	63	84
Shares repurchased before EAD for the nearest period covered by MGD (assuming a uniform repurchase rate) (%)	1.97	0.34	0.89	2.02

	Open market	Tender offer	Dutch auction	Others[1]
Repurchase technique	2,859	34	84	206

[1] The "Others" category of repurchase techniques includes "Accelerated", "Negotiated", and "Odd Lot" (following the SDC classification).

Table 4

Summary statistics of repurchase firms and rival firms

The sample of 3,181 repurchase events is described in Table 3. To identify a rival firm for each event, we start with the sample of all CRSP and Compustat firms that appear at least once in the Guidance database and do not initiate a repurchase of their own from one year before to one year after the FRD of the repurchase firm. We first look for a rival firm with the same 4-digit SIC code and closest in size (market value of equity) provided the size is not less than half or more than twice of the size of the repurchase firm. If no firm meets this requirement, then we look for a 3-digit SIC match and use the same size criteria. If we are still unable to match, then we look for a 2-digit SIC match but without the size restriction. 2,493 repurchase firms are matched at the 4-digit SIC level, 269 at the 3-digit SIC level, and 419 at the 2-digit level. We next identify the search windows for EPS guidance for each pair of repurchase and rival firms as follows. For the repurchase firm we work our way backward from the FRD to the last earnings announcement date (EAD) or the beginning of the fiscal quarter, whichever comes later, in cases where the FRD is more than 60 days from the beginning of the fiscal quarter. However, if the FRD is less than 60 days from the beginning of the fiscal quarter, then we work our way back to the last EAD or the beginning of the previous fiscal quarter, whichever comes later. This date becomes the beginning date of the search window while the ending date is FRD-1. For the rival firm, we follow the same procedure to identify the beginning date of the search window, and then identify the ending date so that the search windows for the repurchase firm and the rival firm are of exactly the same length. We calculate the market value of equity using Compustat data as of the previous year-end. The market-to-book ratio equals the sum of market value of equity, total long-term debt, and debt in current liabilities, all divided by total assets. The return on equity equals the net income for the previous year divided by the book value of equity. We further calculate prior return over a 90-day period ending 2 days before starting date of the search window as the sum of the daily differences between the stock return and the market return. The standard deviation of prior returns is calculated using the same daily differences between returns. The stock beta is calculated using daily stock and market returns over a 250-day period ending 2 days before the starting date of the search window. The earnings surprise equals the actual earnings per share minus the most recent analyst consensus estimate, divided by the stock price and multiplied by 100, computed for the last reported earnings announcement before repurchase. The stock price for scaling is as of MGD-2 days if there is guidance, otherwise as of the quarter-end preceding the earnings announcement date. The following variables are winsorized at the 1% and 99% levels in the combined sample of repurchase firms and rival firms throughout this paper: percent shares repurchased, market value of equity, return on equity, market to book ratio, earnings surprise, and prior return over a 90-day window. Statistical significance at the 5% and 1% levels is highlighted by * and **.

Panel A: Frequency of disclosure	Repurchase firms	Rival firms	*p*-value of difference
Number of repurchase events	3,181	3,181	
Number of unique firms	1,441	1,487	
Average length in days of pre-FRD search window over which we look for an MGD (management guidance date)	49	49	
Number of firms with at least one MGD that provides an EPS update	1,802	1,692	0.006**
Number of all MGDs (since there may be multiple guidance on different days during one search window)	2,178	2,163	0.820
Mean number of MGDs conditional on at least one MGD	1.209	1.278	0.000**
Percent of MGDs that coincide with an earnings announcement	77.2	72.5	0.000**
Number of firms with at least one EPS guidance that does not coincide with an earnings announcement	398	473	0.006**

Panel B: Firm characteristics	Repurchase firms		Rival firms		*p*-value of difference in means
	Mean	Median	Mean	Median	
Market value of equity in $million	8,049	1,661	6,492	1,587	0.003**
Market to book ratio	1.65	1.33	1.63	1.30	0.533
Return on equity (%)	13.1	12.3	9.1	11.4	0.000**
Earnings surprise (%)	0.05	0.05	0.04	0.04	0.196
Prior return over a 90-day period (%)	-1.24	-1.02	-0.04	0.17	0.001**
Stdev of prior return (%)	1.88	1.60	1.98	1.67	0.000**
Stock beta	1.10	1.05	1.12	1.07	0.085

Table 5

Multivariate analysis of whether repurchasing firms are more likely than rival firms to provide EPS guidance during the pre-FRD search window

The sample includes 3,181 repurchase firms and 3,181 rival firms selected using the industry and size matching procedure listed in Table 3. Models (5.1) and (5.2) report logit analysis of a dummy variable that takes the value of one if a firm reports one or more MGDs during its pre-FRD (first repurchase date) search window at any time, and zero otherwise. Models (5.3) and (5.4) impose the further restriction that the dummy variable equals one only if there is at least one MGD that does not coincide with an EAD. The key independent variable is the Repurchase dummy, which equals one for repurchase firms and zero for rival firms in this pre-FRD analysis. The control variables of market value of equity, market-to-book ratio, return on equity, earnings surprise, prior returns over a 90-day period, and standard deviation of prior return are also defined in Table 4. The figures in parenthesis are the *p*-values of coefficient estimates. Statistical significance at the 5% and 1% levels is highlighted by * and **.

Independent variables	Dependent variable equals one if firm had one or more MGDs during the pre-FRD search window at any time, zero otherwise		Dependent variable equals one if firm had one or more MGDs during the pre-FRD search window that did not coincide with an earnings announcement, zero otherwise	
	(5.1)	(5.2)	(5.3)	(5.4)
Intercept	0.128 (0.000)**	-1.253 (0.000)**	-1.745 (0.000)**	-3.105 (0.000)**
Repurchase dummy	0.140 (0.006)**	0.077 (0.154)	-0.200 (0.006)**	-0.254 (0.001)**
Log market value of equity		0.182 (0.000)**		0.181 (0.000)**
Market-to-book ratio		0.217 (0.000)**		0.041 (0.173)
Return on equity (%)		0.002 (0.126)		0.004 (0.016)**
Earnings surprise (%)		0.138 (0.007)**		-0.029 (0.720)
Prior return over a 90-day period (%)		-0.002 (0.234)		-0.001 (0.772)
Stdev of prior return (%)		-0.130 (0.000)**		-0.051 (0.258)
N	6,362	6,015	6,362	6,015
N where dependent variable = 1	3,494	3,432	871	850

Table 6

Comparing the magnitudes of EPS guidance from repurchase firms and rival firms during the pre-FRD search window

The sample includes 3,181 repurchase firms and 3,181 rival firms selected using the industry and size matching procedure described in Table 4. This table analyzes the magnitude of EPS information related to annual or quarterly periods covered by one or more MGDs during the pre-FRD (first repurchase date) search window. Table 4 describes how we identify this pre-FRD search window. Panel A presents sample statistics, Panel B.1 analyzes annual EPS guidance, and Panel B.2 analyzes quarterly EPS guidance. In Panels B.1 and B.2 all statistics are calculated by first aggregating (or summing up) the EPS updates over all MGDs for a search window, and then computing the mean or median values across search windows. The EPS update (annual or quarterly) is calculated as the difference between the EPS guidance and the analyst consensus estimate prevailing before the MGD, divided by the stock price on MGD-2 and multiplied by 100. The EPS guidance may be provided as a point estimate or as a range of estimates. In the latter case, we use the range midpoint. As described in Table 2, we winsorize the annual and quarterly update variables at the 1% and 99% levels in the aggregate sample of that table. The *p*-values of mean and difference between means are calculated using the *t*-test, the *p*-value of median is calculated using the binomial test, and the *p*-value of difference between medians is calculated using the Wilcoxon rank-sum test. Statistical significance at the 5% and 1% levels is highlighted by * and **.

Description	Statistic	Repurchase firms	Rival firms	Difference
		(Figures in parentheses are *p*-values)		
Panel A: Sample				
Number of repurchase events (or pre-FRD search windows)		3,181	3,181	
Number of all MGDs (management guidance dates)		2,178	2,163	
Number of firms providing EPS guidance for at least one annual or quarterly period during the pre-FRD search window		1,802	1,692	
*Panel B.1: **Annual** EPS guidance provided during the pre-FRD search windows*				
Number of firms providing at least one annual EPS guidance		1,440	1,339	
Number of periods for which annual EPS guidance is provided in one window	Mean	1.255	1.356	-0.101 (0.000)**
Aggregated annual EPS updates provided during each window (% of stock price)	Mean	-0.100 (0.000)**	-0.048 (0.024)*	-0.052 (0.062)
- Same -	Median	-0.011 (0.002)**	0.000 (0.933)	-0.011 (0.006)**
*Panel B.2: **Quarterly** EPS guidance provided during the pre-FRD search windows*				
Number of firms providing at least one quarterly EPS guidance		981	940	
Number of periods for which quarterly EPS guidance is provided in one window	Mean	1.262	1.266	-0.004 (0.892)
Aggregated quarterly EPS updates provided during each window (% of stock price)	Mean	-0.158 (0.000)**	-0.156 (0.000)**	-0.002 (0.944)
- Same -	Median	-0.045 (0.000)**	-0.036 (0.000)**	-0.009 (0.385)

Table 7

Market-adjusted excess returns to MGDs during the pre-FRD search window

The sample in this table continues from Table 6. We start with all 2,178 MGDs by repurchase firms and 2,163 MGDs by rival firms in Panel A of this table. The individual MGDs (and not the search windows that may contain more than one MGD) are the primary events in this table. We further divide these MGDs into those given on an EAD (earnings announcement date) in Panel B and those given on any other date in Panel C. We measure good news, mixed news, and bad news based on annual and quarterly EPS updates for a given MGD as follows. First, we calculate total annual EPS update and total quarterly EPS update as described in Table 2. Second, we classify an MGD as a good-news (bad-news) event if both total annual update and total quarterly update are non-missing and greater than (less than) zero, or if one of them is zero or missing and the other is greater than (less than) zero. Third, the remaining cases that are not unambiguously good-news or bad-news events are classified as mixed-news events. Next, we measure the market-adjusted excess return (CAR) as the sum of market-adjusted stock return each day over a three-day period centered on the MGD. The market return is measured by the CRSP value-weighted return including dividend (VWRETD). The *p*-values are shown in parentheses. Statistical significance at the 5% and 1% levels is highlighted by * and **.

	MGDs for repurchase firms		MGDs for rival firms		Difference
Update news	N	Mean CAR % (*p*-value)	N	Mean CAR % (*p*-value)	Mean CAR % (*p*-value)
Panel A: All cases of EPS guidance					
All news	2,178	-1.15 (0.000)**	2,163	0.30 (0.067)	-1.45 (0.000)**
Panel B: Only cases where EPS guidance is given on an EAD (earnings announcement date)					
Good news	609	2.49 (0.000)**	583	3.33 (0.000)**	-0.84 (0.027)*
Mixed news	206	0.44 (0.415)	217	1.63 (0.000)**	-1.19 (0.099)
Bad news	867	-4.00 (0.000)**	768	-2.00 (0.000)**	-2.00 (0.000)**
All news	1,682	-1.11 (0.000)**	1,568	0.48 (0.014)*	-1.59 (0.000)**
Panel C: Only cases where EPS guidance is given on a different date					
Good news	159	3.47 (0.000)**	204	2.48 (0.000)**	0.99 (0.170)
Mixed news	47	-2.57 (0.033)*	68	0.14 (0.821)	-2.71 (0.030)*
Bad news	290	-3.70 (0.000)**	323	-1.94 (0.000)**	-1.76 (0.006)**
All news	496	-1.30 (0.001)**	595	-0.19 (0.522)	-1.11 (0.021)*

Table 8

Multivariate analysis of the market-adjusted excess returns to MGDs during the pre-FRD search window

This table is the multivariate version of Table 7. The dependent variable in all regressions is CAR, or the market-adjusted excess return expressed in percent. This excess return is calculated as the sum of market-adjusted stock return each day over a three-day period centered on the MGD. The market return is measured by the CRSP value-weighted return including dividend (VWRETD). The sample in this table starts with the sample of Table 7, but it is reduced in various regressions depending on the availability of independent variables. The key independent variable is the Repurchase dummy, which equals one for repurchase firms and zero for rival firms. The key control variables include the total annual update and the total quarterly update as defined in Tables 2 and 7. Further, in this table we assign missing values of total annual and total quarterly updates to zero. Models (8.1) to (8.4) analyze cases where an MGD coincides with an EAD. In these models a key control variable is the earnings surprise, which equals the actual EPS minus the last analyst consensus estimate, divided by the stock price and multiplied by 100. Models (8.5) to (8.7) analyze cases where an MGD does not coincide with an EAD, so earnings surprise is not a relevant control variable. Following Freeman and Tse (1992), Subramanyam and Wild (1996), and Wilson (2008), we introduce nonlinear transforms of earnings surprise, total annual update, and total quarterly update as {variable × Abs (variable)}. Based on the latter two papers, we also include additional control variables of predict, persist, market-to-book, beta, log market value of equity, loss dummy, and the interactions of each variable with earnings surprise in Model (8.4). Predict is calculated as the standard deviation of earnings surprise over the 20 quarters preceding the current quarter (reduced to not less than eight if data are not available). Persist is the autocorrelation in earnings surprise series. Loss dummy equals one if current earnings are negative, and zero otherwise. The calculation of market-to-book, beta, and market value of equity is described in Table 4. The coefficients of these variables and their *p*-values are not reported for brevity. Figures in parentheses represent the *p*-values corresponding to heteroscedasticity consistent *t*-statistics. Statistical significance at the 5% and 1% levels is highlighted by * and **.

	Cases where an MGD coincides with an EAD				Cases where an MGD does not coincide with an EAD		
Independent variables	(8.1)	(8.2)	(8.3)	(8.4)	(8.5)	(8.6)	(8.7)
Intercept	0.48 (0.014)*	0.53 (0.005)**	0.16 (0.376)	0.27 (0.782)	-0.19 (0.521)	0.38 (0.158)	0.55 (0.039)*
Repurchase dummy	-1.59 (0.000)**	-1.49 (0.000)**	-1.39 (0.000)**	-1.15 (0.000)**	-1.11 (0.023)*	-1.04 (0.020)*	-0.93 (0.032)*
Earnings surprise (%)		3.07 (0.000)**	10.02 (0.000)**	15.40 (0.001)**			
Total annual EPS update (%)		3.57 (0.000)**	4.40 (0.000)**	4.81 (0.000)**		3.16 (0.000)**	5.89 (0.000)**
Total quarterly EPS update (%)		2.86 (0.006)**	8.45 (0.000)**	8.02 (0.000)**		5.69 (0.000)**	12.15 (0.000)**
Earnings surprise × Abs (earnings surprise) ($\%^2$)			-4.46 (0.000)**	-3.53 (0.000)**			
Total annual EPS update × Abs (total annual EPS update) ($\%^2$)			-0.42 (0.083)	-0.47 (0.065)			-1.02 (0.040)*
Total quarterly EPS update × Abs (total quarterly EPS update) ($\%^2$)			-2.14 (0.000)**	-2.21 (0.000)**			-2.60 (0.000)**
Additional control variables	No	No	No	Yes	No	No	No
Adjusted-R^2	0.010	0.147	0.209	0.229	0.004	0.160	0.214
N	3,250	3,205	3,205	2,992	1,091	1,091	1,091

Table 9

Univariate analysis of the bias and accuracy of EPS guidance of repurchase firms and rival firms

The primary sample in this table starts with 981 repurchase firms and 940 rival firms identified in Table 6 for which there is at least one MGD during the pre-FRD window that contains a quarterly EPS guidance. The requirement of actual earnings reduces the sample a little as shown below. This sample is shown by shading the corresponding rows. For each pre-FRD search window, we identify the earliest quarter for which EPS guidance is provided. For this period, we calculate the bias as the EPS guidance minus the actual earnings, divided by the stock price as of MGD-2 and multiplied by 100. The actual earnings are obtained from the I/B/E/S database. The bias is winsorized at the 1% and 99% levels in the combined sample of repurchase firms and rival firms. The accuracy of EPS forecast is inverse-measured by the absolute value of bias. In addition to the primary sample of repurchase and rival firms during the pre-FRD period, we report a control sample of both repurchase and rival firms that is shifted backward in time by exactly one year. In other words, the search window for this control sample is pre-FRD′, where FRD′ = FRD – 1 year, and all else is done similar to above. The *p*-values are reported in parentheses. Statistical significance at the 5% and 1% levels is highlighted by * and **.

	Repurchase firms		Rival firms		Difference between repurchase and rival firms
	N	Mean (*p*-value)	N	Mean (*p*-value)	Mean (*p*-value)
Panel A: Bias tests: Difference between quarterly EPS guidance and actual earnings as % of stock price					
For EPS guidance issued before FRD (first repurchase date)	962	-0.068 (0.000)**	921	-0.085 (0.000)**	0.017 (0.360)
For EPS guidance issued before FRD′ = FRD – 1 year (for another comparison)	929	-0.115 (0.000)**	867	-0.087 (0.000)**	-0.028 (0.148)
Difference between mean biases in above two rows		0.047 (0.009)**		0.002 (0.912)	
Panel B: Accuracy tests: Inverse measured by absolute value of bias					
For EPS guidance issued before FRD (first repurchase date)	962	0.223 (0.000)**	921	0.243 (0.000)**	-0.021 (0.182)
For EPS guidance issued before FRD′ = FRD – 1 year (for another comparison)	929	0.248 (0.000)**	867	0.241 (0.000)**	0.007 (0.692)
Difference between mean accuracies in above two rows		-0.025 (0.098)		0.002 (0.901)	

Table 10

Multivariate analysis of the bias and accuracy of EPS guidance of repurchase firms and rival firms

The sample in this table starts with that in Table 9, but it is reduced due to unavailability of one or more control variables. We analyze only the primary sample consisting of guidance versus actual earnings during the pre-FRD (first repurchase date) window. Table 9 provides other sample details and the definitions of bias and accuracy of forecasts, which are the two dependent variables. The key independent variable is the Repurchase dummy, which equals one for repurchase firms and zero for rival firms. We calculate the market value of equity using Compustat data as of the previous year-end. The market-to-book ratio equals the sum of market value of equity, total long-term debt, and debt in current liabilities, all divided by total assets. The litigation dummy equals one for firms in biotechnology (Compustat SIC 2833-2836 and 8731-8734), computer (3570-3577 and 7370-7374), electronics (3600-3674), and retail (5200-5961), and it is zero otherwise. The loss dummy equals one if the actual earnings are negative, and zero otherwise. Earnings volatility is the standard deviation of unexpected earnings scaled by stock price during the last 20 quarters (reduced to as few as 8 quarters if a longer time series is not available) before the pre-FRD window. We also divide our sample based on update news, where Good news, Bad news, and Mixed news are as defined in Table 7. We report the *p*-values corresponding to heteroscedasticity consistent *t*-statistics in parentheses. Statistical significance at the 5% and 1% levels is highlighted by * and **.

	Dependent variable is guidance bias Measured by (guidance-actual earnings)/stock price				Dependent variable is (inverse of) guidance accuracy Measured by abs(guidance-actual earnings)/stock price			
		Update news is				Update news is		
Independent variables ↓	Full sample	Good news	Bad news	Mixed news	Full sample	Good news	Bad news	Mixed news
	(10.1)	(10.2)	(10.3)	(10.4)	(10.5)	(10.6)	(10.7)	(10.8)
Intercept	-0.318	-0.311	-0.468	-0.189	0.568	0.591	0.671	0.424
	(0.000)**	(0.003)**	(0.000)**	(0.141)	(0.000)**	(0.000)**	(0.000)**	(0.000)**
Repurchase dummy	0.030	0.034	0.034	-0.031	-0.014	-0.005	-0.008	-0.075
	(0.103)	(0.275)	(0.292)	(0.440)	(0.330)	(0.856)	(0.766)	(0.028)*
Log market value of equity	0.029	0.030	0.042	0.028	-0.041	-0.046	-0.055	-0.017
	(0.000)**	(0.009)**	(0.000)**	(0.080)	(0.000)**	(0.000)**	(0.000)**	(0.223)
Market-to-book ratio	0.009	0.017	0.029	-0.030	-0.032	-0.033	-0.041	-0.020
	(0.112)	(0.037)*	(0.031)*	(0.077)	(0.000)**	(0.000)**	(0.000)**	(0.167)
Litigation dummy	-0.023	-0.044	-0.046	-0.026	0.024	0.043	0.051	-0.050
	(0.220)	(0.176)	(0.167)	(0.547)	(0.115)	(0.100)	(0.055)	(0.145)
Loss dummy	0.368	0.557	0.316	-0.114	0.342	0.460	0.132	0.372
	(0.000)**	(0.008)**	(0.009)**	(0.604)	(0.000)**	(0.005)**	(0.138)	(0.013)*
Earnings volatility %	-0.110	-0.256	-0.167	0.068	0.094	0.125	0.245	0.013
	(0.068)	(0.013)*	(0.269)	(0.502)	(0.055)	(0.132)	(0.003)**	(0.842)
Adjusted-R^2	0.042	0.077	0.044	0.011	0.136	0.171	0.124	0.096
N	1,796	590	601	273	1,796	590	601	273

Table 11

Comparing EPS guidance and market reaction post-LRD (last repurchase date) and pre-FRD (first repurchase date)

This table presents a few assorted statistics on the frequency and magnitude of EPS guidance in Panel A, and market reaction to EPS guidance in Panel B. The focus is on the post-LRD window, which is defined as follows. For each repurchase firm, we identify the ending date of the window as the first EAD (earnings announcement date) after LRD or the end of next quarter, whichever comes first. The starting date of window is LRD+1. Next, for each rival firm, we identify the ending date the same way, and work backwards to identify the starting date such that the post-LRD search windows for the repurchase firm and the rival firm are of the same length. All variables analyzed in this table have been defined before in Tables 6 and 7. The repurchase firms post-LRD are compared two ways, first with rival firms post-LRD, and second with repurchase firms pre-FRD. Figures in square parentheses are the sample sizes. In Panel A, the *p*-values of mean and difference between means are calculated using the *t*-test, the *p*-value of median is calculated using the binomial test, and the *p*-value of difference between medians is calculated using the Wilcoxon rank-sum test. Figures in round parentheses represent the *p*-values corresponding to matched-pairs differences. Statistical significance at the 5% and 1% levels is highlighted by * and **.

Description	Repurchase firms post-LRD	Rival firms post-LRD	Difference between repurchase firms post-LRD and rival firms post-LRD (*p*-value)	Repurchase firms pre-FRD	Difference between repurchase firms pre-FRD and repurchase firms post-LRD (*p*-value)
Panel A: Select frequencies					
Number of search windows	3,181	3,181	-	3,181	-
Number of all MGDs	2,020	1,145	875 (0.000)**	2,178	158 (0.015)*
Number of search windows with at least one MGD	1,760	978	782 (0.000)**	1,802	42 (0.482)
	Mean value in % (*p*-value) [N]				
Panel B: Select statistics					
Aggregated annual EPS updates during each window (mean value – as % of stock price)	-0.084 (0.001)** [1,393]	-0.089 (0.001)** [776]	0.005 (0.870)	-0.100 (0.000)** [1,440]	-0.016 (0.546)
Aggregated quarterly EPS updates during each window (mean value – as % of stock price)	-0.234 (0.000)** [953]	-0.164 (0.000)** [526]	-0.070 (0.057)	-0.158 (0.000)** [981]	0.076 (0.007)**
Panel C: Market reactions					
Mean CAR for all MGDs	0.34 (0.068) [2,020]	0.30 (0.198) [1,145]	0.04 (0.874)	-1.15 (0.000)** [2,178]	-1.49 (0.000)**
Mean CAR for all MGDs that coincide with an EAD	0.68 (0.001)** [1,650]	0.54 (0.056) [820]	0.14 (0.696)	-1.11 (0.000)** [1,682]	-1.79 (0.000)**
Mean CAR for all MGDs that do not coincide with an EAD	-1.13 (0.013)* [370]	-0.31 (0.420) [325]	-0.82 (0.175)	-1.30 (0.001)** [496]	-0.17 (0.732)

Table 12

Multivariate analysis of the market-adjusted excess returns to MGDs during the post-LRD (last repurchase date) search window

This table is similar to Table 8, except that it presents regression analysis of CARs surrounding MGDs during the post-LRD search window whereas Table 8 presented the parallel analysis during the pre-FRD search window. The post-LRD window is identified as described in Table 11. The calculation of independent variables is described in Tables 8 and 11. The key independent variable is the Repurchase dummy, which equals one for repurchase firms and zero for rival firms in this post-LRD analysis. Figures in parentheses represent the *p*-values corresponding to heteroscedasticity consistent *t*-statistics. Statistical significance at the 5% and 1% levels is highlighted by * and **.

	Cases where an MGD coincides with an EAD				Cases where an MGD does not coincide with an EAD		
Independent variables	(12.1)	(12.2)	(12.3)	(12.4)	(12.5)	(12.6)	(12.7)
Intercept	0.54 (0.056)	0.51 (0.055)	0.07 (0.795)	1.64 (0.175)	-0.31 (0.419)	0.19 (0.589)	0.23 (0.511)
Repurchase dummy	0.14 (0.692)	0.26 (0.414)	0.32 (0.295)	0.37 (0.230)	-0.82 (0.169)	-0.19 (0.729)	0.01 (0.991)
Earnings surprise (%)		3.86 (0.000)**	10.64 (0.000)**	15.43 (0.001)**			
Total annual EPS update (%)		3.99 (0.000)**	5.49 (0.000)**	5.30 (0.000)**		1.88 (0.000)**	2.26 (0.011)*
Total quarterly EPS update (%)		3.65 (0.000)**	7.69 (0.000)**	8.21 (0.000)**		3.62 (0.000)**	9.90 (0.000)**
Earnings surprise × Abs (earnings surprise) ($\%^2$)			-4.23 (0.000)**	-3.53 (0.000)**			
Total annual EPS update × Abs (total annual EPS update) ($\%^2$)			-0.80 (0.111)	-0.77 (0.202)			-0.11 (0.483)
Total quarterly EPS update × Abs (total quarterly EPS update) ($\%^2$)			-1.51 (0.010)**	-1.56 (0.009)**			-2.26 (0.000)**
Additional control variables	No	No	No	Yes	No	No	No
Adjusted-R^2	-0.000	0.186	0.241	0.244	0.001	0.130	0.183
N	2,470	2,413	2,413	2,335	695	695	695