Short-Sales Constraints, Investor Disagreement, and the Asymmetric Market Reaction to Earnings News

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Abstract

We predict that when short-selling a stock is difficult and investors disagree about its fundamental value, the price reaction to earnings news will be asymmetric. Specifically, the price response to bad news will be greater than that to good news. Consistent with this prediction, we find that when short-sales constraints and disagreement are high, the magnitude of the bad news return is significantly greater than that of the good news return. However, when short-sales constraints are low, the price reaction to good and bad news is entirely symmetric, regardless of the level of investor disagreement. Our main prediction also helps explain the 'torpedo effect' of Skinner and Sloan (2002), who document that growth stocks experience an asymmetrically large price response to bad news relative to good news. We show that both value and growth stocks exhibit a torpedo effect in the presence of short-sales constraints and disagreement. However, in the absence of shorting restrictions, there is no torpedo effect for either value or growth stocks, even when investors' growth expectations are overoptimistic.

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1. Introduction

In this paper, we study whether constraints on short-selling a stock, coupled with investor disagreement about the stock's fundamental value, generate a negative asymmetry in earnings announcement returns, i.e., the price reaction to bad earnings news is disproportionately greater than that to good earnings news.[1] We then examine whether this idea also helps explain the asymmetrically large price response to bad news for growth stocks (Skinner and Sloan, 2002, hereafter SS), the so-called 'torpedo effect'.[2,3]

The fear of a disproportionately large penalty for missing expectations is widespread. Managers believe that an earnings disappointment makes investors suspect deeper problems at the firm and leads to a sharp fall in the stock price (e.g., Graham, Harvey, and Rajgopal, 2005). To avoid negative earnings surprises, managers resort to various techniques such as manipulating accruals and operating cash flows (e.g., Burgstahler and Eames, 2006), guiding analysts' earnings forecasts downward (e.g., Matsumoto, 2002), reporting pro forma rather than GAAP earnings (e.g., Bradshaw and Sloan, 2002), and strategically influencing the benchmark against

[1] The term 'short-sales constraints' refers both to the direct transaction costs of shorting and to other impediments to shorting. The latter can be mechanical (e.g., recall risk: the risk that the borrowed stock will be recalled by its owner), institutional (e.g., about 70% of mutual funds prohibit shorting), regulatory (e.g., short selling is prohibited or severely limited in many countries), societal (e.g., various constituencies blaming short-sellers for price declines), or behavioral (e.g., many individuals and equity mutual funds are simply unwilling to short). By 'disagreement', we mean that investors in a particular stock hold different beliefs about its fundamental value. Other common terms for disagreement in the literature are 'differences of opinion' and 'dispersion of beliefs'.

[2] Henceforth, we use the terms 'torpedo effect' and 'negative return asymmetry' interchangeably – both refer to an asymmetrically large price response to bad news relative to good news. SS also seem to use these terms interchangeably, although they do not directly test for a return asymmetry between good and bad news. Rather, they show that the bad news return increases with growth whereas the good news return does not.

[3] In replicating SS using unadjusted EPS forecasts from IBES, Payne and Thomas (2003) find no evidence of a negative asymmetry for growth stocks. We also use unadjusted forecasts for the reasons pointed out by Payne and Thomas, but find strong evidence of an asymmetric response for growth stocks for Payne and Thomas's sample period (1984-1999), SS's sample period (1984-1996), and our sample period (1989-2006) if we use the SS method of computing t-statistics (as is also done by Payne and Thomas). We discuss the SS replication for our sample period in section 6.3.

which reported earnings are judged (e.g., Schrand and Walther, 2000). Managers may even be willing to sacrifice real economic value by forgoing positive NPV projects (e.g., Graham et al., 2005). Moreover, this managerial propensity to avoid negative earnings surprises has increased significantly over time (e.g., Brown and Caylor, 2005).

But are managers justified in fearing a torpedo effect? Although there is ample anecdotal evidence of disproportionately large price drops after missing earnings expectations (e.g., Levitt, 1998), formal evidence on a negative return asymmetry is limited and inconclusive. Both Kasznik and Lev (1995) and Payne and Thomas (2009) observe a negative asymmetry in average returns for stocks with large earnings surprises. However, the latter finds no evidence of such an asymmetry for stocks with small earnings surprises. SS find a negative asymmetry in average returns for growth stocks but not for value stocks, while Kinney, Burgstahler, and Martin (2002) find a *positive* asymmetry for growth stocks (p. 1315).

With the exception of SS, prior research also does not explore *why* such an asymmetry might occur. SS attribute the return asymmetry for growth stocks to investors' expectational errors about future earnings. They argue that investors are overly optimistic about growth stocks and are subsequently disappointed when their earnings expectations are not met, leading to the large negative price response to bad earnings news. However, it is unclear why investors' expectational errors are impounded into prices. If rational arbitrageurs short overpriced stocks prior to the earnings announcement - thereby offsetting the beliefs of overoptimistic investors - one would expect the price reaction to good and bad earnings news to be symmetric. Therefore, unless there are impediments to rational arbitrage, expectational errors cannot adequately explain the torpedo effect. We examine the role of one such impediment - short-sales constraints - and show how it generates a negative return asymmetry for any stock subject to investor disagreement. Without shorting restrictions, there is no asymmetry, even in the presence of expectational errors about future earnings.

Our predictions are based on several theoretical papers (Miller, 1977; Harrison and Kreps, 1978; Scheinkman and Xiong, 2003) that imply an asymmetry in the stock price reaction to earnings news when shorting costs and differences of opinion are high. According to these models, if investors disagree about the value of a stock and pessimistic investors are constrained from shorting the stock, its price is set by the most optimistic investors, leading to overvaluation.[4] One intuitive implication of this view is that, all else equal, stocks that are overpriced due to short-sales constraints and disagreement will exhibit a greater price response to bad news than to good news. Bad earnings news, by directly contradicting the beliefs of the optimists who were setting the price prior to the earnings release, will cause the price to "crash", i.e., the bad news return will reflect both the disclosed earnings news as well as the correction of prior overpricing. In contrast, since good news does not contradict the optimists' beliefs, the price reaction to it will simply reflect the good earnings news. Thus, stocks subject to short-sales constraints and divergence of opinion will, on average, display a negative return asymmetry to news.[5]

Consistent with our predictions, we find an asymmetrically large price response to bad earnings news relative to good earnings news when short-sales constraints and disagreement are high (using short interest and share turnover as our main proxies for shorting constraints and disagreement, respectively). After controlling for the magnitude of the earnings surprise, the magnitude of the average bad news return (-6.91%) is more than twice as large as that of the average good news return (3.33%). In the absence of short-sales constraints, there is no evidence

[4] An extensive literature documents evidence consistent with such overpricing (see section 2.1).
[5] The assumptions on which this hypothesis depends are discussed in footnote 10.

of any such return asymmetry, regardless of the level of disagreement.

We also find that this asymmetry in average returns for stocks with high shorting costs and differences of opinion is an intercept effect (in a typical return-earnings regression) and is not driven by a corresponding asymmetry in the earnings response coefficients (ERCs). This suggests that the very act of missing the consensus earnings forecast causes the asymmetrically large price reaction to bad news. The results are robust to controls for firm size and liquidity, to alternative variable definitions, to using idiosyncratic return volatility and firm age as proxies for disagreement, and to refining our proxy for short-selling constraints (i.e., short interest) using institutional ownership. Competing hypotheses, such as differences in factors affecting ERCs (e.g., earnings persistence, growth, risk, losses) or withholding of bad news by managers (e.g., Kothari, Shu, and Wysocki, 2009) are also unlikely to explain the return asymmetry.

We then apply this framework to value and growth stocks and show that the negative return asymmetry for growth stocks (documented by SS) is driven by stocks with high short-selling costs and divergence of opinion. Moreover, consistent with our predictions, value stocks exhibit an equally large negative return asymmetry when shorting is difficult and disagreement is high. However, in the absence of shorting restrictions, neither growth nor value stocks exhibit a torpedo effect, regardless of the level of disagreement. Once again, the asymmetry in average returns for value and growth stocks operates via the intercept and does not depend on differences in ERCs or the magnitude of the earnings surprise.

Our paper contributes to the literature in several ways. First, we provide a comprehensive explanation for why firms sometimes experience a disproportionately large negative stock price reaction to bad earnings news. Although this phenomenon is well-known anecdotally, researchers continue to question its existence (e.g., Payne and Thomas, 2009) and the economic mechanism underlying it. We show that short-sales constraints and differences of opinion generate the torpedo effect; in the absence of shorting restrictions, there is no torpedo effect, even for growth stocks with overoptimistic investors (as in SS).

Second, although the torpedo effect may be an important reason why managers fear missing earnings benchmarks, our findings dispel some commonly held interpretations of this effect among managers and researchers. The torpedo effect does not necessarily imply, as managers seem to fear, that investors suspect deeper, unknown problems at the firm (e.g., Graham et al., 2005). Nor does it occur because investors overreact to the earnings miss, perhaps due to earnings fixation. Rather, our results indicate that the torpedo effect simply reflects a correction of prior overpricing due to high short-selling costs and differences of opinion. Our results also suggest that the apparently widespread fear among managers of a torpedo effect may be overblown, since only stocks with high shorting constraints and disagreement are torpedoed for missing earnings expectations.

Finally, our results shed light on the return premium to meeting/beating earnings expectations (e.g., Kasznik and McNichols, 2002; Bartov, Givoly, and Hayn, 2002). The premium to beating expectations is the difference in intercepts (in a return-earnings regression) between firms beating expectations and those missing expectations.[6] We find that the premium reflects, at least partly, the correction of prior overpricing caused by short-sales constraints. For example, the premium is more than twice as large when short-selling costs and disagreement are high than when they are low (9.77% vs. 4.78%; Table 2, Panel B), with about 75% of this difference driven by firms that are torpedoed after missing expectations. Thus, to the extent that the premium reflects the correction of prior overpricing, it does not reflect expected future

[6] Our definition of the premium differs slightly from Kasznik and McNichols (2002) in that we exclude firms meeting expectations whereas they combine firms meeting or beating expectations. However, the spread in premiums reported above is similar if we use their definition.

performance (e.g., Bartov et al., 2002), a reduction in information asymmetry (e.g., Brown, Hillegeist, and Lo, 2009), or a rational market "reward" for meeting expectations (e.g., Kasznik and McNichols, 2002).

The rest of the paper proceeds as follows. Section 2 discusses related theoretical and empirical research, section 3 presents our hypotheses, section 4 describes the sample and variable measurement, section 5 lays out our empirical specifications, section 6 discusses the results, section 7 discusses two competing explanations for the results, and section 8 concludes.

2. Background and Related Research

2.1 Theory

To develop our empirical predictions about the asymmetry in returns to good and bad news, we rely on the conceptual framework in Miller (1977). Miller (1977) was the first to predict that, if investors have heterogeneous beliefs about the value of a security and pessimistic investors are unable to short the security, its stock price will be set by the most optimistic investors, biasing the stock price upwards. Harrison and Kreps (1978) and Scheinkman and Xiong (2003) extend Miller's (1977) static model to a dynamic setting with similar predictions. In the dynamic models, and unlike Miller (1977), the overvaluation can be greater than even the most optimistic investor's valuation of the stock based on fundamentals. This occurs if the optimistic investor believes that she can find a buyer willing to pay even more for the security in the future. In other words, a price bubble is generated if the right to resell an asset encourages investors to pay more than they would pay if they were forced to hold the asset forever.[7]

[7] In addition to these mispricing models, rational "crash" models (e.g., Diamond and Verrecchia, 1987; Hong and Stein, 2003) also predict that short-sales constraints will affect the distribution of returns. However, in these models, short-sales constraints lead to negatively skewed returns around earnings announcements, but do not affect average returns. This is because, in these models, due to either rational expectations (Diamond and Verrecchia, 1987) or rational arbitrageurs who do not face short-selling restrictions (Hong and Stein, 2003), prices remain unbiased (i.e.,

Empirically, a large literature documents that stocks with high short-selling constraints and/or disagreement have abnormally low future returns, evidence consistent with Miller (1977) overpricing. Studies testing the price effect of short-sales constraints include Figlewski (1981), Jones and Lamont (2002), Desai, Ramesh, Thiagarajan, and Balachandran (2002), Chen, Hong, and Stein (2002), and Asquith, Pathak, and Ritter (2005), while those testing the effect of disagreement on returns include Diether, Malloy, and Scherbina (2002), Ang, Hodrick, Xing, and Zhang (2006), and Brennan, Chordia, and Subrahmanyam (1998). In a sharper test of Miller (1977), Boehme, Danielsen, and Sorescu (2006) show that overpricing occurs only in the presence of *both* short-selling restrictions and divergence of opinion. In the absence of either, there is no overpricing.

The evidence on Miller (1977) overpricing has been questioned. For example, Johnson (2004) finds no relation between analyst forecast dispersion (a proxy for disagreement) and subsequent returns after considering the effects of financial leverage, while Bali and Cakici (2008) find no robust relation between idiosyncratic volatility (another proxy for disagreement) and future returns. However, as Boehme et al. (2006) point out, this evidence does not necessarily contradict Miller (1977) because both shorting constraints and differences of opinion are required for any overpricing to occur. When short-selling is difficult, Boehme et al. (2006) find that both high forecast dispersion and high idiosyncratic volatility predict lower future returns.

2.2 Related Empirical Evidence

We now discuss several empirical studies that bear on our research question, and point

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there is no mispricing on average). Since prices are unbiased, neither model predicts an asymmetry in average returns. In our predictions, we appeal to the mispricing models because a large body of empirical evidence supports Miller (1977) overpricing.

out how our paper differs from them. Three studies focus on an asymmetric price response to earnings news. In addition to SS and Payne and Thomas (2009), who examine asymmetries in average returns and were mentioned above, Conrad, Cornell, and Landsman (2002) find a negative asymmetry in ERCs: the bad news ERC increases with the relative valuation of the aggregate stock market while the good news ERC does not. Unlike these studies, we explore how overpricing due to short-sales constraints and disagreement generates a return asymmetry around earnings announcements.

Another stream of research focuses on the effect of ex-ante disagreement and/or shorting restrictions on earnings announcement returns (using either total returns or ERCs), but does not examine how these factors create return asymmetries between good and bad news. Scherbina (2001) and Berkman, Dimitrov, Jain, Koch, and Tice (2009) find that stocks with high divergence of opinion (using various proxies) and/or shorting costs have lower average returns around earnings announcements, consistent with a reduction in Miller (1977) overpricing as uncertainty is (partly) resolved, and disagreement decreases, following the earnings announcement. Note that this finding does *not* necessarily imply a negative asymmetry in returns.[8] Neither do these studies allude to the possibility of return asymmetries around earnings announcements. Moreover, the purpose of our study is quite different from theirs – whereas

[8] At least three important factors could produce the result reported by Scherbina (2001) and Berkman et al. (2009), none of which implies any return asymmetry between good and bad news. First, if the high disagreement portfolio has a greater frequency of bad news and/or a lower average forecast error, its average return would be lower (other things equal). For example, Scherbina (2001) finds that analyst forecast optimism increases with disagreement, which implies a greater likelihood of bad news and/or a lower average forecast error for the high disagreement portfolio. Second, differences in the magnitude of the forecast error across good and bad news could also generate differences in returns across disagreement portfolios. For example, we find that the ratio of the magnitude of bad news to that of good news increases monotonically as disagreement increases, from 2.7 for the low disagreement portfolio to more than 3.8 for the high disagreement portfolio. All else equal, this would result in the high disagreement portfolio having a lower average return. Third, the high disagreement portfolio could have a lower average return simply because the return to firms meeting expectations (i.e., firms that belong to neither the good news nor bad news category) decreases with disagreement (all else equal). For example, we find that the return to firms meeting expectations decreases systematically from 0.9% for the low disagreement portfolio to -1.25% for the high disagreement portfolio. We control for these three factors in our return asymmetry tests.

these studies set out to test Miller's (1977) theory in an earnings announcement setting, we use Miller's idea to shed light on the torpedo effect, a phenomenon that has interested accounting researchers since Skinner and Sloan (2002) but that continues to be the subject of some debate over whether it actually exists and what its cause(s) might be.

Focusing on ERCs rather than total returns, Imhoff and Lobo (1992) and Kinney et al. (2002) find that firms with high analyst forecast dispersion have lower ERCs. They view this result as being consistent with rational pricing: greater dispersion reduces ERCs because it reflects higher ex-ante earnings uncertainty, i.e., a lower informativeness of current earnings for future earnings. Neither paper discusses the possibility of Miller (1977) overvaluation in the presence of such disagreement.

Chen and Jiambalvo (2004) find the same negative relation between forecast dispersion and ERCs for bad earnings news in particular. They infer that this is inconsistent with Miller's (1977) theory because the latter implies a *greater* price reaction to bad news as dispersion increases. However, Miller's (1977) argument applies to total returns and not necessarily to the price response per unit of earnings news (the ERC). Using total returns, we show that the magnitude of the bad news price reaction is indeed increasing with disagreement, as predicted by Miller (1977), even though the bad news ERC does not increase with disagreement. Chen and Jiambalvo (2004) also do not condition their tests on short-sales constraints, which is a necessary condition for any Miller (1977) overpricing.

3. Hypotheses

Our prediction about an asymmetric reaction to good and bad earnings news follows intuitively from Miller (1977): on average, stocks that are overpriced due to short-sales constraints and disagreement will exhibit a greater absolute price response to bad news than to good news.[9] Because bad news about an overpriced stock contradicts the beliefs of the optimists setting the price prior to the news, the price response to such news will reflect both the current bad news and a correction of prior overvaluation. In contrast, since good news does not contradict the optimists' beliefs, the price response to it will simply reflect the good earnings news. Thus, on average and all else equal, the price response to bad news will be greater than that to good news when shorting constraints and disagreement are high prior to the earnings release.[10] (Note that the Miller (1977) effect, which we rely on for our predictions, is a statement about the effect of shorting restrictions and disagreement on total returns. In the earnings announcement context, it is not clear ex-ante whether this effect operates via the intercept, the ERC, or both. Our predictions, therefore, are about total returns to earnings announcements.)

The above discussion leads to the following hypotheses, all expressed in alternative form. We first focus on how short-selling restrictions and divergence of opinion affect earnings announcement returns for a random cross-section of firms:

> H1a: For stocks with *high* short-sales constraints and *high* disagreement, the absolute return to bad earnings news is *greater than* that to good earnings news.

Conversely:

> H1b: For stocks with *low* short-sales constraints and/or *low* disagreement, the absolute return to bad earnings news is *equal to or less than* that to good earnings news.

We then focus specifically on value and growth firms and examine whether the torpedo effect

[9] To develop our main hypothesis, we rely on a conceptual understanding of Miller's (1977) theory and the role it may play in earnings announcements. Although our argument is logical and intuitive (in our view), it is not based on any formal modeling. However, to the extent that the assumptions and/or the logic on which it is based are incorrect, our prediction will not survive empirical scrutiny.

[10] Our reasoning depends on three assumptions also made (at least implicitly) by Scherbina (2001) and Berkman et al. (2009). First, we assume that prices will reflect fundamental value in the absence of shorting constraints. Second, we assume that, on average, investor disagreement falls after earnings announcements. Several papers find evidence consistent with this assumption (e.g., Patell and Wolfson, 1981; Brown and Han, 1992; Bamber, Barron, and Stober, 1997; Berkman et al., 2009; Rees and Thomas, 2010); however, others argue that disagreement need not fall after earnings announcements (e.g., Barron, Byard, and Kim, 2002). Finally, we assume that, on average, short-sales constraints do not increase following earnings announcements.

documented by SS is driven by short-selling restrictions and disagreement. Since our primary predictions above (H1a and H1b) are generic in nature, we expect them to also hold for both value and growth firms. Thus,

> H2a: For both *value and growth stocks* with *high* short-sales constraints and *high* disagreement, the absolute return to bad earnings news is *greater* than that to good earnings news.

Conversely,

> H2b: For both *value and growth stocks* with *low* short-sales constraints and/or *low* disagreement, the absolute return to bad earnings news is *equal to or less than* that to good earnings news.

H2 serves two purposes. It examines whether the SS torpedo effect for growth stocks occurs because of short-sales constraints and disagreement. It also rules out growth as an explanation for H1 if growth somehow proxies for both the difficulty of shorting and high disagreement.

4. Data and Variables

4.1 Sample

Our sample period runs from January 1989 to June 2006 because we have exchange-provided short interest data for this period.[11] Monthly short interest data are obtained from NYSE, AMEX and NASDAQ. During our sample period, each exchange collected short interest data (i.e., the number of shares shorted) for individual firms around the fifteenth calendar day of every month. Quarterly earnings per share data (realized EPS, median analyst EPS forecast, and the standard deviation of analysts' EPS forecasts) are obtained from the unadjusted IBES summary file (Payne and Thomas, 2003), while quarterly earnings announcement dates are obtained from the quarterly Compustat files. Stock liquidity data are obtained from Joel

[11] Short interest data reported by the NYSE and AMEX begin in January 1991, while those reported by NASDAQ begin in June 1988. We begin our sample period in January 1989 because we have very few observations for 1988.

Hasbrouck's website,[12] institutional ownership data are obtained from the CDA/Spectrum institutional money manager holdings (13-F) database, and stock returns, stock prices, shares outstanding, and trading volume data are obtained from CRSP. All other accounting data are obtained from the quarterly Compustat files. After deleting observations without all the required data, our main sample consists of 174,962 firm-quarter observations, while our value/growth sample for the SS tests consists of 2,696,507 firm-quarter observations.[13] Note that the sample size for the SS tests is larger because for each firm in the value/growth portfolios, we track its earnings surprises and corresponding stock returns for the 20 calendar quarters following portfolio formation (see section 4.7).

4.2 Abnormal Returns

SS document that the torpedo effect is only observed when the earnings announcement return interval includes earnings preannouncements. This is because a large proportion of preannouncements are negative surprises (e.g., Kasznik and Lev, 1995; Soffer, Thiagarajan, and Walther, 2000), and such bad news preannouncements generate greater price reactions relative to firms that do not warn (e.g., Kasznik and Lev, 1995). To avoid missing the stock price reaction to preannouncements, both SS and Kinney et al. (2002) use long-window return intervals. We follow SS and measure stock returns from twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement date for the fiscal quarter (since most preannouncements occur within two weeks on either side of the fiscal quarter end). This return interval averages 31 trading days in length.

We use size-adjusted returns as our measure of abnormal (i.e., risk-adjusted) returns. Abnormal returns are computed as the difference between the buy-and-hold return for an

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[12] We thank Joel Hasbrouck for providing the data.

[13] Dropping financials (SIC codes 6000-6499) and regulated industries (SIC codes 4400-4999) from the sample does not affect our inferences.

individual firm and the buy-and-hold return on an equal-weighted size-matched portfolio over the same return interval. For all sample firms, decile portfolios based on market capitalization are formed at the beginning of each calendar quarter and the equal-weighted buy-and-hold return is computed for each size decile over the return interval. The buy-and-hold return for the size decile to which a firm belongs is then subtracted from the firm's raw buy-and-hold return to give the size-adjusted return.[14] Note that we do not adjust returns for the book-to-market effect (considered as a potential risk factor) because we show that the torpedo effect for value and growth stocks is itself due to short-sales constraints and disagreement.

4.3 Earnings Surprise Variables

The quarterly earnings surprise is defined as the realized EPS less the median (consensus) EPS forecast for the quarter. We use the median EPS forecast provided by IBES in the final month of the fiscal quarter for which earnings is being forecast. Thus, since IBES releases forecast data around the middle of the month, earnings preannouncements made after the middle of the final month of the fiscal quarter are unlikely to influence the consensus forecast. We then define three dummy variables - MEET, GOOD and BAD - to indicate no earnings news, good earnings news, and bad earnings news, respectively. MEET equals one if a firm meets (but does not beat) its consensus forecast and is zero otherwise, GOOD equals one if a firm beats its consensus forecast and is zero otherwise, and BAD equals one if a firm misses its consensus forecast and is zero otherwise. We also create a continuous variable, FE, which captures both the sign and magnitude of the earnings surprise. FE is defined as the earnings surprise scaled by the closing stock price on the last trading day of the fiscal quarter for which earnings are being announced. This variable is winsorized at the 0.01 level to mitigate the influence of outliers.

[14] Using market-adjusted returns leads to similar inferences.

4.4 Short-sales Constraints

Our main proxy for short-sales constraints, SSC, is defined as short interest scaled by the number of shares outstanding. Short interest is the most widely used publicly-available proxy in the literature because of prior evidence that it reflects the direct costs of shorting.[15] First, D'Avolio (2002) shows that the greater the short interest in a stock, the lower the rebate rate, i.e., the higher the cost of shorting. Second, short interest is positively correlated with put-call parity violations in the options market (e.g., Figlewski and Webb, 1993; Lamont and Thaler, 2003). Since put-call parity violations are often caused by shorting costs (e.g., Lamont and Thaler, 2003; Ofek, Richardson, and Whitelaw, 2004), this finding is consistent with short interest reflecting the costs of shorting. Finally, stocks with high short interest tend to have abnormally low future returns (e.g., Figlewski, 1981; Desai et al., 2002; Jones and Lamont, 2002; Asquith et al., 2005), consistent with high short interest reflecting the difficulty of shorting and causing overvaluation when disagreement is high (e.g., Miller, 1977).

One criticism of short interest as a proxy for marginal shorting costs is that it does not directly measure excess shorting demand; rather, the level of short interest is the equilibrium outcome of the demand for shorting as well as the supply of shares available for shorting. To mitigate concerns about this proxy, we also use institutional ownership to refine it. Asquith et al. (2005) argue that if short interest is a proxy for shorting demand while institutional ownership is a proxy for the supply of shares available for shorting, the interaction of short interest and institutional ownership may better capture short-sales constraints.[16] In section 6.2.2, we show

[15] We cannot use data on direct costs of shorting (e.g., rebate rates) because such data are proprietary. The rebate rate is the effective interest rate received by the borrower of the shares on the proceeds of the shorted shares, and is therefore a direct measure of shorting costs in the securities lending market.

[16] However, as Asquith et al. (2005) acknowledge, observed short interest is itself the equilibrium result of both shorting demand and supply. Thus, whether or not interacting short interest and institutional ownership leads to a better proxy for shorting constraints is an empirical issue.

that using both short interest and institutional ownership yields results that are similar to those using short interest alone.[17]

Because short interest is reported by the exchanges around the middle of each month and earnings preannouncements usually occur after the middle of the last month of the fiscal quarter, we use the short interest as of the last month of the fiscal quarter for which earnings are being announced. This avoids any overlap with the price reaction to earnings preannouncements (and any related confounding effects) and best captures the degree to which a firm is short-sales constrained prior to the earnings announcement. The number of shares outstanding is measured at the end of the last month of the fiscal quarter.

4.5 Disagreement

We use share turnover, TURN, as our main proxy for investor disagreement, defined as trading volume scaled by the number of shares outstanding, because it is perhaps the most widely-used measure for disagreement in the empirical literature. This proxy is directly suggested by theoretical models on disagreement because disagreement generates trading activity (e.g., Varian, 1989; Harris and Raviv, 1993; Kandel and Pearson, 1995; Odean, 1998). The empirical evidence is also consistent with a strong relation between disagreement and turnover (e.g., Ofek and Richardson, 2003; Mei, Scheinkman, and Xiong, 2009). Furthermore, Garfinkel (2009) shows that, based on a direct measure of investor disagreement constructed from proprietary limit order and market order data, unexplained turnover appears to be the best proxy for disagreement compared to other commonly used proxies such as analyst forecast dispersion

[17] Short interest could also proxy for the negative information that short-sellers have about a stock (e.g., Dechow, Hutton, Muelbroek, and Sloan, 2001; Richardson, 2003; Drake, Rees, and Swanson, 2009). However, if short interest only reflects negative information and does not also capture shorting constraints, it is difficult to see why short interest would predict a negative return asymmetry around earnings announcements. If anything, one would expect a completely symmetric price reaction because any bad news would be impounded into the stock price by short-sellers prior to the earnings announcement. Only if the bad news were not fully impounded into the price prior to the earnings announcement – which would happen in the presence of shorting constraints – would we expect to observe a torpedo effect.

and idiosyncratic return volatility. (We report results using idiosyncratic volatility, firm age, and analyst forecast dispersion in section 6.2.3.) A large literature also shows that high turnover predicts abnormally low future returns (e.g., Brennan et al., 1998; Lee and Swaminathan, 2000; Baker and Stein, 2004), especially when shorting costs are high (e.g., Mei et al., 2009; Boehme et al., 2006), evidence again consistent with overvaluation in the presence of short-sales constraints if turnover proxies for disagreement.

Trading volume is the average daily trading volume over the 60 calendar days ending on the 15th of the last month of the fiscal quarter, while the number of shares outstanding is measured at the end of the last month of the fiscal quarter.[18, 19] As with our proxy for short-selling constraints (SSC), we measure TURN as of the 15th of the last month of the fiscal quarter to prevent any overlap with, and any confounding effects of, the price reaction to earnings preannouncements.[20] Since turnover may also reflect liquidity trading in addition to disagreement, we control for liquidity in our regression tests (see section 5.1).

4.6 Portfolio Formation

We form portfolios on short-sales constraints and turnover as follows. At the end of every

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[18] Following prior research (e.g., Atkins and Dyl, 1997), we divide trading volume by two for NASDAQ firms to make the level of trading volume comparable to that for NYSE and AMEX firms. NASDAQ is a dealer market where market makers post bid and ask prices and stand ready to buy into or sell from their inventory of a particular stock at these prices. Since virtually all of the trading in NASDAQ stocks is through dealers, the trading volume in these stocks is a poor measure of the actual number of trades between public investors. In contrast, the NYSE and AMEX are auction markets where specialists trade with investors only if no other investors are willing to take the trades. To adjust for these differences, Atkins and Dyl (1997) recommend dividing NASDAQ trading volume by two.

[19] Inferences are unaffected if we use a shorter window for the turnover measure (30 or 45 calendar days).

[20] Since we measure short-sales constraints (SSC) and disagreement (TURN) as of the 15th of the last month of the fiscal quarter, there is a lag between our measurement date and the actual earnings announcement. A possible concern is whether changes in SSC and/or TURN during this interval could affect our results. To investigate this issue, we re-defined TURN to be the average turnover over the 10 trading days immediately preceding the earnings announcement interval, i.e., over [-11, -2], and restricted the return interval to [-1, 1] to avoid overlapping measurement intervals. Our inferences remain unchanged, although the return asymmetry is smaller. The smaller asymmetry is expected due to both the exclusion of earnings preannouncement returns as well as the shorter return window. Thus, any changes in TURN between the measurement date and the earnings announcement are unlikely to explain our results. (Note that we cannot similarly test the effect of changes in short interest prior to earnings announcements because we only have monthly short interest data.)

calendar quarter, all sample firms are independently sorted into SSC and TURN quintiles, resulting in 25 SSC x TURN portfolios every calendar quarter.[21] Because we use regressions for all our analyses, we use the corresponding rank variables for SSC and TURN in the regressions to facilitate the computation of portfolio returns based on estimated regression coefficients.

4.7 Skinner-Sloan Torpedo Effect

For our analysis of the effect of short-sales constraints and disagreement on the SS torpedo effect for growth stocks, we compute the market-to-book ratio and form value/growth portfolios as in SS. The market-to-book ratio is defined as the market value of common equity divided by the book value of common equity, and is measured for each firm at the end of its fiscal quarter. At the end of every calendar quarter, sample firms are sorted into quintiles (GROWTH) based on their market-to-book ratio. Like SSC and TURN, we use the corresponding rank values of GROWTH in the regressions to facilitate the computation of portfolio returns based on the estimated regression coefficients. For each firm in these value/growth portfolios, we track the earnings surprises and corresponding stock returns for the 20 calendar quarters following portfolio formation. For example, firms in portfolios formed at the beginning of January 1991 (based on market-to-book ratios during the last calendar quarter of 1990) correspond to earnings surprises and stock returns from the first quarter of 1991 to the last quarter of 1995.

5. Empirical Tests

5.1 Return Asymmetry for Good and Bad Earnings News

To investigate how short-sales constraints and disagreement generate an asymmetry in

[21] Using conditional sorts leads to similar inferences.

the price response to good and bad news, we use the following specification:[22]

$$R_{it} = b_0MEET_{it} + b_1GOOD_{it} + b_2BAD_{it} + b_3GOOD_{it}*FE_{it} + b_4BAD_{it}*FE_{it} + b_5GOOD_{it}*SSC_{it} + b_6BAD_{it}*SSC_{it} + b_7GOOD_{it}*TURN_{it} + b_8BAD_{it}*TURN_{it} + b_9GOOD_{it}*SSC_{it}*TURN_{it} + b_{10}BAD_{it}*SSC_{it}*TURN_{it} + b_{11}GOOD_{it}*FE_{it}*SSC_{it} + b_{12}BAD_{it}*FE_{it}*SSC_{it} + b_{13}GOOD_{it}*FE_{it}*TURN_{it} + b_{14}BAD_{it}*FE_{it}*TURN_{it} + b_{15}GOOD_{it}*FE_{it}*SSC_{it}*TURN_{it} + b_{16}BAD_{it}*FE_{it}*SSC_{it}*TURN_{it} + b_{17}LIQ + e_{it} \quad (1)$$

where:

i indexes firms and *t* indexes fiscal quarters;

R_{it} = size-adjusted buy-and-hold return for firm *i* in quarter *t*;

$MEET_{it}$ = dummy variable equal to 1 if the earnings surprise for firm *i* in quarter *t* is zero, and 0 otherwise;

$GOOD_{it}$ = dummy variable equal to 1 if the earnings surprise for firm *i* in quarter *t* is positive, and 0 otherwise;

BAD_{it} = dummy variable equal to 1 if the earnings surprise for firm *i* in quarter *t* is negative, and 0 otherwise;

SSC_{it} = short interest quintile to which firm *i* belongs in quarter *t* (0 = low short interest, …4 = high short interest);

$TURN_{it}$ = share turnover quintile to which firm *i* belongs in quarter *t* (0 = low turnover, …4 = high turnover) ;

FE_{it} = earnings surprise for firm *i* in quarter *t*, scaled by stock price at end of quarter *t*;

LIQ_{it} = liquidity for firm *i* in quarter *t*;

We control for the magnitude of the earnings surprise because its distribution differs across good

[22] We opt for a regression approach rather than a portfolio approach in order to more easily incorporate controls such as the magnitude of the earnings surprise and liquidity. Doing so using portfolios would result in unacceptably small portfolio sizes. A regression approach also allows us to examine whether the asymmetry in average returns arises via ERCs or intercepts. However, using a portfolio approach (forming portfolios only on SSC and TURN) leads to similar results.

and bad news (the mean, the 25th percentile, and the median of the absolute value of FE are all higher for bad news than for good news). Equation (1) also allows both the intercept and ERC for good and bad news to independently vary with short-sales constraints and disagreement.

Because turnover can reflect liquidity effects, equation (1) controls for liquidity (LIQ) to isolate the effect of belief dispersion. We use the Gibbs measure of the effective cost of trading to proxy for liquidity (e.g., Hasbrouck, 2009). The Gibbs estimate is based on daily closing prices and has a higher correlation (correlation = 0.965) with liquidity cost estimates based on transaction-level trade and quote data (TAQ) than other commonly used CRSP-based liquidity measures (see Hasbrouck, 2009).[23] Note that a higher value for the Gibbs estimate indicates *lower* liquidity. Since LIQ is measured annually, all quarterly observations for a particular firm in calendar year t are matched to the firm's liquidity measure for calendar year t-1.

All regression coefficients and t-statistics are computed using the Fama-MacBeth (1973) technique to account for cross-correlation of residuals within a calendar quarter.[24] Average returns for each portfolio are then computed from the estimated regression coefficients using the median absolute forecast error (FE) for the relevant regression sample.[25] Statistical significance is evaluated at the 0.05 level unless otherwise mentioned. Tests for the difference in absolute returns between good and bad news are one-sided, while all other tests (for estimated regression coefficients, differences in estimated ERCs, and differences in estimated intercepts) are two-sided.

For ease of exposition, we only report results for the following 4 portfolios to illustrate

[23] Inferences are similar using other common liquidity proxies such as the percentage bid-ask spread, the Roll (1984) effective cost measure, and the Amihud (2002) illiquidity measure.
[24] Adjusting the standard errors using the Newey-West correction does not affect the results, indicating that serial correlation is not a concern in our data.
[25] Inferences remain unchanged if we instead compute each portfolio return using its own median absolute forecast error.

the effect of short-sales constraints and disagreement on the return asymmetry: [SSC, TURN] = [0, 0], [0, 4], [4, 0] and [4, 4], where 0 = lowest quintile and 4 = highest quintile for the relevant variable. Recall that we predict a return asymmetry to good and bad news only when short-sales constraints are binding and disagreement is high (i.e., for portfolio [4, 4]); no asymmetry is predicted for the other portfolios.

5.2 Skinner-Sloan Torpedo Effect

To replicate the return asymmetry documented by SS, we estimate the following specification:

$$R_{itk} = b_0 + b_1 GROWTH_{it} + b_2 GOOD_{itk} + b_3 BAD_{itk} + b_4 GOOD_{itk} {*} GROWTH_{it} + b_5 BAD_{itk} {*} GROWTH_{it} + e_{itk} \quad (2)$$

where:

i indexes firms, *t* indexes calendar quarters in which growth portfolio assignments are made, and *k* indexes the 20 subsequent quarters over which we track returns and earnings surprises for each growth (firm-quarter) observation;

R_{itk} = size-adjusted buy-and-hold return for firm *i* in quarter *t*+*k*;

$GROWTH_{it}$ = market-to-book quintile to which firm *i* belongs in quarter *t* (0 = low growth quintile, …4 = high growth quintile);

All other variables are as defined above for specification (1).

Average returns to value and growth stocks are then computed based on all the estimated regression coefficients in equation (2). (Note that to evaluate any asymmetry between good and bad news for growth stocks, it is not sufficient to simply compare the estimated coefficients on GOOD*GROWTH and BAD*GROWTH in equation (2).) To examine how short-sales constraints and disagreement affect the price response to good and bad news for value and growth stocks, we estimate equation (1) separately for value and growth stocks.

6. Results

This section discusses the results of our empirical tests. We begin with the entire cross-section of firms and examine the effect of shorting costs and divergence of opinion on the price response to good and bad news. We then examine whether these two factors help explain the torpedo effect for growth stocks documented by SS.

6.1 Return Asymmetry for Good and Bad Earnings News

Table 2 reports the results of our main tests. Panel A shows the regression coefficient estimates for equation (1), while Panel B shows the computed average returns, the ERCs, and the intercepts for each portfolio based on the regression coefficients in Panel A. (Note that we use the coefficients from column (1) of Panel A for the "All observations" portfolio and the coefficients from column (2) for all other portfolios.)

Panel B shows that, prior to conditioning on short-sales constraints and disagreement, there is no return asymmetry across good and bad news. The estimated average return for good news is 3.86%, that for bad news is -3.63%, and the difference in magnitudes is statistically insignificant (t-statistic of difference = 0.99). (Note that for the asymmetry tests, we compare absolute values of the good and bad news returns.)

When short-sales constraints and disagreement are high (i.e., when SSC = 4 and TURN = 4), we observe a pronounced asymmetry. The magnitude of the bad news return (est. return = -6.91%) is more than twice as large as that of the good news return (est. return = 3.33%), as predicted by H1a, and this difference of 3.58% is statistically significant at the 0.01 level (t-statistic of difference = 4.72).

Returns are symmetric when short-sales constraints are not binding (i.e., when SSC = 0), consistent with H1b. However, seemingly inconsistent with H1b, we also observe a negative asymmetry when shorting costs are high but disagreement is low. A likely reason is that Miller (1977) overpricing still occurs for this portfolio because disagreement, although low relative to other firms, is not strictly zero. If this conjecture is valid, one would expect to see the overpricing, and hence the negative asymmetry, increasing with disagreement (when shorting costs are high). This is exactly what we observe: the asymmetry is twice as large when disagreement is high (est. asymmetry = 3.58%) compared to when disagreement is low (est. asymmetry = 1.78%). Thus, overall, the results are consistent with H1b.

To shed light on whether the return asymmetry arises via the intercept or the ERC, Panel B shows the estimated ERCs and intercepts for good and bad news. When short-sales constraints are high, there is no statistically significant difference between the good and bad news ERCs, regardless of the level of disagreement. Thus, we find no evidence of a torpedo effect in ERCs, implying that factors affecting ERCs, such as size, earnings persistence and systematic risk, cannot explain the asymmetry. Rather, the torpedo effect arises via the intercept. When both short-sales constraints and disagreement are high, the difference in absolute values of the good and bad news intercepts (est. intercepts of 3.12% and -6.65%, respectively) is an economically large and statistically significant 3.53% (t-statistic of difference = 4.46). There is no negative asymmetry in the intercept in the absence of shorting restrictions. Notice also that the asymmetry in the intercept is almost identical in magnitude to the corresponding asymmetry in total returns when short-sales constraints and disagreement are high. This suggests that it is the very fact of missing an earnings forecast that causes an asymmetrically large price response to bad news rather than differences in the ERC and/or the magnitude of the earnings surprise.

6.2 Additional Tests

6.2.1 Role of Firm Size

Although we use size-adjusted returns, we further explore the role of firm size because of its importance in return anomalies and earnings announcement returns. Every calendar quarter, firms are independently sorted into size quintiles based on their market capitalization at the end of the fiscal quarter. We then estimate specification (1) separately for each size quintile. Table 3 shows that although the magnitude of the return asymmetry decreases with firm size, all but the largest firms (those in the highest size quintile) exhibit a strong return asymmetry.[26] Thus, the torpedo effect is a fairly general phenomenon and is not confined to the smallest firms. A plausible explanation for the negative relation between firm size and the asymmetry is the role of institutional ownership. All else equal, larger firms are more widely held by institutions, making them easier to borrow and sell short (e.g., Nagel, 2005). Thus, firms with higher institutional ownership should exhibit a lower asymmetry. This is indeed what we find in the next section.

6.2.2 Role of Institutional Ownership

To help alleviate concerns about short interest as a proxy for shorting constraints, we follow Asquith et al. (2005) and use a proxy incorporating both short interest and institutional ownership. This new proxy does not alter our main results appreciably.

Institutional ownership (IO) is defined as the sum of all institutional holdings of the stock scaled by the number of outstanding shares. Since institutional holdings are reported every calendar quarter, we use the most recent institutional ownership data for a firm prior to the end of its fiscal quarter. The number of outstanding shares is measured at the end of the last month of the fiscal quarter. As in prior research (e.g., Nagel, 2005), stocks without any reported 13-F

[26] This finding is strikingly consistent with prior studies on the Miller (1977) effect. For example, Diether et al. (2002) find that the negative relation between forecast dispersion and future returns is monotonically decreasing in size, with the relation becoming insignificant for their two highest size quintiles.

institutional holdings are assumed to have no institutional ownership.

We first examine whether the return asymmetry decreases with institutional ownership, as would be expected if institutional ownership proxies for the supply of lendable shares. Three IO portfolios are formed each calendar quarter and specification (1) is estimated separately for each IO tercile. Panel A of Table 4 shows that when short interest and disagreement are high, the return asymmetry is monotonically decreasing with institutional ownership, consistent with institutional ownership proxying for the supply of shares available for shorting (e.g., Asquith et al., 2005; Nagel, 2005). The asymmetry for the lowest institutional ownership tercile (est. asymmetry = 4.30%) is more than twice as large as that for the highest institutional ownership tercile (est. asymmetry = 1.97%).

Next, we use both short interest and institutional ownership to generate a proxy for short-sales constraints. Every calendar quarter, firms are sorted independently into terciles based on short interest and institutional ownership. We then form 3 portfolios of short-sales constraints: the difficulty of shorting is highest for firms with the highest short interest and the lowest institutional ownership (SSC = 2), it is lowest for firms with the lowest short interest and the highest institutional ownership (SSC = 0), and all other firms fall into an intermediate portfolio (SSC = 1).[27] Turnover is independently sorted into quintiles as before, resulting in 15 SSC x TURN portfolios each quarter. Panel B of Table 4 shows that this new proxy does not yield any significant benefits: the results are similar to our main results in Table 2, although the return asymmetry is a little stronger when short-sales constraints and disagreement are high (4.16% versus 3.58% in Table 2).

[27] We use terciles for institutional ownership to be consistent with Asquith et al. (2005). Inferences are similar if we use quintiles instead of terciles for short interest.

6.2.3 Using Alternative Proxies for Disagreement

Since prior research on the price effects of disagreement also uses idiosyncratic return volatility (e.g., Boehme et al., 2006), firm age (e.g., Zhang, 2006), and analyst forecast dispersion (e.g., Diether et al., 2002) as proxies for disagreement, we examine the sensitivity of our results to these different measures. Idiosyncratic volatility, the inverse of firm age, and forecast dispersion are all expected to be positively associated with disagreement. We find that idiosyncratic volatility and firm age yield results similar to those with turnover, whereas our results with forecast dispersion are inconsistent with our prediction and contrary to those with the other three proxies.

Idiosyncratic volatility is defined as the standard deviation of residuals from a regression of the firm's stock return on the value-weighted market return (obtained from CRSP) over the 60 calendar days ending on the 15th of the last month of the fiscal quarter.[28] Firm age is the number of years the firm appears on CRSP prior to the 15th of the last month of the fiscal quarter. Analyst forecast dispersion is defined as the standard deviation of analysts' earning forecasts reported by the unadjusted IBES summary file in the last month of the firm's fiscal quarter, scaled by the average forecast. Stocks with a zero average forecast are assigned to the highest dispersion quintile as in Diether et al. (2002),[29] while firms covered by less than two analysts are dropped. Like SSC and TURN, these three proxies are measured as of the middle of the last month of the fiscal quarter to avoid an overlap with the return cumulation period, which begins around the middle of the last month of the fiscal quarter.

Using idiosyncratic volatility or firm age as disagreement proxies, Panels A and B of

[28] Using a shorter window (30 or 45 calendar days) to compute idiosyncratic volatility leads to similar inferences.
[29] Alternatively, dropping these stocks from the sample does not affect our inferences. Neither does scaling the standard deviation of forecasts by share price instead of the average forecast. Inferences are also similar if we compute forecast dispersion using only forecasts that were issued or reconfirmed by IBES within 45 days of the middle of the last month of the fiscal quarter (using the unadjusted IBES detail file).

Table 5 show that there is no return asymmetry when shorting is unconstrained, but a strong asymmetry emerges when both short-sales restrictions and disagreement are high. These findings are consistent with our predictions. The magnitude of the asymmetry using either idiosyncratic volatility or firm age is also similar to that using turnover in Table 2, Panel B.

Using forecast dispersion, Panel C of Table 5 reports that there is no asymmetry when short-selling restrictions are not binding, as predicted. However, when such restrictions are binding, a return asymmetry is only seen when forecast dispersion is *low* (est. asymmetry = 4.13%, t-statistic = 5.05). There is no asymmetry when both shorting constraints and forecast dispersion are high. This indicates that the asymmetry is decreasing with forecast dispersion, contrary to our prediction.

To better understand this anomalous result, we examine how forecast dispersion affects the return asymmetry using turnover, idiosyncratic volatility, or firm age. If forecast dispersion proxies for disagreement, the return asymmetry using any of the other three proxies should either increase with dispersion or remain unaffected by it (assuming, of course, that our predictions, as well as the three other disagreement proxies, are valid). Surprisingly, Table 6 shows that the return asymmetry using any of the other three disagreement proxies *decreases* (almost monotonically) as forecast dispersion increases. In every case, the highest dispersion portfolio exhibits no torpedo effect at all.[30] Forecast dispersion thus behaves in a manner opposite to that of turnover, idiosyncratic volatility, or firm age.

One plausible reason for this puzzling result is that forecast dispersion is a weak proxy for disagreement. Disagreement among analysts (a relatively well-informed subset of market participants) may not be highly correlated with disagreement among *investors*, our primary

[30] In unreported tests, we find that this negative relation between dispersion and the asymmetry is not driven by firm size. Neither is it driven by variation in short interest or turnover/idiosyncratic volatility/firm age across dispersion portfolios.

focus. For example, Bamber, Barron and Stober (1997) show that, unlike trading volume, forecast dispersion does not capture all aspects of investor disagreement generated by earnings announcements. Forecast dispersion may also be affected by analyst herding (e.g., Welch, 2000; Hong, Kubik, and Solomon, 2000), which could result in low measured dispersion even in the presence of genuine uncertainty about future earnings. Perhaps for such reasons, Garfinkel (2009) finds that forecast dispersion is *negatively* correlated with a direct measure of investor disagreement constructed from proprietary trading order data. Our anomalous results using the dispersion proxy appear to be consistent with Garfinkel's (2009) finding. However, at this juncture, we are unable to explain the dispersion result in a completely satisfying way.

6.3 Replication of Skinner-Sloan Torpedo Effect

We now study whether the SS torpedo effect for growth stocks is also caused by short-sales constraints and disagreement. We first replicate the SS results (Table 7) and then explore how short-sales constraints and disagreement affect the price response to good and bad news for both value and growth stocks (Table 8).

Table 7 reports average returns for value and growth stocks using the estimated coefficients for the regression specification used by SS (equation (2)). To facilitate comparison with SS's findings, we report results using both size- and market-adjusted returns.[31] In Panel A, we use the SS method of correcting for cross-correlation of residuals, while in Panel B we report t-statistics using the Fama-MacBeth (1973) method. SS use a pooled regression and mechanically adjust OLS standard errors by multiplying them by the square root of 20 (since returns are tracked for 20 quarters after portfolio formation, each quarterly observation can be included in the regression up to 20 times).

Panel A shows that, as in SS, value stocks show no sign of a negative asymmetry on

[31] With the exception of Table 2 in their paper, SS report results using market-adjusted returns.

average. Growth stocks, on the other hand, exhibit a strong torpedo effect, which is highly statistically significant at the 0.01 level for both size- and market-adjusted returns. However, when we use the Fama-MacBeth (1973) method to compute t-statistics (Panel B), the growth-stock asymmetry is generally statistically insignificant: it is barely significant using market-adjusted returns (est. asymmetry = 1.41%, t-statistic = 1.60) and insignificant using size-adjusted returns (est. asymmetry = 1.71%, t-statistic = 1.08). Since this indicates that the SS method of standard error correction seems to understate the true standard errors, we use the Fama-MacBeth method for all of our tests.

6.4 Short-sales Constraints, Disagreement, and the Skinner-Sloan Torpedo Effect

Table 8 shows that once we condition on short-sales constraints and disagreement, we always observe a torpedo effect, but only when short-sales constraints are binding and disagreement is high; moreover, under these conditions, both growth and value stocks exhibit a torpedo effect. In the interests of clarity, we run specification (1) separately for value and growth stocks. Also, for brevity, we only discuss results using size-adjusted returns; market-adjusted results are similar (as shown in Table 8).

Panel A shows that, consistent with H2b, there is no torpedo effect for value stocks when short-sales constraints are not binding. However, when both short-sales constraints and disagreement are high, we observe a strong return asymmetry to good and bad news for value stocks, as predicted by H2a. The bad news return is -6.08%, the good news return is 2.76%, and the difference in magnitudes is statistically significant (t-statistic of difference = 2.03). Thus, although value stocks do not exhibit a torpedo effect on average, a pronounced torpedo effect emerges when short-sales constraints are binding and disagreement is high. Moreover, this torpedo effect is entirely an intercept effect rather than an ERC effect. (Note that although the

ERCs are significantly different when shorting constraints and disagreement are high, the good news ERC is *larger* than the bad news ERC. The difference in ERCs, therefore, cannot explain the negative asymmetry in average returns for value stocks.)

Panel B shows that growth stocks, like value stocks, exhibit no torpedo effect when short-sales constraints are low (consistent with H2b). However, when short-sales constraints and disagreement are high, growth stocks show a pronounced torpedo effect just as value stocks do, as predicted by H2a. The bad news return is -7.39%, the good news return is 4.05%, and the difference in absolute returns is statistically significant (t-statistic of 2.07). Interestingly, the asymmetry for value stocks is similar in magnitude (3.32%) to that for growth stocks (3.34%). Once again, the torpedo effect for growth stocks is entirely driven by the intercept rather than the ERC, suggesting that it is the very fact of missing the consensus earnings forecast that results in the asymmetrically large price response to bad news.[32]

7. Alternative Explanations

In this section, we discuss two other possible explanations for the negative return asymmetry and why they are unlikely to explain our results.

7.1. Negative Return Asymmetry Due to Managers Withholding Bad News

Kothari et al. (2009) argue that if managers accumulate and withhold bad news, both the amount of news and the stock price reaction to that news will be greater for voluntary disclosures of bad news compared to voluntary disclosures of good news. However, as we discuss below, managers' withholding of bad news is unlikely to explain our results for at least two reasons.

First, we predict and find a negative return asymmetry *only* for stocks with high short-sales constraints *and* divergence of opinion. Thus, in order for bad news withholding to explain

[32] For the results in Table 8, we conducted robustness tests similar to those for our main tests (Tables 3 to 5), with generally similar results. For the sake of brevity, we do not discuss these robustness tests.

our results, management's decision to withhold bad earnings news would have to be correlated with short-sales constraints and divergence of opinion. It is not obvious why this would be so.

Second, findings from unreported tests suggest that, contrary to the withholding hypothesis, our negative return asymmetry is to a large extent driven by firms that *preannounce* bad earnings news. We find that the asymmetry is considerably weaker if we shorten the return window to exclude earnings preannouncements. For example, using a [-1, 1] return window around the earnings announcement shrinks the asymmetry to a mere 0.63% compared to 3.58% with a long window. Preannouncements play a similar role in SS, who find that the torpedo effect for growth stocks is only observed when the return window includes earnings preannouncements. The importance of preannouncements is not surprising. Not only are bad news firms more likely to preannounce earnings (e.g., Kasznik and Lev, 1995; Soffer et al., 2000), but preannouncing firms experience significantly greater negative stock price reactions compared to firms which do not warn (e.g., Kasznik and Lev, 1995). Thus, managerial withholding of bad news is an unlikely explanation for our findings.

7.2 Differential Persistence of Good vs. Bad Earnings News

Differential earnings persistence could explain the negative asymmetry in earnings announcement returns if bad earnings news is more persistent than good earnings news. However, earnings persistence is unlikely to explain our results for two reasons. First, this argument implies that the bad news ERC should be greater than the good news ERC. However, we find that the two ERCs are insignificantly different when shorting costs and disagreement are high (Table 2, Panel B). Rather, the negative return asymmetry we document is driven by a difference in intercepts and not ERCs. Thus, factors affecting ERCs (e.g., persistence, growth, systematic risk, earnings uncertainty, losses) cannot explain the asymmetry. Second, for differential persistence to explain the asymmetry, it would have to occur *only* when short-sales constraints *and* disagreement are high. However, we can think of no obvious reason for differential earnings persistence to be so correlated with exogenous shorting costs and disagreement.

8. Conclusion

Using Miller's (1977) insight that short-selling restrictions in the presence of differential beliefs leads to overpricing, we demonstrate that the same features lead to an asymmetry in the market's reaction to good and bad earnings news. Specifically, when short-sales constraints and investor disagreement are high, the price reaction to bad news is considerably greater in absolute value than that to good news (what SS refer to as the torpedo effect). When short-sales constraints are not binding, there is no torpedo effect, regardless of the degree of belief dispersion. Further, this return asymmetry manifests itself via an asymmetry in intercepts and not ERCs (in a typical return-earnings regression), suggesting that it is driven by the very fact of missing earnings expectations.

Our analysis also clarifies the mechanism underlying a similar asymmetry for growth stocks documented by SS. We find that the torpedo effect for growth stocks only occurs for stocks with high short-selling restrictions and divergence of opinion. When shorting is not difficult, growth stocks exhibit an entirely symmetric market reaction to good and bad earnings news, even when investors are overoptimistic. Moreover, value stocks also display an equally large torpedo effect when short-selling constraints and divergence of opinion are high.

Thus, overall, our findings indicate that in the presence of divergence of beliefs among investors, an asymmetric trading constraint – impediments to short-selling – affects prices and generates an asymmetric market reaction to earnings announcements. By documenting and explaining this return asymmetry, we contribute to the continuing debate among researchers regarding the existence, the interpretation, and the economic significance of the torpedo effect.

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Table 1: Descriptive Statistics and Correlations

Panel A: Descriptive Statistics

	N	Mean	Std. Dev.	Q1	Median	Q3
SSC (%)	174962	2.10%	3.34%	0.16%	0.80%	2.45%
TURN (%)	174962	0.41%	0.40%	0.15%	0.28%	0.52%
FE	174962	-0.0036	0.0193	-0.0025	0	0.0015
|FE|	174962	0.0075	0.0181	0.0005	0.0018	0.0059
LIQ	174962	0.0079	0.0073	0.0033	0.0055	0.0099
IO (%)	174962	45.29%	24.19%	25.51%	45.20%	64.32%
SIZE ($ millions)	174962	2124	5967	119	368	1287
FDISP	138437	0.2393	0.7111	0.0294	0.0638	0.1667
IVOL (%)	174962	2.93%	1.77%	1.64%	2.49%	3.74%
AGE	174962	15.42	16.06	4.13	9.38	21.46

Panel B: Correlations

This table shows both Pearson (top) and Spearman (bottom) correlations. All correlations are significant at the 1% level.

	SSC	TURN	SIZE	LIQ	IO	FDISP	IVOL	AGE
SSC		0.52	-0.02	-0.15	0.28	0.03	0.07	-0.05
TURN	0.56		0.03	-0.10	0.33	0.03	0.37	-0.19
SIZE	0.38	0.31		-0.13	0.18	-0.07	-0.21	0.25
LIQ	-0.27	-0.15	-0.65		-0.42	0.09	0.47	-0.30
IO	0.38	0.44	0.53	-0.45		-0.07	-0.29	0.22
FDISP	0.05	0.11	-0.22	0.17	-0.11		0.15	0.13
IVOL	0.01	0.39	-0.52	0.59	-0.26	0.26		-0.37
AGE	0.07	-0.18	0.45	-0.43	0.28	0.20	-0.47	

Variable definitions:

SSC is short interest (measured in the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

TURN is trading volume (average daily trading volume over the 60 calendar days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

FE is the earnings surprise (realized EPS less the median EPS forecast, where the latter is measured in the last month of the fiscal quarter) scaled by the closing stock price on the last trading day of the fiscal quarter.

Liquidity (LIQ) is the Gibbs measure of the effective cost of trading (measured in the prior calendar year).

Institutional ownership (IO) is the sum of all institutional holdings of the stock (the last reported value of institutional holdings prior to the end of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

SIZE is the firm's market capitalization at the end of the fiscal quarter.

Forecast dispersion (FDISP) is the standard deviation of analysts' earnings forecasts scaled by the average forecast (both measured in the last month of the fiscal quarter).

Idiosyncratic volatility (IVOL) is the standard deviation of residuals from a regression of the firm's stock return on the value-weighted market return over the 60 calendar days ending on the 15th of the last month of the fiscal quarter.

Firm age (AGE) is the number of years the firm has been covered by CRSP prior to the 15th of the last month of the fiscal quarter.

N is the number of firm-quarter observations.

Table 2: Return Asymmetry for Portfolios Formed on Short-Sales Constraints and Turnover

Panel A: Regressions

These regressions are based on specification (1), estimated quarterly. The dependent variable is size-adjusted returns. Coefficients and t-statistics are computed using the Fama-MacBeth (1973) method. All significance tests are two-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Size-adjusted Returns	
	(1)	(2)
MEET	0.0016	-0.0091***
	(0.66)	(-2.60)
GOOD	0.0339***	0.0187***
	(17.93)	(2.84)
BAD	-0.0342***	-0.0292***
	(-20.44)	(-3.98)
GOOD*FE	2.6117***	2.2209***
	(7.75)	(4.95)
BAD*FE	1.1418***	1.3082***
	(14.12)	(9.36)
GOOD*SSC		-0.0017
		(-1.32)
BAD*SSC		-0.0002
		(-0.09)
GOOD*TURN		0.0051***
		(2.57)
BAD*TURN		-0.0041
		(-1.65)
GOOD*SSC*TURN		-0.0001
		(-0.11)
BAD*SSC*TURN		-0.0013*
		(-1.81)
GOOD*FE*SSC		-0.1542
		(-0.67)
BAD*FE*SSC		0.0259
		(0.36)
GOOD*FE*TURN		0.546***
		(2.63)
BAD*FE*TURN		-0.1348
		(-1.56)
GOOD*FE*SSC*TURN		-0.1635*
		(-1.76)
BAD*FE*SSC*TURN		0.0364
		(1.21)
LIQ		1.3629***
		(4.51)
Ave. Adj. Rsq	0.0805	0.1061

Table 2 (continued)

Panel B: Return Asymmetry

This panel shows average size-adjusted returns (in %), ERCs, and intercepts calculated using estimated coefficients from Panel A. Coefficients from column (1) of Panel A are used for the "All Observations" portfolio and coefficients from column (2) are used for all other portfolios. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns to good and bad news are one-sided, while all other significance tests are two-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	SSC, TURN	Good news	Bad news	diff.[#]	t-stat of diff.
Average Returns[##]	All observations	3.86	-3.63	0.23	0.99
	Low, Low	2.27	-3.16	-0.89	-0.66
	Low, High	4.72	-4.72	0.00	0.00
	High, Low	1.46	-3.24	-1.78	-1.70**
	High, High	3.33	-6.91	-3.58	-4.72***
ERC	All observations	2.61	1.14	1.47	3.81***
	Low, Low	2.22	1.31	0.91	1.89*
	Low, High	4.40	0.77	3.63	4.69***
	High, Low	1.60	1.41	0.19	0.23
	High, High	1.17	1.45	-0.28	-0.46
Intercept	All observations	3.39	-3.42	-0.03	-0.13
	Low, Low	1.86	-2.92	-1.06	-0.77
	Low, High	3.92	-4.58	-0.66	-0.72
	High, Low	1.17	-2.99	-1.82	-1.66*
	High, High	3.12	-6.65	-3.53	-4.46***

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using median |FE| = 0.0018.

Variable definitions:

Size-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

MEET, GOOD and BAD are indicator variables where MEET equals one if a firm meets (but does not beat) its consensus forecast and is zero otherwise, GOOD equals one if a firm beats its consensus forecast and is zero otherwise, and BAD equals one if a firm misses its consensus forecast and is zero otherwise.

FE is the earnings surprise (realized EPS minus the median (consensus) forecast in the last month of the fiscal quarter) scaled by the stock price on the last trading day of the fiscal quarter.

SSC is the short interest quintile to which the firm belongs. LOW indicates the lowest SSC quintile, while HIGH indicates the highest SSC quintile. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

TURN is the share turnover quintile to which the firm belongs. LOW indicates the lowest TURN quintile, while HIGH indicates the highest TURN quintile. TURN is trading volume (average daily trading volume over the 60 days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

LIQ (liquidity) is the Gibbs measure of the effective cost of trading (measured in the prior calendar year).

Table 3: Role of Firm Size in the Return Asymmetry

This table shows, for each size quintile, average size-adjusted returns (in %) to good and bad news for portfolios formed on short interest and turnover. Average returns are calculated using average estimated coefficients from specification (1), estimated quarterly for each size quintile. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns to good and bad news are one-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

		Average Returns[##]			
SIZE Quintile	SSC, TURN	Good news	Bad news	diff.[#]	t-stat of diff.
SIZE = 0 Small Firms	Low, Low	3.29	-4.65	-1.36	-0.84
	Low, High	6.87	-7.01	-0.14	-0.08
	High, Low	2.17	-4.95	-2.78	-1.22
	High, High	3.33	-10.47	-7.14	-3.09***
SIZE = 1	Low, Low	2.77	-2.96	-0.19	-0.11
	Low, High	6.82	-5.21	1.61	1.04
	High, Low	1.75	-4.41	-2.66	-1.85**
	High, High	5.64	-8.31	-2.67	-1.82**
SIZE = 2	Low, Low	2.01	-2.31	-0.30	-0.17
	Low, High	6.58	-2.66	3.92	2.64***
	High, Low	4.37	-4.01	0.36	0.21
	High, High	3.18	-7.15	-3.97	-4.22***
SIZE = 3	Low, Low	1.39	-2.13	-0.74	-0.41
	Low, High	4.75	-3.27	1.48	1.31*
	High, Low	1.61	-2.02	-0.41	-0.27
	High, High	3.73	-5.41	-1.68	-1.78**
SIZE = 4 Large Firms	Low, Low	1.79	-4.24	-2.45	-1.23
	Low, High	0.68	-1.39	-0.71	-0.40
	High, Low	0.20	1.07	N/A[###]	N/A
	High, Low	3.70	-3.95	-0.25	-0.28

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using the median |FE| for each size quintile.
[###] Not meaningful because the bad news return is positive.

Variable definitions:

Size-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

SIZE is the size quintile to which the firm belongs (based on market capitalization at the end of the fiscal quarter).

SSC and TURN are the short interest and turnover quintiles, respectively, to which the firm belongs. LOW indicates the lowest SSC or TURN quintile, while HIGH indicates the highest SSC or TURN quintile. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter). TURN is trading volume (average daily trading volume over the 60 days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

Table 4: Role of Institutional Ownership in the Return Asymmetry

Panel A: Return asymmetry by institutional ownership tercile

This panel shows, for each institutional ownership (IO) tercile, average size-adjusted returns (in %) to good and bad news for portfolios formed on short interest and turnover. Average returns are calculated using average estimated coefficients from specification (1), estimated quarterly for each IO tercile. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns to good and bad news are one-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

		Average Returns[##]			
Institutional Ownership (IO) Tercile	SSC, TURN	Good news	Bad news	Diff.[#]	t-stat of diff.
IO = Low	Low, Low	2.44	-3.24	-0.80	-0.59
	Low, High	7.10	-5.84	1.26	0.81
	High, Low	2.30	-3.11	-0.81	-0.77
	High, High	3.69	-7.99	-4.30	-2.35***
IO = Medium	Low, Low	2.81	-3.34	-0.53	-0.41
	Low, High	4.75	-4.56	0.19	0.15
	High, Low	1.00	-2.53	-1.53	-1.11
	High, High	4.40	-7.20	-2.80	-2.55***
IO = High	Low, Low	2.29	-2.03	0.26	0.16
	Low, High	3.37	-3.13	0.24	0.20
	High, Low	1.46	-3.18	-1.72	-1.19
	High, High	3.64	-5.61	-1.97	-2.57***

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using median |FE| for each IO tercile.

Panel B: Return asymmetry - SSC portfolios are based on short interest and institutional ownership

This panel shows average size-adjusted returns (in %) to good and bad news for portfolios formed on short-sales constraints and turnover. Short-sales constraints (SSC) portfolios are formed using the interaction of short interest and institutional ownership. Average returns are calculated using average estimated coefficients from specification (1), estimated quarterly. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns to good and bad news are one-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Average Return[##]			
SSC, TURN	Good news	Bad news	diff.[#]	t-stat of diff.
Low, Low	2.40	-2.99	-0.59	-0.35
Low, High	3.81	-5.16	-1.35	-0.77
High, Low	1.54	-3.24	-1.70	-1.26
High, High	3.40	-7.56	-4.16	-2.29**

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using median |FE| = 0.0018.

Variable definitions:

Size-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

Institutional ownership (IO) is the sum of all institutional holdings of the stock (the last reported value of institutional holdings prior to the end of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

In Panel A, SSC and TURN are the short interest and turnover quintiles, respectively, to which the firm belongs. LOW indicates the lowest SSC or TURN quintile, while HIGH indicates the highest SSC or TURN quintile. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter). TURN is trading volume (average daily trading volume over the 60 days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

In Panel B, three SSC portfolios are formed based on short interest and institutional ownership. LOW (HIGH) SSC firms are in the highest (lowest) tercile of institutional ownership and lowest (highest) tercile of short interest. TURN quintiles are defined as in Panel A.

Table 5: Return Asymmetry using Alternative Proxies for Disagreement

This table shows average size-adjusted returns (in %) to good and bad news for portfolios formed on short interest and disagreement, where the latter is defined as idiosyncratic volatility (IVOL) in Panel A, firm age (AGE) in Panel B, and forecast dispersion (FDISP) in Panel C. Average returns are calculated using average estimated coefficients from specification (1), estimated quarterly. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns between good and bad news are one-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Return asymmetry using idiosyncratic volatility (IVOL) as a proxy for disagreement

	Average returns##			
SSC, IVOL	Good news	Bad news	diff.#	t-stat of diff.
Low, Low	0.88	-1.86	-0.98	-0.78
Low, High	5.92	-4.71	1.21	1.35*
High, Low	1.70	-3.39	-1.69	-2.09**
High, High	4.81	-8.10	-3.29	-2.26**

Panel B: Return asymmetry using firm age (AGE) as a proxy for disagreement

	Average returns##			
SSC, 1/AGE	Good news	Bad news	diff.#	t-stat of diff.
Low, Low	1.86	-2.85	-0.99	-0.88
Low, High	3.82	-4.13	-0.31	-0.34
High, Low	2.01	-3.69	-1.68	-2.89***
High, High	4.03	-8.39	-4.36	-3.92***

Panel C: Return asymmetry using forecast dispersion (FDISP) as a proxy for disagreement

	Average returns##			
SSC, FDISP	Good news	Bad news	diff.#	t-stat of diff.
Low, Low	2.50	-3.01	-0.51	-0.42
Low, High	4.23	-2.72	1.51	1.46*
High, Low	2.88	-7.01	-4.13	-5.05***
High, High	3.60	-4.18	-0.58	-0.69

\# Difference in absolute values, i.e., |Good news| - |Bad news|.

\## Calculated using median |FE| = 0.0018 in Panels A and B and 0.0015 in Panel C.

Variable definitions:

Size-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

SSC is the short interest quintile to which the firm belongs. LOW indicates the lowest SSC quintile, while HIGH indicates the highest SSC quintile. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

IVOL is the idiosyncratic volatility quintile to which the firm belongs. LOW indicates the lowest IVOL quintile, while HIGH indicates the highest IVOL quintile. Idiosyncratic volatility is the standard deviation of residuals from a regression of the firm's stock return on the value-weighted market return over the 60 calendar days ending on the 15th of the last month of the fiscal quarter.

AGE is defined as the number of years the firm has been covered by CRSP prior to the 15th of the last month of the fiscal quarter. Quintiles are formed using the inverse of AGE, so LOW indicates the oldest firms, while HIGH indicates the youngest firms.

FDISP is the forecast dispersion quintile to which the firm belongs. LOW indicates the lowest FDISP quintile, while HIGH indicates the highest FDISP quintile. Forecast dispersion is the standard deviation of analysts' earnings forecasts scaled by the average forecast (both measured in the last month of the fiscal quarter).

Table 6: Analysis of Forecast Dispersion as a Measure of Investor Disagreement

This table shows, for each forecast dispersion (FDISP) quintile, the return asymmetry for portfolios with high short interest and disagreement, where the latter is defined as share turnover (TURN), idiosyncratic volatility (IVOL), and firm age (AGE) in Panels A, B, and C, respectively. Size-adjusted average returns (in %) are calculated using average estimated coefficients from specification (1), estimated quarterly for each FDISP quintile. T-statistics are computed using the Fama-MacBeth (1973) method. Significance tests for the difference in absolute returns between good and bad news are one-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Effect of forecast dispersion (FDISP) on return asymmetry using SSC & TURN

FDISP Quintile	Return Asymmetry when SSC and TURN are High[##]	t-stat
0	-4.64	-3.61***
1	-3.37	-3.78***
2	-2.32	-2.35***
3	-3.50	-3.93***
4	-0.38	-0.30

Panel B: Effect of forecast dispersion (FDISP) on return asymmetry using SSC & IVOL

FDISP Quintile	Return Asymmetry when SSC and IVOL are High[##]	t-stat
0	-6.28	-3.43***
1	-4.83	-2.75***
2	-3.95	-2.57***
3	-2.32	-1.51*
4	0.67	0.34

Panel C: Effect of forecast dispersion (FDISP) on return asymmetry using SSC & AGE

FDISP Quintile	Return Asymmetry when SSC and 1/AGE are High[##]	t-stat
0	-7.49	-3.61***
1	-4.66	-3.36***
2	-3.70	-2.59***
3	-4.00	-2.69***
4	-0.96	-0.56

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using the median |FE| for each FDISP quintile.

Variable definitions:

Size-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

SSC is the short interest quintile to which the firm belongs. HIGH indicates the highest quintile of short interest. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

TURN is the turnover quintile to which the firm belongs. HIGH indicates the highest turnover quintile. Turnover is trading volume (average daily trading volume over the 60 days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).

IVOL is the idiosyncratic volatility quintile to which the firm belongs. HIGH indicates the highest quintile of idiosyncratic volatility. Idiosyncratic volatility is the standard deviation of residuals from a regression of the firm's stock return on the value-weighted market return over the 60 calendar days ending on the 15th of the last month of the fiscal quarter.

AGE is defined as the number of years the firm has been covered by CRSP prior to the 15th of the last month of the fiscal quarter. Quintiles are formed using the inverse of AGE, so the HIGH quintile has the youngest firms.

Forecast dispersion (FDISP) is the standard deviation of analysts' earnings forecasts scaled by the average forecast (both measured in the last month of the fiscal quarter).

Table 7: Replicating the Skinner-Sloan Torpedo Effect - Return Asymmetry for Value and Growth Portfolios

This table shows average returns (in %) calculated using estimated coefficients from specification (2). In Panel A, returns and t-statistics are computed as in Skinner and Sloan (2002), using a pooled regression and multiplying OLS standard errors by the square root of 20. In Panel B, returns and t-statistics are computed using the Fama-MacBeth (1973) method with quarterly regressions. Significance tests for the difference in absolute returns to good and bad news are two-sided. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: T-statistics calculated as in Skinner and Sloan (2002)

		Size-adjusted Returns				Market-adjusted Returns			
		Good news	Bad news	diff.[#]	t-stat of diff.	Good news	Bad news	diff.[#]	t-stat of diff.
Average Return[##]	Value	4.27	-3.95	0.32	1.63	4.93	-3.60	1.33	7.08***
	Growth	4.36	-6.18	-1.82	-7.92***	4.51	-6.21	-1.70	-7.74***

Panel B: T-statistics calculated using the Fama-MacBeth (1973) method

		Size-adjusted Returns				Market-adjusted Returns			
		Good news	Bad news	diff.[#]	t-stat of diff.	Good news	Bad news	diff.[#]	t-stat of diff.
Average Return[##]	Value	4.00	-4.16	-0.16	-0.11	4.64	-3.65	0.99	1.09
	Growth	4.36	-6.07	-1.71	-1.08	4.59	-6.00	-1.41	-1.60

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using median |FE| = 0.0033 for value stocks and 0.0011 for growth stocks.

Variable definitions:

Size- and market-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement for the fiscal quarter.

VALUE (GROWTH) indicates stocks in the lowest (highest) market-to-book quintile.

Table 8: Return Asymmetry for Value and Growth Portfolios Conditioned on Short-sales Constraints and Turnover

This table shows average returns (in %) to good and bad news for value and growth stocks. Average returns are calculated using average estimated coefficients from specification (1), estimated quarterly and separately for value and growth stocks. T-statistics are computed using the Fama-MacBeth (1973) technique. Significance tests for the difference in absolute returns to good and bad news are one-sided, while all other significance tests are two-sided. . ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: Value Stocks

		Size-adjusted Returns				Market-adjusted Returns			
	SSC, TURN	Good news	Bad news	diff.[#]	t-stat of diff.	Good news	Bad news	diff.[#]	t-stat of diff.
Average Return[##]	Low, Low	1.96	-3.12	-1.16	-1.00	2.73	-2.59	0.14	0.13
	Low, High	4.7	-4.07	0.63	0.32	5.45	-3.68	1.77	1.24
	High, Low	1.50	-1.98	-0.48	-0.32	1.65	-1.52	0.13	0.10
	High, High	2.76	-6.08	-3.32	-2.03**	3.31	-5.62	-2.31	-2.23**
ERC	Low, Low	2.78	1.31	1.47	2.72***	2.59	1.37	1.22	2.28**
	Low, High	5.28	1.20	4.08	3.18***	5.06	1.23	3.83	3.06***
	High, Low	1.04	2.58	-1.54	-1.54	1.03	2.64	-1.61	-1.62
	High, High	2.91	0.76	2.15	2.22**	2.77	0.83	1.94	2.08**
Intercept	Low, Low	1.05	-2.69	-1.64	-1.45	1.87	-2.14	-0.27	-0.24
	Low, High	2.96	-3.67	-0.71	-0.36	3.78	-3.27	0.51	0.35
	High, Low	1.16	-1.12	0.04	0.02	1.31	-0.65	0.66	0.49
	High, High	1.80	-5.82	-4.02	-2.50**	2.40	-5.35	-2.95	-2.79***

[#] Difference in absolute values, i.e., |Good news| - |Bad news|.
[##] Calculated using median |FE| = 0.0033.

Panel B: Growth Stocks

	SSC, TURN	Size-adjusted Returns Good news	Bad news	diff.#	t-stat of diff.	Market-adjusted Returns Good news	Bad news	diff.#	t-stat of diff.
Average Return##	Low, Low	3.27	-4.18	-0.91	-0.67	3.47	-3.89	-0.42	-0.32
	Low, High	3.91	-5.05	-1.14	-0.73	4.10	-4.93	-0.83	-0.71
	High, Low	3.10	-3.36	-0.26	-0.17	3.27	-3.23	0.04	0.03
	High, High	4.05	-7.39	-3.34	-2.07**	4.38	-7.29	-2.91	-2.86***
ERC	Low, Low	3.64	1.24	2.40	2.01**	3.46	1.31	2.15	1.85*
	Low, High	4.79	1.15	3.64	2.25**	4.63	1.26	3.37	2.10**
	High, Low	1.52	1.44	0.08	0.04	1.16	1.70	-0.54	-0.29
	High, High	1.4	1.97	-0.57	-0.56	1.30	2.08	-0.78	-0.79
Intercept	Low, Low	2.87	-4.04	-1.17	-0.85	3.09	-3.74	-0.65	-0.49
	Low, High	3.38	-4.92	-1.54	-0.99	3.59	-4.79	-1.20	-1.00
	High, Low	2.93	-3.20	-0.27	-0.18	3.14	-3.04	0.10	0.08
	High, High	3.89	-7.17	-3.28	-2.04**	4.24	-7.06	-2.82	-2.75***

Difference in absolute values, i.e., |Good news| - |Bad news|.
Calculated using median |FE| = 0.0011.

Variable definitions:

Size- and market-adjusted returns are measured starting twelve trading days prior to the end of the fiscal quarter through the day after the earnings announcement date for the fiscal quarter.

VALUE (GROWTH) indicates stocks in the lowest (highest) market-to-book quintile.

SSC and TURN are the short interest and turnover quintiles, respectively, to which the firm belongs. LOW indicates the lowest SSC or TURN quintile, while HIGH indicates the highest SSC or TURN quintile. Short interest (measured in the last month of the fiscal quarter) is scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter). TURN is trading volume (average daily trading volume over the 60 days prior to the 15th of the last month of the fiscal quarter) scaled by the number of shares outstanding (measured at the end of the last month of the fiscal quarter).