Disaggregated discretionary disclosure and future operating performance*

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Keywords: Corporate Disclosure; Firm Performance; IPO

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Abstract

Recent disclosure models predict that firms with more pessimistic private information about future operating performance will make more disaggregated discretionary disclosures. We use the IPO S-1 filing setting to address this question, arguing that this setting closely matches the theory models' disclosure and timing setup for several reasons. Accordingly, we find that after controlling for other disclosure determinants, higher S-1 disaggregated discretionary disclosure quantity is significantly associated with future operating performance declines both in the absolute and relative to matched control firms that control for heterogeneity across firms. We also plausibly rule out alternative litigation, proprietary cost, and management obfuscation motives. Our focus on future operating performance complements prior disclosure studies' focus on current and past operating performance.

1 Introduction

Theories of disaggregated discretionary disclosure often model a firm's choice to voluntarily disclose more information as being driven by management's beliefs about future operating performance. Ebert, Simons, and Stecher (2017), for example, model a setting where managers with foreknowledge of poor future bottomline numbers disclose more in equilibrium by disaggregating those numbers to showcase pockets of future strength. By contrast, managers with foreknowledge of strong future bottomline numbers hide pockets of weakness by not disaggregating. These theories thus predict that future operating performance will be lower for firms with more extensive disaggregated disclosures.[1] Yet, the bulk of the research studying disaggregated disclosure quantity in financial reports links it to current and prior, not future operating performance (deHaan et al., 2021; Li, 2008, p. 222; Li, 2010, Appendix A1). In this study, we find that for 3,201 US initial public offerings (IPOs) from 1996 to 2017, the disaggregated disclosure quantity in firms' S-1 filings, the key disclosure before an IPO, is robustly related to declines in future profitability in the absolute and relative to matched control firms, as predicted by Ebert et al. (2017) and other recent disclosure theories.

Receiving a high stock valuation to maximize IPO proceeds is not the only disclosure motive for managers. An alternative motive is fear of litigation, which can drive managers to disclose their private information even when it is bad news (Skinner, 1994). This litigation risk hypothesis is far from being settled—many studies continue to show that managers hide bad news and disclose good news (Bao et al., 2019; Kothari et al., 2009)—but it is outwardly consistent with our results that more disclosure in the S-1 predicts poor future operating performance. However, the litigation risk arguments rest on the future stock price dropping below the offer price (Lowry and Shu, 2002), whereas our definition of bad firms rests on

[1] Informed managers of weak firms cannot mimic strong firms by not disaggregating because unraveling forces all firms to report their aggregate numbers, which investors use to form their beliefs on whether a firm is strong or weak. Unraveling of disaggregated disclosure does not happen in strong firms because not all managers are equally privately informed about the disaggregated details, and investors cannot always identify these different types of managers. See Section 2.2 for more detail, including a numerical example.

future operating performance drops. These are unrelated phenomena to the extent that future operating performance drops are anticipated by investors (as will be the case with rational expectations signaling). Indeed, we find no evidence that our disclosure measures predict the probability of the stock falling below the offer price within a year of the IPO, which is when most lawsuits are filed (Lowry and Shu, 2002, Table 2), and our results survive the partitioning of our sample on litigation risks as well as comparisons with matched control samples.

Other key features of the IPO setting also make litigation risk an unlikely driver of our results. As just noted, initial investors typically file Section 11 IPO lawsuits when the stock drops below the offer price. The finance literature therefore argues that firms and underwriters reduce the chances of such price drops by lowering the IPO offer price in the first place, i.e., the well-known IPO underpricing phenomenon (Hughes and Thakor, 1992; Lowry and Shu, 2002; Tinic, 1988). Underpricing, not disclosure, is thus the main vehicle to deal with litigation risk in our setting. Indeed, Hanley and Hoberg (2012, Table 8) note that underpricing, and not disclosure, lowers the chances of Section 11 lawsuits, but then argue that underpricing does not deter non-Section 11 10b-5 lawsuits filed by post-IPO investors, whereas disclosure does. Yet, Hanley and Hoberg (2012, Table 7, rows 4 and 6) find that disclosing bad news has no significant impact on litigation, both for the entire sample and high litigation risk subsample. Disclosing good news, on the other hand, significantly reduces litigation. These findings suggest that Hanley and Hoberg's claims that disclosure deters non-Section 11 litigation are being driven by good news firms, i.e., litigation risk should prompt good news firms to disclose more details in our setting compared to bad news firms, which is the opposite of our hypothesis. In any case, the probability of non-Section 11 lawsuits is only five percent, and average damages are 10 percent of IPO proceeds, meaning the ex ante litigation risk is only about 0.5 percent of the IPO proceeds (Hanley and Hoberg, 2012, Tables 1 and 2). These facts only serve to imply that litigation risk is not the main reason weak firms in our IPO setting disclose more.

Another outwardly consistent alternative for good firms disclosing less is due to these firms facing high proprietary costs. The canonical study of Verrecchia (1983, p. 190-191) indeed considers this possibility and shows that even in these cases, good firms disclose more than bad firms. The reason is straightforward. If non-disclosure implies goodness, bad firms will also be silent and try to pass off as good firms, unless they have litigation worries, an issue we have addressed in the previous paragraphs. Nonetheless, we partition our sample based on standard measures of proprietary costs and show that they are not driving our results. More disclosure could also be obfuscation by management, a possibility we control for with widely used measures of obfuscation. Finally, all our performance changes tests are conducted relative to a matched control sample. To the extent each treatment firm's control has similar litigation risk, proprietary costs, and obfuscation motives, these factors should not explain the performance patterns we find.

Having dealt with the litigation and proprietary cost alternatives, we now turn to the challenge of testing the predictions of disaggregated discretionary disclosure models, which foremost require a setting where the manager has a clear benefit from the price reaction to disclosure before their private information is revealed in a subsequent mandatory disclosure. The IPO proceeds to the firm are a significant such benefit in our S-1 filing setting and happen before any subsequent mandatory disclosure. By contrast, in ongoing public firms, there is often not always a clear and objectively measurable managerial benefit from the price reaction after a management earnings forecast but before a subsequent mandatory disclosure that reveals the private information.

An important requirement in the model, which also uses an IPO or first-period setting, is that disclosures have a significant voluntary component, be comprehensive, and be truthful. S-1 filings satisfy the truthfulness and credibility requirement because they are scrutinized by several external entities before their release, including the firm's auditor, the underwriting banks, and regulators. While certain sections of the S-1 are devoted to the exact details of the underwriting process, other sections are devoted to topics that are broader and not as

well-defined, giving managers considerable scope for discretion in these disclosures (Loughran and McDonald, 2013). Another key feature of the S-1 filing is that it is a single source of all disclosures deemed relevant by management up to the date it is filed, for the institutional and regulatory reasons detailed in Section 2.1. By contrast, for ongoing public firms, it is hard for researchers to comprehensively capture in a single filing all the relevant disaggregated disclosures made by the firm, which can range from social media disclosures to press releases to other voluntary disclosures made prior and up to the current point in time, and whose truthfulness and credibility vary from source to source and tweet to tweet (Blankespoor et al., 2020). In sum, the IPO setting comports well with theory by offering a clear valuation benefit, a comprehensive single source of disaggregated discretionary disclosure that is truthful and credible, and institutional safeguards against alternative hypotheses.

Turning to the empirics, theory does not suggest a clear unambiguous measure of disaggregated discretionary disclosure: Ebert et al. (2017, p. 74), for example, model disaggregation using a vector of Bernoulli random variables and note that the key requirement is that the disaggregated items have different valuation multiples ($+1$ and -1 in their case). Lev and Thiagarajan (1993) show that individual components of financial statements have different valuation multiples, and indeed Ebert et al. (2017, Section VI) suggest using counts of more detailed financial metrics. More importantly, Roychowdhury et al. (2019, Section 3.2.2) suggest that not all managers have access to such detailed metrics, a key requirement of the model to prevent unraveling. Our main disclosure measure is therefore the sum of the following components of the S-1: (1) the number of line items on the income statement appearing above operating income (i.e., excluding interest- and tax-related items, non-controlling interests, discontinued operations, and totals), (2) the number of non-GAAP metrics listed in the reconciliation of non-GAAP metrics, and (3) the number of uniquely labeled disaggregated sections and subsections included in the components of results of operations. Some managers may also disaggregate and disclose their private information in a more qualitative manner; therefore, in a supplemental analysis, we use the popular text-based measure of word counts

of the appropriate S-1 sections (e.g., Blankespoor, 2019; deHaan et al., 2021). The financial and textual measures are positively correlated and yield similar results.[2]

A considerable amount of the variation in any disclosure measure is likely mandatory due to various regulatory and business model issues, such as complexity, underwriter legal conservatism, and other concerns. We account for this variation by controlling for a rich set of fixed effects for industry, time, and lead underwriter, as well as various firm factors. The year-fixed effects, industry-fixed effects, industry-year-fixed effects, and lead underwriter-fixed effects control for any systematic or sample-wide S-1 disclosure patterns that vary across time, across industry, across industry and time simultaneously, and across lead underwriter, thus alleviating any concerns that alternative explanations, such as IPO waves, are driving our results (e.g., Pástor and Veronesi, 2005). We also control for litigation risk using the Kim and Skinner (2012) measures and control for the obfuscation motives of Li (2008) using readability indices. The residuals from this regression are the basis of our measure of disaggregated discretionary disclosure. This two-step research design is not susceptible to the methodology issues discussed in Chen et al. (2018) because we do not use the residual as a dependent variable.[3] Nonetheless, we also replicate the main results in a one-step regression using the raw disaggregated disclosure measure and its controls.

In Ebert et al. (2017), equilibrium disclosure levels in the cross-section jump discontinuously from only aggregate disclosure to fully disaggregate disclosure. We therefore split the residuals from the above disclosure regression into terciles based on rank order, where terciles one, two, and three represent low, medium, and high S-1 disaggregated discretionary disclosure. These discrete terciles are our main measures of disaggregated discretionary disclosure and not only comport with the theory but also confer empirical advantages such as facilitating comparisons across the IPO firms and control firms within and across terciles

[2]Another measure of disaggregation discussed by Ebert et al. (2017) is segment reporting, but 92 percent of our IPO sample reports only one segment, consistent with these firms being relatively focused (Guay et al., 2016). We discuss segment disclosure models shortly.

[3]In fact, this residual technique is common in the accounting and finance literature (see Bao et al., 2019; Core et al., 1999; Demerjian et al., 2012; Dikolli et al., 2020).

and across individual years, thus enhancing the granularity of our analysis (see Section 4 for more detail). We nonetheless ensure that terciling does not re-induce correlations with the disclosure regressors, and also replicate the main findings with raw disclosure scores.

We next validate the disaggregated discretionary disclosure tercile measure. After controlling for other determinants of the information environment, we find that our disaggregated discretionary disclosure tercile measure is significantly associated with better information environments using proxies from the IPO literature, such as lower first-day IPO absolute returns and bid-ask spreads (e.g., Barth et al., 2017; Lowry et al., 2010; Ritter and Welch, 2002). These results also alleviate concerns that our disclosure measure is capturing obfuscation or disclosures that lack credibility, or some other factor that may worsen the information environment and, as a result, predict poor performance.

Turning to operating firm performance, Ebert et al. (2017) assume i.i.d. firms whose performance can be compared directly. In our heterogeneous sample, we eliminate any spurious cross-sectional variation by using as a baseline the IPO firm's operational performance from its most recent fiscal year in the S-1, and compare the performance change from this baseline relative to performance-matched control firms. We thus employ a changes-in-changes research design as opposed to the model's level specification. This differencing process is the counterpart to our attempt to control for the heterogeneity in the S-1 disclosure levels by residualizing them.

We find that for the IPO firms in the top tercile of discretionary disaggregated disclosures, EBITDA $\div$ assets and EBITDA $\div$ sales significantly decrease by 2.47 and 2.56 percentage points, respectively, from the IPO year to three years after the IPO. Similar results also obtain when we examine only the within IPO-firm changes and do not include control firms. By contrast, operating performance holds steady for firms in the middle discretionary disclosure tercile, and increases significantly over time for firms in the bottom discretionary disclosure tercile. The last result indicates that many IPO firms perform relatively well, and so our findings are not due to all IPO firms performing poorly irrespective of their disclo-

sures. We also replicate these results in a one-step regression using the raw disaggregated disclosure measure and its controls. Furthermore, these findings cannot be attributed to obfuscation theories because we control for various readability indices, including fog, of the S-1 disclosures.[4] Finally, we partition the sample based on litigation risk and proprietary costs of disclosure and find that our results survive these partitions.

We recognize that we do not exhaust all disclosure models. For example, Hayes and Lundholm (1996) show how competition in the product markets can drive segment reporting disaggregation choices. However, these models are less applicable to our IPO setting where most firms have only one segment. Nonetheless, a common feature of all these models is their focus on management's expectations of future performance. Yet, there is a surprising lack of empirical evidence linking management's disaggregated disclosure choices to future performance. Rather, prior studies largely examine how disaggregated disclosures are associated with the firm's current and past performance (e.g., Bernard, 2016; Bloomfield, 2008; Dedman and Lennox, 2009; deHaan et al., 2021; Li, 2010, Appendix A1; Matsumoto et al., 2011; Merkley, 2014). Even in disaggregated segment reporting research, Bens et al. (2011), Berger and Hann (2007), Botosan and Stanford (2005), and Harris (1998) find that firms' segment disclosure choices depend on prior segment profitability, but these studies do not examine whether segment disclosure choices signal future overall profits, as noted by Leuz and Wysocki (2016, Section 3.3).[5] Finally, Chen et al. (2015) show that firms with fewer missing Compustat items have better information environments in the cross-section (the second-moment effect), whereas we show that despite being associated with a better information environment, more disclosure implies poor operating performance (the first-moment effect).

Our findings also add to the empirical research on IPOs, which has not extensively examined the link between a firm's disaggregated discretionary disclosures at the IPO and

[4]We examine survivorship biases and alternative disclosure measures in Section 4.

[5]By contrast, a rich literature examines the accuracy of management's aggregated bottomline earnings forecasts (e.g., Blankespoor et al., 2020).

its subsequent performance. Instead, the IPO research is more focused on such issues as the associations among investor sentiment, the firm's underwriting choices, first-day and other short-term stock returns around the IPO, and litigation. Section 2.2 relates our study to prior research in detail.

2 Institutional background and hypothesis development

2.1 Institutional background

Theoretical models of disaggregated discretionary disclosure such as Ebert et al. (2017) typically assume two main steps in managers' disclosure decisions: (1) the managers, some of whom are privately informed about the firm's future prospects, voluntarily choose to disclose their private information or not, and if they disclose, they do so truthfully and credibly; and (2) stock prices rationally react and managers gain benefits from the price.

The setting of an IPO disclosure followed by a clear payoff, namely the IPO proceeds, meets these criteria. The major disclosure before the IPO is the S-1 registration statement filing, which provides extensive information about many aspects of the issuer's business. The filing is produced collaboratively with the issuer's management, internal and external auditors, potential investors, issuer and underwriter counsel, and is approved by the SEC after possible revisions. The S-1 filing thus meets the theory models' requirement of truthful and credible disclosure. We next briefly summarize the relevant legal aspects of the IPO setting using Westenberg (2019) as our legal source. Finally, Ebert et al. (2017) is a single-period model, and the IPO setting in some sense can be viewed as the first period.[6]

The S-1 is subject to a quiet period that begins when the registration statement is made effective and ends 25 days after the offering date if the issue is listed on a national exchange, although the exact length of this period varies somewhat over the sample period due to

[6]Testing single-period models with data from multi-period firms is quite standard (Fama and French, 2004).

regulatory changes (Securities Act Section 4(a)(3) and Securities Act Rule 174). If the issue is not listed, the period is 90 days. Thus, in the typical IPO process, the S-1 serves as the main source of disclosure, as required by the theory models. This claim, however, is subject to some nuances that we discuss next.[7]

Virtually all issuers revise their S-1 by filing amended registration statements, the final versions of which are what we examine. After registration, the issuer goes on roadshows to generate subscriber demand (Arcella et al., 2011, p. 50-59; Westenberg, 2019, Ch. 18). Keeping the information in a roadshow within the bounds of the information in the registration statement is a widespread norm because the issuer's and the underwriter's counsel are careful to avoid violations that would trigger costly fines and reputational damage.[8] A potential additional document is the Securities Rule 405 "free writing prospectus," which the SEC defines as "any written communication that constitutes an offer to sell or a solicitation of an offer to buy the securities relating to a registered offering that is used after the registration statement in respect of the offering is filed." However, if this prospectus contains any information that conflicts with the S-1, an amended S-1 must be filed before releasing the prospectus. The final registration statement is the issuer's most complete and thoroughly reviewed disclosure regarding the IPO, thus meeting the models' assumptions.

We next examine liability, which can be alleged under several sections of the Securities Act of 1933, but the section that is particular to the S-1 is Section 11, which states that "In case any part of the registration statement... omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading, any person acquiring such security... may, either at law or in equity, in any court of competent jurisdiction, sue every person who signed the registration statement," including the underwriter. Further,

[7]The Jumpstart Our Business Startups (JOBS) Act allows delayed or "confidential" S-1 filing. But even there, the full S-1 must be made public at least 15 days before the roadshow, which typically occurs well before the IPO date (e.g., Barth et al., 2017; Chaplinsky et al., 2017). In contrast, traditional S-1 filings are made public several months before the roadshow. In either case, the public observes the firm's full S-1 filing well before the IPO. For more detail on the S-1 reporting requirements, see `https://www.sec.gov/files/forms-1.pdf`.

[8]Repeating the S-1 information in roadshows can still be valuable if investors have behavioral biases and limited attention or information processing abilities (Blankespoor et al., 2021).

"the suit... may be to recover such damages as shall represent the difference between the amount paid for the security (not exceeding the price at which the security was offered to the public) and (1) the value thereof as of the time such suit was brought, or (2) the price at which such security shall have been disposed of in the market before suit..." Thus, a key trigger is the stock falling below the offer price. Furthermore, Section 11 only pertains to initial investors. Post-IPO investors can also sue under the broader 10b-5 umbrella (of which Section 11 is a part) when the stock price falls (Hanley and Hoberg, 2012).

2.2 Hypothesis development

The rational expectations literature initiated the argument that senders will always disclose their private information due to the unraveling of receiver expectations (Grossman, 1981; Milgrom, 1981). Building on this argument, many of the initial discretionary disclosure theories modeled value-relevant information as a single (but potentially noisy) aggregated number about future operating performance and showed that privately informed managers will disclose this number when it is high, and will stay silent when this number is low. Unraveling does not happen in these models because not all managers are privately informed. As a result, investors cannot assume that a silent manager is hiding something bad; it could be that the manager does not have any private information about the future (e.g., Dye, 1985).

Subsequent disclosure theories modified the above result by considering value-relevant information not as a single number but as a disaggregated multi-dimensional report. Hayes and Lundholm (1996) consider the case of a multi-segment firm where product market competition drives segment reporting disaggregation choices. However, our IPO firm setting primarily comprises single-segment firms (92 percent in our sample), and so these models are not relevant.

A more natural model for us is Ebert et al. (2017). In that model, managers are differentially privately informed about the details of the firm's future (or liquidation value). A privately informed manager has the option of reporting either an aggregated bottomline

number about future performance or a detailed disaggregated report of the business-model details that underlie this number (total silence never happens due to unraveling). All disclosures, while discretionary, are required to be truthful. The result is that when the aggregated bottomline number is very strong, the privately informed manager discloses just this number in equilibrium and no disaggregated details, which can only reveal pockets of weakness in the firm. When the aggregated bottomline number is weak, the privately informed manager releases a more detailed disaggregated report in equilibrium to showcase pockets of strength. Note that all managers disclose the bottomline aggregate number due to unraveling (Theorem IV.1), so it is hard for a manager with overall weak performance to persuade investors that she is a strong manager.[9]

2.2.1 Numerical example

A simple example is illustrative. Suppose managers witness a random number of independent 'transactions', each yielding \$1 with probability p and $-\$1$ with probability $(1-p)$. Fewer transactions are assumed to arise from aggregation (e.g., $+1$, $+1$, -1 aggregated to $+1$) and indicate that this manager's private information is not very detailed. Risk-neutral investors are interested in estimating the maximum likelihood probability p, which can be viewed as a valuation measure or a measure of the *permanence* of $+1$ transactions and the *transitoriness* of -1 transactions.[10]

First note that due to unraveling, i.e., investors assuming the worst otherwise, every manager is forced to disclose her total. Suppose the total is $-\$3$. At this point, the worst situation is if the manager drew $-1, -1, -1$: there are no positive transactions, so investors will assess a very low maximum likelihood point estimate of p (e.g., 0). A manager who drew $-1, -1, -1, -1, +1$ will want to report her disaggregates because investors will see she got at least a single $+1$, and so will give a higher p valuation (e.g., $\frac{1}{5}$). Similarly, a manager who drew $+1$ a total of N times and -1 a total of $(N+3)$ times (N being very large) will

[9] The breakpoint between the strong and weak dichotomy is in equations 11 and 37 of Ebert et al. (2017).
[10] Being risk-neutral, investors only care about the point estimate of p, not the spread.

disaggregate and receive almost $p \approx \frac{N}{N+N+3} \approx \frac{1}{2}$ valuation. Thus, poorly performing firms disaggregate to show their +1 strengths and separate themselves from even worse firms.

Next, consider the opposite case when total earnings are +\$3. The best case is if the manager drew $+1, +1, +1$. There are no negative transactions, so in the full-information scenario, investors will grant the highest possible p (e.g., 1). Now consider a manager who drew five transactions $+1, +1, +1, +1, -1$. She can aggregate the last three transactions and report $+1, +1, +1$. Likewise, any manager who drew -1 a total of N times and $+1$ a total of $(N + 3)$ times can aggregate all but the last two transactions and report $+1, +1, +1$. Thus, well-performing firms all pool by aggregating and hiding their -1 weaknesses to show they are as strong as the strongest firms.[11]

In sum, each firm is trying to maximize its valuation but cross-sectionally, firms reporting total earnings above the breakpoint 0 accomplish this by not disaggregating at all, while firms reporting total earnings below the breakpoint 0 accomplish this by disaggregating fully. A testable cross-sectional prediction is therefore that firms that disclose less outperform the firms that disclose more.

2.2.2 Hypotheses

Ebert et al. (2017) use a Bayesian belief setting with one firm and derive an equilibrium of no disaggregate disclosure or full disaggregate disclosure depending on whether the manager believes she is above or below the performance threshold of equation 11. We interpret this result from a frequentist perspective, i.e., managers who disclose more are more pessimistic about future earnings (below the threshold) than managers who disclose less (above the threshold). Uninformed managers also do not disclose more details, but these managers by assumption are spread across both strong and weak firms and we therefore assume that their presence weakens but does not change our frequentist hypothesis that disclosers will have lower future performance than non-disclosers on average. Of course, firms in our sample are

[11]Note that everyone reporting $+1, +1, +1$ is equivalent to reporting just +3, i.e., no disaggregation. Investors estimate the average p over all possible +3 firms.

not i.i.d., so we control for other determinants, and also run the performance regressions in a difference-in-differences (D-in-D) manner instead of a levels specification using matched control firms.

To the best of our knowledge, there are few direct empirical tests linking disaggregated discretionary disclosure in financial reports to future operating performance. As noted in Section 1, prior studies largely examine how disaggregated disclosures are associated with the firm's current and past performance (e.g., Bloomfield, 2008; deHaan et al., 2021; Li, 2010, Appendix A1; Merkley, 2014). The main argument of Li (2008) is that discretionary disclosure is systematically related to the magnitude of the link from current to future earnings (earnings persistence), suggesting that the link from discretionary disclosure to future earnings cannot be inferred from prior results on current earnings, but must be explicitly examined empirically. Statistically speaking, Li (2008) uses the interaction effect of prior earnings and disclosure fog to predict future earnings, whereas we are interested in the main effect of prior disclosure quantity. Ultimately, Li (2008), Lo et al. (2017), and Merkley (2014) do not focus on future performance because they test the alternative hypothesis that managers use discretionary disclosure in financial reports not to explain performance but to obfuscate performance. We control for the obfuscation alternative.

We next review the relevant non-litigation IPO research. Lowry et al. (2017) and Ritter and Welch (2002) segment the IPO literature into studies that focus on the firm's underwriter choice, allocation of shares, and extent of IPO underpricing. Some of this research examines whether the S-1 tone and content are associated with the attributes of the book-building process and the IPO's first-day returns, but not whether the quantity of the firm's S-1 disaggregated discretionary disclosures is associated with the firm's long-term post-IPO operating performance. For example, Ferris et al. (2013), Hanley and Hoberg (2010, 2012), Jegadeesh and Wu (2013), and Loughran and McDonald (2013) find that uncertain words and other linguistic patterns in designated sections of the S-1 are associated with the first-day IPO returns, but these studies do not examine the firm's longer-term operating performance post

IPO, and they explicitly exclude from their analysis several discretionary portions of the S-1. Jog and McConomy (2003, Section 6) examine post-IPO stock performance for a sample of about 150 Canadian firms, some of whom provide financial guidance; however, they find that guiding firms do not perform differently than non-guiders.

Prior studies also examine firms' roadshow presentations that market the offering before the IPO, although managers typically do not reveal new information beyond the amended S-1 in these often pre-recorded presentations. Blankespoor et al. (2017) find that first-day IPO returns are associated with managers' physical appearance in the roadshow presentation, but they do not examine disclosure quantity or the firm's performance post IPO. In an unpublished working paper, Blankespoor et al. (2021, Tables 5-8) find that firms' ROA post IPO is associated with the tone of managers' forward-looking statements in the roadshow presentation (but not disclosure quantity), and they find weak or no associations between the tone of designated sections of the S-1 and firms' future ROA. They also measure future ROA in levels, whereas we measure firm performance in changes to control for across-firm heterogeneity. When Blankespoor et al. (2021) add fixed effects in their last column in Table 8, their S-1 tone measures are insignificant. Blankespoor et al. (2021) also do not examine disclosure quantity and only analyze a small sample of 345 IPOs over four years for which they can locate roadshow evidence, as opposed to our analysis of 3,201 IPOs over 22 years. These studies therefore do not speak to our main research question. Finally, Pástor and Veronesi (2005) suggest that IPOs happen in industry, time, and underwriter waves. We control for this variation using industry, time, industry $\times$ time, and lead underwriter fixed effects.[12]

Next, the litigation hypothesis of Skinner (1994) predicts that poorly performing firms disclose aggregated bottomline numbers such as projected earnings to reduce litigation costs. As noted in Section 1, the litigation risk hypothesis is far from being settled—many studies

[12]For related studies, see Barth et al. (2017), Beatty (1989), Beatty and Ritter (1986), Boulton et al. (2011), Bushee et al. (2020), Chaplinsky et al. (2017), Ertimur et al. (2014), Guo et al. (2004), Leone et al. (2007), Ljungqvist and Wilhelm (2003), and Willenborg (1999).

continue to show that managers hide bad news and disclose good news (Bao et al., 2019; Kothari et al., 2009). Hanley and Hoberg (2012, Table 8) find that disclosure has no effect on Section 11 lawsuit probability, but underpricing significantly reduces this probability. Underpricing, not disclosure, is thus the main vehicle to deal with Section 11 litigation risk in our setting. Second, Hanley and Hoberg (2012, Tables 1, 2) also show that non-Section 11 ex ante litigation risk by post-IPO investors amounts to about 0.5 percent of the IPO proceeds. More importantly, in their Table 7, rows 4 and 6, they find that disclosure reduces non-Section 11 lawsuit risk only when the firm hides good news and not bad news. Clearly, their results on disclosure being a deterrence only for good IPO firms suggests that our finding of more disclosure by bad IPO firms cannot be attributed to these firms facing high litigation risk.

Finally, our definition of bad firms rests on future operating performance drops, whereas litigation arguments rest on the future stock price dropping below the offer price. These are entirely disconnected phenomena to the extent that future operating performance drops are anticipated by investors (as will be the case with rational expectations signaling). Indeed, we find no evidence that our disclosure metric predicts the probability of the stock falling below the offer price within a year of the IPO, which is when most lawsuits are filed (Lowry and Shu, 2002, Table 2). In any event, the litigation literature suggests various fixed effects and firm-level characteristics that proxy for litigation risk (Kim and Skinner, 2012). We control for many of these factors as well, use matched control firms with presumably similar litigation risks and proprietary costs, and partition the sample on litigation risk and re-run the tests separately.

Another outwardly consistent alternative for good firms disclosing less is due to these firms facing high proprietary costs. The canonical study of Verrecchia (1983, p. 190-191) indeed considers this possibility and shows that even in these cases, good firms disclose more than bad firms. The reason is straightforward. If non-disclosure implies goodness, bad firms will also be silent and try to pass off as good firms, unless they have litigation worries, an

issue we address in the previous paragraphs. Nonetheless, we also control for and partition our sample based on standard measures of proprietary costs and use matched control firms. Finally, more disclosure could also be obfuscation by management, a possibility we control for with widely used measures of obfuscation.

Turning to performance measures, Ebert et al. (2017) assume i.i.d. firms and thus directly compare performance relative to some sample-wide level belief baseline. We instead compute changes in changes. We define as the baseline the IPO firm's operating performance in the most recent fiscal year before the IPO in the S-1, and then measure performance changes relative to that year, and also relative to changes in a matched control firm. Note that the differencing calculations for within-firm operating performance changes and relative to matched control firms remove any firm- and time-fixed effects, respectively. Furthermore, to the extent each treatment firm's control has similar litigation risk, proprietary costs, and obfuscation motives, they should not explain the performance patterns we see. We then predict:

Hypothesis 1 in the alternative form: *A firm's disaggregated discretionary disclosure quantity in its S-1 filing is associated with declines in future operating margins in the IPO sample and also relative to matched control firms.*

The disclosure equilibrium in Ebert et al. (2017) also depends on investors pricing the disclosures rationally. Since the S-1 disclosure is released prior to the market opening (as required by the model), it should not rationally predict price movements after the opening bell (even if these movements are generated by subsequent events and managerial and investor choices and behaviors). Furthermore, to the extent there is IPO underpricing, the average amount should not affect any within-sample analysis. However, the model's equilibrium asymmetry plausibly supports small deviations in pricing. In the Ebert et al. (2017) equilibrium (equations 11 and 37), a weak firm discloses details to separate itself from an even weaker firm. If weak firms were to systematically receive overvalued IPO proceeds on average, it should not remove the incentive for a weak firm to separate itself from an even

weaker firm (as long as the overvaluation is not too large and these firms are still under the equation 11 threshold). Likewise, the average underpricing of strong firms should not reduce a strong firm's incentive to pool with an even stronger firm (as long as the undervaluation is not too much and these firms are still over the equation 11 threshold).[13]

Hypothesis 2 in the null and alternate form: *A firm's disaggregated discretionary disclosure quantity in its S-1 filing is not associated with future returns. Alternatively, there could be some amount of systematic overpricing or underpricing in the extreme terciles of disaggregated discretionary disclosures.*

3 Measuring S-1 disaggregated discretionary disclosure

Our sample consists of 3,201 completed US IPOs from 1996 to 2017. Following Loughran and McDonald (2013), we include only IPOs with an initial offer price of at least $5. We begin our sample in 1996 because this was when electronic filing with the SEC became mandatory, and we end our sample in 2017 to ensure we have the appropriate post-IPO data. Our sample of form S-1 filings is obtained from the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system, with additional details obtained from Ritter's IPO data repository.[14] In cases where firms revise or amend their S-1 before the IPO date, we use the firm's most recent S-1 filing prior to its IPO date while merging in any exhibits appended to the S-1. Such amendments result in a change in the total S-1 word count of less than five percent, on average. We also capture S-1 filings regardless of whether firms file under the JOBS Act. Even in the case of a delayed or "confidential" S-1 filing under the JOBS Act, the full S-1 must be made public at least 15 days prior to the roadshow, which is typically well before the IPO date (e.g., Barth et al., 2017; Boone et al., 2016; Chaplinsky et al., 2017).

We obtain firms' stock price data from CRSP and financial statement data from Com-

[13] We do not mathematically establish this conjecture, but instead rely on the Nash equilibrium often being robust to small perturbations.

[14] See `https://site.warrington.ufl.edu/ritter/ipo-data/`.

pustat. Consistent with other IPO studies, Table 1 shows that the sample size by year decreases over time, peaking in 1999 and reaching a low in 2008 (e.g., Gao et al., 2013). Table 2 shows that across industries, IPO firms are diverse, with the most populous industries being information technology, healthcare, and consumer discretionary.

3.1 The disaggregated disclosure measure and summary statistics

Ebert et al. (2017) show that the aggregated profit number is always disclosed in equilibrium, which is true in the S-1 as well. They then model disaggregation using a vector of Bernoulli random variables, which is more empirically problematic. They note, however, that the key requirement is that the disaggregated items have different valuation multiples, $+1$ and -1 in their case (Ebert et al., 2017, p. 74). Lev and Thiagarajan (1993) show that individual components of financial statements have different valuation multiples, and indeed Ebert et al. (2017, Section VI) suggest using counts of more detailed financial metrics. More importantly, Roychowdhury et al. (2019, Section 3.2.2) suggest that not all managers have access to such detailed metrics, a key requirement of the model to prevent unraveling.

We therefore construct our main disaggregated disclosure measure by summing the following components of the S-1: (1) the number of line items on the income statement appearing above operating income (i.e., excluding interest- and tax-related items, non-controlling interests, discontinued operations, and totals), (2) the number of non-GAAP metrics listed in the reconciliation of non-GAAP metrics, and (3) the number of uniquely labeled disaggregated sections and subsections included in the components of results of operations. Note that the third component of this measure is not simply a proxy for business segments, as 92 percent of our sample firms have only one segment. For example, Twitter includes a section on its user growth and another that disaggregates its marketing expenses, as explained further below. We conduct the overall count using hand-coding, and we label the measure *S-1 Disaggregated Disclosure*. The theoretical legal minimum value of our measure is two if a company includes only one line item for revenues and another for expenses on the income statement,

and neither includes non-GAAP measures nor disaggregates the results of operations section of the S-1 (Westenberg, 2019, Ch. 13). As discussed in more detail in Section 4.3, we also construct several alternative disclosure measures, including a measure based on word counts akin to those employed by prior research (e.g., Blankespoor, 2019; deHaan et al., 2021).[15] To provide an example of our main disaggregated discretionary disclosure measure, we use Twitter's S-1, which contains five line items appearing above operating income on the income statement, plus two non-GAAP measures, plus eight unique disaggregated sections and subsections in the components of results of operations, for a measure value of 15.

Table 3 reports some of the distributional properties of our main measure, *S-1 Disaggregated Disclosure* (or *S-1 DD*). Its mean of 8.9 and median of 11.0 suggest that most IPO firms include at least some disaggregated metrics in their S-1, consistent with Black et al.'s (2018, Section 3.2) finding that many firms disclose several disaggregated metrics in various periodic SEC filings. The Twitter example from above is at the higher end of our measure's distribution with a value of 15. Also, Table 3 shows that 92 percent of firms report only one segment. Following Guay et al. (2016), we conjecture that this cross-sectional pattern in the number of segments likely reflects the limited business model complexity of relatively focused IPO firms and not disclosure aggregation or disaggregation choices.

If our sample firms are i.i.d. like those in Ebert et al. (2017), we could attribute all the variation in the disaggregated disclosure measure to managerial discretion. However, our sample is likely more heterogeneous, and there are several other potential economic reasons for observing variation in our S-1 disaggregated disclosure measure. In an analysis of disclosure determinants, Li (2008, Section 3.4) provides a set of variables motivated by prior research that we augment in our analysis. For example, a firm's disclosure choices may vary with its size (e.g., Baginski et al., 2004; Cox, 1985), prior performance (e.g., deHaan et al., 2021; Kothari et al., 2009; Lang and Lundholm, 1993), and complexity, where complexity is measured by the number of business segments (e.g., Guay et al., 2016; Li, 2008). As

[15]The enactment of Regulation G in 2003 required all public firms to reconcile non-GAAP metrics with their GAAP counterparts. For IPOs prior to 2003, we look for non-GAP metrics in the full S-1.

mentioned above, because single-segment firms comprise 92 percent of our sample, segment variation is not a sample-wide concern empirically. We therefore attempt to conservatively isolate the discretionary part of our measure by residualizing it against other (possibly correlated) determinants.[16]

Specifically, we regress *S-1 Disaggregated Disclosure* on established proxies for the above effects, after controlling for year-fixed effects, industry-fixed effects, industry-year-fixed effects, and lead underwriter-fixed effects, and then extract the residuals. Our extensive use of fixed effects controls for many alternative explanations, including IPO waves (e.g., Pástor and Veronesi, 2005), as well as any systematic or sample-wide S-1 disaggregated disclosure patterns that vary across time, across industry, and across industry and time simultaneously. We also include measures of the firm's prior performance, investment activities, governance structure, investor base, age, complexity, and obfuscation. We then include proxies for litigation risk using the industry, size, and growth controls recommended by Kim and Skinner (2012), and proxy for the propensity to issue future earnings guidance with actual future guidance. Appendix A provides the exact formulas for these variables.

Table 4 shows that loss firms and growth firms (as measured by a higher market-to-book ratio) make more disaggregated disclosures in the S-1 (1% level). Larger firms (as measured by assets and revenues), firms conducting more research and development, firms with multiple share classes, and venture capital (VC) funded firms make significantly more disaggregated disclosures in the S-1 (1% level). The few firms (8 percent) with more than one reported segment also make more disaggregated disclosures, suggesting that firms with broader or more complex business models disclose more (Guay et al., 2016). The overall tone of the S-1 is negatively associated with the quantity of disaggregated disclosures (1% level). Disclosure obfuscation, as measured by the Gunning Fog readability index (Li, 2008),

[16]Our choices also align with Beyer et al. (2010, Section 3.2.1), who further survey managers' motives for making discretionary disclosures.

is positively associated with the quantity of disaggregated disclosures in the S-1 (5% level).[17]

Table 4 also includes a measure of the firm's total accruals scaled by assets. Teoh et al. (1998) find that in the IPO setting, an accrual-based measure of earnings management is negatively associated with the firm's longer-term post-IPO performance. However, Fan (2007) shows that this relationship is not robust and finds no significant association between a firm's accruals and post-IPO performance. We find that firms with more total accruals make slightly fewer S-1 disaggregated disclosures.[18]

Since some regressors in Table 4 could potentially be correlated with discretion, we consider the residuals in Table 4 to be a conservative measure of management's disaggregated discretionary disclosure choices. Note that our two-step research design uses the residual as an independent variable and so is not susceptible to the Chen et al. (2018, p. 758) critique.[19]

In Ebert et al. (2017), equilibrium disclosure levels jump discontinuously in the cross-section from minimal disaggregated disclosure to maximally detailed disaggregated disclosure. We therefore place the Table 4 residuals into terciles based on rank order, where tercile 1, 2, and 3 represent low, medium, and high S-1 discretionary disaggregated disclosure. The residuals used to form these terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling does not spuriously re-induce any correlations with the disclosure regressors. We nonetheless explicitly control for this possibility in Section 4.1 by running a one-step regression with

[17]We find similar results in terms of sign and significance when we use the log of S-1 disaggregated disclosures as the dependent variable in Table 4. Our results are also unchanged when we include other readability measures, such as the Flesch Kincaid Reading Index (Guay et al., 2016).

[18]To understand the cross-sectional industry variation in our measure, we insert the industry-fixed effects one at a time in an untabulated analysis, and find that energy, healthcare, financial, communications, and utility firms make more disaggregated disclosures in the S-1 relative to the rest of the sample.

[19]Residuals are also commonly used in accounting and finance research. Core et al. (1999, Table 2) build a regression model of executive pay and use its residuals as a measure of excess pay, which is a procedure also used by several subsequent follow-up studies (Edmans et al., 2017 survey this literature). Demerjian et al. (2012, Table 2) also use a similar approach for firm profitability to create a measure of managerial ability, and Dikolli et al. (2020, Table 3) use it to create a measure of CEO integrity.

the raw S-1 disaggregated disclosure measure that controls for all the variables in Table 4. Our results are not sensitive to this research design choice, highlighting their robustness to various functional forms.

3.2 Validating the disaggregated discretionary disclosure tercile measure

We validate our assumption that our measure proxies for managers' disaggregated discretionary disclosure choices by testing whether it is associated with the unsigned or absolute magnitude of firms' first-day and two-day market-adjusted IPO returns as well as bid-ask spreads. Prior research interprets relatively high one- and two-day IPO absolute returns as evidence of a lower quality IPO information environment where some (non-insider) investors are differently informed (e.g., Barth et al., 2017; Lowry et al., 2010; Ritter and Welch, 2002). The argument is that high levels of information asymmetry among investors raise investor concerns about informed trading and move prices more than in transparent environments with no information asymmetry.

After controlling for other determinants, any variation in information environments should arise from discretionary disclosures. Prior studies argue that discretionary disclosures improve information environments (Balakrishnan et al., 2014; Guay et al., 2016), in which case our tercile measure should be negatively correlated with the absolute returns measure. The tercile being a categorical variable, we use separate indicator variables for IPO firms in the high and low discretionary disclosure terciles, which lets the baseline or base case value of each dependent variable equal its conditional mean relative to the middle tercile (the one omitted tercile) and after controlling for all the other variables and fixed effects. Table 5, Column 1 shows that relative to the IPO firms in the middle discretionary disclosure tercile, the absolute first-day market-adjusted returns for IPO firms in the high discretionary disclosure tercile are lower by 2.9 percentage points (1% level), which is an economically meaningful shift relative to the sample mean and standard deviation for these returns of

7.5 and 9.0 percentage points, respectively. By comparison, the absolute first-day market-adjusted returns for IPO firms in the low discretionary disclosure tercile are higher by 3.1 percentage points relative to the middle tercile (1% level). We also find statistically similar results for two-day absolute IPO returns in Table 5, Column 2.[20] Table 5, Columns 3 and 4 show that in terms of sign and significance, the results do not change much when we drop the controls from Table 4, consistent with the orthogonality of the terciled residuals. The differences in the high and low tercile coefficients are also all statistically significant (1% level). Table 5, Column 5 confirms the above results with bid-ask spreads, showing that they are lower for firms in the highest tercile.

The above findings also alleviate concerns that our disclosure measure reflects obfuscation attempts by managers to confuse investors by complicating the financial statements, in which case these disclosures may lack credibility and not move prices or spreads, or may lead to more investor uncertainty as rational investors try to price-protect their trades. The findings also alleviate concerns that our upcoming results on operating performance declines for the high tercile disclosure firms reflect deterioration in the information environment. Finally, Table 5, Column 6 shows that disclosure disaggregation is not significantly correlated with the likelihood that the IPO firm's stock price drops below its offer price in the year after the IPO, suggesting that high levels of disclosure are unlikely to be driven primarily by litigation risk.

[20]We also find statistically similar negative coefficients when we use as the independent variable the S-1 discretionary disclosure tercile in a linear form that takes a value of 1, 2, or 3, and with the raw disclosure score.

4 S-1 disaggregated discretionary disclosure and future performance

4.1 Testing Hypothesis 1: Future operating margins

We test whether the firm's S-1 disaggregated discretionary disclosures are associated with its future operating performance over the three years post IPO, as measured by EBITDA ÷ assets and EBITDA ÷ sales, both in the IPO cross-section and relative to a control sample. These performance measures focus on the firm's core operating performance and are mostly immune to factors outside management's control such as taxes. We use the performance in the last fiscal year before the IPO date (using data from the S-1) as the baseline, and use a post window of the first three fiscal years ending after the event date of the IPO to give time for the firm's future performance to materialize. We then measure operating performance relative to the last fiscal year before the IPO date, and also relative to changes in operating performance in a matched control firm. This "collapsed" style of difference-in-differences (D-in-D) is recommended by Bertrand et al. (2004) and Baker et al. (2022) and is similar to Brav et al.'s (2008, Table VII) analysis of relative changes in firms' operating performance. Note that the differencing calculations for within-firm operating performance and relative to the control firms remove any firm- and time-fixed effects. This process is the counterpart to our attempt to control for the heterogeneity in the S-1 disclosure levels by residualizing them. Thus, to the extent litigation risk, proprietary costs, and obfuscation are similar across the treatment firm and its control, these alternatives are unlikely to explain our findings. Our disclosure measure is the residual tercile measure constructed in Section 3.

Table 6 reports the IPO firms' average performance in excess (or deficit) of two different benchmarks: (1) the matched control firms, which facilitate the D-in-D analyses; and (2) the IPO firm relative to itself without control firms. To select the control firms, we adopt the performance-matching approach of Barber and Lyon (1996) whereby each IPO firm is

matched to another Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets. IPO firm performance in excess of this benchmark indicates how IPO firms take potentially different paths of operating performance than comparable firms that had almost identical performance in the event year. We examine IPO firm performance in excess of itself without the control firms to ensure that our selection of control firms is not driving the results.

Table 6, Panel A examines the high S-1 discretionary disclosure tercile and shows that the IPO firms, by construction, start with near-zero excess performance relative to the performance-matched control firms in the most recent fiscal year before the IPO. However, in years t+1 and t+2, these IPO firms' performance significantly deteriorates relative to the control firms. Specifically, in year t+3, IPO firms' performance falls behind that of the control firms by 2.47 (1% level) and 2.56 (1% level) percentage points for EBITDA ÷ assets and EBITDA ÷ sales, respectively, further extending a pattern that emerges as early as year t+1. We also find similar performance deterioration using D-in-D estimates in the row marked "(t+3) − Event year," which provides the t+3 difference in performance less the event year difference in performance between the IPO firms and control firms (1% level). On the right side of Table 6, Panel A, the "(t+2) − Event year" and "(t+3) − Event year" rows yield similar results without including the matched control firms. Taken together, these findings show that higher levels of S-1 disaggregated discretionary disclosure are associated with poorer future performance, as evidenced by lower ex post operating margins for IPO firms within firm and relative to closely matched control firms.[21]

Table 6, Panel B examines the medium or average S-1 discretionary disclosure tercile and shows that as before, the IPO firms, by construction, start with near-zero excess performance relative to the performance-matched control firms in the most recent fiscal year before the

[21]We also find statistically similar results for all the tests in Table 6 at the median using Wilcoxon-based tests.

IPO. However, in years t+1 and t+2, these IPO firms' performance relative to the control firms is not statistically significantly different from zero. We also find stable performance using D-in-D estimates in the row marked "(t+3) − Event year," which provides the t+3 difference in performance less the event year difference in performance between the IPO firms and control firms (1% level). The results are also similar when we do not include the control firms.

On the other end of the spectrum, Table 6, Panel C examines the low S-1 discretionary disclosure tercile and shows that the IPO firms, by construction, again start with near-zero excess performance relative to the performance-matched control firms in the most recent fiscal year before the IPO. However, in years t+1 and t+2, IPO firms' performance significantly improves relative to the control firms. Specifically, in year t+3, IPO firms' performance exceeds that of the control firms by 2.50 (1% level) and 3.12 (1% level) percentage points for EBITDA ÷ assets and EBITDA ÷ sales, respectively, further extending a pattern that emerges in year t+1. We also find similar performance improvements using D-in-D estimates in the row marked "(t+3) − Event year," which provides the t+3 difference in performance less the event year difference in performance between the IPO firms and control firms (1% level). On the right side of Table 6, Panel C, the "(t+2) − Event year" and "(t+3) − Event year" rows yield similar results without including the matched control firms. The findings for years t+1 to t+3 are also statistically different from those in Table 6, Panel A (1% level). Taken together, these findings show that lower levels of S-1 disaggregated discretionary disclosure are associated with better future performance, as evidenced by higher ex post operating margins for IPO firms within firm and relative to closely matched control firms.

The ex post IPO performance can only be analyzed for IPO firms that remain in the Compustat sample after their IPO. However, our research design is year-by-year and thus does not require the treatment firm to survive for three years. In fact, when statistically comparing the results across the terciles by year, the D-in-D performance gaps between tercile 3 to tercile 1 in "(t+1) − Event year," "(t+2) − Event year," and "(t+3) − Event

year" are all significant.[22]

Finally, in the Online Appendix, Table OA.1 shows that we obtain statistically significant results when we run a one-step regression with the raw disaggregated disclosure score and its Table 4 controls as regressors, highlighting the robustness of our results to different functional forms. Overall, our findings support the prediction that firms with poorer future prospects will make more disaggregated discretionary disclosures.

4.2 Ruling out litigation risk and proprietary costs as alternative explanations

We have already shown in Table 5, Column 6 that the main driver of Section 11 litigation, namely the stock price dropping below the offer price (Lowry and Shu, 2002, Table 2), is not significantly correlated with our disclosure measure. Our performance changes tests also include several controls that proxy for proprietary costs and litigation risks, and these tests are also relative to a matched control sample of firms that likely have similar litigation risk and proprietary costs. However, these controls are additive and may not capture any important nonlinear effects. We therefore perform two additional tests to rule out proprietary costs and litigation risk as alternative explanations. First, we partition the sample into high and low litigation risk subsamples based on the Kim and Skinner (2012) and Hanley and Hoberg (2012) measures of litigation risk. Specifically, we follow these studies and classify certain industries as high or low risk and re-run our main tests on the sample firms in these industries.[23] Second, we partition the sample into two based on the textual competition measure of Li et al. (2013) to create high and low proprietary cost subsamples.[24]

[22] An examination of DealScan suggests that the majority of the decline in numbers is due to firms getting acquired. This phenomenon is beyond this study's scope.

[23] Following Kim and Skinner (2012) and Hanley and Hoberg (2012), low litigation risk firms are those in the following industries: consumer discretionary, industrials, energy, and materials (n = 1,054). High litigation risk firms are those in the following industries: communications, financials, healthcare, and information technology (n = 2,067).

[24] We construct the Li et al. (2013) measure from our firms' first post-IPO annual report, and partition the sample based on the median score. The number of total observations decreases from the main analysis due to the requirement that firms stay public long enough to file a 10-K.

In Tables OA.2 and OA.3, we find no evidence that the results are driven by litigation risk and proprietary costs. For all the subsamples, the economic magnitudes and statistical significance are similar to those for the full sample in Table 6: the high disclosure IPO firms start with near-zero excess performance relative to the performance-matched control firms, and then operating performance significantly deteriorates relative to the control firms in years t+1 to t+3 (see Panel A of Tables OA.2 and OA.3). For the low disclosure firms, operating performance significantly improves relative to the control firms in years t+1 to t+3 (see Panel C of Tables OA.2 and OA.3). Differences across the high and low litigation risk and the high and low proprietary cost firms are also statistically insignificant at the 10% level. Having survived the partitioning of our sample on litigation risks and proprietary costs, these results suggest that these factors are not viable alternative explanations.

4.3 Alternative disaggregated disclosure measures

We next replicate our main results with alternative definitions of S-1 disaggregated discretionary disclosure, starting with a measure based on the total number of words in specific S-1 items (numbers are considered words and counted).[25] Form S-1 is segmented into two parts, *Part I* and *Part II*, and a total of 17 item numbers. Certain item numbers in the S-1 are devoted to details on the price of the shares, the firm's recent financial statements, and the underwriting process. Other item numbers are devoted to more discretionary disclosures, such as supplemental exhibits and financial statements. While prior studies such as Loughran and McDonald (2013) focus on Part I of the S-1 and exclude Part II from their analysis, we examine items from both parts of the S-1 to compute our word count measure.

Specifically, to compute our word count measure, we remove from each S-1 any ASCII, HTML, and other encodings, and then extract any content related to item 3 ("summary information, risk factors and ratio of earnings to fixed charges"), item 4 ("use of proceeds"),

[25]Examples of prior studies that use word counts to quantify other corporate filings include Allee et al. (2021), Blankespoor (2019), deHaan et al. (2021), Dyer et al. (2017), Lang and Stice-Lawrence (2015), Li (2008), and You and Zhang (2009).

and item 16 ("exhibits and financial statement schedules"), which are the key sections of the S-1 whose content derives in part from management's discretionary disclosure choices (Loughran and McDonald, 2013). Our focus on these item numbers is motivated by the fact that they are unlike the other items in the S-1 that are transaction-driven or related to the underwriting process, such as item 13 ("other expenses of issuance and distribution"), item 14 ("indemnification of directors and officers"), and item 15 ("recent sales of unregistered securities"). We also do not parse any exhibits related to the mandated filing of material agreements, such as debt contracts, as these are also not discretionary (but we do parse the text of discretionary exhibits such as supplemental financial statements).[26]

We also analyze a third disclosure measure based on the Li (2010) measure of forward-looking statements, which are completely voluntary in the S-1 and not mandated by the SEC (Westenberg, 2019, p. 13-19). Following the technique in Li (2010, Appendix B), we define forward-looking statements as those sentences that contain the words *anticipate*, *believe*, *can*, *could*, *expect*, *forecast*, *goal*, *hope*, *intend*, *may*, *might*, *objective*, *plan*, *project*, *seek*, *should*, or *will*. We do not count as forward-looking statements any sentences that contain *anticipated*, *believed*, *expected*, *forecasted*, or *projected* when these words follow *had*, *had been*, *was*, and *were*. For each S-1, we then compute the percentage of total sentences that are forward-looking statements. For all our disclosure measures, we perform manual spot checks and take other precautions to ensure we capture all the disclosures in our item numbers of interest, cross-referencing the table of contents and XRBL encodings when necessary.

We then re-run the regression in Table 4, first replacing the dependent variable with the log of the word count of the S-1 items designated above, and then replacing the dependent variable with the percentage of sentences that are forward-looking statements in the S-1. We find that compared to the initial specification in Table 4, most of the coefficients in the new

[26]Note that IPO firms also file form 424, which is the final IPO prospectus. However, form 424 specifically excludes Part II of the S-1. Thus, in contrast to Ferris et al. (2013) and Hanley and Hoberg (2010, 2012), who analyze only form 424, we examine items from the full S-1. Boone et al. (2016) and Dambra et al. (2015) also find that some firms temporarily remove certain mandatory details, such as contract terms, from Part I of their S-1, but these removals do not affect our analysis because they fall outside the discretionary sections of the S-1.

specifications are similar in terms of sign and statistical significance. Based on the residuals from these two separate regressions, we then recreate two different sets of S-1 disaggregated discretionary disclosure terciles, with one set based on the word count residuals and the other set based on the forward-looking statement residuals.

Consistent with both residual measures proxying for a similar underlying disaggregated discretionary disclosure construct, the initial terciles created from Table 4 are correlated with the word count terciles at +0.74 (1% level) and the forward-looking statements terciles at +0.70 (1% level). These terciles are also positively associated with better information environments in validation tests akin to those in Table 5. It is therefore an expected outcome that when we re-run the analyses in Table 6 using both these new tercile rankings, our inferences are statistically and qualitatively unchanged, although with economic magnitudes that are different but still significant. These results appear in the Online Appendix, Tables OA.4 and OA.5. We similarly replicate the results using a character count instead of a word count for our S-1 items of interest (deHaan et al., 2021, Section 3.3). For brevity, we do not present these results.

4.4 Survivorship bias due to withdrawn IPOs

We next examine another key outcome in the IPO setting that relates to our hypotheses, IPOs that are initiated with an S-1 filing and later withdrawn. Prior research finds that in recent years, anywhere from 20 to 40 percent of firms that initiate an IPO with an S-1 do not complete the process successfully (e.g., Dunbar, 1998; Dunbar and Foerster, 2008). Similar to these studies, we find that about 30 percent of the S-1 filings from 1996 to 2017 do not result in a public offering, as measured by the subsequent lack of a firm in CRSP or Compustat that matches the CIK, CUSIP, and other identifying information from the S-1 filing. Consistent with our other findings, we find that our main S-1 disaggregated disclosure measure for withdrawn IPOs is higher by about three compared to successful IPOs (1% level). Given that withdrawn IPOs are typically considered a negative event and signal about a firm's

future (Ritter and Welch, 2002), this finding supports the negative association between the firm's disaggregated disclosure quantity and future performance.

4.5 Testing Hypothesis 2: Future stock returns

Hypothesis 2 in the null form predicts no significant returns patterns with rational investors—average IPO underpricing should not affect within-sample variation. Table 7 shows that as early as [0, +30 days], where day 0 is the firm's IPO date, a firm's S-1 disaggregated discretionary disclosure is significantly negatively associated with its market-adjusted stock returns (labeled in the tables as *cumulative abnormal returns* or *CARs*). Table 7, Column 2 shows that relative to the IPO firms in the middle S-1 discretionary disclosure tercile, the 30-day market-adjusted returns for the IPO firms in the high S-1 discretionary disclosure tercile are lower by 1.3 percentage points (5% level) after controlling for fixed effects for IPO year, industry, IPO year × industry, and lead underwriter. By comparison, the 30-day market-adjusted returns for the IPO firms in the low S-1 discretionary disclosure tercile are higher by 1.0 percentage points relative to the middle tercile (1% level).

The returns effects also persist and strengthen over time. Relative to the middle tercile, the top tercile of S-1 discretionary disclosure has lower returns of 6.5 percentage points for [0, +1 year], 5.5 percentage points for [0, +2 years], and 6.2 percentage points for [0, +3 years], after controlling for the other variables and fixed effects (1% level). The low tercile, by contrast, consistently has higher returns than the high and middle terciles, and the differences in the high and low tercile coefficients are all statistically significant for these returns (1% level).[27] Relative to the sample means and standard deviations of the returns variables, all these effects also represent economically meaningful changes. Note that all these analyses include any firms that may have delisted due to acquisitions or other reasons before the end of the return window under consideration. Our results are therefore not due to imposing a survival criterion on the sample firms. Table OA.6 shows similar patterns for the Sharpe

[27] We also find statistically similar negative coefficients when we use the S-1 discretionary disclosure tercile as a linear variable that takes a value of 1, 2, or 3.

ratio, suggesting that the returns results are not due to any differences in risk.

Our results thus suggest that high discretionary disclosure firms are relatively overvalued at the IPO, and low discretionary disclosure firms are undervalued. These findings are consistent with the alternative version of H2 that suggests that as long as the magnitude of the investor misvaluation is small, the negative association between disclosure and future operating performance is still theoretically plausible, although we do not know if our observed returns are small enough in magnitude. We also note that our significant returns results are in contrast to prior studies that find no future returns effects of discretionary disclosure (Bloomfield, 2008).

5 Conclusion

Recent disaggregated discretionary disclosure models, such as Ebert et al. (2017), predict that firms with more pessimistic private information about future operating performance will make more disclosures. We use the IPO S-1 filing setting to address this question, arguing that this setting closely matches the theory models' disclosure and timing setup for several reasons. Consistent with theory, we find that higher S-1 disaggregated discretionary disclosure quantity is significantly associated with future operating performance declines. We also plausibly rule out alternative litigation and management obfuscation motives, both for institutional reasons and by using multiple residualized disclosure measures, matched control samples, and sample partitioning analyses. Our diff-in-diff approach of measuring performance changes of treatment firms relative to matched control firms also alleviates concerns that heterogeneity across firms is driving our results. Our focus on future operating performance not only gets to the essential economics of disclosure theory but also distinguishes us from the prior empirical focus on current and past operating performance or the second-moment information environment. Future studies can test other recent models of voluntary disclosure that rely on multi-period considerations (Aghamolla and An, 2021) or managers'

risk-aversion (Bond and Zeng, 2022; Nagar, 1999).

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Appendix A
Variable Construction

This appendix describes the variables in this study and their sources. Index i represents each IPO firm and S-1 filing pair, and $y = 0$ represents the most recent fiscal year in the S-1 filing. Index f represents the IPO firm, r represents stock returns, and d represents the denoted trading day. Note that we do not compute firm and market returns on any days an IPO firm is not traded or after any subsequent delisting event. Data source C = Compustat, SEC = Securities and Exchange Commission, and R = Jay Ritter's IPO data (`https://site.warrington.ufl.edu/ritter/ipo-data/`). Variables are winsorized at the 1 and 99 percent levels except for indicator variables and variables with lower or upper bounds of zero or one, which are winsorized from the top or bottom only, respectively.

Variable	Definition	Source
S-1 Disaggregated Disclosure (S-1 DD)$_i$	Sum of the following components of the S-1: (1) the number of line items on the income statement appearing above operating income (i.e., excluding interest- and tax-related items, non-controlling interests, discontinued operations, and totals), (2) the number of non-GAAP metrics listed in the reconciliation of non-GAAP metrics, and (3) the number of uniquely labeled disaggregated sections and subsections included in the components of results of operations.	SEC
S-1 Filing Word Count$_i$	Count of words in firm i's S-1 discretionary disclosures in items 3, 4, and 16, as defined further in Section 3.1 (numbers are considered words and counted)	SEC
$[X, Y]$ Cumulative Abnormal Returns$_i$	$\left[\exp\left[\sum_{d=X}^{Y} \ln(1+r_{fd})\right]-1\right]$ minus the same value for the value-weighted market index. Day 0 CAR is based on the offer price.	CRSP
Price $<$ Offer in Year 1$_i$	1 if the IPO firm's stock price falls below its IPO offer price in the 365 days after the IPO date, 0 otherwise	CRSP
Percent Spread$_i$	$\left[100 \times \frac{\text{Closing ask}_{fd} - \text{Closing bid}_{ft}}{(\text{Closing ask}_{fd} + \text{Closing bid}_{fd})/2}\right]$	CRSP
$[X, Y]$ Sharpe Ratio$_i$	$\left[\exp\left[\sum_{d=X}^{Y} \ln(1+r_{fd})\right]-1\right] \div \sigma(r_{f_{[X,Y]}})$	CRSP
Total Assets$_i$	Total assets$_{f,y=0}$	C
Revenue$_i$	Revenue$_{f,y=0}$	C
Loss Firm$_i$	1 if EBITDA$_{f,y=0}$ is less than zero, 0 otherwise.	C
Market:Book$_i$	Market cap.$_{f,y=0}$ $\div$ common equity$_{f,y=0}$	C
R&D$_i$	Research and development$_{f,y=0}$ $\div$ total assets$_{f,y=0}$	C
CAPEX$_i$	Capital expenditures$_{f,y=0}$ $\div$ total assets$_{f,y=0}$	C
PPE$_i$	Property, plant, and equipment$_{f,y=0}$ $\div$ total assets$_{f,y=0}$	C

(continued on the next page)

Appendix A (continued from the prior page)
Variable Construction

Variable	Definition	Source
Segments_i	$\text{Total business segments}_{f,y=0}$	C
Total Accruals_i	(Earnings before extraordinary items and discontinued $\text{operations}_{f,y=0}$ – net cash flow from continuing $\text{operations}_{f,y=0}$) ÷ $\text{total assets}_{f,y=0}$. Higher values of this measure signify higher accruals (Hribar and Collins, 2002; Fan, 2007).	
S-1 Filing Tone_i	($\text{Positive Word Count}_i$ – $\text{Negative Word Count}_i$) ÷ ($\text{Positive Word Count}_i$ + $\text{Negative Word Count}_i$), based on the positive and negative word dictionaries from Loughran and McDonald (2011, 2013). This variable is standardized to a mean of 0 and a standard deviation of 1.	SEC
$\text{Multiple Share Classes}_i$	1 if the IPO includes multiple share classes, 0 otherwise.	R
VC Funded_i	1 if the IPO firm has received funding from a venture capital firm, 0 otherwise.	R
Firm Age_i	$\text{The number of years since the IPO firm's date of incorporation}_{f,d=0}$	SEC
$\text{Management Guidance}_i$	1 if the IPO firm releases earnings or sales guidance over the three years post IPO, 0 otherwise	IBES
Fog Readability_i	0.4 × (number of words / number of sentences) + 40 × (number of words with more than two syllables / number of words). Higher values of this measure signify reduced readability (Li, 2008).	SEC

Table 1
Year Distribution of IPOs from 1996 to 2017

Year j	IPOs_j	$\frac{\text{IPOs}_j}{\text{N = 3,320}}$
1996	235	7.34%
1997	340	10.62%
1998	204	6.37%
1999	365	11.40%
2000	283	8.84%
2001	64	2.00%
2002	62	1.94%
2003	56	1.75%
2004	159	4.97%
2005	141	4.40%
2006	150	4.69%
2007	149	4.65%
2008	19	0.59%
2009	42	1.31%
2010	92	2.87%
2011	88	2.75%
2012	103	3.22%
2013	161	5.03%
2014	205	6.40%
2015	119	3.72%
2016	65	2.03%
2017	99	3.09%
Total	3,201	100%

Table 2
Industry Distribution of IPOs from 1996 to 2017

Industry k	IPOs_k	$\frac{\text{IPOs}_k}{\text{N = 3,320}}$
Energy	254	7.94%
Materials	66	2.06%
Industrials	312	9.75%
Consumer Discretionary	422	13.18%
Consumer Staples	63	1.97%
Healthcare	696	21.74%
Financials	330	10.31%
Information Technology	925	28.90%
Communications	116	3.62%
Utilities	13	0.41%
Real Estate	4	0.12%
Total	3,201	100%

Table 3
Descriptive Statistics for IPO Firms and S-1 Disaggregated Disclosures from 1996 to 2017
The cumulative abnormal returns (CAR) variables are computed as firm returns less the contemporaneous value-weighted market index from CRSP, where day 0 is firm i's IPO date. Variables are winsorized at the 1 and 99 percent levels except for indicator variables and variables with lower or upper bounds of zero or one, which are winsorized from the top or bottom only, respectively. Observations vary based on data availability. Note that we do not compute returns on any days an IPO firm is not traded. Variables are increased by 1 before being natural logged, if necessary. See Appendix A for variable definitions.

Variable	N	Mean	σ	P25	P50	P75
S-1 Discretionary Disclosure$_i$ (S-1 DD$_i$)	3,201	8.86	6.30	8.00	11.00	16.00
Log(S-1 Filing Word Count)$_i$	3,201	10.510	0.60	10.057	10.394	10.848
Abs(Day 0 CAR)$_i$	3,201	0.075	0.09	0.018	0.044	0.099
Abs([0, +1 day] CAR)$_i$	3,201	0.074	0.08	0.020	0.046	0.098
[0, +7 days] CAR$_i$	3,201	0.002	0.11	-0.048	-0.005	0.043
[0, +30 days] CAR$_i$	3,201	0.038	0.23	-0.079	0.008	0.110
[0, +1 year] CAR$_i$	3,201	-0.033	0.73	-0.538	-0.164	0.251
[0, +2 years] CAR$_i$	3,201	-0.123	1.03	-0.767	-0.376	0.196
[0, +3 years] CAR$_i$	3,201	-0.152	1.25	-0.852	-0.498	0.216
Price < Offer in Year 1$_i$	3,201	0.538	0.49	0.000	1.000	1.000
Day 0 Percent Spread$_i$	3,201	0.914	1.09	0.251	0.520	1.123
[0, +1 year] Sharpe Ratio$_i$	3,201	4.365	18.96	-9.251	-1.848	13.397
[0, +2 year] Sharpe Ratio$_i$	3,201	5.518	28.15	-11.597	-6.267	14.111
[0, +3 year] Sharpe Ratio$_i$	3,201	7.904	35.30	-12.301	-6.918	15.777
Loss Firm$_i$	3,201	0.345	0.48	0.000	0.000	1.000
Log(Total Assets)$_i$	3,201	5.556	1.59	4.460	5.372	6.502
Log(Revenue)$_i$	3,201	4.643	2.00	3.614	4.766	5.899
Market:Book$_i$	3,201	4.196	5.84	1.229	2.448	4.606
R&D$_i$	3,201	0.100	0.17	0.000	0.006	0.142
CAPEX$_i$	3,201	0.066	0.09	0.013	0.036	0.080
PPE$_i$	3,201	0.190	0.23	0.036	0.091	0.246
Business Segments$_i$	3,201	1.175	0.28	1.000	1.000	1.000
Total Accruals$_i$	3,201	-0.044	0.15	-0.094	-0.027	0.027
S-1 Filing Tone$_i$	3,201	0.017	1.00	-0.644	0.014	0.664
Multiple Share Classes$_i$	3,201	0.141	0.35	0.000	0.000	0.000
VC Funded$_i$	3,201	0.449	0.50	0.000	0.000	1.000
Firm Age$_i$	3,201	9.036	3.41	6.161	9.057	11.907
Management Guidance$_i$	3,201	0.112	0.32	0.000	0.000	0.000
Fog Readability$_i$	3,201	20.653	1.65	19.601	20.423	21.203

Table 4

Determinants of S-1 Disaggregated Disclosures for IPO Firms from 1996 to 2017

This table empirically models the determinants of firms' S-1 disaggregated disclosures. The residuals from this regression are used to form the terciles in the subsequent tables, where the tercile values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in this table. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in this table, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. See Appendix A for the exact variable definitions. T-statistics are in parentheses and the standard errors are clustered by IPO year and robust to heteroskedasticity. ***, **, and * indicate statistical significance at the two-tailed 1%, 5%, and 10% level, respectively.

	S-1 Disaggregated Disclosure$_i$ (1)	
Loss Firm$_i$	1.843***	(3.32)
Log(Total Assets)$_i$	1.907***	(4.75)
Log(Revenue)$_i$	0.453***	(2.96)
Market:Book$_i$	-0.112*	(-1.71)
R&D$_i$	3.042***	(3.38)
CAPEX$_i$	1.049	(1.10)
PPE$_i$	0.806	(1.17)
Business Segments$_i$	3.981***	(6.62)
Total Accruals$_i$	-2.348*	(-2.03)
S-1 Filing Tone$_i$	-0.767***	(-3.30)
Multiple Share Classes$_i$	0.362**	(2.49)
VC Funded$_i$	0.739***	(4.24)
Firm Age$_i$	0.127	(1.49)
Management Guidance$_i$	0.355	(0.88)
Fog Readability$_i$	0.445**	(2.32)
Year FE	Y	
Industry FE	Y	
Year × Industry FE	Y	
Lead Underwriter FE	Y	
S.E. Clustering	IPO Year	
Observations	3,201	
R^2	0.67	

Table 5
Validation of the S-1 Disaggregated Discretionary Disclosure Measure for IPO Firms from 1996 to 2017

This table analyzes the unsigned or absolute magnitude of the cumulative abnormal returns (CAR) from the IPO date (day 0) to one day afterward. "Abs" represents the absolute value. The variable "S-1 Discretionary Disclosure" is denoted as "S-1 DD," and the "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. We insert separate indicator variables for IPO firms in the high and low disaggregated disclosure terciles, which lets the baseline or base case value of each dependent variable equal its conditional mean relative to the middle tercile (the one omitted tercile) and after controlling for all the other regressors and fixed effects. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. The CAR variables are computed as firm i's returns less the contemporaneous value-weighted market index from CRSP. See Appendix A for the exact variable definitions. T-statistics are in parentheses and the standard errors are clustered by IPO year and robust to heteroskedasticity. ***, **, and * indicate statistical significance at the two-tailed 1%, 5%, and 10% level, respectively.

	Abs(Day 0 CAR)$_i$	Abs([0, +1 day] CAR)$_i$	Abs(Day 0 CAR)$_i$	Abs([0, +1 day] CAR)$_i$	Day 0 Percent Spread$_i$	Price < Offer in Year 1$_i$
	(1)	(2)	(3)	(4)	(5)	(6)
High S-1 DD Tercile$_i$	-0.029***	-0.035***	-0.033***	-0.036***	-0.19**	-0.023
	(-4.98)	(-4.76)	(-5.19)	(-5.29)	(-2.57)	(-0.50)
Low S-1 DD Tercile$_i$	0.031***	0.030***	0.025***	0.030***	0.12***	-0.004
	(6.13)	(5.52)	(5.12)	(6.00)	(2.73)	(-0.21)
Year FE	Y	Y	N	N	Y	Y
Industry FE	Y	Y	N	N	Y	Y
Year × Industry FE	Y	Y	N	N	Y	Y
Lead Underwriter FE	Y	Y	N	N	Y	Y
Other Table 4 Controls	Y	Y	N	N	Y	Y
S.E. Clustering	IPO Year	IPO Year	IPO Year	IPO Year	IPO Year	IPO Year
Observations	3,201	3,201	3,201	3,201	3,201	3,201
R^2	0.13	0.11	0.05	0.06	0.45	0.21

Table 6

S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017

This table analyzes S-1 disaggregated disclosure (DD) and firm operating performance. The variable "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. In the columns labeled "Performance Match," each IPO firm is matched to a Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets (size). The differences for each measure are then computed between each IPO firm and matched firm (IPO firm − matched firm), and then averaged over all IPO firms for each year (labeled "Diff w/ Match"). The differences and their associated t-statistics are reported. In the columns labeled "Without Matching," the means of performance measures are reported in levels in the first four rows, and in the next three rows these measures are differenced within firm and without a matched firm. This is in contrast to the "Performance Match" columns, where the first four rows are single differences between the IPO and matched firms, and the next three rows are difference-in-differences (D-in-D). T-statistics are reported only for the rows where differencing is performed. Observations vary due to attrition within the terciles. ***, **, and * indicate statistically different from zero at the two-tailed 1%, 5%, and 10% level, respectively.

Panel A: S-1 DD Tercile 3 (High S-1 Disaggregated Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	0.01%	0.12	0.03%	0.27	3.15%	-	5.98%	-
963	t+1	−0.89%**	−2.27	−1.35%**	−2.60	2.19%	-	5.01%	-
839	t+2	−1.15%**	−2.49	−1.98%***	−3.00	1.36%	-	4.95%	-
727	t+3	−2.47%***	−3.43	−2.56%***	−3.88	1.14%	-	4.28%	-
963	(t+1) − Event year	−0.90%*	−1.90	−1.38%*	−1.78	−0.96%	−1.53	−0.97%	−1.60
839	(t+2) − Event year	−1.16%***	−2.75	−2.01%***	−2.79	−1.79%***	−2.87	−1.03%**	−2.18
727	(t+3) − Event year	−2.48%***	−3.86	−2.59%***	−4.60	−2.01%***	−3.61	−1.70%***	−3.77

Panel B: S-1 DD Tercile 2 (Medium S-1 Disaggregated Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	−0.01%	−0.10	−0.03%	−0.30	2.97%	-	6.65%	-
950	t+1	0.15%	0.82	−0.01%	0.67	3.09%	-	6.88%	-
818	t+2	−0.05%	−1.02	0.09%	0.63	3.15%	-	6.79%	-
720	t+3	0.10%	0.68	−0.02%	−0.84	3.27%	-	6.75%	-
950	(t+1) − Event year	0.16%	1.07	0.02%	0.37	0.13%	0.75	0.23%	1.20
818	(t+2) − Event year	−0.04%	−0.82	0.12%	0.69	0.18%	1.17	0.14%	0.89
720	(t+3) − Event year	0.11%	1.03	0.01%	0.18	0.30%	1.02	0.10%*	1.14

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Table 6 (continued from the prior page)
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017

Panel C: S-1 DD Tercile 1 (Low S-1 Disaggregated Disclosure)									
		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	0.08%	0.33	0.02%	0.18	4.80%	-	8.26%	-
940	t+1	0.99%*	2.01	1.30%*	1.99	5.95%	-	9.70%	-
812	t+2	1.23%**	2.63	2.18%***	2.87	6.39%	-	10.19%	-
712	t+3	2.50%***	2.92	3.12%***	4.10	7.65%	-	11.23%	-
940	(t+1) − Event year	0.91%	1.59	1.28%*	1.65	1.15%	1.52	1.44%*	1.76
812	(t+2) − Event year	1.15%**	2.21	2.16%***	2.71	1.59%**	2.29	1.93%***	2.97
712	(t+3) − Event year	2.42%***	3.77	3.10%***	4.86	2.82%***	4.04	2.97%***	3.63

Table 7
S-1 Disaggregated Discretionary Disclosure and Stock Returns for IPO Firms from 1996 to 2017

This table analyzes cumulative abnormal returns (CAR) of varying intervals for IPO firms from the IPO date (day 0) to three years post. The variable "S-1 Discretionary Disclosure" is denoted as "S-1 DD," and the "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disclosure terciles, respectively. We insert separate indicator variables for IPO firms in the high and low disclosure terciles, which lets the baseline or base case value of each dependent variable equal its conditional mean relative to the middle tercile (the one omitted tercile) and after controlling for all the other variables and fixed effects. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. The CAR variables are computed as firm i's returns less the contemporaneous value-weighted market index from CRSP. See Appendix A for the exact variable definitions. T-statistics are in parentheses and the standard errors are clustered by IPO year and robust to heteroskedasticity. ***, **, and * indicate statistical significance at the two-tailed 1%, 5%, and 10% level, respectively.

	Dependent Variables are Cumulative Abnormal Returns (CAR) from Firm i's IPO Date (Day 0)				
	(1) $[0, +7$ days$]$ CAR$_i$	(2) $[0, +30$ days$]$ CAR$_i$	(3) $[0, +1$ year$]$ CAR$_i$	(4) $[0, +2$ years$]$ CAR$_i$	(5) $[0, +3$ years$]$ CAR$_i$
High S-1 DD Tercile$_i$	-0.001	-0.013**	-0.065***	-0.055***	-0.062***
	(-0.20)	(-2.48)	(-3.85)	(-3.32)	(-4.59)
Low S-1 DD Tercile$_i$	0.002	0.010*	0.057***	0.051***	0.058***
	(0.67)	(2.73)	(3.01)	(2.69)	(2.88)
Year-Fixed Effects	Y	Y	Y	Y	Y
Industry-Fixed Effects	Y	Y	Y	Y	Y
Year × Industry-Fixed Effects	Y	Y	Y	Y	Y
Lead Underwriter-Fixed Effects	Y	Y	Y	Y	Y
Non-Fixed-Effects Controls from Table 4	Y	Y	Y	Y	Y
S.E. Clustering	IPO Year	IPO Year	IPO Year	IPO Year	IPO Year
Observations	3,201	3,201	3,201	3,201	3,201
R^2	0.05	0.10	0.12	0.13	0.15

ONLINE APPENDIX ("OA")

Table OA.1

One-Step Version of Table 6 using the Raw S-1 Disaggregated Disclosure Measure with Table 4 Controls

"Δ_{IPO} Δ_C" represents the D-in-D differencing procedure, where subscript "IPO" represents the IPO firm and subscript "C" represents the control firm. For each pairing and performance measure, "(t+2) − Event year" is computed for the IPO firm, and the same value is computed for the control firm and then subtracted from that of the IPO firm (and similarly for t+3). These are the same D-in-D measures used in Table 6.

	D-in-D: Δ_{IPO} Δ_C (t+2) − Event year		D-in-D: Δ_{IPO} Δ_C (t+3) − Event year	
	(1) EBITDA ÷ Assets$_i$	(2) EBITDA ÷ Sales$_i$	(3) EBITDA ÷ Assets$_i$	(4) EBITDA ÷ Sales$_i$
S-1 Disaggregated Disclosures$_i$	-0.004***	-0.005***	-0.005***	-0.006***
	(-4.31)	(-3.05)	(-3.77)	(-3.96)
Year-Fixed Effects	Y	Y	Y	Y
Industry-Fixed Effects	Y	Y	Y	Y
Year × Industry-Fixed Effects	Y	Y	Y	Y
Lead Underwriter-Fixed Effects	Y	Y	Y	Y
All Other Controls from Table 4	Y	Y	Y	Y
S.E. Clustering	IPO Year	IPO Year	IPO Year	IPO Year
Observations	2,469	2,469	2,159	2,159
R^2	0.50	0.51	0.43	0.49

Table OA.2
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 for Low and High Litigation Risk

This table analyzes S-1 disaggregated disclosure (DD) and firm operating performance separately for firms with high and low litigation risk, as measured by the industry-based litigation-risk findings in Hanley and Hoberg (2012, Section 3) and Kim and Skinner (2012, Table 1). Following these studies, low litigation risk firms are those in the following industries: consumer discretionary, industrials, energy, and materials. High litigation risk firms are those in the following industries: communications, financials, healthcare, and information technology. The variable "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. In the columns labeled "D-in-D Performance Matching," each IPO firm is matched to a Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets (size). The differences for each measure are then computed between each IPO firm and matched firm (IPO firm − matched firm), and then averaged over all IPO firms for each year (labeled "Diff w/ Match"). The differences and their associated t-statistics are reported. The rows that subtract the event year from the year under consideration are thus differences-in-differences (D-in-D). T-statistics are reported and observations vary due to attrition within the terciles. ***, **, and * indicate statistically different from zero at the two-tailed 1%, 5%, and 10% level, respectively.

Panel A: DD Tercile 3 (High S-1 Discretionary Disclosure)

		Low Litigation Risk D-in-D Performance Matching					High Litigation Risk D-in-D Performance Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	321	0.08%	0.25	0.02%	0.26	677	0.03%	0.82	0.10%	0.46
(t+1) − Event year	302	−1.02%**	−2.09	−1.25%*	−1.90	609	−0.82%*	−2.01	−1.01%*	−1.88
(t+2) − Event year	283	−1.22%***	−2.75	−1.65%***	−2.68	540	−1.20%**	−2.28	−1.42%***	−2.80
(t+3) − Event year	225	−2.35%***	−4.21	−2.36%***	−3.18	450	−2.11%***	−2.97	−2.52%***	−4.01

Panel B: DD Tercile 2 (Medium S-1 Discretionary Disclosure)

		Low Litigation Risk D-in-D Performance Matching					High Litigation Risk D-in-D Performance Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	351	0.05%	0.86	0.08%	0.93	698	−0.03%	−0.19	0.09	0.43
(t+1) − Event year	336	0.13%	0.99	0.03%	0.48	611	−0.70%	−1.14	−0.01%	−0.10
(t+2) − Event year	304	−0.09%	−0.21	−0.08%	−0.43	553	0.07%	0.21	0.11%	0.52
(t+3) − Event year	239	−0.01%	−0.12	0.03%	0.56	466	0.67%	0.42	0.55%	1.23

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Table OA.2 (continued from the prior page)
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 for Low and High Litigation Risk

Panel C: DD Tercile 1 (Low S-1 Discretionary Disclosure)										
		Low Litigation Risk D-in-D Performance Matching					High Litigation Risk D-in-D Performance Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	382	0.04%	0.27	−0.02%	−0.62	692	0.09%	0.21	0.02%	0.20
(t+1) − Event year	335	1.01%**	2.25	1.23%*	2.00	610	0.98%*	1.82	1.35%**	2.21
(t+2) − Event year	296	1.20%**	2.37	1.67%***	2.77	551	1.25%***	3.02	1.54%***	2.74
(t+3) − Event year	251	2.93%***	3.46	2.80%***	3.80	462	2.87%***	3.62	2.74%***	3.10

Table OA.3
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 for Low and High Proprietary Costs

This table analyzes S-1 disaggregated disclosure (DD) and firm operating performance separately for firms with high and low proprietary costs of disclosure, as measured by the Li et al. (2013) competition measure. Using each IPO firm's first 10-K filing after its IPO, we split the sample based on the median value of the Li et al. (2013) measure in the full sample, where firms above the median are considered to have high proprietary costs and firms below the median are considered to have low proprietary costs. The variable "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. In the columns labeled "D-in-D Performance Matching," each IPO firm is matched to a Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets (size). The differences for each measure are then computed between each IPO firm and matched firm (IPO firm − matched firm), and then averaged over all IPO firms for each year (labeled "Diff w/ Match"). The differences and their associated t-statistics are reported. The rows that subtract the event year from the year under consideration are thus differences-in-differences (D-in-D). T-statistics are reported and observations vary due to attrition within the terciles and the requirement that firms stay public long enough to file a 10-K. ***, **, and * indicate statistically different from zero at the two-tailed 1%, 5%, and 10% level, respectively.

Panel A: DD Tercile 3 (High S-1 Discretionary Disclosure)

	Low Proprietary Costs D-in-D Performance Matching					High Proprietary Costs D-in-D Performance Matching				
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	490	0.04%	0.17	−0.01%	−0.33	471	0.02%	0.13	0.03%	0.21
(t+1) − Event year	490	−0.94%***	−2.70	−1.01%**	−2.29	471	−0.92%*	−1.82	−1.10%*	−1.95
(t+2) − Event year	426	−1.01%***	−2.89	−1.53%***	−2.97	410	−1.12%**	−2.44	−1.45%***	−2.68
(t+3) − Event year	374	−2.28%***	−3.52	−2.30%***	−3.00	360	−2.33%***	−2.89	−2.35%***	−3.03

Panel B: DD Tercile 2 (Medium S-1 Discretionary Disclosure)

	Low Proprietary Costs D-in-D Performance Matching					High Proprietary Costs D-in-D Performance Matching				
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	457	0.03%	0.45	−0.04%	−0.24	496	0.04%	0.11	0.02	0.12
(t+1) − Event year	457	0.31%	0.53	0.07%	0.53	496	0.42%	0.98	0.03%	0.42
(t+2) − Event year	391	0.12%	0.13	−0.02%	−0.02	425	0.33%	0.58	0.14%	0.22
(t+3) − Event year	345	0.25%	0.15	0.19%	0.74	374	0.57%	1.09	−0.09%	−0.83

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Table OA.3 (continued from the prior page)
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 for Low and High Proprietary Costs

Panel C: DD Tercile 1 (Low S-1 Discretionary Disclosure)										
		Low Proprietary Costs D-in-D Performance Matching					High Proprietary Costs D-in-D Performance Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales			EBITDA ÷ Assets		EBITDA ÷ Sales	
	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat	Obs.	Diff w/ Match	t-stat	Diff w/ Match	t-stat
Event year	458	0.07%	0.28	−0.05%	−0.27	477	0.02%	0.28	0.08%	0.36
(t+1) − Event year	458	0.88%***	2.75	1.02%**	2.10	477	0.76%**	2.19	1.24%**	2.46
(t+2) − Event year	399	1.05%**	2.40	1.34%***	2.75	416	1.19%***	2.90	1.50%***	2.87
(t+3) − Event year	349	2.54%***	3.06	2.39%***	3.12	365	2.57%***	3.84	2.51%***	3.85

Table OA.4

S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 using Word Counts

This table analyzes S-1 disaggregated disclosure and firm operating performance based on S-1 word counts from the S-1 items noted in Table OA.4. The variable "S-1 Word Count Tercile" is computed based on firm i's residual from the regression in Table 4 (except the dependent variable is the S-1 word count of the appropriate item numbers), where the values 1, 2, and 3 represent the low, medium, and high disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. In the columns labeled "Performance Match," each IPO firm is matched to a Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets (size). The differences for each measure are then computed between each IPO firm and matched firm (IPO firm − matched firm), and then averaged over all IPO firms for each year (labeled "Diff w/ Match"). The differences and their associated t-statistics are reported. In the columns labeled "Without Matching," the means of performance measures are reported in levels in the first four rows, and in the next three rows these measures are differenced within firm and without a matched firm. This is in contrast to the "Performance Match" columns, where the first four rows are single differences between the IPO and matched firms, and the next three rows are difference-in-differences (D-in-D). T-statistics are reported only for the rows where differencing is performed. Observations vary due to attrition within the terciles. ***, **, and * indicate statistically different from zero at the two-tailed 1%, 5%, and 10% level, respectively.

Panel A: S-1 Word Count Tercile 3 (High S-1 Discretionary Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	−0.02%	−0.09	−0.06%	−0.55	3.01%	-	6.12%	-
963	t+1	−0.95%**	−2.41	−1.27%**	−2.38	2.12%	-	5.11%	-
839	t+2	−1.19%**	−2.55	−1.90%***	−2.73	1.40%	-	5.03%	-
727	t+3	−2.31%***	−3.28	−2.53%***	−4.12	1.17%	-	4.67%	-
963	(t+1) − Event year	−0.93%*	−1.95	−1.21%*	−1.72	−0.89%	−1.47	−1.01%	−1.60
839	(t+2) − Event year	−1.17%***	−2.69	−1.84%**	−2.47	−1.61%**	−2.51	−1.09%**	−2.18
727	(t+3) − Event year	−2.29%***	−3.93	−2.47%***	−4.94	−1.84%***	−3.02	−2.45%***	−3.77

Panel B: S-1 Word Count Tercile 2 (Medium S-1 Discretionary Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	−0.03%	−0.24	0.07%	0.46	3.13%	-	6.99%	-
950	t+1	0.20%	0.32	0.12%	1.07	3.15%	-	7.05%	-
818	t+2	−0.01%	−1.36	0.18%	1.19	3.39%	-	7.25%	-
720	t+3	0.12%	1.17	0.09%	1.21	3.49%	-	7.47%	-
950	(t+1) − Event year	0.23%	0.56	0.05%	0.21	0.02%	0.65	0.06%	0.45
818	(t+2) − Event year	0.02%	1.32	0.11%	0.45	0.26%	0.91	0.26%	1.31
720	(t+3) − Event year	0.15%	0.81	0.02%	1.08	0.36%	1.08	0.48%*	1.80

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Table OA.4 (continued from the prior page)
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 using Word Counts

Panel C: S-1 Word Count Tercile 1 (Low S-1 Discretionary Disclosure)									
		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	0.14%	0.33	−0.05%	−0.62	4.89%	-	8.68%	-
940	t+1	1.02%**	2.35	1.45%**	2.29	6.01%	-	9.97%	-
812	t+2	1.25%**	2.52	2.31%***	3.15	6.38%	-	10.30%	-
712	t+3	2.42%***	2.75	3.10%***	3.79	7.63%	-	11.18%	-
940	(t+1) − Event year	0.88%*	1.99	1.50%**	2.11	1.12%*	1.74	1.29%*	1.68
812	(t+2) − Event year	1.11%**	2.07	2.36%***	3.03	1.49%**	2.38	1.62%**	2.22
712	(t+3) − Event year	2.28%***	4.06	3.15%***	3.93	2.74%***	3.83	2.50%***	2.80

Table OA.5
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 using Forward-Looking Statements

This table analyzes S-1 disaggregated disclosure and firm operating performance based on the number of forward-looking statements in the S-1. The variable "S-1 FLS Tercile" is computed based on firm i's residual from the regression in Table 4 (except the dependent variable is the number of S-1 forward-looking statements), where the values 1, 2, and 3 represent the low, medium, and high disclosure terciles, respectively. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. Forward-looking statements in the S-1 are completely voluntary and not mandated by the SEC (Westenberg, 2019, p. 13-19). In the columns labeled "Performance Match," each IPO firm is matched to a Compustat firm that has very close performance by the measure under consideration (the ratios between the measures being between 0.9 and 1.1) in the most recent fiscal year in the S-1 filing before the IPO (which we refer to as the "event year"), plus a best possible match along the dimensions of GICS industry and total assets (size). The differences for each measure are then computed between each IPO firm and matched firm (IPO firm − matched firm), and then averaged over all IPO firms for each year (labeled "Diff w/ Match"). The differences and their associated t-statistics are reported. In the columns labeled "Without Matching," the means of performance measures are reported in levels in the first four rows, and in the next three rows these measures are differenced within firm and without a matched firm. This is in contrast to the "Performance Match" columns, where the first four rows are single differences between the IPO and matched firms, and the next three rows are difference-in-differences (D-in-D). T-statistics are reported only for the rows where differencing is performed. Observations vary due to attrition within the terciles. ***, **, and * indicate statistically different from zero at the two-tailed 1%, 5%, and 10% level, respectively.

Panel A: S-1 FLS Tercile 3 (High S-1 Discretionary Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	−0.01%	−0.12	−0.07%	−0.32	3.24%	-	5.75%	-
961	t+1	−0.83%*	−2.01	−1.12%**	−2.50	2.35%	-	4.91%	-
836	t+2	−1.25%***	−2.87	−2.01%***	−2.99	1.44%	-	4.88%	-
734	t+3	−2.55%***	−3.63	−2.65%***	−3.80	1.20%	-	4.35%	-
961	(t+1) − Event year	−0.82%	−1.39	−1.05%**	−2.10	−0.89%	−1.05	−0.84%	−1.52
836	(t+2) − Event year	−1.24%***	−2.75	−1.94%**	−2.50	−1.80%*	−1.91	−0.87%*	−1.69
734	(t+3) − Event year	−2.54%***	−3.88	−2.58%***	−3.73	−2.04%***	−2.79	−1.40%**	−2.57

Panel B: S-1 FLS Tercile 2 (Medium S-1 Discretionary Disclosure)

		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	−0.05%	−0.26	−0.06%	−0.35	2.95%	-	7.15%	-
953	t+1	0.19%	0.42	0.14%	0.96	3.01%	-	6.89%	-
816	t+2	0.01%	0.25	0.02%	1.19	2.92%	-	7.19%	-
719	t+3	0.08%	0.92	−0.08%	−1.21	3.15%	-	7.12%	-
953	(t+1) − Event year	0.24%	0.86	0.20%	0.51	0.06%	0.81	−0.26%	−1.42
816	(t+2) − Event year	0.06%	0.47	0.08%	0.42	−0.03%	−0.62	0.04%	0.65
719	(t+3) − Event year	0.13%	1.01	−0.02%	−0.98	0.20%	0.88	−0.03%	−0.36

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Table OA.5 (continued from the prior page)
S-1 Disaggregated Discretionary Disclosure and Operating Performance for IPO Firms from 1996 to 2017 using Forward-Looking Statements

Panel C: S-1 FLS Tercile 1 (Low S-1 Discretionary Disclosure)									
		D-in-D Performance Matching				Without Matching			
		EBITDA ÷ Assets		EBITDA ÷ Sales		EBITDA ÷ Assets		EBITDA ÷ Sales	
Obs.		Diff w/ Match	t-stat	Diff w/ Match	t-stat	Within Firm	t-stat	Within Firm	t-stat
1,067	Event year	0.04%	0.23	0.02%	0.25	5.01%	-	8.50%	-
935	t+1	0.99%*	1.80	1.35%**	2.31	5.98%	-	9.32%	-
815	t+2	1.16%**	2.43	2.27%***	3.10	6.25%	-	10.08%	-
714	t+3	1.98%***	3.01	2.87%***	3.15	7.40%	-	11.12%	-
935	(t+1) − Event year	0.95%	1.20	1.33%**	2.09	0.97%	1.05	0.82%	0.78
815	(t+2) − Event year	1.12%*	1.92	2.25%***	2.68	1.24%*	1.98	1.58%**	2.23
714	(t+3) − Event year	1.94%**	2.61	2.85%***	2.94	2.39%***	2.75	2.62%***	3.03

Table OA.6

S-1 Disaggregated Discretionary Disclosure and Sharpe Ratios for IPO Firms from 1996 to 2017

This table analyzes Sharpe ratios of varying intervals for IPO firms from the IPO date (day 0) to three years post. The variable "S-1 Discretionary Disclosure" is denoted as "S-1 DD," and the "S-1 DD Tercile" is computed based on firm i's residual from the regression in Table 4, where the values 1, 2, and 3 represent the low, medium, and high disaggregated disclosure terciles, respectively. We insert separate indicator variables for IPO firms in the high and low disclosure terciles, which lets the baseline or base case value of each dependent variable equal its conditional mean relative to the middle tercile (the one omitted tercile) and after controlling for all the other variables and fixed effects. The residuals used to form the terciles are, by construction, uncorrelated with firm size, year, industry, and all the other independent variables, including the fixed effects, in Table 4. Across the three terciles, a MANOVA test indicates an insignificant F-stat (Wilks' lambda) at the 10 percent level for all the regressors in Table 4, suggesting that the terciling process does not spuriously re-induce any correlations with the disclosure regressors. The Sharpe ratios are computed as firm i's cumulative daily returns scaled by the standard deviation of firm i's daily returns for the denoted time period. See Appendix A for the exact variable definitions. T-statistics are in parentheses and the standard errors are clustered by IPO year and robust to heteroskedasticity. ***, **, and * indicate statistical significance at the two-tailed 1%, 5%, and 10% level, respectively.

	Dependent Variables are Sharpe Ratios from Firm i's IPO Date (Day 0)		
	(1)	(2)	(3)
	$[0, +1$ year$]$ Sharpe Ratio$_i$	$[0, +2$ year$]$ Sharpe Ratio$_i$	$[0, +3$ year$]$ Sharpe Ratio$_i$
High S-1 DD Tercile$_i$	-0.898***	-1.097***	-1.176***
	(-3.21)	(-3.36)	(-3.89)
Low S-1 DD Tercile$_i$	1.034**	0.921***	1.070***
	(2.53)	(2.78)	(3.01)
Year-Fixed Effects	Y	Y	Y
Industry-Fixed Effects	Y	Y	Y
Year × Industry-Fixed Effects	Y	Y	Y
Lead Underwriter-Fixed Effects	Y	Y	Y
Non-Fixed-Effects Controls from Table 4	Y	Y	Y
S.E. Clustering	IPO Year	IPO Year	IPO Year
Observations	3,201	3,201	3,201
R^2	0.19	0.21	0.23