Review of Accounting Studies
https://doi.org/10.1007/s11142-024-09820-0

New product announcements, innovation disclosure, and future firm performance

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Accepted: 8 January 2024

Abstract

This study examines the properties of innovation disclosures contained in new product announcements, a form of voluntary, nonfinancial disclosure. We analyze these properties using a novel, text-based measure of the extent of product innovation disclosed in new product announcements. We find that stock prices react more positively to announcements with more extensive innovation disclosure. In our main analyses, we first find that a higher level of innovation disclosure predicts a greater increase in future sales. We further find that this predictive ability falls when managers have stronger incentives to maximize their wealth and when the corporate governance structure and customers' bargaining power weaken. Our research enhances the understanding of the properties of managerial voluntary, nonfinancial disclosures and contributes a text-based measure of innovation that captures managerial assessment of the extent of product innovation. This new measure is more generalizable and incrementally informative for firm value and future performance than conventional innovation measures that depend on the existence of patents or research and development expenses.

Keywords New product announcements · Innovation · Voluntary disclosure · Incentives · Performance · Qualitative disclosure · Narrative disclosure

JEL Classification M41 · G34 · M13

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Published online: 15 February 2024

1 Introduction

Innovation occurs across all levels of an organization, including product design, trial production, market analysis, employee training, and fixed asset investments that translate into new or improved products (Kleinknecht et al. 2002). Firm stakeholders typically learn about product innovations through a firm's new product announcements. Disclosure in these announcements is important, as studies link product innovation to firm success and prosperity (Cooper 1998; Drucker 2007; Schumpeter 1942). Managerial discussions in new product announcements provide information that helps customers appreciate the quality and value of a new product (Van de Ven 1986) and provide investors with an understanding of the implications of the product for firm value (Bayus et al. 2003; Chaney et al. 1991; Chen et al. 2002). Product announcements also cohesively depict the links between research and development (R&D) expenses, patent development, and final product innovations. (See the recent literature review by Glaeser and Lang 2023.)

We first examine whether the extent of innovation disclosed in new product announcements is associated with incremental improvements in future firm performance beyond the expected level, given innovation inputs and past innovation successes. We then study the impact of several managerial disclosure incentives on the ability of a firm's level of innovation disclosure to predict firm performance. Our findings provide insight regarding the properties and usefulness of managerial voluntary, nonfinancial disclosures of new product innovation. This insight is especially useful, given the central role innovation plays in a firm's success.

To capture the degree of managerial innovation disclosure in new product announcements, we develop a novel measure that counts the number of words in each announcement that appear in our constructed dictionary of innovation words. Specifically, in our empirical analysis, we employ an innovation disclosure measure based on the residuals from a regression of the innovation word count on variables that capture innovation inputs and innovation successes (e.g., patent number, value, and citations, R&D expenses, trade secrets, and the number of recent new product announcements). This approach allows us to capture the extent to which managers use innovation-related words to describe the new products beyond the level predicted by innovation inputs.[1] To validate that our measure captures economically meaningful disclosure, we show that a higher level of innovation disclosure in an announcement is associated with a significantly greater stock market reaction to the disclosure. For example, we find that a one standard-deviation increase in the extent of innovation disclosure is associated with a 23% higher market reaction in a three-day window around the announcement.

[1] Studies rely primarily on R&D or patents to measure corporate innovation. However, these findings may not be generalizable to industries without R&D or patent development, nor can they fully explain how technical innovations ultimately improve product features (Griliches et al. 1987; Kleinknecht et al. 2002). By contrast, our measure is based on new product announcements reflecting managerial innovation assessments issued across a diverse set of industries, controlling for R&D expenses and patent developments. As such, our study may enable firm stakeholders and scholars to better understand the performance and valuation implications of these voluntary, nonfinancial innovation disclosures.

In our main analyses, we find that greater innovation disclosure is associated with higher future sales, consistent with innovation disclosure capturing the value of the new product to customers. Specifically, we find that a one standard-deviation increase in the extent of innovation disclosure is associated with an increase of approximately 1.22% in a firm's next year's sales deflated by assets, representing an average increase of $328 million in sales. Importantly, we find that our measure has greater power to predict future sales than traditional innovation input measures, such as R&D expenses and patents, as it directly quantifies the level of innovation in new products that make it to market. These findings support our prediction that new product announcements provide new information about product innovation over and above that contained in observable innovation inputs and successes. In other tests, we document that the degree of innovation disclosure is positively correlated with future earnings but negatively correlated with future selling, general, and administrative (SG&A) expenses. We find no relation to a firm's future costs of goods sold (COGS). These findings are consistent with prior findings that innovative products are less costly to market but may not lower product or inventory costs (Gatignon and Xuereb 1997; Shields and Young 1994).

In addition to examining the predictive power of our innovation disclosure measure, we explore the impact of managerial incentives on the ability of innovation disclosures to predict firm performance. In this analysis, we expect a weaker relation between innovation disclosure and future sales performance when managers have greater incentives to disclose for strategic reasons.[2] To address this question, we conduct a series of cross-sectional analyses partitioned according to managerial disclosure incentives. First, we examine whether managers have stronger incentives to strategically disclose product innovation information either before engaging in insider trading (Rogers and Stocken 2005) or when their compensation is positively tied to risk-taking (Armstrong et al. 2013). Second, we examine whether the predictive power of innovation disclosure for firm sales is lower when board members are busier (Fich and Shivdasani 2006; Hauser 2018) or when CEOs have golden parachutes (Bebchuk et al. 2009). Finally, we examine whether our main finding differs with several customer-related measures, including firms' vertical integration scores (Frésard et al. 2020) and the extent of product market competition (the number of close rivals, as defined by Hoberg and Phillips 2010, 2016). These measures proxy for customers' ability to monitor and verify innovation disclosure quality. Across all these measures, we empirically document that stronger strategic reasons for disclosure reduce the ability of innovation disclosures to predict sales performance.

Together, our findings validate our text-based innovation measure and indicate that innovation disclosure in new product announcements predicts sales performance

[2] The relation between innovation disclosure and future performance relates to the degree to which a disclosure reflects the value of the innovation embedded in the product. A weaker relation represents a larger differential between the innovation stated in new product announcements and the actual amount of innovation in the product. We argue that managers, on average, are aware of the true level of product innovation and that the relation between disclosure and future performance reflects managerial disclosure choices.

but that this predictive ability decreases when managers have stronger disclosure incentives.

Our study contributes to the literature on the impact of voluntary, nonfinancial disclosures as well as the literature on the impact of corporate innovation on firm outcomes. Within the area of voluntary, nonfinancial disclosure research, studies generally focus on corporate social responsibility (Dhaliwal et al. 2011), environmental impact disclosures (Blacconiere and Patten 1994), and product market reporting, such as levels of customer satisfaction (Ittner and Larcker 1998). We extend this literature by focusing on the informativeness of managerial innovation disclosures for future firm performance as well as the impact of managerial incentives on a disclosure's informativeness.[3]

Our study also contributes to the growing literature on the role of innovation in a firm's success by developing a text-based measure of innovation that draws on managerial narratives in a large sample of new product announcements. By contrast, the literature on innovation typically uses proxies constructed from either R&D expenses (e.g., Chan et al. 2001; Hsu 2009) or patents (e.g., Griliches 1990; Lerner and Seru 2022; Matolcsy and Wyatt 2008). However, these proxies are limited in the conclusions that can be drawn about the benefits of technical innovations for customer-focused product features or streamlined marketing costs (Griliches et al. 1987; Kleinknecht et al. 2002). Moreover, these studies tend to focus on firms in R&D-intensive or patent-focused industries, excluding innovation in a broader swath of industries.[4] Within this area, Bellstam et al. (2021) apply an unsupervised topic modeling approach to a sample of sell-side analysts' reports to measure innovation. However, their approach requires an ex-ante, subjective determination of the total number of topics in their sample and yields an abstract (i.e., untitled) list of topics. Their sample is also limited by the availability of sell-side analyst research reports (in comparison, one-third of our sample firms are not covered by sell-side analysts). By contrast, our focus on the narratives in new product announcements allows us to explicitly quantify the extent of innovation discussed by corporate managers, who have the most precise information regarding a product's true innovation. Thus, we can study the economic phenomenon of the determinants of managerial voluntary innovation disclosure. Moreover, our innovation-word dictionary is based on synonyms from an English-language dictionary, providing a more objective list of innovation terms. Finally, our innovation disclosure measure is based on a large archival database of new product announcements issued by the universe of Compustat firms.

[3] Our paper also complements and extends Merkley's (2014) study of managerial R&D disclosure in 10-Ks by investigating voluntary rather than regulatory disclosure, by including firms in non-R&D-intensive industries and by identifying situations in which managers may have incentives to strategically disclose new product innovation.

[4] Studies suggest that R&D expenses and patents are noisy measures of innovation value. Various firm characteristics can affect the market's valuation of R&D investments, such as industry concentration (Doukas and Switzer 1992), firm size (Connolly and Hirschey 2005), ownership concentration (Hall and Oriani 2006), and the overall financial environment (Booth et al. 2006). Using the implicit valuation of patents in mergers and acquisitions, Belenzon and Patacconi (2013) find that the value of American patents has declined substantially from 1985 to essentially zero near the end of their sample period in 2007, further limiting the usefulness of this measure.

Overall, our use of an objective-based measure applied to firms beyond those tied to R&D, patents, or analyst coverage yields findings with greater generalizability to a diverse set of firms.

The rest of the paper proceeds as follows. Section 2 develops our hypotheses. Section 3 describes the sample and our definitions of the empirical variables. Section 4 details our findings. Section 5 concludes.

2 Hypothesis development

2.1 Innovation disclosure and future sales performance

Product innovation is an important signal of firm value for capital market investors and also helps firms secure share in the product market (Van de Ven 1986). To enhance transparent communication between informed managers and stakeholders, managers use new product announcements to provide crucial contextual information about new product innovation and benefits. These narrative disclosures provide customers and investors with a foundational understanding of both the existence and features of new products. For example, managers may use the announcements to explain why a new product is innovative, position the product within the portfolio of the firm's other products, or educate customers about technological advancements that can cater to their evolving needs. These disclosures can also clarify how new products compare with competing products to facilitate customers' buying decisions. Innovation disclosures can also provide investors with insights into potential future revenue streams and profits from a new product, enhancing their understanding of a firm's position in the competitive landscape and informing their investment decisions.

Based on this discussion of the usefulness informativeness of new product announcements, we predict that innovation disclosures in these announcements are incrementally informative about future firm performance. This leads to our first hypothesis:

H1: Future sales increase with the extent of innovation information disclosed in new product announcements.

2.2 Disclosure incentives, innovation disclosure, and future firm performance

In addition to understanding the relation between innovation disclosures and future sales, we investigate the effect of managerial disclosure incentives on this relation. Managers may have conflicting incentives when disclosing value-relevant information to outsiders (Shleifer and Vishny 1989). On the one hand, truthful disclosures can improve firms' information environment, help investors assess firm value, and potentially lower the cost of capital (Botosan 1997). On the other hand, managers may have incentives to bias their firms' disclosures to bolster compensation

and gains from stock sales, enhance job security, increase operational flexibility, or gain greater control (e.g., Rogers and Stocken 2005; Dechow et al. 2010; Kothari 2001).

In the context of our study, outsiders are at an information disadvantage in assessing how new product innovation translates into future financial performance (Rijsdijk and Hultink 2009). Thus, managers may exploit this information disadvantage by strategically disclosing product innovation for personal gain. To test for this possibility, we identify three settings in which managers are more likely to strategically disclose new product innovation. First, managers may disclose innovation information to maximize their personal wealth, specifically to reap personal gains via insider trading (Rogers and Stocken 2005). The accounting literature further suggests that managers may strategically disclose information when their wealth is sensitive to changes in stock price volatility (Armstrong et al. 2013). Thus, in our setting, we expect managers with such incentives to strategically disclose information about product innovation. In turn, this strategic disclosure is likely to reduce the predictive ability of innovation disclosures for future firm performance. Motivated by this discussion, we state our next hypothesis as follows:

H2A: The positive relation between the extent of innovation disclosed and future sales is reduced when managers' personal wealth is more sensitive to firm value.

In addition to examining managerial personal wealth incentives for disclosure, we examine whether our observed predictive effect changes with the strength of corporate governance within a firm. Studies show that weak corporate governance exacerbates the agency problem, leading to lower quality managerial voluntary disclosures (Karamanou and Vafeas 2005). Studies also suggest that the earnings of firms with weaker governance are less informative (Irani and Oesch 2013). Following these findings, we predict a lower relation between innovation disclosure and future performance for firms with weaker governance.

H2B: The positive relation between the extent of innovation disclosed and future sales is reduced for firms with weaker corporate governance.

Finally, we examine whether our observed predictive effect differs with the ability of customers to assess the quality of innovation disclosures. On the one hand, managers may have incentives to report an inflated level of innovation in their new products to impress capital market participants and reduce the cost of capital (Botosan 1997). On the other hand, users of the product have first-hand information that can be used to assess the true innovativeness of a product (Nelson 1970). Therefore, firms that strategically disclose information about product innovation to increase their firm value may suffer a resulting decrease in reputation in the product market if their claims are not borne out. Consequently, we predict that innovation disclosures are *less* predictive of future sales when customers have less ability to monitor firms' disclosure quality (i.e., when managerial capital market incentives dominate product market incentives). Formally, we hypothesize:

H2C: The positive relation between the extent of innovation disclosure and future sales is reduced when customers have a weaker ability to monitor disclosure quality.

3 Sample selection and empirical methodology

3.1 Sample

Panel A of Table 1 details our sample selection methodology. To obtain our initial sample, we begin with the complete list of US firms in the Capital IQ Key Developments database listed on the New York Stock Exchange, NASDAQ, or the American Stock Exchange between January 2001 and December 2016. This database contains summaries of material news and events, such as mergers and acquisitions (M&A), management changes, regulatory issues, and product development. From this list, we select any announcements identified as product-related and ensure that the announcement headline contains words that describe the introduction of new products ("unveil," "launch," and "new product").[5] From this curated list, we delete observations that cannot be read by our text-processing algorithm as well as any observations where the innovation keywords appear only in the company name. Next, we ensure that each firm in our sample has daily stock returns data in the Center for Research in Security Prices (CRSP) database and financial information in Compustat. Finally, because the Capital IQ database contains only summaries of the new product announcements, we manually search and download the full text of each of the new product announcement press releases from Factiva. This procedure results in a sample of 30,663 announcements. Requiring non-missing data for the control variables reduces our sample to 17,800 firm-quarter (28,076 firm-day) observations that contain at least one announcement for the future performance (market reaction) tests.[6] All continuous variables are winsorized at the top and bottom one percent levels.

Panel B of Table 1 reports the industry classifications for our sample firms.[7] A comparison of our sample distribution (% in sample) with that in the Compustat universe (% in Compustat) indicates that our sample has a higher proportion of firms from the business equipment industries, which include computers, software, and electronic equipment. This finding is not surprising, as these industries experienced an increase in innovation during our sample period. Interestingly, our sample

[5] We manually check a random sample of 800 announcements and find that all of them are new product announcements.

[6] In the market reaction tests, we eliminate announcements made within five days of a firm's earnings announcement date. The nearest earnings announcement to a new product announcement is on average 24.5 days away (untabulated). Therefore, it is unlikely that our market reaction results are driven by earnings announcements rather than by the innovation disclosures in new product announcements.

[7] Industry classification is based on the Fama-French 12 industry classification obtained from Ken French's website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_49_ind_port.html.

Table 1 Sample Selection and Summary Statistics

Panel A: Sample Selection

Step	Sample Selection	Number of Observations
1	Number of product-related announcements from Capital IQ (January 2001 to December 2016) where the headlines contain at least one of the three keywords (new product, launch, unveil) and have the firm identifier and announcement date available.	98,849
2	Keep announcements that can be read by the text-processing algorithm.	97,296
3	Keep announcements made by companies whose names contain no innovation keywords.	96,520
4	Keep announcements made by companies with non-missing returns in CRSP and Compustat.	31,467
5	Download the full press releases of each new product announcement from Factiva.	30,663
	Merge the announcements with firm days and quarters to generate the testing samples.	
6	Firm days with non-missing data for the market reaction tests.	28,076
7	Firm quarters with non-missing data for the future sales performance tests.	17,800

Panel B: Industry Classification

Industries	N	% of Sample	% in Compustat	% not reporting patents	% not reporting R&D	% not reporting either patents or R&D
Consumer Nondurables	688	3.9	3.1	50.4	53.1	68.5
Consumer Durables	510	2.9	1.6	14.7	9.4	20.2
Manufacturing	1,100	6.2	5.8	13.7	9.2	18.3
Energy	68	0.4	4.9	17.6	22.1	25.0
Chemicals	321	1.8	1.6	17.8	3.7	18.4
Business Equipment	8,449	47.5	12.4	23.3	5.9	25.2
Telecommunications	1,101	6.2	2.3	47.3	65.6	74.2
Utilities	28	0.2	2.6	85.7	100.0	100.0
Shops	916	5.1	5.4	71.5	81.9	87.0
Healthcare	1,897	10.7	8.5	23.6	3.6	24.2
Finance	1,450	8.1	37.6	64.8	83.0	90.2
Other	1,272	7.2	14.4	58.0	66.4	80.0
Total	17,800	100.0	100.0	33.3	26.1	41.6

Table 1 (continued)

Panel C: Summary Statistics of the Frequency of Innovation Words in New Product Announcements

Quartile of Innovation Words	Innovation Words per Announcement			Quarterly sum of Innovation Words		
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
Low	0.555	1.000	0.497	1.095	1.000	0.798
2	2.449	2.000	0.497	3.457	3.000	0.498
3	4.428	4.000	0.495	6.237	6.000	1.103
High	9.177	8.000	3.570	17.430	14.000	10.170
Total	3.848	3.000	3.695	6.173	4.000	7.697

Panel A presents the sample selection procedure. Panel B shows the industry classification (based on the Fama-French 12 industries) of the new product announcement sample compared with the industry distribution of the entire Compustat database for the same sample period. Panel C reports descriptive statistics of each innovation word quartile sorted on the number of innovation words in new product announcements

shows significant representation of firms in industries that do not tend to report R&D expenses or patents such as finance, consumer durables and nondurables, and shops. From the last column of Panel B, we see that 41.6% of our sample firms do not report either patent or R&D data, particularly those in the utilities (100.0%) and shops (87.0%). Therefore, we conclude that our findings and inferences are generalizable to firms and industries that innovate but are associated with little or no R&D or patent development.

3.2 Measuring innovation in new product announcements

We begin the process of constructing our text-based innovation disclosure measure by identifying our list of words related to innovation. Using "innovative" and "innovation" as seed words, we implement an iterative process that identifies derivative and synonymous words according to the *Oxford Thesaurus of English*. (See the details of this procedure in Panel A of Appendix Table 9) This process results in 61 words and inflections that describe innovation that are contained in our new product announcements (Panel B of Appendix Table 9).[8] The online appendix (A.1) provides three examples of new product announcements that illustrate the use of words from our innovation word list.

Using this list, we count the number of times each word appears in each new product announcement. From Table 1 Panel C, we see that the average number of innovation words in a given announcement is 3.848, ranging from an average of 0.555 in the bottom quartile to 9.177 in the top quartile. The right three columns of this panel show that the number of innovation words in all new product announcements issued in each firm-quarter ranges from 1.095 to 17.430 across the top and bottom quartiles.

After validating our selection of words, we use this list to construct our empirical measure that captures the degree of managerial innovation disclosure, which is either above or below the expected degree of disclosure, given the level of innovation inputs and innovation successes. We do so by estimating a regression of the innovation word count (either at the announcement level or aggregated by firm at the quarterly level) on variables that capture innovation inputs and innovation successes. We then use the residuals from this regression as our primary measure of innovation disclosure in our sample of new product announcements. Specifically, we estimate the following regression:

$$\begin{aligned} INNOVCOUNT_{QTR} \text{ or } INNOVCOUNT = {} & \alpha + \beta_1 R\&D\ Capital + \beta_2 Patent + \beta_3 PatCitation + \beta_4 PatValue \\ & + \beta_5 Trade\ Secret + \beta_6 Industry\ R\&D\ Capital + \beta_7 Industry\ Patent \\ & + \beta_8 Industry\ PatCitation + \beta_9 Industry\ PatValue + \beta_{10} NUMNPA12Q \\ & + \beta_{11} Industry\ NUMNPA12Q + Year \times Quarter\ Dummies + \epsilon. \end{aligned} \tag{1}$$

The dependent variable $INNOVCOUNT_{QTR}$ is equal to the total number of innovation words divided by the total number of words in all new product announcements

[8] To validate our list, we confirm that each innovation word appears in a random sample of 100 new product announcements in the context of benefits to customers, how the new product is positioned within the existing product portfolio, and how the new product compares with other products in the market.

issued by a firm in a given quarter, whereas *INNOVCOUNT* is equal to the number of innovation words divided by the total number of words in *each* new product announcement. The explanatory variables for these regressions include proxies of innovation inputs and innovation successes. The proxies for our innovation inputs are R&D capital (*R&D Capital*), patent count (*Patent*), forward citations received by the patents (*PatCitation*), the monetary value of the patents (*PatValue*), and trade secrecy (*Trade Secret*). We control for industry-level technological progress by including the industry R&D capital (*Industry R&D Capital*), the number of patents (*Industry Patent*), patent citations (*Industry PatCitation*), and patent value (*Industry PatValue*) of all firms in each three-digit SIC industry.[9] The proxies for firm- and industry-level innovation success include the natural logarithm of one plus the number of new product announcements made by a firm in the past three years (*NUMNPA12Q*) as well as the sum of *NUMNPA12Q* for all firms in each three-digit SIC industry (*Industry NUMNPA12Q)*. All variables are defined in Appendix Table 10 and 11.

Table 2 presents the estimation results of Eq. (1). The dependent variable for the results in column (1) is the quarterly measure of the innovation word count ($INNOVCOUNT_{QTR}$), whereas that for column (2) is the announcement-level word count (*INNOVCOUNT*). The results reported in both columns are qualitatively similar. For example, the results in column (1) show a positive and significant relation between $INNOVCOUNT_{QTR}$ and R&D capital (coefficient 0.007 with t-statistic 2.26), number of patents (coefficient 0.012 with t-statistic 1.70), and number of patent citations (coefficient 0.007 with t-statistics 2.74), suggesting our innovation word count measure reflects firms' innovation fundamentals. We further find that industry-level patent citations positively predict innovation word count, whereas industry-level patent value and innovation successes relate negatively to our firm-level innovation word count.

We next use the residual components from the above regressions to test the relation between managerial innovation disclosure in new product announcements and future performance ($INNOVDIS_{QTR}$) as well as that between innovation disclosure and stock market reactions to new product announcements (*INNOVDIS*). Doing so allows us to control for the effect of innovation inputs and successes on the expected use of innovation-related words in new product announcements. It also allows us to better distinguish those words that reflect managerial disclosure of innovation from those that describe innovation inputs or innovation successes.[10]

[9] Untabulated tests suggest that our findings remain qualitatively similar if we replace R&D capital and patents variables (both at the firm and industry levels) with combined innovation efficiency measures that use the number of patents or citations as the numerator and R&D capital as the denominator.

[10] This approach resembles that of Huang et al. (2014), who estimate the abnormal tone in earnings press releases based on the "residuals of a tone model that controls for firm quantitative fundamentals such as performance, risk, and complexity." They refer to the normal component of tone as the part that "reflects a neutral description of current available information about fundamentals" and the abnormal component as the one that proxies for "managerial strategic choice of tone either to inform or misinform investors."

Table 2 Expected Innovation Disclosure Model

VARIABLE	(1) $INNOVCOUNT_{QTR}$	(2) *INNOVCOUNT*
Intercept	1.150***	1.201***
	(5.87)	(7.32)
R&D Capital	0.007**	0.010***
	(2.26)	(3.48)
Patent	0.012*	0.013*
	(1.70)	(1.89)
PatCitation	0.007***	0.006**
	(2.74)	(2.53)
PatValue	-0.006	-0.006*
	(-1.52)	(-1.68)
Trade Secret	-0.001	0.004
	(-0.10)	(0.36)
Industry R&D Capital	-0.003	-0.006*
	(-0.77)	(-1.86)
Industry Patent	0.002	0.001
	(0.18)	(0.11)
Industry PatCitation	0.022***	0.024***
	(3.71)	(4.35)
Industry PatValue	-0.020***	-0.020***
	(-4.33)	(-4.49)
NUMNPA12Q	-0.003	-0.008
	(-0.58)	(-1.65)
Industry NUMNPA12Q	-0.017***	-0.013***
	(-4.04)	(-2.98)
Year-Quarter FE	Yes	Yes
Observations	17,938	28,117
Adj. R^2	0.015	0.014

This table reports the coefficients and t-statistics of Eq. (1). Standard errors are double-clustered at the fiscal quarter and firm levels. Variable definitions are provided in Appendix Table 10. ***, **, and * indicate two-tail significance at the 1%, 5%, and 10% levels, respectively

3.3 Validation test of the innovation disclosure measure

To validate the ability of our innovation disclosure measure to capture value-relevant information, we investigate the stock market's reaction to innovation disclosures in individual new product announcements.[11] Specifically, we estimate the following regression model:

[11] Studies in marketing document a positive market reaction to firms announcing new products and a negative one for their rivals (Bayus et al. 2003; Chaney et al. 1991; Chen et al. 2002, 2005). However, these studies do not investigate the cross-sectional variation in the extent of innovation disclosed in new product announcements.

$$CAR = \beta_0 + \beta_1 INNOVDIS + \sum_{j=2}^{J} \beta_j Controls + \varepsilon, \quad (2)$$

where the dependent variable, *CAR*, is equal to the size-adjusted cumulative abnormal return in various windows around a new product announcement and *INNOVDIS* captures the level of managerial innovation disclosure incremental to innovation inputs and innovation successes within each individual NPA. To control for announcement characteristics, we include the number of new product announcements (*NUMNPA*), measured as the natural logarithm of the number of new product announcements made by a firm on the announcement day; the tone of the announcement (*TONE*), based on the word list proposed by Loughran and Mcdonald (2011); and the readability of the announcement (*FOG*), as suggested by Li (2008). Finally, we include firm size (*Size*), market-to-book ratio (*MTB*), leverage ratio (*Leverage*), sales growth (*Salesgrowth*), cash holdings (*Cash*), and momentum (*Momentum*) as additional control variables in Eq. (2).

Figure 1 depicts the stock price reaction around new product announcement dates for our full sample as well as two subsamples partitioned by whether *INNOVDIS* is above or below the sample median. Figure 1 shows a positive market reaction on the announcement date, with a greater reaction for those firms with more innovation disclosure (our *High* subsample). The figure further shows that this market reaction starts a few days prior to the announcement date, consistent with information leakage. Finally, the positive market reaction does not revert within 10 days of the

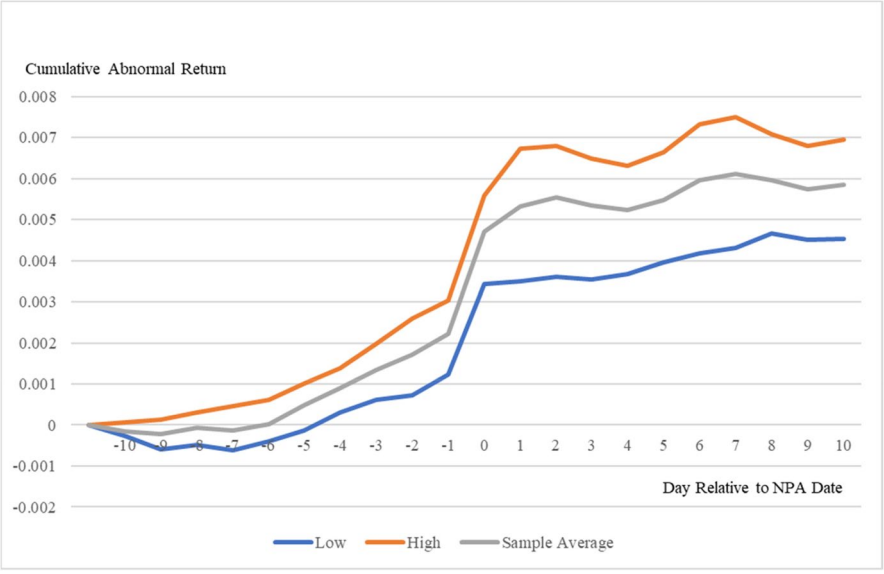

Fig. 1 Cumulative abnormal returns around new product announcement dates. *Notes.* This figure depicts sample average cumulative abnormal returns in the (-10, +10) window around New product announcement dates (day 0). New product announcements are assigned to the *High* group when *INNOVDIS* is above the sample median and to the *Low* group otherwise

announcement date. In summary, Fig. 1 suggests that the disclosure of innovation words in new product announcements elicits a positive, lasting market reaction.

Table 3 Panel A reports the average abnormal returns (*CAR*) for different windows around new product announcement dates. From Panel A, we see that firms announcing new products experience statistically significant and positive abnormal returns during the announcement periods. For example, announcing firms experience an average positive return of 0.3% during the three-day (-1, +1) announcement window and an average positive return of 0.5% during the 21-day (-10, +10) announcement window. An untabulated analysis suggests that these sample averages differ statistically from 0 at 1% confidence levels. These results are consistent with those of previous studies indicating that new product announcements are associated with an increase in an announcing firm's value.[12]

Panel B of Table 3 reports the results of estimating Eq. (2) across different announcement windows. From Panel B, we see that *INNOVDIS* is positively and significantly related to an announcing firms' cumulative abnormal returns across all windows: the coefficients on the (-1, +1), (-2, +2), (-5, +5), and (-10, +10) windows are 0.10% (t-statistic of 3.45), 0.10% (t-statistic of 2.86), 0.10% (t-statistic of 1.73), and 0.20% (t-statistic of 2.03), respectively. We also find a positive and significant reaction to the readability of new product announcements (a higher *FOG* score indicates lower readability) but a similar effect for tone (*TONE*) only across the shorter announcement windows. Overall, these results suggest that greater innovation disclosure in a new product announcement is associated with higher announcement returns. They further validate the ability of our innovation disclosure measure to capture value-relevant information.

4 Empirical analysis of innovation disclosure and future firm performance

4.1 Research design

To examine the relation between innovation disclosure and future sales (H1), we estimate Eq. (3) as follows:

$$\begin{aligned} Future\ Sales = {} & \gamma_0 + \gamma_1 INNOVDIS_{QTR} + \gamma_2 NUMNPA_{QTR} + \gamma_3 FOG_{QTR} + \gamma_4 TONE_{QTR} + \gamma_5 Size + \gamma_6 MTB \\ & + \gamma_7 Leverage + \gamma_8 ROAVOL + \gamma_9 Age + \gamma_{10} Instown + \gamma_{11} ADV + \gamma_{12} HHI \\ & + \gamma_{13} Salesgrowth + \gamma_{14} Cash + Industry\ Dummies + Year \times Quarter\ Dummies + \sigma. \end{aligned} \tag{3}$$

In the above specification, the dependent variable is future sales, measured as (a) sales in each of the next four quarters or (b) the rolling sum of future sales over the next four quarters. The variable of interest, $INNOVDIS_{QTR}$, is our measure of quarterly innovation disclosure, as developed in Section 3.2. We further

[12] The mean value of *INNOVDIS* (the residual component from Eq. (1)) is not identical to zero due to winsorization of the top and bottom one percent of the raw values.

Table 3 Stock market reaction to innovation disclosure in individual new product announcements

Panel A: Descriptive Statistics

Variable	Mean	SD	P10	P25	P50	P75	P90
CAR (-1, +1)	0.003	0.042	-0.038	-0.016	0.001	0.019	0.046
CAR (-2, +2)	0.003	0.054	-0.051	-0.022	0.001	0.025	0.060
CAR (-5, +5)	0.004	0.082	-0.081	-0.033	0.002	0.039	0.092
CAR (-10, +10)	0.005	0.113	-0.117	-0.050	0.002	0.055	0.126
INNOVDIS	-0.001	0.686	-0.800	-0.497	-0.121	0.364	0.923
FOG	3.084	0.141	2.901	2.998	3.089	3.174	3.255
TONE	0.524	0.494	-0.130	0.200	0.667	1.000	1.000
LENGTH	5.922	0.642	5.056	5.595	5.989	6.337	6.663
Size	8.016	2.633	4.440	5.910	8.073	10.120	11.540
MTB	3.572	4.418	0.926	1.542	2.625	4.388	7.434
Leverage	0.182	0.186	0.000	0.005	0.146	0.281	0.439
Salesgrowth	0.004	0.037	-0.027	-0.006	0.003	0.015	0.035
Cash	0.248	0.199	0.031	0.086	0.196	0.369	0.541
Momentum	1.056	0.344	0.672	0.863	1.033	1.198	1.422

Panel B: Innovation Disclosure and Market Reaction

	(1)	(2)	(3)	(4)
VARIABLE	***CAR (-1, +1)***	***CAR (-2, +2)***	***CAR (-5, +5)***	***CAR (-10, +10)***
INNOVDIS	0.001***	0.001***	0.001*	0.002**
	(3.45)	(2.86)	(1.73)	(2.03)
NUMNPA	0.002	0.003	0.005	0.002
	(0.89)	(0.86)	(0.94)	(0.37)
FOG	-0.003*	-0.005*	-0.006	-0.009
	(-1.80)	(-1.95)	(-1.38)	(-1.65)
TONE	0.001*	0.001*	0.002	0.002
	(1.95)	(1.79)	(1.27)	(1.02)
Size	-0.001***	-0.001***	-0.001***	-0.002***
	(-7.04)	(-6.28)	(-4.51)	(-3.66)
MTB	-0.000	-0.000	-0.000***	-0.001***
	(-0.37)	(-1.27)	(-2.92)	(-3.43)
Leverage	-0.001	0.002	0.006*	0.008
	(-0.63)	(0.71)	(1.71)	(1.55)
Salesgrowth	0.031***	0.031**	0.073***	0.134***
	(3.11)	(2.38)	(3.74)	(4.60)
Cash	0.002	0.004*	0.011**	0.014*
	(1.10)	(1.69)	(2.18)	(1.95)
Momentum	-0.002	-0.003	-0.003	0.003
	(-1.35)	(-1.51)	(-0.96)	(0.75)
Constant	0.021***	0.026***	0.030*	0.036*
	(3.20)	(3.22)	(1.96)	(1.96)
Observations	28,076	28,076	28,076	28,076

Table 3 (continued)

Adjusted R-squared	0.008	0.007	0.009	0.014
Industry FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes

Panel A provides descriptive statistics for the variables used in the market reaction tests. Panel B reports the coefficients and t-statistics from the ordinary least squares regressions of cumulative abnormal returns (*CAR*) on *INNOVDIS* and the control variables. The t-statistics based on standard errors clustered at both the firm and fiscal quarter levels are displayed in parentheses below the coefficients. Variable definitions are provided in Appendix Table 10 and 11. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests

include control variables for the following: the number of new product announcements issued by a firm in a given quarter ($NUMNPA_{QTR}$), to account for firms' propensity to issue these announcements; the tone and readability of new product announcements, aggregated over the quarter ($TONE_{QTR}$ and FOG_{QTR}, respectively); and variables related to future firm performance, measured as firm size (*Size*), market-to-book value (*MTB*), leverage ratio (*Leverage*), institutional ownership (*Instown*), firm age (*Age*), advertising expenses (*ADV*), cash ratio (*Cash*), industry competition (*HHI*), and sales growth rate (*Salesgrowth*). Finally, we include fixed effects for Fama-French 49 industries and fiscal year-quarters to control for industry-specific and time-invariant unobservable variables.

To examine whether the relation between the degree of innovation disclosure and future firm performance is affected by the presence of disclosure incentives (H2A–H2C), we use the following modified version of Eq. (3):

$$\begin{aligned} Future\ Sales = {} & \gamma_0 + \gamma_1 INNOVDIS_{QTR} \times D_{Incentive} \\ & + \gamma_2 INNOVDIS_{QTR} + \gamma_3 D_{Incentive} + \sum_{j=2}^{J} \gamma_j Controls + \sigma, \end{aligned} \tag{4}$$

where *D_Incentive* is an indicator variable that takes the value of one when our empirical proxies for managerial disclosure incentives are classified as strong and zero otherwise. In Eq. (4), γ_1 captures the impact of managerial disclosure incentives on the relation between innovation disclosure and future firm performance. In this analysis, we expect that stronger disclosure incentives will reduce the predictive power of innovation disclosure for future sales (i.e., a negative coefficient for γ_1).

Table 4 provides the descriptive statistics for the variables used in this analysis. From Table 4, we see that the average of the natural logarithm of one plus the average number of new product announcements per quarter is 0.891 (representing 1.707 new product announcements issued per quarter). We further see that the average of the natural logarithm of one plus the average Fog Index of new product announcements per quarter is 3.093 (21.251 prior to taking natural logarithm). Comparing this with a mean Fog Index of 24 for 10-K R&D disclosures (Merkley 2014) shows that new product announcements are associated with easier readability, appropriate for their intended broader audience. Finally, we see that new product announcements exhibit a positive tone (mean and median of 0.537 and

0.636, respectively), consistent with their goal of promoting new products. The descriptive statistics of the other control variables are generally consistent with those in prior studies (e.g., Bellstam et al. 2021; Merkley 2014).

Table 5 reports the correlation coefficients among the variables. Consistent with our expectations, we see that $INNOVDIS_{QTR}$ relates positively and significantly to future sales in the next fiscal quarter. The correlation coefficients among the control variables suggest that multicollinearity is not a concern for our tests.

4.2 Innovation disclosure and future sales

Table 6 reports the results of the regressions of future sales performance on innovation disclosure using sales in the next one to four quarters (rolling sum of sales in the next four quarters) as the dependent variable in columns (1) through (4) (column (5)). The results in Table 6 show a positive and significant relation between the extent of innovation disclosure in new product announcements and future sales across all future windows. For example, using rolling sales as our dependent variable, we find that the coefficient on $INNOVDIS_{QTR}$ is 0.017 (t-statistic of 2.26), indicating that a one standard deviation increase in $INNOVDIS_{QTR}$ is associated with a

Table 4 Descriptive statistics of variables used in the future performance tests

Variable	Mean	SD	P10	P25	P50	P75	P90
$INNOVDIS_{QTR}$	0.000	0.623	-0.739	-0.442	-0.101	0.323	0.822
$NUMNPA_{QTR}$	0.891	0.363	0.693	0.693	0.693	1.099	1.386
$LENGTH_{QTR}$	6.246	0.783	5.347	5.778	6.186	6.690	7.257
FOG_{QTR}	3.093	0.128	2.930	3.015	3.095	3.174	3.249
$TONE_{QTR}$	0.537	0.452	-0.037	0.289	0.636	0.975	1.000
Size	7.297	2.513	4.053	5.395	7.214	9.098	10.600
MTB	3.493	5.166	0.855	1.446	2.485	4.189	7.132
Leverage	0.185	0.195	0.000	0.005	0.141	0.290	0.453
ROAVOL	0.040	0.108	0.004	0.007	0.016	0.039	0.087
Age	2.857	0.747	1.946	2.303	2.833	3.434	3.989
Instown	0.605	0.282	0.143	0.424	0.668	0.817	0.917
ADV	0.016	0.032	0.000	0.000	0.002	0.016	0.046
HHI	0.134	0.145	0.038	0.052	0.076	0.147	0.305
Salesgrowth	0.004	0.042	-0.029	-0.006	0.003	0.015	0.038
Cash	0.252	0.210	0.029	0.079	0.197	0.376	0.570
t+1 Qtr. Earnings	-0.007	0.079	-0.057	-0.007	0.009	0.021	0.036
t+1 Qtr. Sales	0.217	0.152	0.069	0.121	0.185	0.273	0.394
t+1 Qtr. COGS	0.619	1.022	0.198	0.336	0.508	0.693	0.822
t+1 Qtr. SG&A	0.482	0.761	0.128	0.225	0.356	0.531	0.756

This table reports the summary statistics for the variables used in the future performance tests. Variable definitions are provided in Appendix Table 10 and 11

Table 5 Correlation matrix for variables used in future performance tests

	$INNOVDIS_{QTR}$	$NUMNPA_{QTR}$	FOG_{QTR}	$TONE_{QTR}$	*Size*	*MTB*	*Leverage*	*ROAVOL*	*Age*	*Instown*	*ADV*	*HHI*	*Salesgrowth*	*Cash*	*1 Qtr. Sales*
$INNOVDIS_{QTR}$	1														
$NUMNPA_{QTR}$	0.000	1													
FOG_{QTR}	0.014*	-0.041***	1												
$TONE_{QTR}$	0.163***	0.008	0.005	1											
Size	-0.027***	0.335***	-0.177***	-0.054***	1										
MTB	-0.008	0.013*	-0.038***	-0.022***	-0.037***	1									
Leverage	0.000	0.016**	-0.110***	0.016**	0.293***	-0.011	1								
ROAVOL	-0.015**	-0.054***	0.037***	0.013*	-0.270***	0.043***	-0.010	1							
Age	0.016**	0.175***	-0.077***	-0.037***	0.535***	-0.050***	0.198***	-0.179***	1						
Instown	-0.012*	0.072***	-0.032***	-0.036***	0.379***	-0.010	0.081***	-0.228***	0.221***	1					
ADV	0.056***	0.011	-0.184***	0.027***	-0.026***	0.066***	-0.001	0.080***	-0.071***	-0.033***	1				
HHI	0.006	-0.043***	-0.081***	0.035***	0.105***	0.008	0.058***	-0.055***	0.150***	0.046***	0.046***	1			
Salesgrowth	-0.008	-0.010	-0.002	0.007	-0.033***	0.056***	-0.026***	0.008	-0.055***	-0.016**	0.012	-0.009	1		
Cash	-0.023***	-0.025***	0.103***	-0.023***	-0.421***	0.112***	-0.402***	0.157***	-0.374***	-0.113***	0.056***	-0.198***	0.020***	1	
t+1 Qtr. Sales	0.052***	-0.055***	-0.066***	0.086***	-0.185***	0.074***	-0.054***	-0.008	0.015**	-0.014*	0.052***	0.197***	0.109***	-0.125***	1

This table reports the Pearson correlations for the variables used in the empirical analyses. Variable definitions are provided in Appendix Table 10 and 11.***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests

1.22% percentage increase in the next year's sales deflated by assets, translating to an increase of $328 million in sales for an average firm.

Examining the coefficient estimates on the control variables, we find that more new product announcements per quarter ($NUMNPA_{QTR}$) and a more positive announcement tone ($TONE_{QTR}$) are each associated with higher future sales, while poorer readability is associated with lower future sales. These results are consistent with findings related to tone and readability in the literature, which shows a positive (negative) relation between tone (readability) and firms' financial performance (e.g., Merkley 2014). We also find that smaller (*Size*), higher growth (*MTB*), and older (*Age*) firms are associated with higher future sales. Finally, we find that future sales are positively associated with greater industry concentration (*HHI*), greater past sales growth (*Salesgrowth*), and lower liquidity (*Cash*).[13] Taken together, the results in Table 6 support our hypothesis H1 and suggest that greater innovation disclosure in new product announcements is associated with more product purchases and thus higher future sales.

4.3 The effect of managerial incentives on the predictability of future sales

We next examine our results related to the impact of strategic disclosure incentives on the predictive power of innovation disclosures for future firm performance. First, we examine the impact of managerial personal wealth incentives (H2A). Empirically, we proxy for this type of incentive using net insider sales (*Insider Trading*) as well as the sensitivity of managerial wealth to changes in stock price volatility (*Executive Vega*).[14] The choice of these proxies is motivated by research that shows firm disclosures are more likely to be biased when there is greater managerial net sales of shareholdings (Rogers and Stocken 2005) and greater sensitivity of executive wealth to changes in stock price volatility. Accordingly, we expect that the existence of these incentives will diminish the quality of the innovation disclosures in new product announcements, reducing their ability to predict sales.

Second, we examine the impact of the strength of corporate governance (H2B). Following prior research, we proxy for the strength of a firm's corporate governance by measuring how busy its board members are as well as whether CEO compensation agreements include golden parachutes. Busy boards, defined as the total number of directorships held by all the members of a firm's board, are less effective at managerial monitoring (Brown et al. 2019; Fich and Shivdasani 2006; Hauser 2018).[15]

[13] The variance inflation factors of the regressions are lower than three, suggesting that multicollinearity is not a concern. In addition, an untabulated analysis suggests that including regressors from Eq. (1) does not change our interpretation of the results in Table 6.

[14] Executive vega measures the sensitivity of executives' wealth to a 1% change in stock return volatility (Coles et al. 2006). Armstrong et al. (2013) document a positive relation between executive vega and earnings management. They further show that the disclosure incentives associated with a higher executive vega subsume those of executive delta, which measures the sensitivity of executives' wealth to a 1% change in stock price.

[15] Using an M&A setting to improve identification, Brown et al. (2019) find that busy directors of acquired firms devote more time to the remaining boards and that the monitoring gain on average dominates the loss in connections. In our setting, the monitoring role of boards matters more than their advisory role.

Table 6 Innovation disclosure and future sales performance

VARIABLE	(1) 1st Qtr.	(2) 2nd Qtr.	(3) 3rd Qtr.	(4) 4th Qtr.	(5) 1 Yr.
$INNOVDIS_{QTR}$	0.004*	0.004**	0.004**	0.005**	0.017**
	(1.90)	(2.23)	(2.19)	(2.45)	(2.26)
$NUMNPA_{QTR}$	0.018***	0.020***	0.019***	0.018***	0.077***
	(3.28)	(3.53)	(3.43)	(3.43)	(3.52)
FOG_{QTR}	-0.040***	-0.037***	-0.032**	-0.032**	-0.140***
	(-3.13)	(-2.83)	(-2.48)	(-2.61)	(-2.79)
$TONE_{QTR}$	0.006**	0.006*	0.005*	0.006*	0.023*
	(2.04)	(1.89)	(1.76)	(1.95)	(1.95)
Size	-0.019***	-0.019***	-0.019***	-0.019***	-0.077***
	(-11.84)	(-12.24)	(-12.01)	(-12.58)	(-12.45)
MTB	0.002***	0.002***	0.002***	0.002***	0.009***
	(4.88)	(4.51)	(4.68)	(4.37)	(4.66)
Leverage	-0.057***	-0.049***	-0.049***	-0.047***	-0.196***
	(-3.63)	(-3.06)	(-3.12)	(-3.00)	(-3.13)
ROAVOL	-0.034	-0.028	-0.025	-0.021	-0.103
	(-1.54)	(-1.11)	(-1.02)	(-0.76)	(-1.01)
Age	0.010**	0.010**	0.010**	0.011**	0.041**
	(2.44)	(2.47)	(2.38)	(2.60)	(2.55)
Instown	0.011	0.008	0.007	0.004	0.030
	(1.29)	(0.99)	(0.88)	(0.53)	(0.92)
ADV	0.086	0.117	0.057	0.081	0.352
	(1.10)	(1.43)	(0.72)	(1.01)	(1.11)
HHI	0.075***	0.068***	0.072***	0.068***	0.286***
	(3.61)	(3.25)	(3.42)	(3.25)	(3.47)
Salesgrowth	0.342***	0.185***	-0.036	0.476***	0.959***
	(8.74)	(4.14)	(-0.76)	(10.40)	(6.22)
Cash	-0.133***	-0.127***	-0.121***	-0.121***	-0.502***
	(-9.98)	(-9.43)	(-9.11)	(-9.04)	(-9.44)
Constant	0.448***	0.439***	0.423***	0.427***	1.736***
	(10.54)	(10.26)	(10.11)	(10.50)	(10.47)
Observations	17,800	17,799	17,800	17,796	17,794
Adjusted R-squared	0.409	0.393	0.395	0.407	0.419
Industry FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes

This table reports the coefficients and t-statistics from the ordinary least squares regressions of sales on $INNOVDIS_{QTR}$ and the control variables. Columns (1)–(4) use quarterly sales as the dependent variable. Column (5) uses the rolling sum of the future four quarters of sales as the dependent variable. Variable definitions are provided in Appendix Table 10 and 11. The t-statistics based on standard errors clustered at both the firm and fiscal quarter levels are displayed in parentheses below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests

Golden parachutes provide executives with substantial monetary compensation in the event of a change of control, thus shielding them from discipline by the market for corporate control (Bebchuk et al. 2009). Accordingly, we expect managers of firms with busy boards and managers with golden parachutes in their compensation agreements to have fewer constraints that prevent them from extracting private benefits from their firm. In turn, these managers may be more likely to behave opportunistically, resulting in innovation disclosures that are less predictive of future sales.

Third, we examine the impact of the ability of customers to monitor and discipline managerial disclosure quality (H2C). We proxy for customer bargaining power using the degree of vertical integration (Frésard et al. 2020) as well as the level of product market competition (the number of product market rivals, as defined by Hoberg and Phillips 2010, 2016). Vertically integrated firms are better protected against the loss of existing customers, given their enhanced supply chain capabilities and resources (Forbes and Lederman 2010).[16] Similarly, a less competitive product market means customers have higher switching costs and lower bargaining power. In both cases, customers' lower bargaining power makes them less able to monitor innovation disclosure quality, opening the possibility for strategic disclosure.

Table 7 reports the results of our cross-sectional tests of the impact of managerial incentives on the predictive power of innovation disclosure for future sales. Consistent with our prediction in H2A, the negative and significant coefficients on the interactions between $INNOVDIS_{QTR}$ and insider trading in column (1) (-0.025, t-statistic -1.78) and executive vega in column (2) (-0.039, t-statistic-2.19) indicate that our observed positive relation between innovation disclosure and future sales is significantly lower when managers' personal wealth is more sensitive to firm value. Consistent with our prediction in H2B, the negative and statistically significant coefficients on the interaction terms between $INNOVDIS_{QTR}$ and board busyness in column (3) (-0.032, t-statistic -2.21) and $INNOVDIS_{QTR}$ and golden parachutes in column (4) (-0.047, t-statistic -3.08) indicate that innovation disclosure by firms with weaker governance has lower predictive ability for future sales than that of other firms (holding the level of innovation constant).

Finally, consistent with our prediction in H2C, the negative and statistically significant coefficient on the interaction terms between $INNOVDIS_{QTR}$ and *Vertical Integration* (-0.023, t-statistic of -1.69) and $INNOVDIS_{QTR}$ and *Low Competition* (-0.051, t-statistic of -3.26) in columns (5) and (6) indicate that the relation between innovation disclosure and future sales weakens when customers have less power to monitor disclosure quality.

[16] Vertical integration provides a competitive advantage through increased economics of scope (resources and capabilities), reduced transaction costs, decreased costs arising from corporate complexity, and greater ability to capture upstream and downstream profit margins (Grant 2015). These attributes reduce customer bargaining power and thus their ability to discipline poor quality disclosures.

Table 7 Innovation disclosure and future one-year-ahead sales performance partitioned based on managerial disclosure incentives

	(1)	(2)	(3)	(4)	(5)	(6)
	D_Incentive is equal to:					
VARIABLES	*Insider Trading*	*Executive Vega*	*Board Busyness*	*Golden Parachute*	*Vertical Integration*	*Low Competition*
$INNOVDIS_{QTR}$×*D_ Incentive*	-0.025*	-0.039**	-0.032**	-0.047***	-0.023*	-0.051***
	(-1.78)	(-2.19)	(-2.21)	(-3.08)	(-1.69)	(-3.26)
$INNOVDIS_{QTR}$	0.021***	0.035**	0.023**	0.036***	0.029**	0.042***
	(2.70)	(2.57)	(2.44)	(2.84)	(2.62)	(3.68)
D_ Incentive	0.027*	0.013	0.012	-0.028	0.039*	0.095***
	(1.82)	(0.58)	(0.47)	(-1.25)	(1.73)	(3.88)
$NUMNPA_{QTR}$	0.076***	0.072***	0.067***	0.066***	0.071***	0.076***
	(3.47)	(3.11)	(3.17)	(2.93)	(3.18)	(3.51)
FOG_{QTR}	-0.139***	-0.124**	-0.137**	-0.094	-0.151***	-0.144***
	(-2.77)	(-2.07)	(-2.59)	(-1.67)	(-2.87)	(-2.80)
$TONE_{QTR}$	0.022*	0.022	0.023*	0.017	0.018	0.018
	(1.95)	(1.60)	(1.91)	(1.29)	(1.46)	(1.46)
Size	-0.078***	-0.084***	-0.076***	-0.084***	-0.078***	-0.074***
	(-12.42)	(-8.29)	(-11.04)	(-9.44)	(-11.85)	(-10.87)
MTB	0.008***	0.012***	0.008***	0.013***	0.009***	0.008***
	(4.50)	(4.03)	(4.20)	(5.32)	(4.51)	(4.27)
Leverage	-0.195***	-0.255***	-0.233***	-0.286***	-0.186***	-0.187***
	(-3.12)	(-2.92)	(-3.32)	(-3.79)	(-2.90)	(-2.87)
ROAVOL	-0.102	0.026	-0.078	0.097	-0.168*	-0.162*
	(-1.00)	(0.22)	(-0.52)	(0.50)	(-1.95)	(-1.80)
Age	0.042**	0.031	0.034*	0.056**	0.043**	0.033*
	(2.65)	(1.36)	(1.94)	(2.39)	(2.47)	(1.94)

Table 7 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	D_Incentive is equal to:					
VARIABLES	*Insider Trading*	*Executive Vega*	*Board Busyness*	*Golden Parachute*	*Vertical Integration*	*Low Competition*
Instown	0.027	-0.140**	-0.022	-0.096*	-0.005	-0.012
	(0.81)	(-2.28)	(-0.57)	(-1.69)	(-0.14)	(-0.31)
ADV	0.348	0.189	0.395	-0.062	0.283	0.121
	(1.10)	(0.40)	(1.16)	(-0.16)	(0.88)	(0.36)
HHI	0.286***	0.355***	0.354***	0.373***	0.297***	0.264***
	(3.48)	(3.61)	(4.00)	(3.78)	(3.50)	(3.05)
Salesgrowth	0.951***	0.782***	1.054***	0.844***	0.960***	0.993***
	(6.16)	(4.32)	(6.31)	(5.01)	(6.01)	(6.34)
Cash	-0.508***	-0.237***	-0.518***	-0.289***	-0.485***	-0.433***
	(-9.54)	(-2.82)	(-9.25)	(-3.41)	(-8.86)	(-7.86)
Constant	1.735***	1.877***	1.785***	1.695***	1.789***	1.730***
	(10.48)	(7.98)	(10.14)	(7.99)	(10.31)	(10.21)
Observations	17,794	10,957	14,882	9,687	16,592	16,115
Adjusted R-squared	0.420	0.526	0.429	0.566	0.426	0.436
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the coefficients and t-statistics from the ordinary least squares regressions of the rolling sum of the future four quarters of sales on $INNOVDIS_{QTR}$, the interaction terms of $INNOVDIS_{QTR}$ and the incentive variables, and the control variables. The variable *D_Incentive* is alternatively equal to *Insider Trading*, *Executive Vega*, *Board Busyness*, *Golden Parachute*, *Vertical Integration*, and *Low Competition*. The control variables are the same as those in Table 6. Variable definitions are provided in Appendix Table 10 and 11. The t-statistics based on standard errors clustered at both the firm and fiscal quarter levels are displayed in parentheses below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests

Taken together, our findings in Table 7 are uniformly consistent with our prediction that managers with disclosure incentives will incorporate a strategic component in their innovation disclosure, reducing the predictive ability of their innovation disclosures for future sales.[17]

4.4 Additional future performance measures

In this section, we examine whether innovation disclosures yield similar predictive power for other measures of firm performance, namely COGS, SG&A, and earnings. Unlike the relation with future sales, the relation between innovation disclosure and future COGS is unclear. On the one hand, improved engineering and manufacturing technology embedded in product innovation may help a firm reduce its production costs, as reflected in COGS. On the other hand, innovative new products may require significant additional production and inventory costs or may lead to a loss of previous cost efficiencies derived from economies of scale if these product lines replace obsolete brands or product lines. Given these opposing forces, the relation between innovation disclosure and future COGS is an open question.

Regarding the relation between innovation disclosure and SG&A expenses, innovative products may enable firms to better target their existing customers, instead of incurring additional marketing expenditures to find new customers. For instance, Bayus et al. (2003) find that new products in the personal computer industry contribute to a firm's current and future profitability mainly due to a reduction in SG&A expenses as a proportion of sales, since new products require less marketing support than old ones. We expect the relation between innovation disclosure and earnings to be determined jointly by the earnings components examined above.

Regarding additional measures of firm performance, the results in Panel A of Table 8 indicate that innovation disclosure does not reliably predict COGS, consistent with the notion that production costs scaled by sales are not necessarily reduced by innovations in product features. However, the results in Panel B show that the degree of innovation disclosure in negatively correlated with SG&A expenses, consistent with the findings of Bayus et al. (2003). Finally, the results in Panel C suggest that innovation disclosure is positively correlated with future earnings. Overall, these findings are consistent with our inference that innovation disclosure helps predict multiple measures of firms' performance, including sales, SG&A expenses, and earnings.

4.5 Robustness checks

We conduct several additional tests to ensure the robustness of our main findings. First, we re-run our main analysis using $INNOVCOUNT_{QTR}$ (the sum of all

[17] In untabulated results, we find that managers with stronger incentives to disclose strategically (defined as above-median values based on an equal-weighted index of our incentive measures in Table 7) use more innovation words in their new product announcements and yield announcements with a higher innovation disclosure value. This finding suggests that managerial disclosure incentives manifest themselves in the form of more innovation words in the respective firm new product announcements compared to those issued by firms with little or no disclosure incentives.

Table 8 Innovation disclosure and future earnings, COGS, and SG&A performance

Panel A: Future COGS					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
VARIABLE	**1 Qtr.**	**2 Qtr.**	**3 Qtr.**	**4 Qtr.**	**1 Yr.**
$INNOVDIS_{QTR}$	-0.011	-0.012	-0.003	-0.006	-0.042
	(-0.92)	(-1.17)	(-0.30)	(-0.67)	(-1.05)
$NUMNPA_{QTR}$	0.044*	0.031	0.036*	0.030	0.145*
	(1.86)	(1.52)	(1.78)	(1.65)	(1.81)
FOG_{QTR}	-0.042	0.039	0.005	0.048	0.025
	(-0.49)	(0.60)	(0.08)	(0.89)	(0.10)
$TONE_{QTR}$	-0.031	-0.019	-0.003	-0.003	-0.080
	(-1.52)	(-1.12)	(-0.21)	(-0.27)	(-1.22)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	17,697	17,704	17,696	17,696	17,534
Adjusted R-squared	0.136	0.134	0.130	0.134	0.136
Industry FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Panel B: Future SG&A					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
VARIABLE	**1 Qtr.**	**2 Qtr.**	**3 Qtr.**	**4 Qtr.**	**1 Yr.**
$INNOVDIS_{QTR}$	-0.019**	-0.032***	-0.025***	-0.028***	-0.073**
	(-2.16)	(-3.66)	(-2.84)	(-3.22)	(-2.43)
$NUMNPA_{QTR}$	0.022	0.017	0.021	0.012	0.052
	(1.11)	(0.83)	(1.17)	(0.77)	(0.77)
FOG_{QTR}	0.131**	0.106*	0.052	0.075*	0.384**
	(2.23)	(1.98)	(1.14)	(1.72)	(2.07)
$TONE_{QTR}$	-0.030*	-0.036**	-0.028*	-0.020	-0.084
	(-1.94)	(-2.05)	(-1.81)	(-1.46)	(-1.66)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	16,165	16,184	16,199	16,197	16,048
Adjusted R-squared	0.220	0.205	0.220	0.221	0.251
Industry FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Panel C: Future Earnings					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
VARIABLE	**1 Qtr.**	**2 Qtr.**	**3 Qtr.**	**4 Qtr.**	**1 Yr.**
$INNOVDIS_{QTR}$	0.002**	0.002**	0.002***	0.002*	0.009***
	(2.35)	(2.11)	(2.70)	(1.90)	(2.83)
$NUMNPA_{QTR}$	-0.003*	-0.002	-0.003	-0.004*	-0.012
	(-1.77)	(-0.74)	(-1.64)	(-1.84)	(-1.53)
FOG_{QTR}	-0.013**	-0.013***	-0.015***	-0.010**	-0.052***
	(-2.45)	(-2.70)	(-2.89)	(-2.04)	(-2.89)
$TONE_{QTR}$	0.001	0.002*	0.001	0.002	0.006
	(1.06)	(1.87)	(1.00)	(1.26)	(1.40)

Table 8 (continued)

Controls	Yes	Yes	Yes	Yes	Yes
Observations	17,801	17,801	17,801	17,801	17,801
Adjusted R-squared	0.230	0.213	0.211	0.204	0.276
Industry FE	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes

This table reports the coefficients and t-statistics from the ordinary least squares regressions of cost of goods sold (Panel A), SG&A expenses (Panel B), and earnings (Panel C), on $INNOVDIS_{QTR}$ and the control variables. In Panels A–C, columns (1)–(4) use quarterly performance as the dependent variable. Column (5) uses the rolling sum of the future four quarters of performance as the dependent variable. Variable definitions are provided in Appendix Table 10 and 11. The t-statistics based on standard errors clustered at both the firm and fiscal quarter levels are displayed in parentheses below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, using two-tailed tests

innovation words in new product announcements made by a firm in a given quarter deflated by the total number of words in these announcements) as the dependent variable and including the regressors in Eq. (1) as additional control variables in Eq. (3) and find similar results (Table A2 in the online appendix). Next, we replace all the quarterly measures in our current tests with annual measures and obtain similar inferences (Table A3 of the online appendix).

We further find our main results are robust to using alternative industry fixed effects definitions, separating year and quarter fixed effects, and clustering standard errors at firm, firm quarter, or industry levels (Table A4). Lastly, we re-run our main analysis for subsamples of firms with or without R&D or patent data and obtain similar findings (Table A5).

5 Conclusion

Innovation has long been recognized as a critical aspect of business success, offering value to both customers and investors. We examine the ability of innovation disclosure to predict future firm performance. We first construct a dictionary of innovation words to identify the information content and properties of voluntary, nonfinancial managerial disclosures of production innovation. We use this dictionary to develop an innovation disclosure measure that is more generalizable and incrementally informative for firm value and future performance than conventional innovation measures that depend on the existence of R&D expenses and patents.

We then employ our measure to conduct a comprehensive empirical investigation and find a positive relation between the extent of innovation disclosure in new product announcements and future firm performance. Further analyses find that the predictive ability of innovation disclosures weakens when managers have incentives to disclose innovation information strategically.

As the first archival study to quantify the extent of managerial innovation disclosure in new product announcements and investigate its implications, our research

provides insights into how managers voluntarily reveal qualitative private information to both product and capital market audiences. While innovation disclosure in new product announcements is informative, our analysis shows that careful interpretation is needed to effectively link innovation disclosure to future firm performance.

Appendix 1

Table 9 Innovation disclosure measure

Panel A. Word List Construction Procedure

Step	Procedure
1	Identify the synonyms of "innovative" according to the *Oxford Thesaurus of English*. These synonyms are called "level 1 synonyms" (seven synonyms, total eight words).
2	Identify synonyms of the "level 1 synonyms" according to the *Oxford Thesaurus of English*. Keep a synonym if it has at least two synonyms that are included in the eight words in step 1, i.e., "innovative" and "level 1 synonym"; drop the word otherwise. These synonyms are called "level 2 synonyms" (added 14 new words for a total of 22 words).
3	Find the synonyms of the "level 2 synonyms" according to the *Oxford Thesaurus of English*. Keep a synonym if it has at least two synonyms that are included in the eight words in step 1, i.e., "innovative" and "level 1 synonym"; drop it otherwise. These synonyms are called "level 3 synonyms" (added two new words for a total of 24 words).
4	Repeat the same procedure (from steps 1 through 3) to find synonyms of "innovation" (added two "level 1 synonyms," one "level 2 synonym," and four "level 3 synonyms" for a total of eight words).
5	The word list consists of "innovation" and "innovative," "level 1 synonyms," "level 2 synonyms," and "level 3 synonyms," with 32 words in total.
6	Form a final word list with the adjectival and adverbial forms of the synonyms of "innovative" and the noun and verb forms of the synonyms of "innovation," with 61 words in total.

Panel B. List of Innovation Words

"advanced, avant-garde, brilliant, brilliantly, clever, cleverly, create, created, creates, creating, creation, creations, creative, creatively, creativeness, different, fresh, groundbreaking, ground-breaking, imaginative, ingenious, ingeniously, innovate, innovated, innovates, innovating, innovation, innovations, innovative, innovatively, innovativeness, innovatory, invent, invented, inventing, invention, inventions, inventive, inventively, inventiveness, invents, new, newest, newness, novel, novelties, novelty, offbeat, original, originalities, originality, pioneering, precedent-setting, progressive, revolutionary, seminal, unconventional, uniqueness, unprecedented, unprecedentedly, way-out".

Appendix 2: Variable definitions

Table 10 Variables used to estimate the innovation disclosure measure (Table 2)

Variable Name	Definition
$INNOVCOUNT_{QTR}$	The sum of innovation words deflated by the total number of words in all new product announcements made by a firm in a given quarter, multiplied by 100.
INNOVCOUNT	The sum of innovation words deflated by the total number of words in each new product announcement, multiplied by 100.
R&D Capital	Natural logarithm of 1 plus the sum of five-year cumulative R&D expenses, assuming an annual depreciation rate of 20% in the fiscal year ending in year *t*-1. Missing values are replaced by 0.
Patent	Natural logarithm of 1 plus the sum of the number of patents filed by a firm in the past three years. Missing values are replaced by 0.
PatCitation	Natural logarithm of one plus the sum of the number of forward citations of patents filed by a firm in the past three years. Missing values are replaced by zero.
PatValue	Natural logarithm of one plus the sum of the monetary value of patents filed by a firm in the past three years. Missing values are replaced by zero.
Trade Secret	Natural logarithm of one plus the total number of "trade secret" or "trade secrecy" phrases mentioned in the 10-K filing in the last year, following Glaeser (2018).
Industry R&D Capital	Natural logarithm of one plus the sum of five-year cumulative R&D expenses, assuming an annual depreciation rate of 20% in the fiscal year ending in year *t*-1 in a three-digit SIC code. Missing values are replaced by zero.
Industry Patent	Natural logarithm of one plus the sum of the number of patents filed by all firms in a three-digit SIC code in the past three years. Missing values are replaced by zero.
Industry PatCitation	Natural logarithm of one plus the sum of the number of forward citations of patents filed by all firms in a three-digit SIC code in the past three years. Missing values are replaced by zero.
Industry PatValue	Natural logarithm of one plus the sum of the monetary value of patents filed by all firms in a three-digit SIC code in the past three years. Missing values are replaced by zero.
NUMNPA12Q	Natural logarithm of one plus the number of new product announcements made by a firm in the past 12 quarters.
Industry NUMNPA12Q	Natural logarithm of one plus the number of new product announcements made by all firms in a three-digit SIC in the past 12 quarters.
$INNOVDIS_{QTR}$	The residuals from model (1) when $INNOVCOUNT_{QTR}$ is the dependent variable (used in the future performance tests).
INNOVDIS	The residuals from model (1) when *INNOVCOUNT* is the dependent variable (used in the market reaction tests).

Table 11 Variables used in Tables 3, 4, 5, 6, 7 and 8

Variable Name	Definition
Sales	Sales divided by average total assets (*Sales* = SALEQ / (ATQ + lag (ATQ)) / 2).
Earnings	Net quarterly income divided by average total assets (*Earnings* = NIQ / (ATQ + lag (ATQ)) /2).
SG&A	Quarterly selling, general, and administrative expenses deflated by total sales (*SG&A* = SGAQ/SALEQ).
COGS	Quarterly cost of goods sold deflated by total sales (*COGS* = COGSQ /SALEQ).
CAR(-t,+t)	Size-adjusted cumulative abnormal return for the three-, five-, 10-, 21- day window around the new product announcement date. The size-adjusted abnormal return is equal to the firm's stock return minus the index return of firms in the same size portfolio formed at the end of the previous calendar year.
$LENGTH_{QTR}$	Natural logarithm of the total number of words in new product announcements made by a firm in a quarter.
$TONE_{QTR}$	NPA Tone is calculated as (quarterly sum of positive words − quarterly sum of negative words) / (quarterly sum of positive words + quarterly sum of negative words), following Loughran and Mcdonald (2011).
FOG_{QTR}	Natural logarithm of the quarterly average Fog Index, which is calculated as (words per sentence + percentage of complex words) × 0.4, following Li (2008).
$NUMNPA_{QTR}$	Natural logarithm of the number of new product announcements made by a firm in a quarter.
Insider Trading	This variable is equal to one if net insider sales (insider sales minus purchases in a fiscal quarter) are in the top quintile of the sample in a fiscal year and zero otherwise. Insider trading data is obtained from the Thomson Reuters Insider Filing data.
Executive Vega	This variable is equal to one if the average pay sensitivity to a 1% change in stock volatility of the top five executives in a firm is greater than the sample median in a fiscal year and zero otherwise. Executive compensation data is from Execucomp. The calculation method of *Executive Vega* follows Coles et al. (2006).
Board Busyness	This variable is equal to one if the total number of directorships held by all the members of the firm's board is in the top quintile of the sample in a fiscal year and zero otherwise. Total number of directorships held by all the member of the firm's board is calculated by aggregating individual board member's number of board's seats. This data is from the BoardEx database.
Golden Parachute	This variable is equal to one if a firm has a golden parachute for its CEO in a fiscal year and zero otherwise. This data is from the Institutional Shareholder Services database.
Vertical Integration	This variable is equal to one if a firm's vertical integration score is greater than the sample median in a fiscal year and zero otherwise. The vertical integration score indicates the extent to which a given firm's products are vertically related to the other products of the same firm (Frésard et al. 2020). We obtain the vertical integration data from the Frésard-Hoberg–Phillips Vertical Relatedness Data Library.
Low Competition	This variable is equal to one if the number of all of the product market rivals is lower than the sample median by fiscal year group (i.e., low competition) and zero otherwise. The number of product market rivals is defined as the number of competitors that have similar products with a firm for a year using the firm-by-firm pairwise product similarity scores (Hoberg and Phillips 2010, 2016). We obtain the product similarity score variable from the Text-based Network Industry Classifications data provided by the Hoberg-Phillips Data Library.
Size	Natural logarithm of the book value of total assets (Compustat item ATQ), measured at the beginning of the fiscal quarter.

Table 11 (continued)

Variable Name	Definition
MTB	Market-to-book ratio, measured at the beginning of the fiscal quarter (MTB = CSHOQ*PRCCQ/CEQQ).
Leverage	Long-term debt plus debt in current liabilities divided by assets for the preceding quarter, measured at the beginning of the fiscal quarter (*Leverage* = (DLCQ + DLTTQ) / ATQ).
ROAVOL	Standard deviation of *Earnings* over the past 12 quarters.
Age	Natural logarithm of one plus the number of years since the first year entered in Compustat, measured at the beginning of the fiscal year.
Instown	Percentage of institutional ownership, measured at the beginning of the fiscal quarter.
ADV	Advertising expenses deflated by sales, measured at the beginning of the fiscal year (*ADV* = XAD / SALE). Missing values are replaced by zero.
HHI	Sum of the squares of the market share of all firms within each three-digit SIC industry, measured at the beginning of the fiscal year. A firm's market share is calculated as its sales divided by the total sales of all firms operating in the three-digit SIC industry. Sales data is from Compustat.
Salesgrowth	Quarterly sales growth deflated by lagged total assets, measured at the beginning of the fiscal quarter. Quarterly sales growth is calculated as sales in the current quarter minus sales in the previous quarter.
Cash	Cash and short-term investments as a fraction of total assets, measured at the beginning of the fiscal quarter (Cash = CHEQ/ATQ).
Momentum	A firm's buy-and-hold return over the past six months.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11142-024-09820-0.

Acknowledgements We thank our editor, Russell Lundholm, and an anonymous reviewer for their valuable comments and guidance. We also gratefully acknowledge helpful comments and suggestions from Mary Barth, Anne Beatty, John Campbell, Patricia Dechow, Ross Garon, Igor Goncharov, Stephan Hollander, Peter Joos, Philip Joos, Wayne Landsman, Lubomir Litov, Shiwon Song, Jayanthi Sunder, Steven Young, and seminar participants at Cubist Systematic Strategies, INSEAD, Lancaster University, Nova Business School, Tilburg University, Wuhan University, University of Oklahoma, and University of Technology Sydney. Yuan He acknowledges financial support from the National Natural Science Foundation of China (No. 72202189; No. 72232007) and Fundamental Research Funds for the Central Universities (No. 20720221055).

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