



The financial reporting environment: Review of the recent literature [☆]

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ARTICLE INFO

Available online 21 October 2010

JEL classification:

D80
G12
G14
M41
M43

Keywords:

Information environment
Voluntary disclosures
Mandatory disclosures
Regulation
Analysts

ABSTRACT

The corporate information environment develops endogenously as a consequence of information asymmetries and agency problems between investors, entrepreneurs, and managers. We review current research on the three main decisions that shape the corporate information environment in capital market settings: (1) managers' voluntary disclosure decisions, (2) disclosures mandated by regulators, and (3) reporting decisions by analysts. We conclude that, in the last ten years, research has generated several useful insights. Despite this progress, we call for researchers to consider interdependencies between the various decisions that shape the corporate information environment and suggest new and interesting issues for researchers to address.

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1. Introduction

Accounting information plays two important roles in market-based economies. First, it allows capital providers (shareholders and creditors) to evaluate the return potential of investment opportunities (the ex-ante or valuation role of accounting information). Second, accounting information allows capital providers to monitor the use of their capital once committed (the ex-post or stewardship role of accounting information).

Thus, the demand for accounting information by outsiders arises for two reasons. First, ex-ante, firms' managers typically have more information about the expected profitability of firms' current and future investments than outsiders. This information asymmetry makes it difficult for outside capital providers to assess the profitability of the firm's investment opportunities. This problem is exacerbated because insiders (both managers and owner-managers) have incentives to exaggerate their firms' projected profitability. In turn, if capital providers cannot assess firms' profitability, they will under-price firms with high profitability and over-price firms with low profitability, potentially leading to market failure. This "lemons problem" (Akerlof, 1970) and the resulting incentives to disclose additional information have long been recognized in the literature.

[☆] We thank Philip Berger (discussant), Ronald Dye, Ilan Guttman, Margaret Neale, Ulf Schiller, Ron Shalev, Ross Watts (editor), Jerold Zimmerman (editor), and participants at the 2009 *Journal of Accounting and Economics* conference for helpful comments and discussions. We appreciate the financial support from Stanford University, New York University, and the Kellogg School of Management at Northwestern University.

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Second, the ex-post demand for accounting information arises from a separation of ownership and control (a characteristic of modern economies), which results in capital providers not having full decision-making rights. To solve the ensuing agency problems, both implicit and explicit contracts often use accounting information such as the use of resources, decisions taken, and generated return on investments. Investors value such information ex-post and require a lower rate of return ex-ante when they can rely on such information. However, as we will discuss, the ex-ante and ex-post demands for accounting information may not always result in the information being voluntarily supplied.

The characteristics of the corporate information environment will therefore be shaped by the relative magnitude of the stewardship and valuation problems. This tension has long been recognized in the literature (e.g., Gjesdal, 1981), and can best be illustrated with a simple example. Suppose the firm's value (net of the manager's compensation) depends on two factors: management effort and luck (i.e., things that affect firm value but are beyond the manager's control). In such a setting, resolving the stewardship problem and valuing the firm require different information. The latter requires that the firm's accounting system provides information about firm value, i.e., the combined effect of management effort and luck. By contrast, the former requires that investors either observe the manager's actions directly (which is usually not the case) or that the firm's accounting system provides information that allows investors to make inferences about the manager's actions.¹

We focus on these two reasons for information environments to develop endogenously: the information asymmetry between capital providers and entrepreneurs with investment opportunities (the valuation problem) and the agency problems that result from the separation of ownership and control (the stewardship problem). If the corporate information environment arises endogenously to resolve valuation and stewardship problems, then why is disclosure regulation needed in capital markets? In Section 3.1, we discuss the conditions under which insiders (e.g., managers) do not voluntarily disclose all their private information (i.e., when the "unraveling result" by Grossman and Hart (1980), Grossman (1981), Milgrom (1981), and Milgrom and Roberts (1986) does not hold).

Our discussion implies that the corporate information environment will be shaped by (i) the extent to which each of the conditions of the unraveling result do not hold (see Section 3.1), (ii) the availability and cost-effectiveness of alternative mechanisms or information from sources other than the firm itself that help address valuation and stewardship problems (see Section 5), and (iii) the magnitude of the stewardship problem compared to the magnitude of the valuation problem.

When managers do not voluntarily disclose all their private information, there is room for disclosure regulation in capital markets. As discussed in Section 4, the literature provides two main reasons for disclosure regulation. First, misalignment of insiders' (entrepreneurs' or management's) and investors' incentives can make it difficult for managers to credibly convey information. From this perspective, disclosure requirements, accounting standards, auditors, and SEC enforcement actions are mechanisms that allow firms to commit to certain disclosure levels and improve the credibility of disclosed information. We discuss these issues in Section 4.2.

Second, the public goods aspect of disclosures results in free-rider problems, creating circumstances in which managers' incentives to voluntarily disclose information are insufficient even though additional information would improve social welfare. In such cases, regulation mandating the disclosure of certain information can be desirable.² Hence, disclosure regulation will, in part, depend on the kind of information that a firm voluntarily discloses or that can (efficiently) be produced by other market participants.

In addition to voluntary and mandatory disclosures, third parties (e.g., information intermediaries) play a key role in shaping the information environment. Consistent with the extant literature, we focus our discussion of information intermediaries on sell-side security analysts. In Section 5, we structure our discussion of the information environment around the key decisions an analyst makes: (i) whether to follow a firm and how many firms to follow; (ii) how much information to acquire/produce; (iii) whether and when to issue or revise a report; (iv) what kind of report to issue; and (v) whether and to what extent to issue a report that diverges from or is less precise than the analyst's private signal or beliefs.

Throughout the survey, we emphasize the endogenous nature of the corporate information environment, the role of disclosure regulation, and the interdependencies between the various parts of the disclosure environment. Considering this endogeneity is likely to affect the inferences drawn. For example, when analyzing the effects of a mandatory change in disclosure requirements, most empirical studies do not incorporate how other aspects of the corporate information environment, such as third-party production of information or the incentive to disclose information voluntarily, respond to

¹ Specifically, there would be no tension between valuation and stewardship if the firm's accounting system were able to measure the firm value attributable to management effort and luck separately; investors could infer the manager's effort from the firm value attributable to management effort and hence resolve the moral hazard problem and could also add up the firm value attributable to management effort and luck to determine total firm value. Hence, the information system would resolve both the valuation and the stewardship problems. However, there is a tension between the valuation and stewardship perspective when the disclosure is limited to only one signal. In such a setting, firms can disclose either the part of firm value attributable to management effort alone (which resolves the stewardship problem but provides only imprecise valuation information), or some combination of the two (which provides the most useful information available for valuing the firm but only a noisy, and, as such, less useful measure of the manager's effort). Which information firms would optimally disclose (or what kind of information system firms would optimally install) when firms are constrained to disclosing only one measure depends on the relative magnitudes of the valuation and the stewardship problems. This example illustrates two aspects of firms' information environment: (1) the optimal information system will depend on how significant stewardship problems are compared to valuation or adverse selection problems; and (2) the tension between valuation and stewardship is closely tied to limits placed upon the information communicated, such as aggregation of accounting information.

² In addition to the reasons discussed above, disclosure regulation may also be due to a regulator that is not benevolent but self-interested.

this change. Another example is the interrelation between earnings management, management's propensity to issue voluntary forecasts, and the informativeness of managements' forecasts. It is likely that a standard that reduces the ability to manage earnings also reduces managers' willingness to issue voluntary forecasts, but simultaneously increases the informativeness of any forecasts issued. As a consequence, it is necessary to consider multiple aspects of the corporate information environment in order to conclude whether it becomes more or less informative in response to an exogenous change.

While it would be desirable to consider all interdependencies of the decisions related to the information environment, this is hardly feasible for two reasons. First, as a result of the numerous interdependencies, one would not expect simple causal relationships to hold (such as voluntary disclosure strategies determine analyst following or vice versa). Rather, "equilibrium" concepts for the market for information defy a simplified view of cause and effect. Second, our understanding of the interdependencies and interactions of the elements of the information system is still limited. For instance, to date, not much is known about the effect of regulation (e.g., Regulation Fair Disclosure), the incentives to produce and disseminate information, the resulting information asymmetry between insiders and outsiders, the role of regulatory enforcement actions on the incentives to produce information, the (political) process by which disclosure regulation evolves over time, or the role and relative effectiveness of alternative accounting standards (e.g., U.S. GAAP versus IFRS).

Due to the inherent complexity of the corporate information environment, we do not provide a formal general framework that captures all those interdependencies. Rather, following a somewhat more limited approach, we focus on the decision makers' incentives for selected decisions that shape the corporate information environment (such as management's decision to voluntarily provide earnings forecasts or an analyst's decision to cover a company). We discuss possible links to other decisions and interactions with other parties in the corporate information environment.³ To provide some guidance on which information sources are likely to be the most relevant, we start with an empirical analysis of the relative importance of earnings announcements, voluntary management forecasts, analyst forecasts, and regulatory filings in explaining abnormal stock returns (see Section 2).

As stated, the purpose of a survey reviewing the corporate information environment might be too broad to result in a systematic and careful examination of all the research in this area. For that reason, we have chosen to limit our review in four ways. First, we systematically exclude certain topics that, while part of the corporate information environment, are either covered by other surveys (e.g., management's decision to manipulate earnings, stock market anomalies and capital market inefficiencies, and features of corporate governance that affect firms' disclosure strategies) or are not part of the focus of accounting research in general or the *Journal of Accounting and Economics* in particular. The latter category includes the information processing of individual decision makers including their behavioral biases to the extent that they are not specific to the context studied here.⁴ Second (and related), we concentrate almost exclusively on research using analytical and empirical archival methods. By its very nature, an analytical approach assumes away a lot of the complexity inherent in the environment. As such, these models are only able to address narrow parts of the puzzle. By contrast, empirical archival data reflect the complexity of the real world. However, inference problems result because it is impossible to control for all of these complex factors in empirical analyses. Thus, combining the results from both approaches increases the reliability of the conclusions drawn. Third, we primarily focus our survey on papers published or written during the 2000–2010 period to highlight the current state of the literature and to also minimize overlap with the surveys published in the *Journal of Accounting and Economics* in 2001 (see Healy and Palepu, 2001; Core, 2001; Fields et al., 2001). (We make exceptions to this restriction as we see fit for papers that serve as a foundation for the recent literature).⁵ Fourth, we focus on the role of accounting information in the corporate information environment and largely ignore other sources of information (e.g., signaling through dividends or other specific corporate transactions).

We hope that our survey will impact future research in three ways. First, the description of the corporate information environment highlights aspects of the environment that are still not well understood. Providing answers to questions that lead to a more complete description of the corporate information environment is an important first step to develop a better understanding of the elements of the corporate information environment. We conclude that the fundamental questions that still remain unanswered include: (1) the costs and benefits of voluntary disclosure, (2) the reasons why disclosure regulation is so prevalent in advanced and developed economies such as the U.S., and (3) the relation between firms' voluntary disclosure policies, mandatory disclosure requirements, and the information produced by security analysts (including which firms they follow and what items they include in their reports).

Second, the interrelations among the decisions that shape the corporate information environment highlight the interdependencies that have so far been ignored in the literature or not considered in a joint fashion. For example, incentive systems are designed not only to influence management's disclosure decisions but also investment decisions, competitive behavior, and capital structure choices. Incorporating some (if not all) of these other (real) decisions in any analysis of disclosure decisions would allow us to obtain a better understanding of the effect of firms' disclosure policies. Moreover, the influence of the firm's existing information environment (including firm disclosures and disclosures from other information

³ In addition, we also discuss the limitations of the empirical methods used or the restrictive assumptions of models used.

⁴ We also exclude any endogenous communication that arises as part of mechanism design.

⁵ Naturally, the selection process of papers surveyed as well as the emphasis given to various papers reflects our interests, tastes and understanding of the topic. We apologize to all authors whose papers were omitted from the survey or were not given the deserved attention.

intermediaries) in an analyst's decision to follow a firm is unclear. For example, there is conflicting evidence from theoretical and empirical studies on whether firms are able to attract analyst following through additional voluntary disclosures.

Finally (and possibly most importantly), the link between theory and empirical tests is still weak and rather "loose." Commonly, empirical work selectively focuses on aspects of related analytical research in motivating and interpreting the results. Empirical researchers should acknowledge competing theoretical predictions underlying their research questions, and attempt to distinguish among these predictions. A tighter link between theory and empirical work would enhance our understanding of the corporate information environment significantly.

The survey proceeds as follows: in Section 2, we describe our empirical analysis of the importance of earnings announcements, voluntary management forecasts, analyst forecasts, and regulatory filings in explaining abnormal stock returns. In Section 3, we discuss the literature on voluntary disclosures, followed by a review of the research on mandatory disclosures in Section 4. Section 5 discusses the decisions facing sell-side security analysts and the research on each. Finally, our conclusions and suggested directions for future research are in Section 6.

2. Sources of corporate financial information

We motivate our review by documenting the sources of information obtained by investors. To this end, we conduct a simple decomposition of the quarterly stock return variance. The main purpose of this analysis is to determine the relative contribution of management forecasts (voluntary disclosures), analyst forecasts (information provided by information intermediaries), SEC filings (mandatory disclosures), issuance of earnings guidances (voluntary disclosures), and actual earnings disclosures (mandatory disclosures) to the information reflected in security prices. This analysis allows us to put into perspective the research on the different sources of the firm's information environment that we consider in this survey.

We estimate the following time-series regression for each sample firm j^6 :

$$CAR_{j,q} = a + b_{j,1} \times car_{j,q}^{EA} + b_{j,2} \times car_{j,q}^{PRE-EA} + b_{j,3} \times car_{j,q}^{MF} + b_{j,4} \times car_{j,q}^{AF} + b_{j,5} \times car_{j,q}^{SEC} + \varepsilon_{j,q} \quad (1)$$

where for company j and quarter q : $CAR_{j,q}$ is the log abnormal return from the first day of calendar quarter q to the last day of calendar quarter q^7 ; $car_{j,q}^{EA}$ the three day log abnormal return centered on the earnings announcement; $car_{j,q}^{PRE-EA}$ the three day log abnormal return centered on earnings pre-announcements if issued, 0 otherwise; $car_{j,q}^{MF}$ the three day log abnormal return centered on management earnings forecasts if issued, 0 otherwise; $car_{j,q}^{AF}$ the three day log abnormal return centered on analyst forecasts, if issued, 0 otherwise; and $car_{j,q}^{SEC}$ is the three day log abnormal return centered on any SEC-form filings date (including 10Qs, 10Ks, and other SEC filings).

We compute log abnormal stock returns by first subtracting the corresponding size-decile from the raw return and then taking the natural logarithm. Cumulative abnormal returns are computed as the sum of the daily abnormal log-returns. For each firm-quarter, the independent variables are coded as zero when the specific event did not occur (e.g., if management did not issue any earnings forecast, $car_{j,q}^{MF}$ equals zero), or as the sum (i.e., cumulative return) when multiple occurrences of a given disclosure event occurred within a quarter. To address issues of multicollinearity, if a management forecast and/or analyst forecast were issued concurrently with an earnings announcement, we include the CAR around this event only for the earnings announcement and code the management forecast/analyst forecast CAR as zero. This coding decision will increase the proportion of the quarterly return variance that we attribute to the formal earnings announcement.

Our sample selection begins with the universe of firms on COMPUSTAT and CRSP. We use daily and size-decile returns from CRSP and collect the firm's earnings announcement dates from COMPUSTAT and filing dates from the Standard & Poors' Filing Dates Database.⁸ We require that all sample companies have four earnings announcements for a fiscal year. We collect management forecasts from the First Call database and analyst forecasts from I/B/E/S (I/B/E/S, 2001). Because the First Call database is available only from 1994, our sample spans the period 1994–2007. We find that over the sample period analyzed, 29% of the COMPUSTAT/CRSP population issue at least one management earnings forecast whereas 24% issue at least one pre-announcement. The final sample consists of 70,700 firm-quarter observation representing 2,747 firms. The number of firms included in our final sample consists of approximately 35% of the overall COMPUSTAT/CRSP firm population as of 2007. Thus, our findings discussed below may only apply to large firms.

We report the summary statistics of the firm-specific estimations of Eq. (1) in Table 1. For each mean coefficient, we report p -values corresponding to F -tests that the mean coefficient is equal to unity. Under this research design specification, a coefficient of one is consistent with market efficiency. We provide additional descriptive statistics on the partial R^2 to allow for a better understanding of the distribution properties. Interestingly, there is not much variation in the percentage of the total R^2 for each coefficient across the 25th and 75th percentiles. Given this lack of variation, our discussion focuses on the mean partial R^2 .

⁶ Using a somewhat related approach, Ball and Shivakumar (2008) conclude that quarterly earnings announcements are not timely in providing incremental information to capital markets.

⁷ To account for compounding, Eq. (1) is specified in log returns form.

⁸ The Standard & Poors' Filing Dates Database provides filing dates for SEC filings (from the SEC EDGAR database) for COMPUSTAT active and inactive companies that had a market value in excess of \$1 million at the end of the quarter. This database also provides type of form filed as well as additional information retrieved from the filings.

Table 1

Decomposition of the quarterly return variance 1994–2007.
70,700 firm-quarter observations and 2,747 individual firms

$$CAR_{j,q} = a + b_{j,1} \times car_{j,q}^{EA} + b_{j,2} \times car_{j,q}^{PRE-EA} + b_{j,3} \times car_{j,q}^{MF} + b_{j,4} \times car_{j,q}^{AF} + b_{j,5} \times car_{j,q}^{SEC} + \varepsilon_{j,q}$$

	Coefficient	Partial R ²			
		Mean (p-value, H ₀ =1)	25th Percentile (% of total) ^a	Mean (% of total)	Median (% of total)
EA: Earnings announcements	1.043 (0.26)	1.72 (7.86)	2.32 (8.18)	2.44 (8.35)	3.04 (8.69)
PRE-EA: Earnings pre-announcement(s)	0.964 (0.18)	2.43 (11.11)	3.21 (11.31)	3.04 (10.41)	4.12 (11.78)
MF: Management forecast(s)	1.034 (0.02)	12.23 (55.92)	15.67 (55.23)	16.81 (57.58)	18.47 (52.81)
AF: Analyst forecast(s)	0.842 (0.32)	4.75 (21.72)	6.14 (21.64)	5.96 (20.41)	8.12 (23.21)
SEC: SEC filing(s)	0.974 (0.16)	0.74 (3.38)	1.03 (3.64)	0.94 (3.22)	1.22 (3.48)
Total R ²		21.87	28.37	29.19	34.97

^a The percent of total is computed by dividing the partial R² of each variable by the total regression R².

The results indicate that, for the average firm, 28.37% of the quarterly stock return variance occurs on days when accounting disclosures are made. Surprisingly, management forecasts provide, on average, approximately 55% of accounting-based information (partial R²=15.67%; 15.67/28.37=55.23%). In addition, earnings pre-announcements contribute an additional 11% (partial R²=3.21%; 3.21/28.37=11.31%) of the accounting-based information. Thus, for the average firm in our sample, approximately 66% of the accounting-based information is provided by voluntary disclosures.

Analyst forecasts (information intermediaries) provide 22% of the accounting-based information (partial R²=6.14%; 6.14/28.37=21.64%).⁹ Finally, earnings announcements provide 8% (partial R²=2.32%; 2.32/28.37=8.18) and SEC filings (mandatory disclosures provide 4% of the corporate information (partial R²=1.03%; 1.03/28.37=3.64%). These results imply that mandatory disclosures provide less than 12% (8.18+3.64%), the smallest amount, of the total accounting-based information used by investors.

Focusing exclusively on these partial R²s to assess the contribution of each of these sources of information to the firm's information environment, however, ignores the interdependencies and complementarities of the individual sources of information. For example, when analyzing the impact of a new standard on the information content of earnings, one should take into account the extent that some of the disclosures have been reflected in management and analyst forecasts and in SEC filings. These complementary disclosures reduce the resolution of the remaining uncertainty at the earnings release date.¹⁰ However, as our review of the literature indicates, the vast majority of the research to date focuses on a single information source, most often earnings announcements (see Section 3 for a discussion), and ignores these interdependencies.

Similarly, while Table 1 indicates that most of the information provided by earnings has been resolved prior to the actual earnings announcement, it is not correct to interpret this result as implying that earnings announcements are not relevant (Ball and Shivakumar, 2008). For example, earnings still are likely to play an important disciplining role on management, thus making management forecast credible and, hence, informative (see Section 4 for a discussion). Similarly, management forecasts, analyst forecasts, and earnings preannouncements are incorporated in investors' expectations of earnings. As a result, they reduce the remaining uncertainty that is resolved by earnings announcements. What is left for earnings announcements in addition to the uncertainty resolution is the confirmation and interpretation of the "forecasted" numbers (for example, the extent to which management's earnings forecast represents permanent or transitory earnings, the amount of earnings management necessary to meet that number, etc.). Finally, analyst earnings forecasts are an important part of the information environment, and again, the accuracy of these forecasts can only be evaluated in the presence of an "objective" benchmark. We address these and related issues about the interplay of mandatory and voluntary disclosures in the next three sections, beginning with mandatory financial disclosures.

3. Voluntary disclosures

3.1. Models of corporate voluntary disclosure

The unraveling result (Grossman and Hart, 1980; Grossman, 1981; Milgrom, 1981; Milgrom and Roberts, 1986) identifies conditions under which firms voluntarily disclose all their private information. These conditions include (1) disclosures are costless; (2) investors know that firms have, in fact, private information; (3) all investors interpret the firms' disclosure in the

⁹ See Borcard (2002) for a proration of the total R² into partial R²s.

¹⁰ In addition, to the extent that managers' and analysts' incentives affect their forecasts, the stock market reaction at the earnings announcement date also reflects the information about the impact of those incentives on forecasted earnings.

same way and firms know how investors will interpret that disclosure; (4) managers want to maximize their firms' share prices; (5) firms can credibly disclose their private information; and (6) firms cannot commit ex-ante to a specific disclosure policy.^{11,12}

The unraveling result is a consequence of investors rationally inferring that if managers do not disclose any information, that information would have caused investors to revise their beliefs about firm value downwards. As a result, managers have incentives to disclose their information to distinguish themselves from managers with less favorable information. This holds true for all information (except the very worst possible outcome) leading to the “unraveling” of any information that is withheld.

The conditions of the unraveling result are similar to those of the Modigliani and Miller theorem (Miller and Modigliani, 1961; Modigliani and Miller, 1958) that lists the conditions under which capital structure and dividend policy are irrelevant. In analogy to the Modigliani–Miller theorem, the unraveling result does not suggest that firms always fully disclose their private information. Rather, it postulates when and why less than full disclosure is likely to occur: less than full disclosure must, of course, be due to the fact that one or more of the six conditions listed above do not hold. We organize our discussion of the theoretical voluntary disclosure literature around these six conditions.¹³

3.1.1. Disclosure costs

The first condition used to derive the unraveling result is that disclosure is costless. If disclosure is costly to the firm, a manager attempting to maximize firm value (as perceived by investors) will disclose information only if it is sufficiently favorable (e.g., Jovanovic, 1982; Verrecchia, 1983, 1990a; Dye, 1986; Lanen and Verrecchia, 1987). Information is favorable when it reveals that asset values are expected to be high and/or of low risk (e.g., Jorgensen and Kirschenheiter, 2003).¹⁴ In the absence of any disclosure, investors rationally infer that asset values are expected to be low or of high risk. Even though investors view the lack of disclosure as relatively “bad news,” managers will not disclose sufficiently unfavorable news because they can achieve higher payoffs by avoiding the costs associated with a disclosure.

In these models, the disclosures costs that prevent full disclosure from occurring do not vary with the manager's private information and hence best capture the actual costs of making the disclosure (e.g., costs of holding a conference call or distributing a press release). Disclosure costs can also include the consequential costs resulting from the proprietary nature of the information: When disclosure reveals proprietary information (e.g., to competitors in product markets, labor unions, or regulators), it is costly because it is informative. But then, non-disclosure is also informative. Thus, the costs of disclosing and withholding information depend on how third parties react to disclosure and non-disclosure. For example, in a Cournot duopoly in which one firm is privately informed about (the intercept of) aggregate demand, the competitor rationally infers that aggregate demand is high in the absence of disclosure. In this setting, the unraveling result still applies and the firm fully discloses its private information (Verrecchia, 2001). Wagenhofer (1990) considers a related model of proprietary costs and also shows that full disclosure always constitutes an equilibrium.

More recently, several papers have further explored partial disclosure equilibria in models of proprietary information. In Fischer and Verrecchia (2004), unraveling does not occur because the information that is withheld by the firm includes both very low and very high outcomes.¹⁵ Arya et al. (2009) present a related model of endogenous disclosure costs in which partial disclosure is sustained in equilibrium because disclosing value-increasing information for one business segment comes at the cost of implying value-decreasing information for another business segment. Together, these models illustrate that disclosure costs that arise from the proprietary nature of information may sometimes, but not always, prevent full disclosure. Moreover, considering different forms of disclosure costs simultaneously can lead to unexpected results. Suijs (2005) combines the fixed disclosure costs of Verrecchia (1983) and the proprietary information costs of Wagenhofer (1990). He shows that the manager discloses both sufficiently favorable and unfavorable news but withholds intermediate news if the disclosure costs are relatively low. The fact that the firm discloses not only sufficiently favorable but also sufficiently unfavorable news stands in contrast to the predictions in both Verrecchia (1983) and Wagenhofer (1990).¹⁶

¹¹ See Dye (2001, p. 217).

¹² A review of the theoretical literature on communication in agency problems as well as signaling is beyond the scope of this survey. We refer to Spence (1974), Lambert (2001, pp. 47–70), and Armstrong et al. (2010) for a discussion of these topics. We focus on firms' disclosure in non-contractual settings. Due to the survey's focus on the endogenous nature of the corporate information environment, we do not cover models that study the effect of exogenous information arrival (i.e., exogenous disclosures) on stock prices or trading volume (e.g., Diamond and Verrecchia, 1981; Holthausen and Verrecchia, 1988). Verrecchia (2001, pp. 101–140) provides a review of such “association-based” disclosure models.

¹³ The following discussion draws heavily on Verrecchia (2001) and Dye (2001). Unless noted otherwise, the discussion ignores agency problems between management and the firm's shareholders.

¹⁴ What constitutes “favorable” information depends on the context in which the disclosure is made (e.g., managers may have incentives to minimize stock prices when stock options are awarded (Abody and Kasznik, 2000). Unless noted otherwise, we assume that management has incentives to maximize share price.

¹⁵ Fischer and Verrecchia (2004) include another aspect in their model. Instead of all firms being fully rational, only some firms process information in a rational (Bayesian) fashion while others process information in a heuristic fashion. The firm that receives the private signal may (voluntary disclosure setting) or must (mandatory disclosure setting) disclose its private information. If it makes a disclosure, it truthfully reports its private beliefs. If a heuristic firm makes a disclosure, the disclosure will be biased relative to Bayesian updating. Hence, the model provides an explanation for why disclosures with transparent bias persist.

¹⁶ The intuition is as follows. Managers disclose their asset values either to separate themselves from firms with lower asset values or to prevent proprietary costs. For a simple example, consider the case when asset values are distributed uniformly over [0,1], the firm incurs proprietary costs of 0.6

3.1.2. Probabilistic information endowment

The second condition for the unraveling result to hold is that investors know that the manager has private information. If this is not the case, firms with unfavorable information do not make a disclosure because they are, from the investors' perspective, indistinguishable from firms without information (e.g., Dye, 1985; Jung and Kwon, 1988; Penno, 1997; Pae, 2002).^{17,18}

Because managers have incentives to withhold bad news, investors' residual uncertainty about firm value is higher when the manager receives bad news than when the manager receives good news. In contrast, one would expect the residual uncertainty to be the same for good and bad news if the information arrival to the market were exogenous. In a multi-period setting, managers' strategic disclosure decisions cause asset returns to be serially correlated (Shin, 2003, 2006). Moreover, asset returns follow patterns similar to short-run momentum and long-run reversals when investors are uncertain about the rate at which managers obtain information (Shin, 2006).¹⁹ This provides yet another illustration of the insights to be gained by considering the corporate information environment as the endogenous outcome of strategic choices.

Managers can also strategically time their disclosures when investors are uncertain whether managers have information. Studying such disclosure settings, both Dye and Sridhar (1995) and Acharya et al. (2008) show that managers are likely to release good news earlier than bad news and that managers are likely to cluster their disclosures in time. Such inter-temporal aspects arise because management's disclosure policy today affects investors' future beliefs, which in turn will affect management's future disclosure decisions. Rational managers consider these inter-temporal effects in choosing their optimal disclosure policy today (e.g., Einhorn and Ziv, 2008).

3.1.3. Uncertain investor response

A third condition of the unraveling result is that all investors uniformly interpret (and react to) managers' disclosures or their absence and that investors' interpretation and reaction is known to managers.²⁰ Dutta and Trueman (2002) relax this assumption by allowing investors to possess private information about the demand for the firm's products. Investors whose private information indicates that the demand for the firm's products is high will interpret high inventory levels as positive news as it allows the firm to meet high future product demand. By contrast, investors whose private information indicates that the demand for the firm's products is weak will interpret high inventory levels as negative news as it reinforces their concerns that the firm is having difficulties selling its products. Uncertainty about investors' interpretation of corporate disclosure causes managers to disclose information that is either sufficiently high or sufficiently low. Note that it is not the managers' interpretation of their information that determines their disclosure decisions but rather their beliefs about how investors will interpret it. To prevent full disclosure, Dutta and Trueman (2002) nevertheless have to assume that the manager does not always obtain private information, such that investors are uncertain about the manager's information endowment (as in Dye, 1985). In contrast, Suijs (2007) maintains all conditions of the unraveling result except for investors' uniform response and illustrates that managers' being uncertain about investors' response to their disclosures by itself is sufficient to break the unraveling result.

Another reason for why firms might not know how investors will react to disclosures is varying levels of sophistication among investors. Dye (1998) shows that when investors are fully rational but obtain private information probabilistically, the probability that a firm discloses information is higher if investors are more likely to be informed. In Fishman and Hagerty (2003), sophisticated investors can fully process a firm's disclosure while unsophisticated investors merely observe that a disclosure has been made without being able to infer firm value based on the disclosure.²¹ If the fraction of sophisticated investors is sufficiently low and unsophisticated investors are suspicious of disclosure (in the sense that they believe that only firms with low firm values would make a disclosure), then firms optimally do not make a disclosure.

These models illustrate that the audience for corporate disclosure is important to a firm's disclosure strategy and that audience characteristics alone can explain why firms do not fully disclose their information. The reason is simple: Audience characteristics determine the response to (non-)disclosure and managers disclose information not because their own

(footnote continued)

when investors perceive asset values to be higher than 0.2 and disclosure costs are 0.1. Then, there exists an equilibrium in which the manager does not disclose asset values between 0.2 and 0.4

¹⁷ For example, managers receive information probabilistically if they may acquire information at unobservable (random) cost and, in equilibrium, acquire the information only if the cost is lower than a threshold. Then, the manager will be informed if the cost is sufficiently low and uninformed otherwise (see Hughes and Pae, 2004; Einhorn and Ziv, 2007).

¹⁸ A key assumption is that the manager cannot credibly convey that he did not receive information. Also, unfavorable information can again consist of expected firm value being low, firm risk being high, or the precision of (un)favorable news being low (high) (Hughes and Pae, 2004).

¹⁹ Similar to Shin (2006), Rogers et al. (2007) predict that negative return shocks are associated with larger volatility of future returns than positive return shocks and that this association is stronger for firms that engage in strategic disclosure to a larger extent. Rogers et al. (2007) provide evidence consistent with this prediction and hence suggests that the well-documented "leverage" effect (Black, 1976; Campbell and Hentschel, 1992) may be partly due to strategic disclosure behavior by firms.

²⁰ One reason a manager might not know how investors will react to his disclosure is that investors may possess private information unknown to the manager.

²¹ Fishman and Hagerty (2003) frame their model as a firm disclosing information about the quality of the products it sells to consumers. However, the intuition of their results also applies to a firm's decision to disclose other value-relevant information to investors. Also, see Dye (1998) for a model of investor sophistication.

interpretation of it is favorable but because they anticipate that their audience's interpretation of it is favorable. One factor that determines investors' interpretation of management's interpretation is their own private information. When investors possess information that management does not, the stock market reaction to a firm's disclosure may be informative to management, suggesting that disclosures are not only a tool of information dissemination but also of information acquisition (e.g., Dye and Sridhar, 2002).

3.1.4. Uncertain disclosure incentives

The fourth condition used to derive the unraveling result is that managers want to maximize the firm's stock price and that investors know that this is the manager's objective.²² This condition may not hold when managers sometimes have incentives to maximize stock prices (e.g., when they sell shares) and sometimes have incentives to minimize stock prices (e.g., when stock options are awarded; see Aboody and Kasznik, 2000). As a result, in the absence of disclosure, investors price the firm at some weighted average of good and bad news and unraveling does not occur (Einhorn, 2007). This illustrates that investors being uncertain about managers' reporting incentives can prevent full disclosure in equilibrium.

3.1.5. Non-verifiable disclosure

A fifth condition of the unraveling result is that firms can only make truthful disclosures.²³ However, some of the information sharing in capital markets is done through informal communication channels where firms do not necessarily have to tell the truth. How much investors can learn from voluntary disclosures that may not be truthful and what disclosure strategies managers follow depends to a large extent on whether misrepresentation is costless (cheap-talk models) or costly (costly state falsification models).

3.1.5.1. Cheap-talk models. When there are no (direct) costs of misreporting, managers make whatever disclosure leads investors to value their firm closest to managers' objectives.²⁴ As a result, such disclosures are non-informative because they are independent of managers' private information, and, in equilibrium, it does not matter whether managers make a disclosure or what they communicate ("babbling equilibrium," e.g., Stocken, 2000).

But what if talk is cheap but managers' incentives are only partially misaligned with those of investors or other information users? Then, managers can convey some information even though they can send any signal, truthful or not (e.g., Crawford and Sobel, 1982). For instance, managers might want to convince investors that firm value is high, but at the same time convey to the firm's competitors that its business segment is unprofitable to deter entry or decrease its competitors' output (Gigler, 1994). Such communications would be uninformative if the manager could separately and privately communicate with investors and competitors. However, when managers' disclosures are public and can be observed by both investors and competitors, managers may not want to report too optimistically or too pessimistically. As a result, the managers' disclosure is informative.²⁵ In repeated games, communication can be further improved because managers can benefit from building a reputation for truthful disclosure (Stocken, 2000).

These cheap-talk models illustrate interesting interdependencies between different elements of the corporate information environment: how much information can be conveyed to investors depends on whether competitors receive the information as well, and how much information can be conveyed depends on whether there will be communication in future periods. The models also show that the fact that managers' private information is proprietary can actually enable rather than prevent voluntary corporate disclosure (Gigler, 1994). These findings reinforce the need to jointly consider different elements of the corporate disclosure environment because the interaction can lead to qualitatively different disclosure behavior.

3.1.5.2. Costly state falsification models. In contrast to mandatory disclosure settings, costly reporting distortions have largely been left unexplored in voluntary disclosure settings (with the exception of Korn, 2004; Beyer and Guttman, 2010; Einhorn and Ziv, 2010).²⁶ Costly state falsification models assume that while disclosures do not have to be truthful, reporting distortions are costly to managers. The costs such reporting distortions impose on managers are typically assumed to be increasing in the magnitude of the difference between the reported and the true value of managers' private information. As such, costly state falsification models cover the "middle ground" compared to cheap-talk models (which assume that

²² Equivalently, the unraveling result persists when managers want to minimize the firm's stock price (or perceived type) and investors know that this is the manager's objective.

²³ The unraveling result requires that firms can make only truthful disclosures. If we make the less stringent assumption that the disclosures that are made in equilibrium are truthful (e.g., because investors are able to ex-post verify the information disclosed by firms), but that investors' off-equilibrium beliefs do not have to be consistent with truthful disclosure, then the unraveling result does not hold (Korn and Schiller, 2003).

²⁴ Cheap-talk settings may also describe mandatory disclosure settings or disclosures by information intermediaries, such as research analysts or rating agencies (e.g., Fischer and Stocken (2001 and 2008); also see Section 5 on analysts' reports as part of the corporate information environment). In fact, such information intermediaries are usually subject to less severe litigation risk than managers and hence their reports are even more descriptive of "cheap talk." Consistent with predictions of cheap-talk games, reports by information intermediaries are often partitions. Examples are ratings of corporate debt or analysts' stock recommendations.

²⁵ In such cheap-talk models, all informative equilibria are "partition equilibria." Newman and Sansing (1993) consider a similar setting in which the firm wants to convey its true value to investors.

²⁶ Costly state falsification models of earnings management include, for example, Dye (1988), Lacker and Weinberg (1989), Stein (1989), Fischer and Verrecchia (2000), Sankar and Subramanyam (2001), Dye and Sridhar (2004), Guttman et al. (2006), and Beyer (2009).

there are no direct costs associated with misrepresentation) and the conditions underlying the unraveling result (i.e., that disclosures must be truthful).

In costly state falsification models of voluntary disclosures, managers sometimes withhold their private information. This non disclosure occurs because even though they could make a costless (truthful) disclosure, managers cannot costlessly communicate the actual value of their private information in equilibrium. If a manager were to issue the report that does not impose disclosure costs, investors would perceive his firm to be less valuable than it actually is. Thus, managers bias their reports upwards in order to increase investors' perception of their firms' value. This bias causes disclosure to be costly such that withholding information rather than disclosing it can be preferred by some managers for reasons similar to those discussed in Section 3.1.1. This illustrates that managers' ability to misreport affects their voluntary disclosure decisions and, as a consequence, affects the information available to investors (e.g., Beyer and Guttman, 2010).

3.1.6. *Ex-ante commitment to disclosure strategies*

Finally, the unraveling result assumes that firms cannot credibly commit to a disclosure policy prior to receiving private information. The impact of this assumption on the unraveling result can be illustrated by the following example: Suppose each person is subject to the risk of incurring a loss.²⁷ Because of risk-aversion, individuals demand insurance which allows them to share risk, resulting in a Pareto improvement to the economy. Now, suppose that prior to the opening of the insurance market each person privately learns the probability of incurring a loss. If they cannot commit to a disclosure policy ex-ante, individuals who learn that they will incur the loss with low probability will say so to lower their insurance premium. In turn, insurers will correctly interpret non-disclosure as an indication that the person learned that (s)he will incur a loss with high probability. As a result of these disclosures, the insurance premium will decrease for low-risk individuals and increase for high-risk individuals, thereby reducing risk-sharing opportunities. In this context, disclosure of private information is a strict social bad from an ex-ante perspective but cannot be prevented ex-post. In contrast, if everybody were able to credibly commit to a disclosure policy prior to receiving information, no disclosure would occur and hence insurance companies would again charge everybody the same rate, enabling risk-sharing and making everybody better off from an ex-ante perspective.²⁸

To illustrate how firms' disclosure decisions differ when managers can commit ex-ante to a disclosure strategy (i.e., before receiving the information) versus when they cannot, consider a Cournot duopoly in which one of the competitors perfectly observes the intercept of the demand while the other competitor does not. Verrecchia (2001) shows that, as long as the parameters of the model are such that the equilibrium selling price is positive, managers who are able to commit to a disclosure strategy ex-ante choose not to disclose any information but managers who are not able to commit ex-ante fully disclose their private information. The reason is that the unraveling result applies ex-post, but ex-ante disclosure reduces the informed firm's profit because it allows the uninformed firm to increase its output when market demand is high (Dye, 2001, p. 222).

These examples show that (i) disclosure can reduce welfare because it destroys risk-sharing opportunities, and (ii) for disclosure to be welfare enhancing, disclosure must have some real effects (including risk-sharing opportunities) that lead to benefits outweighing the costs of disclosures.²⁹ Disclosures can improve firms' cash flow generating abilities (i.e., have welfare enhancing real effects) when, for example, disclosures provide information to firms that produce strategic complements (Vives, 1984), or reduce the adverse selection problem in capital markets (Göx and Wagenhofer, 2009).

These models illustrate costs and benefits that determine firms' ex-ante optimal disclosure level. Since the ex-post optimal disclosure is likely to be different, firms need a mechanism to credibly commit to the ex-ante optimal disclosure policy. Corporate governance structures that support increased transparency can allow firms to commit to high levels of disclosures. Alternatively, regulation that mandates certain disclosure can also take on the role of a commitment mechanism. Whether such commitment mechanisms are available will determine, in part, when predictions of models based on ex-ante optimal disclosure are better than predictions based on models where disclosures are selected to be optimal ex-post. Ultimately, this issue is an empirical question.

3.1.7. *Summary of corporate voluntary disclosure models and avenues for future research*

Voluntary disclosure models derive management's optimal disclosure decision when management possesses private information about its firm's profitability or performance. Three aspects of the preceding discussion are particularly worth emphasizing in light of future research opportunities.

First, investors' (and/or other relevant parties') interpretation of both disclosure and the absence of disclosure plays a key role in management's decision to voluntarily disclose information. Since investors rationally anticipate that managers disclose information only if it is beneficial to them, how investors interpret disclosures and, in particular, the absence of disclosure depends on their perception and knowledge of management's incentives and the firm's fundamental economics. Numerous models assume that investors know the context in which the manager reaches his disclosure decision. In reality, investors are uncertain not only about the realization of managers' private information but also about context-related

²⁷ See the "broken leg economy" in Dye (2001, pp. 188–190). Also see Wilson (1968), Marshall (1974), Hirshleifer (1971), and Dye (1985).

²⁸ This assumes that the risk-sharing benefits are sufficiently high even for the low-risk individuals so that they are not driven out of the insurance market.

²⁹ For a survey of real effects of disclosure, see Kanodia (2006). We also discuss social welfare effects of mandatory disclosures in Section 4.1.

variables such as the process by which managers receive information, firms' economic and competitive environment, and managers' incentives and utility. When managers and investors interact over multiple periods, these additional dimensions of uncertainty allow managers to build a reputation. For example, managers can build reputations for accurate disclosures (Stocken, 2000), for being uninformed (Einhorn and Ziv, 2008), or for being forthcoming (Beyer and Dye, 2010) such that investors interpret the absence of disclosure less skeptically. Models that consider management's trade-off between high payoffs in the current period and reputation gains are likely to provide us with a better understanding of the multi-period interaction between management and the users of corporate disclosure.

Second, it is management and not the "firm" that makes disclosure decisions. As a result, the costs and benefits of disclosure that explain disclosure decisions reflect management's utility and disutility from making a disclosure. Factors that affect management's utility and disutility from disclosure include management's compensation packages or the firm's corporate governance structure, both of which are endogenous. In other words, when shareholders design management's incentives and the firm's governance structure in order to maximize the value of their investment, they take into account how incentives and governance structure affect management's disclosure decisions and hence firm value (John and Ronen, 1990; Core, 2001). Most models assume that managers attempt to maximize share price. However, managers sometimes have incentives to reduce their firms' stock price, for example to reduce the exercise price of their option grants (Yermack, 1997; Aboody and Kasznik, 2000) or when they are exposed to political pressure (Watts and Zimmerman, 1986).

Moreover, in practice, managers obtain and disclose information over time. As a result, it is insufficient to specify managers' preferences for a share price at a single point in time. Instead, it is necessary to specify managers' preferences over time series of share prices. Dye (2010) derives such preferences based on managers' optimal trading decisions in their firms' shares. Models that further explore optimal compensation structures and consider their effect on management's disclosure decisions have the potential to provide new insights into both firms' disclosure behavior and optimal incentive structures.

Third, incentive systems are designed not only to influence management's disclosure decisions but also investment decisions, competitive behavior, and capital structure choices. With few exceptions, models of voluntary disclosure focus exclusively on management's decision to disclose information.³⁰ Models that incorporate disclosure decisions alongside with other (real) decisions or effort allocation allow us to obtain a better understanding about how firms' disclosure policies affect not only market valuations but also firms' other (real) decisions and cash flows and the welfare of different shareholder groups (Kanodia, 2006). Clearly, incorporating such real decisions into voluntary disclosure models adds an additional level of complexity. Nevertheless, the insights that can potentially be obtained about the interdependencies among disclosures, cash flow distributions, and the welfare of stakeholders make such models worth the effort.

In all of this the challenge will be to identify the most important incentives managers face in making their voluntary disclosure decisions. Since theoretical models, by their very nature, are abstract representations of the complex corporate information environment, models are most likely to produce insights into practice and inform empirical studies if their predictions reflect the key trade-offs managers consider in choosing corporate disclosure policies.

3.2. Empirical research on voluntary corporate disclosure

In the models discussed, managers have an informational advantage over outside investors with respect to the firm's value and its profitability and have incentives to maximize the value of the firm as perceived by investors. To that end, managers have incentives to strategically and selectively disclose information. In turn, investors will rationally anticipate such strategic disclosures, and will provide managers with incentives to disclose information that reduces information asymmetry.

Managers' incentives to select disclosures that maximize stock prices are highest when they raise external funds, are concerned about corporate control contests, or when their compensation is tied to stock prices. We discuss the related empirical research in Section 3.2.1. Voluntary disclosures also affect stock prices through disclosure costs, liquidity, and the cost of capital which we discuss in Section 3.2.2.

The institutional setting in which firms operate and the organizational structure of the firm also impact managers' disclosure strategies. For example, the threat of shareholder litigation can create incentives to issue forward-looking disclosures. In addition, corporate governance mechanisms can influence managers' disclosure decisions either because they provide incentives for disclosure or because they act as substitute mechanisms to address the stewardship problems within a corporation which we discuss in Section 3.2.3.

In Section 3.2.4 we discuss different proxies that have been used in the literature to measure the extent of voluntary disclosures. Because of the difficulty of deriving an all encompassing measure of disclosure, studies have focused on a particular type of voluntary disclosures, primarily management's earnings or cash flow forecasts. We discuss the literature on management forecasts in Section 3.2.5.

³⁰ Prior literature on real effects of voluntary disclosure has focused on the decision of firms to disclose private information about market conditions to their competitors (e.g., Vives, 1984; Darrough and Stoughton, 1990; Verrecchia, 1990b; Wagenhofer, 1990; Feltham and Xie, 1992; Darrough, 1993; Newman and Sansing, 1993; Gigler, 1994; Kanodia et al., 2000; Hughes et al., 2002; Fischer and Verrecchia, 2004). Göx and Wagenhofer (2009) and Beyer and Guttman (2010) consider the effects of voluntary disclosure on firms' investment choices while Bertomeu et al. (2010) focus on the effects of voluntary disclosure on firms' capital structure decisions.

3.2.1. Motives for voluntarily disclosures and financial reporting decisions

In this subsection, we discuss the three main motives identified in the literature for managers to provide voluntary disclosures.

3.2.1.1. Capital market transactions. Myers and Majluf (1984) originally noted that firms have increased incentives to raise outside equity when insiders believe that outsiders overestimate the firm's value. Extending the Myers and Majluf model to multiple periods, Korajczyk et al. (1991) show that firms are most likely to issue equity following earnings announcements (when information asymmetry is less severe), particularly following earnings announcements that are informative and contain good news.

Related, Lang and Lundholm (1993) provide empirical evidence suggesting that analysts' ratings of firms' disclosure policies are higher for firms that are issuing equity. Similarly, Healy et al. (1999) report evidence consistent with firms having high analyst ratings of disclosure policies prior to issuing public debt, while Ruland et al. (1990) and Marquardt and Wiedman (1998) document that the number of management earnings forecasts increases significantly around equity offerings. More recently, Lang and Lundholm (2000) find that firms dramatically increase their disclosure activities six months prior to seasoned equity offerings.

However, the demand for additional funds increases when firms have new investment opportunities. In turn, new investment opportunities are likely to be associated with increased information asymmetries between insiders and outsiders. As a result, it is difficult to ascertain whether the increased information asymmetries or other confounding factors are contributing to managers' disclosure strategies (see Healy and Palepu, 2001). Therefore, we recommend that when testing the relation between corporate financing decisions, disclosures, and capital market consequences, researchers control for exogenous factors that affect the decision to raise capital, either by performing additional robustness tests (e.g., Lang and Lundholm, 2000) or by using simultaneous equations (e.g., Marquardt and Wiedman, 1998).

3.2.1.2. Stock-based compensation and corporate control contests. Stock-based compensation plans (option grants and restricted stock) can induce managers to provide certain voluntary disclosures, for example when managers contemplate buying or selling their companies' securities or when they are being awarded stock options. Indeed, the evidence shows that managers sell more shares after good-news than after bad-news releases, and buy more after bad-news than after good-news releases (Noe, 1999). Further, in periods when insiders buy more shares, there are more bad-news forecasts (which lower the purchase price) (Cheng and Lo, 2006). Related, the evidence is consistent with CEOs' opportunistically timing voluntary disclosure decisions to maximize stock option awards (Aboody and Kasznik, 2000). Nagar et al. (2003) find that both management earnings forecast frequency and the quality of firms' disclosures, as measured by analysts' subjective ratings of firms' disclosure practices, are higher when the CEO's compensation and wealth are more sensitive to stock price changes. They argue that equity-based incentives encourage not only good-news but also bad-news disclosures.

In addition, because poor stock performance is associated with executive turnover (Warner et al., 1988; Weisbach, 1988), managers may also use voluntary disclosures to "explain" poor performance. However, our understanding of how management's career concerns affect their disclosure strategies is still limited, a fact previously noted by in the survey by Healy and Palepu (2001).

3.2.2. The costs and benefits of disclosures

3.2.2.1. Proprietary costs of disclosure. To date, the evidence of the impact of product market competition as a proxy for proprietary costs on firms' disclosures is mixed. Using changes in segment reporting (from SFAS No. 14 to SFAS No. 131), Berger and Hann (2007) find inconclusive evidence that proprietary costs affect disclosure of segment profits. In contrast, Botosan and Stanford (2005) find that firms use the provisions of SFAS No. 14 to hide profitable segments operating in less competitive industries but find no evidence that firms use the requirements of SFAS No. 14 to hide poor performance.

Consistent with a proprietary cost hypothesis, Verrecchia and Weber (2006) find that firms are more likely to redact (presumably proprietary) information when they are in a competitive industry. However, Bamber and Cheon (1998) show that firms are less likely to provide earnings forecasts in less competitive industries. These conflicting findings suggest that there is no clear empirical evidence to date on how proprietary costs, as proxied by the level of competition in an industry, are related to voluntary disclosures.

A major challenge still remains in measuring and quantifying proprietary costs, especially when focusing on the level of competition in an industry (as proxied by its level of concentration). Recent evidence in Ali et al. (2009) suggests that proxies using COMPUSTAT data, which covers only public firms in an industry, exhibit significant measurement error for the actual level of product market competition. They encourage future researchers to develop proxies based on the U.S. Census data since their findings imply that empirical measures based on COMPUSTAT data may lead to incorrect conclusions and inferences. Additional work in this area is required to understand the relative importance of proprietary costs on firms' disclosure decisions.

3.2.2.2. Liquidity. Economic theory suggests that voluntary disclosures and increased information quality reduce information asymmetries (either between the firm and market participants or between informed and uninformed investors).

This reduction in information asymmetries in turn increases the firm's stock liquidity (e.g., [Glosten and Milgrom, 1985](#); [Amihud and Mendelson, 1986](#); [Diamond and Verrecchia, 1991](#); [Kim and Verrecchia, 1994](#); [Easley and O'Hara, 2004](#)).³¹

Early empirical work by [Amihud and Mendelson \(1986\)](#) reports that firms that provide more public information can reduce the adverse selection component of the bid-ask spread, and thus potentially reduce their cost of equity capital. [Welker \(1995\)](#) finds that firms with higher Association for Investment Management and Research (AIMR)³² rankings have lower information asymmetry, as proxied by bid-ask spreads. [Healy et al. \(1999\)](#) find that firms with sustained improvements in analysts' ratings of disclosure quality (AIMR scores) show an increase in stock liquidity, analyst following, institutional ownership, and stock performance. In an international context, [Leuz and Verrecchia \(2000\)](#) document that German firms that adopt a high-quality reporting regime by switching to international reporting standards exhibit lower information asymmetry, as reflected by lower bid-ask spreads and higher trading volume.

Using the financial reporting environment of SFAS No. 14 (i.e., before the 1997 adoption of SFAS No. 131 when quarterly segment disclosures were voluntary), [Botosan and Harris \(2000\)](#) document that firms that initiate quarterly segment disclosures experienced a decline in liquidity and an increase in information asymmetry during the period preceding the change in voluntary disclosure frequency. Those firms also experienced an increase in analyst following in the year they initiated quarterly segment disclosures.

Overall, the empirical evidence suggests that disclosures and accounting information of higher quality are related to improved liquidity in the firm's stock, implying a reduction in adverse selection. While the literature has interpreted the AIMR rankings and other self-constructed indices of disclosure as representing voluntary disclosures, these measures capture both voluntary and mandatory material disclosures (see [Heitzman et al. \(2010\)](#) for a detailed discussion). Thus, it is unclear whether the association between disclosures and liquidity is attributable to voluntary or mandatory disclosures, or some interaction of the two.

3.2.2.3. Cost of capital. Whether disclosure policies and financial reporting affect a firm's cost of capital is one of the most interesting and important questions in the accounting and finance literature. However, the theoretical underpinning of this hypothesis critically depends on whether information risk is diversifiable. In addition, the empirical tests of this hypothesis typically do not include the costs of disclosing and providing financial information, thereby leaving the question of why all firms do not reduce their costs of capital to the lowest possible level through full disclosure generally unanswered.

There are two main theoretical arguments supporting why disclosure characteristics and cost of capital are linked: pricing of estimation risk and pricing of information quality. Disclosure and the cost of capital can be related through estimation risk (e.g., [Brown, 1979](#); [Barry and Brown, 1984, 1985](#)). This research suggests that a firm can reduce the estimation risk by providing more disclosures and, if estimation risk is priced, providing more information will reduce the firm's cost of capital.³³

[Easley and O'Hara \(2004\)](#) suggest that firms can affect their cost of capital through the precision and quantity of the accounting information they provide to investors. Specifically, using a rational expectations asset pricing model, they argue that more private information increases the risk faced by uninformed investors since better informed investors can shift their portfolio weights to adjust for new information. However, [Hughes et al. \(2007\)](#) revisit the [Easley and O'Hara \(2004\)](#) model and conclude that information risk is either diversifiable or subsumed by existing risk factors. In addition, [Hughes et al. \(2007\)](#) critique the theoretical underpinnings of the specifications used in recent empirical studies and show that in large economies, idiosyncratic risk as well as the asymmetric information risk associated with idiosyncratic factors is fully diversifiable and should not affect the cost of capital in a systematic manner. Because of prominence of this issue in empirical research, we re-iterate and emphasize the issues raised by [Hughes et al. \(2007\)](#) as they have clear and important implications for future empirical research. In particular, [Hughes et al. \(2007, p. 707\)](#) claim:

...our analysis clarifies a commonly held misperception about the pricing of asymmetric information in a competitive market ([Easley and O'Hara, 2004](#)). A number of large studies cite the flawed intuition that information asymmetry should be priced because uninformed investors demand price protection from trading with privately informed investors, while in fact both informed and uninformed investors exploit liquidity traders whose demands are manifested in an assumption of noisy supply. **The analysis in this paper demonstrates that the pricing effect characterized by Easley and O'Hara (2004) proposition 2 can be diversified away when the economy is large** (emphasis added)...Many empirical papers in accounting cite Easley and O'Hara's results as an explanation for an asymmetric information risk premium without recognizing the role played by under diversification due to the restriction to a finite set of assets. Some authors even mistakenly conclude that Easley and O'Hara have proven that asymmetric information risk is not diversifiable....

³¹ [Kim and Verrecchia \(1994\)](#) also introduce certain settings where information asymmetries among informed and uninformed investors might lead to a decrease in observed short term liquidity. Specifically, they show that around earnings announcements, information asymmetry as evidenced in bid-ask spreads might increase in the short window, leading to a decrease in liquidity at the time of the earnings announcement. They also illustrate that following such public disclosures one observes significant increases in trading volumes.

³² AIMR rankings are based on the annual survey of financial analysts' rankings of U.S. firms' disclosure activities. The rankings are based on annual and quarterly financial statements and other voluntary disclosures provided through firms' analyst meetings and conference calls.

³³ [Clarkson et al. \(1996\)](#) question whether estimation risk should be priced (i.e., affect the cost of capital) when diversification among a larger number of assets is possible.

Lambert et al. (2007) examine whether and how public accounting reports and disclosures affect a firm's cost of equity capital in the presence of diversification. Using a model that is consistent with the CAPM and allows for multiple securities whose cash flows are correlated, they demonstrate that the quality of accounting information can influence the cost of capital, both directly and indirectly. The quality of accounting information has a direct effect on the assessed covariance of a firm's cash flows with other firms' cash flows, suggesting that earnings quality can affect the cost of capital via a firm's beta. In addition, earnings quality will have an indirect effect on the cost of capital if it affects real decisions and hence cash flows. Lambert et al. (2007) argue that well-specified, forward-looking beta would fully capture cross-sectional differences in expected returns. However, if beta were measured with error, a proxy for information risk could appear to be priced if it proxies for measurement error in beta. Lambert et al. (2007) explicitly claim (pp. 396–397) that when the number of traders becomes large in the Easley and O'Hara (2004) model, the information effect is diversified away. If their claim were correct, the Easley and O'Hara (2004) model provides no support for the hypothesis that information risk or accounting quality is priced. In other words, Lambert et al. (2007) show that the information effect developed in Easley and O'Hara (2004) is diversifiable. This implication and conclusion is not new since earlier work in the asset pricing literature (Fama, 1991) implies that information risk is potentially idiosyncratic in nature and, thus, fully diversifiable. As such, it should not be priced (and not have any effect on expected returns).

Christensen et al. (2008) point out that Lambert et al. (2007) focus on cost of capital after the release of information. They show that the decrease in cost of capital after the release of information that is due to an increase in disclosure quality is exactly offset by an increase in cost of capital prior to the release of information as long as indirect disclosure effects are ignored. Hence, the paper suggests that disclosure quality affects the timing of resolution of uncertainty but does not affect the firm's overall cost of capital so long as real effects are ignored. Introducing an investment decision, Bertomeu et al. (2010) predict a negative association between the extent firms disclose information voluntarily and their costs of capital. However, the negative association does not imply that a firm could reduce its cost of capital by increasing its voluntary disclosure for a given capital structure. To the contrary, an increase in voluntary disclosure would increase the firm's cost of capital in the context of the model. Given these theoretical models, we urge empirical researchers to analyze the relation between the information quality (earnings quality), information risk, and the cost of capital, focusing on whether information quality proxies for idiosyncratic components of asset risk or for undiversifiable (systematic) risk component.

Empirical studies analyzing the association between disclosures, financial reporting quality, and the cost of capital can be classified into two main categories: corporate event-driven (i.e., an IPO, SEO, a decision to cross-list on an exchange and/or adopt different standards or rules) and cross-sectional analyses. With regards to the first category, recent work documents more extensive pre-IPO disclosures are associated with lower under-pricing (e.g., Schrand and Verrecchia, 2005; Leone et al., 2007). The negative relation between intended use IPO proceeds and the first-day under-pricing in Leone et al. (2007) are particularly interesting because their research design addresses the endogenous nature of voluntary disclosures.

The second category of studies focuses on the cross-sectional association between disclosures and the cost of capital in non-specific event driven samples. Early empirical work has documented mixed evidence that disclosure reduces the cost of capital. Botosan (1997) finds a negative association between an index of disclosure level and the cost of equity capital only for the sub-sample of manufacturing firms with a low security analyst following. Botosan and Plumlee (2002) find a negative relation between the annual report disclosure level (as measured by the AIMR ratings) and the cost of equity capital, but also find a positive association between the cost of capital and levels of disclosures in quarterly reports. In contrast, Sengupta (1998) documents that high AIMR ratings are negatively associated with an ex-ante cost of debt.

Much of the empirical literature to date in this second category seeks to provide evidence that firms that disclose more have a lower cost of capital. However, as Heitzman et al. (2010) discuss, an observed negative association between disclosure and the cost of capital could be mechanical. In particular, firms with high costs of capital have lower earnings response coefficients. Firms with lower earnings response coefficients have stock prices that are less sensitive to accounting information, and thus will have a higher threshold to determine whether a given disclosure is material. These higher materiality thresholds translate into fewer mandatory disclosures. Given that the disclosure indices used in the literature capture both mandatory and voluntary disclosures, the documented negative association between disclosure and the cost of capital can be explained by the alternative materiality hypothesis advanced in Heitzman et al. (2010).

The main question addressed in the recent empirical studies we discuss below is whether the quality of accruals is a priced risk factor that impacts the cost of equity capital. Francis et al. (2004, 2005a, 2005b) suggest that accruals quality is an additional non-diversifiable priced risk factor. However, their results are difficult to interpret because, while purportedly relying on a model that links information asymmetry to the cost of capital (Easley and O'Hara, 2004), Francis et al. (2004, 2005a, 2005b) document a link between earnings quality and cost of capital without establishing a link between earnings quality and information asymmetry. A more balanced discussion of the pricing effects of information asymmetry is presented in Francis et al. (2008, p. 61). In particular, the authors claim:

It should be noted that the literature predicting and finding that disclosure has cost of capital effects as well as the literature predicting and finding that earnings quality is priced assumes that idiosyncratic risk is priced. From an asset-pricing literature perspective this is not an uncontroversial assertion, as traditional models of market equilibrium (such as the capital asset pricing model (CAPM), Sharpe [1964], Lintner [1965], Black [1972]) assume that all relevant information is reflected in price at all times; consequently, **information asymmetry should have no pricing effects** (emphasis added)... Whether this pricing effect is diversifiable remains controversial.

More recently, Mohanram and Rajgopal (2009) conclude that they are unable to document any empirical specification in which the probability of informed trading (PIN)³⁴ is positively and statistically associated with ex-ante measures of cost of equity capital. Specifically, they find that the average PIN loading for small firms is negative, whereas for large firms it is positive. Moreover, they document that the PIN factor loadings are unrelated to stock returns and that there appears to be no robust relationship between PIN and ex-ante measures of the cost of equity capital (their evidence suggests that PIN was priced only for a sub-period spanning 1984–1988). Recall, that if PIN were a priced risk factor, one would expect higher measures of PIN and higher PIN factor loadings to be associated with higher ex-ante measures of cost of equity capital. Not only do they not find such a relationship, PIN factor loadings exhibit a negative association with ex-ante measures of cost of equity capital.

Whether information risk measured by alternative empirical constructs affects expected returns is a question that still remains open in the literature. Fundamentally, a case still has to be made for why one would expect ex-ante information risk to be priced in large economies, as recent papers suggest (see Hughes et al., 2007; Lambert et al., 2007; Core et al., 2008), and consistent with traditional asset pricing theory (Fama, 1991). The attempt to understand and document empirically the complex relation between measures of accounting quality, information asymmetry/information risk, and the cost of capital is not an easy task. Recent research taking a first step is a working paper by Bhattacharya et al. (2008) who analyze a direct path and indirect paths in which information quality might be related to the cost of equity capital. Based on their findings, the authors conclude:

We also conclude that the attribution of the association between measures of earnings quality and the cost of equity to the information-asymmetry-mediated (indirect) path—made by Francis et al. (2005a, 2005b) and several other empirical studies—was incomplete.

Indeed, Aboody et al. (2005), Liu and Wysocki (2007) and Cohen et al. (2008) show that the association between firms' cost of capital and accruals quality is not significant but that it is sensitive to research design choices.³⁵ Similarly, conducting well-specified asset-pricing tests, Core et al. (2008) find no evidence that accruals quality is a priced risk factor.

Related, Easton and Monahan (2005) evaluate the reliability of implied cost of capital measures and find that these empirical proxies contain significant measurement errors and thus are unreliable. In a related study, Easton and Sommers (2007) raise potential methodological limitations of using implied cost of equity capital measures based on analysts' forecasts. They show that as a consequence of optimistic analysts' forecasts, the resulting implied cost of capital metrics exhibit a positive bias that is both statistically and economically significant. As a result, researchers should use these measures with caution. In addition, Bradshaw and Brown (2006) show that on average, analysts overestimate target prices by 35% and that the target price is met or beaten only 24% (45%) of the time at the end of the corresponding forecasting period. Thus, we expect similar biases to be present in models using analysts' target prices to estimate the implied cost of capital.

Overall, the empirical evidence on the relation between voluntary disclosures, financial reporting quality attributes, and cost of capital is still inconclusive. We cannot draw unambiguous conclusions whether the theory and the related empirical evidence so far supports a significant statistical and economic link between information quality and cost of capital. In addition, as previously discussed, the documented association between disclosure and the cost of capital could be mechanical (e.g., Heitzman et al., 2010). The recent empirical evidence reported in the literature appears to be sensitive to alternative research design choices undertaken by researchers, especially with regards to controlling for endogeneity and self-selection (e.g., Cohen, 2008; Larcker and Rusticus, 2005), firm-specific operating environment characteristics (e.g., Liu and Wysocki, 2007), and the empirical metrics used to measure both the cost of capital (Easton, 2003; Elton, 1999) as well as the accounting quality attributes, in particular accruals quality (e.g., Wysocki, 2009).

Related, the evidence in Hou and Robinson (2006) implies that the level of industry competition is an important correlated omitted variable in any study investigating the association between disclosure/information quality and the cost of capital. Such considerations, among other firm-specific characteristics that determine the quality of financial information and disclosures (for example, demands for capital, litigation costs, and incentive costs), make it difficult to interpret the association between information quality/information risk and capital markets benefits documented in prior research.

In summary, a major limitation of empirical research to date is that proxies for costs of disclosures are correlated with capital market benefits of increased disclosures, making it difficult to infer how increased disclosures affect capital markets benefits. More work in this area is needed and we encourage researchers to analyze both the cost side and other motives constraining disclosures policies when analyzing the potential capital market benefits. We believe that a promising topic to investigate is how disclosures vary with the ability of the accounting process to convey useful and relevant information.³⁶

³⁴ The PIN measure is a firm-specific estimate of the probability that a trade order originates from an investor who is privately informed and as such captures the extent of information asymmetry among investors.

³⁵ Some of these findings are consistent with the smaller cost of equity capital effects documented by Francis et al. (2005a, 2005b) for the discretionary component of accruals quality.

³⁶ Lev and Zarowin (1999) note that the accounting measurement process is significantly distorted in high-tech and growing firms, resulting in a low level of informativeness of financial information. We are aware of only few papers that build on this observation and address its implications. For example, Frankel et al. (1999) document that high-growth firms are more likely to hold conference calls compared to other firms. This result might be due to the possibility that high-growth firms' reported earnings are not that informative and useful to users of financial statements when calculated and presented using the current U.S. GAAP. Tasker (1998) provides evidence consistent with this interpretation by documenting that firms that hold conference calls to

Also, more research is warranted on the relation between voluntary disclosures and the attributes of the accounting process across different firms and industries.

Finally, as pointed out in [Fields et al. \(2001\)](#) and [Cohen \(2008\)](#), if full disclosure has significant benefits, it is puzzling that all firms do not select the highest possible disclosure levels, i.e., choose a corner solution of maximum disclosures. One potential explanation is that other factors, such as disclosure costs, constrain such a behavior. But then, research must incorporate such constraints when estimating the benefits of disclosure; that is, future empirical works must analyze both the relative costs and benefits of increased disclosures.

3.2.3. Effect of the institutional context on voluntary disclosure

Shareholder litigation and corporate governance mechanisms (e.g., independent board of directors) are important determinants of voluntary disclosure strategies. We discuss the research on each of these determinants below.

3.2.3.1. Litigation costs. [Skinner \(1994\)](#) provides evidence that, given the asymmetric incentives to provide timely bad news disclosures, managers are more likely to issue imprecise interim forecasts during periods of large negative earnings surprises than during periods of large positive surprises. However, [Francis et al. \(1994\)](#) find that significant declines in earnings are not sufficient to cause litigation, early disclosure of negative earnings news is not an effective deterrent to litigation, and failure to provide early disclosure of adverse earnings news does not necessarily lead to subsequent litigation. [Baginski et al. \(2002\)](#) find that managers are more likely to issue earnings forecasts, both bad and good news, in the less litigious Canadian financial reporting environment. In contrast, while finding no evidence that management forecast disclosures increase the probability of lawsuit dismissal, [Skinner \(1997\)](#) provides evidence that timely disclosures reduce settlement amounts.

Much of the research on the relation between disclosures and litigation suffers from the endogenous relation between disclosure and expected litigation risk. Using a simultaneous equations approach, [Field et al. \(2005\)](#) find no evidence that disclosure triggers litigation. Their findings suggest, however, that disclosure deters certain types of litigation. By contrast, [Rogers and Van Buskirk \(2009\)](#) find that firms reduce disclosures subsequent to class-action lawsuits. Their findings are consistent with the hypothesis that the litigation process decreases managers' incentives to disclose, despite the increased protections afforded by the Private Securities Litigation Reform Act of 1995. However, [Lowry \(2009\)](#) points out that the evidence in [Rogers and Van Buskirk \(2009\)](#) is based on a sample of firms that were actually sued; as such, the results cannot be generalized to the larger population of firms who were not sued. Finally, one needs to focus not only on the relation between quantity/frequency of disclosures and litigation costs but also on other attributes of disclosures such as the nature of the information disclosed (e.g., good news versus bad news).

3.2.3.2. Governance mechanisms, disclosures, and financial reporting³⁷. Numerous studies empirically examine whether corporate disclosures and corporate governance are substitutes or complements. Using a sample of firms during 1990–1993 (before the FASB required firms to disclose this information), [Bens \(2002\)](#) documents a positive relation between the information voluntarily disclosed and increased monitoring by shareholders, suggesting that monitoring complements disclosure rather than substitutes for it.

[Bushman et al. \(2004\)](#) hypothesize that limited transparency of firms' operations to outside investors increases demands for governance mechanisms that alleviate agency problems, mainly moral hazard. They find that ownership concentration, directors' and executives' equity-based incentives, and outside directors' reputations vary inversely with earnings timeliness, while ownership concentration and directors' equity-based incentives increase with firm complexity. However, board size and the percentage of inside directors do not vary significantly with earnings timeliness or firm complexity.

[Fan and Wong \(2002\)](#) examine the relation between earnings informativeness and the ownership structure of 977 companies in seven East Asian economies. Their results are consistent with two complementary explanations. First, concentrated ownership and the associated pyramidal and cross-holding structures create agency conflicts between controlling owners and outside investors. Consequently, controlling owners are perceived to report accounting information for self-interested purposes, causing the reported earnings to lose credibility to outside investors. Second, concentrated ownership is associated with low earnings informativeness as ownership concentration prevents leakage of proprietary information about firms' rent-seeking activities.

[Francis et al. \(2005a, 2005b\)](#) contrast the informativeness of earnings and dividends for firms with dual class and single class ownership structures. Results of both across-sample tests and within-sample tests show that earnings are generally less informative, and dividends are at least as informative for dual class firms relative to single class firms. The authors interpret these results as suggesting that the net effect of dual class structures is to reduce the credibility of earnings and to enhance the salience of dividends as measures of performance.

(footnote continued)

convey information to investors are more likely to have public financial statements that are not that informative and useful. Recent evidence in [Joos and Zhidanov \(2008\)](#) is also consistent with [Tasker \(1998\)](#).

³⁷ We do not review the corporate governance literature in general because this is done in [Armstrong et al. \(2010\)](#) but instead focus on the link between corporate governance and firms' disclosure policy.

Hope and Thomas (2008) test whether managers have incentives to take actions that benefit them at the expense of shareholders (agency-cost hypothesis). Using a sample of U.S. multinationals with substantial foreign operations, they compare non-disclosing firms to firms that continue to disclose geographic earnings post SFAS 131, when most U.S. multinational firms were no longer required to disclose earnings by geographic area. They find that non-disclosing firms experience greater expansion of foreign sales, produce lower foreign profit margins, and have lower firm value in the post SFAS 131 period. Overall, the evidence they report is consistent with the agency-cost hypothesis and the important role of financial disclosures in monitoring managers.

Healy et al. (1999) and **Bushee and Noe (2000)** report that increases in disclosures are associated with an increase in institutional investors ownership, possibly because of the pressure they exert on managers. **Bushee et al. (2003)** find that the decision to hold an “open” conference call is associated with the composition of the firm’s investor base. They document that firms with greater analyst following and greater institutional ownership are less likely to hold open calls (see also **Tasker, 1998**). **Core (2001)** interprets these findings as suggesting that informed investors prefer less disclosure and that analysts and institutions are intermediaries producing information that reduces information asymmetry. In a more recent study, **Ajinkya et al. (2005)** find that firms with concentrated institutional ownership are less likely to provide voluntary disclosures.

Ali et al. (2007) show that firms that are managed or controlled by founding families report higher quality earnings, are more likely to issue warnings when facing bad news, and make fewer disclosures about their corporate governance practices. Consistent with family firms making better disclosures, they find that family firms have larger analyst following, more informative analysts’ forecasts, and smaller bid-ask spreads. In a related paper, **Chen et al. (2008a, 2008b)** document that family firms provide fewer earnings forecasts and conference calls, but more earnings warnings.

Ajinkya et al. (2005) find that the probability of occurrence of management earnings forecasts and the frequency of such forecasts are positively associated with the percentage of the board that consists of outsiders. The results also suggest that companies with a greater percentage of outside directors make more accurate and less optimistically biased earnings forecasts. **Karamanou and Vafeas (2005)** find that firms with effective governance mechanisms are more likely to issue a management forecast, especially a bad news forecast. This evidence suggests that better governance in public corporations is associated with less information asymmetry between management and shareholders, especially when shareholders are most likely to be at risk of suffering losses. They also find that among forecasting firms, forecast precision decreases with better governance, but only when bad news is conveyed.

A significant challenge facing the empirical work on the association between governance mechanisms, disclosure, and financial reporting practices is the issue of causality and endogeneity. The endogenous nature of the firm’s information environment, governance mechanisms, and observed outcomes make it difficult to establish causal links and identify the exact effect that one mechanism might have on another one. We echo Armstrong et al.’s (2010) concerns that researchers must address the endogeneity issues apparent in this line of research by identifying research design settings in which an exogenous shock can be used to study the jointly determined relations among governance mechanisms and the firm’s information environment.

3.2.4. Measuring voluntary disclosures and financial reporting quality

An issue that has long plagued the research on voluntary disclosure and financial reporting quality is the appropriate empirical measures for those constructs. Approaches used in the literature include survey rankings, researcher-constructed indices, measures from natural language processing technologies, and properties of the firm’s reported earnings. Before discussing these approaches and the related research below, we would like to emphasize that a sensible economic definition of voluntary disclosure / financial reporting quality and direct derivation of measures from that definition is missing from the literature. This lack of an underlying economic definition hinders our ability to draw inferences from this work, and we recommend that future research address this issue.

Numerous studies in the accounting literature have used AIMR rankings as a voluntary disclosure measure (e.g., **Brown and Hillegeist, 2007**; **Lang and Lundholm, 1993, 1996**; **Welker, 1995**; **Healy et al., 1999**; **Sengupta, 1998**). However, as has been discussed by **Healy and Palepu (2001)**, there are certain limitations to the AIMR rankings. Specifically, analysts chose to rank only large U.S. firms during the 1980s and 1990s and it is not clear what were the objectives in assigning the disclosure ratings and whether these scores are biased. There are also some concerns that the surveyed analysts simply assign higher disclosure ratings to firms with better future prospects and operating performance (**Lang and Lundholm, 1993**). Finally, since the AIMR discontinued its disclosure rankings in 1997, we can no longer use them as an empirical measure of voluntary disclosures.

In contrast, **Botosan (1997)**, **Francis et al. (2008)** and **Shalev (2009)** use self-constructed indices of the quality of disclosures. However, because construction of such metrics involves subjective judgment by the researcher, the findings may be difficult to replicate and generalize. These empirical measures are also very labor intensive, suggesting that they are feasible only for small samples of firms. Furthermore, these measures rely on disclosures provided in the firms’ financial statements and other public forums and documents. This suggests that disclosures that firms provide during conference calls and other related venues that might complement or substitute for the information contained in financial statements are not captured and, therefore, are omitted from the analysis.

A problem common to both the AIMR scores and other self-constructed indices of disclosure is that they capture both voluntary and mandatory disclosures. As discussed in **Heitzman et al. (2010)**, mandatory disclosure requirements only apply if the disclosure is material. Since materiality thresholds vary cross-sectionally, these indices measure both voluntary and mandatory disclosures. Thus, interpreting these measures as representing purely voluntary disclosures is problematic.

Following the suggestions in Core (2001), researchers have recently started focusing on different techniques in natural language processing technologies as measures and proxies of disclosures. Li (2008) provides the first large-sample evidence of the determinants and implications of the lexical properties of corporate disclosures. He examines the implications of annual report readability and other lexical features of the annual report for current performance and earnings persistence. The findings suggest that annual reports of firms with poor performance are more difficult to read. Further, the profits of firms with annual reports that are easier to read are more persistent. Overall, Li's (2008) evidence suggests that managers may be opportunistically structuring the annual reports to hide adverse information from investors. Using a naïve Bayesian machine-learning algorithm, Li (2010) examines the tone and content of the forward-looking statements in corporate 10-K and 10-Q filings. He finds that firms with better current performance, lower accruals, smaller size, lower market-to-book ratio, and less return volatility tend to have more positive forward looking statements in their MD&As. These findings are consistent with firms facing lower litigation risk providing more forward looking information in their MD&As. As such, these results can add to the existing literature on the relation between disclosures and litigation risk. Furthermore, the average tone of the forward-looking statements in a firm's MD&A is positively associated with future earnings and liquidity, even after controlling for other determinants of future performance.

While the use of natural language processing technologies to obtain proxies for disclosures is innovative, one should note that this approach does not solely measure voluntary disclosures. MD&A disclosures are mandated by Reg. S-K, and the SEC closely monitors firms' filings and challenges those filings that are not in compliance with Reg. S-K. Therefore, the Li (forthcoming) measure, much like the AIMR ratings and self-constructed disclosure indices, reflects both voluntary and mandatory disclosures.

Numerous studies have made a more direct attempt to measure the "quality" of accounting information by analyzing the properties of a firm's reported earnings. Dechow and Dichev (2002) and Francis et al. (2004, 2005a, 2005b) model the relation between a firm's cash flows and accruals to derive a measure of earnings quality. Using these measures of accruals quality as proxies for overall information quality, studies have analyzed the determinants and economic consequences of these measures, reporting mixed and inconclusive evidence as discussed in the previous section.

Although the Dechow and Dichev (2002) measure gained popularity among empirical researchers, it is important to note that this measure is problematic in capturing "earnings quality." In particular, Wysocki (2009) demonstrates both analytically and empirically that the underlying Dechow and Dichev (2002) model has limited ability to distinguish between manipulated and high quality accruals. Overall, Wysocki's evidence implies that the widely used Dechow and Dichev (2002) measure of earnings quality is based on a model that may not reliably capture high quality accruals. As Wysocki (2009) notes, the Dechow and Dichev earnings quality model is dominated by the negative contemporaneous correlation between cash flows and accruals and that the Dechow and Dichev accruals quality model displays weak relations with fundamental earnings attributes and institutional factors associated with high-quality earnings for U.S. and international firms. As a solution, Wysocki (2009) presents a simple modification to the original Dechow and Dichev model that captures the incremental association between accruals and past and future cash flows. His modification yields a superior proxy of accruals quality for U.S. and international firms.

To avoid numerous problems identified in the literature when applying the discretionary accruals model originally introduced in Jones (1991), future researchers should be cautious in using an empirical measure of earnings and accruals quality without being confident in its empirical validity to capture high quality accounting information. We want to emphasize that future empirical researchers using any "information quality" proxy be aware of the underlying characteristics and determinants of these measures. The use of ad hoc control variables will not necessarily solve this important problem, and again points to the need for an economic definition of earnings/information quality and direct derivation of measures from that definition. Dechow et al. (2010) discuss these issues, among others, in more detail.

To summarize, the existing literature shows that measuring firms' financial reporting and disclosure activities is difficult and that commonly used proxies exhibit numerous problems. We want to reiterate and emphasize what Core (2001) pointed out in his discussion of the empirical disclosure literature almost a decade ago. As Core (2001) originally suggested, we believe that analyzing disclosures using natural language processing techniques seems most promising in creating meaningful disclosure quality measures for large samples. While we tend to focus on disclosed financial statement numbers in accounting, corporate disclosures consist, to a large extent, of qualitative information in the form of text. Analyzing these non-quantitative parts of corporate disclosure will likely provide us with a better understanding of management's disclosure choices and the resulting economics consequences. Future researchers should note, however, that much of the natural language techniques capture both voluntary and mandatory disclosures. Thus, a challenge remains to find research design settings in which these two attributes of the overall firm's disclosure strategy can be measured separately.

3.2.5. Management forecasts and other voluntary disclosure mechanisms

Management forecasts are an important form of corporate voluntary disclosures. Our analysis in Section 2 indicates that for the average firm, management forecasts account for 15.67% of the quarterly return variance. Given the decision to provide a forecast, managers choose the characteristics of the information disclosed such as its form, horizon, and the timing of the forecast. The form of the disclosed information, for example, an earnings forecasts, could range from a specific point projection ("EPS will be \$X this year") to qualitative statements ("earnings will be good this year"). Managers can also issue forecasts for different horizons by releasing either quarterly or annual projections. Finally, managers can also bundle their forecasts with other information, most commonly reported earnings. Below, we discuss each of these decisions in turn.

3.2.5.1. Propensity of firms to provide management forecasts. The number of firms providing public earnings guidance has increased from approximately 10–15% in the mid-1990s to approximately 50% in 2004 (e.g., Anilowski et al., 2007). However, based on a survey of 654 members of the National Investor Relations Institute (NIRI), Hirst et al. (2008) document that as of 2006, the percentage of publicly traded companies providing annual guidance increased from 61% to 82% while the percentage of companies providing quarterly guidance declined from 61% to 52%. Hirst et al. (2008) explain that this change in behavior may be the result of market participants (CFA Institute, 2006) and numerous researchers (e.g., Fuller and Jensen, 2002) expressing concerns over managers using their earnings forecasts to strategically manage the analysts' consensus earnings forecasts. In particular, Fuller and Jensen (2002) claim that this type of managerial and analyst behavior represents a game, particularly when it is done on a quarterly basis. Based on this, Fuller and Jensen (2002) call for firms to stop providing any quarterly earnings guidance.

Addressing the concern that frequent issuances of management earnings forecasts and guidance induces a short term focus, Houston et al. (2010) find that poor operating performance (decreased earnings, missing analyst forecasts, and lower anticipated profitability) is the major reason that firms stop providing quarterly guidance. Their evidence is also suggestive of a deterioration in the information environment of firms that cease providing guidance in the form of increased analyst forecast errors and forecast dispersion and a decrease in analyst coverage. The sample used in Houston et al. (forthcoming) covers only 2002–2005 and as such their evidence should be interpreted with caution as it is not clear how pervasive and widespread this phenomenon is.

Anilowski et al. (2007) investigate whether aggregate earnings guidance affects aggregate stock returns. They find most earnings guidance involves quarterly forecasts and that over half of all quarterly guidance is downward guidance. They also find that the relative extent of downward guidance varies from one quarter to the next. This guidance varies more than the corresponding aggregate annual guidance, suggesting that the relative extent of quarterly downward guidance, in particular, is potentially informative about economic aggregates. This conclusion is consistent with our results reported in Table 1 suggesting that management forecasts are the single most important determinant of the quarterly return variance.

Finally, Chen and Zhang (2008b) find that firms who announce that they are stopping issuing earnings guidance exhibit a negative three-day return around the announcement and that this reaction is associated with analysts' downward revisions in expectations of future earnings. However, announcing firms do not appear to fare worse than firms who quietly stop providing guidance.

3.2.5.2. Forecast form and timing and nature of the disclosure. Managers can issue earnings forecasts in either qualitative or quantitative forms. Recent studies indicate that approximately 50% of forecasts sampled from 1993 to 1997 are point and range forecasts (Hutton et al., 2003; Baginski et al., 2004), implying that other types of forecasts account for half of forecasts.

King et al. (1990) find that the forecast form (i.e., point versus range forecasts) captures the precision of managers' beliefs about the future, and Hughes and Pae (2004) suggest point forecasts are generally perceived to reflect greater managerial certainty relative to range forecasts. Managers can also choose the time horizon over which they provide their forecasts. Typically, managers provide quarterly or annual earnings forecasts.

The evidence in the literature suggests that features of the firm's operating and information environments provide managers with different incentives to disclose. When proprietary costs are introduced or when investors are uncertain about the private information possessed by management, theoretical work suggests that the firm will tend to voluntarily disclose good news and withhold bad news (see our discussion in Section 3.1). Early empirical evidence on management earnings forecasts is consistent with these predictions (e.g., Penman, 1980; Lev and Penman, 1990). Earlier empirical work focusing on the effect of litigation risk on voluntary disclosures suggests management earnings forecasts are more likely to convey bad news (Skinner, 1994, 1997; Kasznik and Lev, 1995; Baginski et al., 2002). In a recent study, Kothari et al. (2009) examine whether managers delay disclosure of bad news relative to good news. The authors hypothesize that certain incentives motivate managers to withhold bad news up to a certain threshold but to quickly reveal good news to investors. As discussed previously, these incentives include increasing the value of their options grants and the sales price of the firm's stock. Consistent with their hypothesis, Kothari et al. (2009) find that, on average, managers delay the release of bad news to investors.

Focusing on recent practice to issue cash flow forecasts, Wasley and Wu (2006) examine managers' incentives to issue these forecasts. They argue that the findings in prior literature with regards to the incentives to voluntary disclose earnings forecasts (for example, to reduce the risk of litigation) need not apply to a setting in which cash flows news are voluntarily disclosed. They predict and find that managers issue cash flow forecasts to signal good news and to meet investors' demand for cash flow information. They also find that managers issue cash flow forecasts to pre-commit to a certain mix of cash flows versus accruals information, thus reducing the amount of freedom they have to engage in accrual-based earnings management activities.

3.2.5.3. Bundling of management forecasts with reported earnings. Anilowski et al. (2007) report that by 2006 more than one in six quarterly earnings announcements also contains a management forecast.³⁸ Rogers and Van Buskirk (2008) provide strong

³⁸ Most studies in this area use First Call's CIG database to obtain management earnings forecasts. This database contains only of a portion of the population covered in the COMPUSTAT/CRSP database. As such, the documented findings need not generalize to the entire population of firms.

evidence that managers selectively disclose good news by bundling earnings forecasts with the current period reported financial results. More importantly, they also show that a failure to account for contemporaneous earnings news might lead to the opposite characterization of the information content of bundled forecasts, which in turn induces inaccurate inferences and conclusions about managers' disclosure incentives. We recommend that empirical research analyzing earnings announcements should account for the relatively recent phenomenon of issuing bundled earnings forecasts in the research design employed.

3.2.5.4. Conferences calls as a voluntary disclosure mechanism. Bowen et al. (2002) document that conference calls increase analysts' ability to forecast earnings accurately and also decrease dispersion among analysts. Since conference calls could be restricted ("closed") during the sample period that Bowen et al. (2002) analyze, their evidence suggests that conference calls contributed to an information gap between financial analysts and other capital market participants. Bushee et al. (2003) examine the determinants and effects of the decision to provide "open" conference calls and find that these calls are associated with a greater increase in small trades, consistent with investors trading on the information released during the call, and higher price volatility during the call.

Brown et al. (2004) hypothesize that conference calls are a voluntary disclosure mechanism that leads to long-term reductions in information asymmetry among equity investors. They show that information asymmetry, measured as the probability of informed trade (PIN), is negatively associated with conference call activity. Firms initiating a policy of regularly holding conference calls experience significant and sustained reductions in information asymmetry, in contrast to one-time callers who experience no significant decline in asymmetry. Based on prior work documenting that the cost of equity capital is increasing in the level of information asymmetry, Brown et al. (2004) interpret their results as suggesting that firms holding conference calls frequently have lower costs of capital. Kimbrough (2005) examines the effect of conference calls on analysts' and capital markets participants' under-reaction to earnings surprises. The findings in Kimbrough (2005) suggest that while there is some mixed evidence whether conference calls increase the total amount of information about the attributes of currently reported earnings that analysts and investors use, conference calls result in more timely analyst and investor reactions to the future implications of currently reported earnings.

3.2.6. Summary of empirical evidence on corporate voluntary disclosures and avenues for future research

Inferences based on the existing empirical work analyzing voluntary disclosures have been limited by incomplete analyses and measurement issues. As discussed above, most empirical research does not fully incorporate all of the costs and benefits of voluntary disclosures. Rather, the literature focuses on one aspect at a time, for example the benefits from increased disclosures. However, this approach is likely to lead to faulty inferences because the related costs and benefits are not independent. For example, the cost of capital literature leaves open the question as to why firms do not resort to full disclosure to maximize firm value.

While the evidence suggests that management forecasts are informative (see Table 1), it is still unclear why this is so, particularly given managements' incentives and the voluntary nature of management forecasts. While legal liability is clearly one part of this puzzle, we suspect that mandatory disclosures play an important role in increasing the credibility of management forecasts. To this end, we encourage researchers to investigate the interplay between management forecasts and mandatory disclosures in general and management forecasts in particular. As we will discuss in more detail in Section 4, it also would be useful to combine analyses of voluntary disclosures with mandatory disclosure to investigate, for example, the extent to which mandatory disclosure requirements affect the amount of information produced by third parties or the amount of voluntary disclosures, thereby altering (and possibly reducing) the ability of the accounting process to convey useful and relevant information. To do so, however, researchers must be able to separate mandatory and voluntary disclosures and avoid misclassifying mandatory disclosures as voluntary.

Opportunities for future research are also present in studies focusing on management earnings forecasts. For example, numerous papers investigate one reason for issuing a forecast (i.e., to increase liquidity and/or reduce the cost of capital), but we are not aware of a study that analyzes the decision to issue guidance controlling for (or at least acknowledging) other incentives. Again, this partial analysis limits the inferences and conclusions one can draw.

Moreover, we call on researchers to acknowledge the numerous changes in the institutional environment that affect the incentives and ability to voluntarily disclose information. For example, certain insider trading rules issued by the SEC might induce managers to issue management forecasts absent any personal incentive to do so. In particular, Rule 10b-5 prohibits insiders from trading in their companies' stock based on material non-public information, forcing them to either disclose such information or abstain from trading (e.g., Heitzman et al., 2010). In other words, one can observe management earnings forecasts which are issued only because an underlying duty to disclose certain information. Moving forward, researchers should use a broader and more comprehensive framework when investigating the determinants and consequences of voluntary disclosures, acknowledging the continuing changes in the regulatory environment.

One difficulty in analyzing voluntary disclosures relates to measurement issues. The existing literature demonstrates that measuring firms' disclosure activities is difficult, and that there are a number of issues with commonly used proxies. Moreover, the currently used proxies for costs of disclosures are correlated with capital market benefits of increased disclosures, making it difficult to infer how increased disclosures affect capital markets benefits. We urge researchers to consider alternative ways to develop measures of disclosures, costs, and benefits. One promising approach, recommended by Core (2001), is the use of natural language processing techniques to obtain disclosure quality measures. However, as

previously discussed, the use of these techniques to obtain a measure of voluntary disclosure is confounded by mandatory disclosure requirements for material information.

4. Mandatory disclosure

4.1. Models of disclosure regulation

Most developed capital markets mandate corporate disclosures, but why is such regulation necessary? If the unraveling result (Grossman and Hart, 1980; Grossman, 1981; Milgrom, 1981; Milgrom and Roberts, 1986) holds, firms will voluntarily disclose all information, making mandatory disclosure requirements unnecessary. The unraveling result, however, has not been successful in explaining observed disclosure practices. Section 3.1 discusses the reasons full disclosure may not occur. But even if less than full disclosure occurs, this does not necessarily imply that disclosure regulation is desirable. In fact, justifying disclosure regulation is often quite challenging.

Specifically, because disclosure regulation often increases the welfare of some stakeholders while decreasing the welfare of others, its desirability depends on how we value welfare effects of different constituents.³⁹ This normative aspect of disclosure regulation, in part, explains why there currently is no unifying theory of mandatory disclosure despite the existence of numerous mandatory disclosure laws in practice (Dye, 2001; Verrecchia, 2001). While a comprehensive theory of mandatory disclosure is lacking, the literature studies rationales for disclosure regulation (Section 4.1.1) and the desirability of accounting standards (Section 4.1.2) in specific contexts. We discuss the research in these two areas in the following sections.⁴⁰

Another approach to understanding disclosure regulation examines the political process of how accounting standards evolve instead of focusing on the social value of disclosure regulation.⁴¹ Since the rule-making processes of the FASB and the SEC are open to public observation and participation, the FASB and the SEC are subject to significant pressure from various political constituents (e.g., Watts and Zimmerman, 1978; Sunder, 1988). Empirical evidence suggests that accounting standards and regulation (including their enforcement) are in fact subject to political pressure (Ramanna, 2008; Correira, 2009; Hochberg et al., 2009). A broad literature in economics and finance has examined the effect of (political) institutions on the development of economic systems and financial markets.⁴² Similarly, Bertomeu and Magee (2010) use a voting mechanism to model the public influence on the process of accounting standard setting. Additional research that examines the effect of existing institutions on accounting standards and disclosure regulation could be valuable in informing the design of the due process the FASB follows when creating standards.⁴³

4.1.1. Rationales for disclosure regulation

Four main rationales for financial disclosure regulation have been established in the literature: financial externalities, real externalities, agency costs, and economies of scale.⁴⁴

4.1.1.1. Financial externalities. Financial externalities exist when a firm's disclosure is informative not only about its own financial position but also about that of other firms. Because firms are likely to ignore the information their disclosures provide about other firms, this kind of positive informational externalities can cause firms to choose socially inefficient disclosure levels. As a result, disclosure regulation that mandates additional disclosures can improve social welfare (e.g., Dye, 1990; Easterbrook and Fischel, 1991; Admati and Pfleiderer, 2000).⁴⁵

4.1.1.2. Real externalities. Real externalities exist when a firm's disclosure affects other firms' real decisions.⁴⁶ For instance, a firm's disclosure about expected future earnings can affect competitors' decisions to enter or exit the market (e.g., Pae, 2000, 2002), or affect competitors' decisions of production volumes (e.g., Vives, 1984; Darrough, 1993; Kanodia et al., 2000; Hughes

³⁹ Early papers that emphasize the social choice character of accounting information systems include Demski (1973, 1974) and Verrecchia (1982).

⁴⁰ We include a discussion of disclosure regulation at this point because it is an important determinant of the corporate information environment. However, we limit this discussion as a separate survey by Kothari et al. (2010) focuses exclusively on accounting standards.

⁴¹ See, for example, Watts and Zimmerman (1979), Ramanna (2008), and Ramanna and Watts (2009).

⁴² See, e.g., Haber and Perotti (2008) for a survey of how institutions affect financial development.

⁴³ The desirability of accounting standards also has to take into account that managers may not truthfully report their true estimate but manipulate their report ("earnings management"). We exclude a discussion of earnings management from this survey because the survey by Dechow et al. (2010) focuses exclusively on earnings quality and earnings management.

⁴⁴ The distinction between financial and real externalities as reasons for disclosure regulation has been introduced by Dye (1990). Shleifer (2005), Leuz and Wysocki (2008), and Kothari et al. (2010) also consider the question when disclosure regulation is socially desirable.

⁴⁵ Financial externalities do not always need to be resolved through disclosure regulation. Sometimes, firms' voluntary disclosure practices are socially optimal even in the presence of financial externalities (Dye, 1990).

⁴⁶ Of course, financial and real externalities are related. For instance, financial externalities can affect firms' access to new capital and as a result can alter firms' real decisions.

et al., 2002). If the disclosed information allows other firms to make more informed decisions, regulation that mandates additional disclosure can improve social welfare.⁴⁷

4.1.1.3. Agency costs. Disclosure of performance related information is valuable because it allows for more efficient contracting with agents and/or better screening of agents (e.g., Holmstrom, 1979).⁴⁸ In such settings, disclosure is part of the contract and mandated by the principal (i.e., shareholders). In addition, disclosure regulation can serve as a cost-effective way to commit to frequent and detailed future disclosures. As such, disclosure regulation is particularly valuable to new entrants to capital markets (Leuz and Wysocki, 2008). While many studies in agency theory suggest that more information can reduce agency costs (e.g., Shleifer and Wolfson, 2002), this kind of efficiency gain is insufficient to justify disclosure regulation for two reasons. First, when agents value the resources expropriated at least as much as the principal, expropriations constitute wealth transfers but not a loss in welfare. Second, profitable investment opportunities foregone by agents can be exploited by competitors. To support the desirability of disclosure regulation on the basis of agency problems, one needs to argue that regulators can enforce disclosures that shareholders cannot enforce on their own (e.g., because regulators can impose sanctions that are unavailable in private contracting) and that reduced agency problems lead to greater wealth creation.

4.1.1.4. Economies of scale. Common accounting standards can result in efficiency gains by reducing investors' duplication of information production and enhancing comparability of disclosures across firms. This is likely to result in more accurate assessments of individual firm performances (Dye and Sunder, 2001) and generate economies of scale in terms of understanding/evaluating disclosures for investors. For instance, Mahoney (1995) and Dye and Sridhar (2008) predict that disclosure regulation can provide market-wide cost savings and efficiency gains as long as the optimal disclosure level is relatively similar across firms.

Even if disclosure regulation provides some benefits due to real or financial externalities, agency costs, or economies of scale, these benefits are insufficient to justify disclosure regulation for two reasons: (1) the absence of regulation can still be preferred to "one-size-fits-all standards" (Admati and Pfleiderer, 2000); and (2) increased public information can also have detrimental effects. For example, mandating additional disclosure can reduce risk-sharing (e.g., Hirshleifer, 1971; Verrecchia, 1982; Diamond, 1985; Dye, 1990) and disclosure costs can reduce social welfare (e.g., Verrecchia, 1983). Moreover, mandating additional disclosure can reduce other market participants' information production, thus reducing the overall informativeness of market prices (e.g., Diamond, 1985; Fischer and Stocken, 2008; Guttman, 2010). Also, more transparency can be undesirable in agency settings (e.g., Christensen and Feltham, 2000; Gigler and Hemmer, 2004) and can facilitate collusion among agents.⁴⁹

4.1.2. Optimal accounting standards

Whether a particular accounting standard is desirable depends on how it affects market participants' decisions and welfare. Therefore, one needs to understand how accounting measurement and disclosure regulation affect risk-sharing among investors and firms' real decisions.⁵⁰ While the literature has progressed in recent years with respect to the economic consequences of specific accounting standards, numerous questions still remain unanswered. We discuss the progress made from a theoretical perspective with special focus on accounting conservatism and fair value accounting.⁵¹

4.1.2.1. Conservative accounting. One prevalent characteristic of accounting information is conservatism, i.e., a higher degree of verification for gains than for losses (Basu, 1997; Watts, 2003a, 2003b).⁵² Conservative accounting is based on the idea that, absent asymmetric verification, losses reported by management are informative even if they cannot be verified by an outside party because of management's disincentives to report bad news. In contrast, gains reported by management are considered to be less informative because of management's incentives to report good news. As a result, requiring asymmetric verification of gains versus losses limits management's ability to opportunistically bias asset values and earnings upwards (Watts, 2003a, 2003b).⁵³

Conservatism can result from "conservative" accounting standards as well as from reporting choices of individual firms.⁵⁴ For example, standards can prescribe valuing certain assets at the lower of cost or market. But managers are also able to

⁴⁷ However, Vives (1984) shows that effects of disclosure regulation on social welfare are sensitive to the type of competition (Cournot versus Bertrand competition; substitutes versus complements) and that disclosure regulation can also result in social welfare losses. This highlights one of the challenges regulators face when designing (uniform) disclosure standards.

⁴⁸ For a review of the agency literature in accounting, see Armstrong et al. (2010).

⁴⁹ The detrimental effects of public information on the behavior of agents are well known in the context of bank runs or currency attacks. Morris and Shin (2002) and Allen et al. (2006) show that increased transparency can give rise to similar inefficiencies in equity markets. However, public disclosure can also increase price efficiency because it reduces uncertainty about underlying fundamentals (Gao, 2008).

⁵⁰ There are separate streams of literature that examine the consequence of additional public information on investors' trading behavior (e.g., Brunnermeier, 2005) and on firms' cost of capital (e.g., Easley and O'Hara, 2004; Zhang, 2001; Easley et al., 2002; Lambert et al., 2007; Christensen et al., 2008).

⁵¹ In addition, Dye and Sridhar (2008) study the trade-off between allowing firms to better reflect the firm-specific underlying economics in their accounting reports at the cost of introducing idiosyncratic bias ("flexible accounting standards") against restricting firms to ignore firm-specific components of their economic transactions at the benefit of limiting the idiosyncratic bias in accounting reports ("rigid accounting standards").

⁵² For a review of the literature on conservatism, see Watts (2003a, 2003b) and Kothari et al. (2010).

⁵³ For models that include management's ability to misreport see, e.g., Chen and Zhang (2007) and Gow (2008).

⁵⁴ When managers engage in misrepresentations, the "de jure" standard can differ from the "de facto" standard (see Dye, 2002). The standard setter rationally anticipates the firms' misrepresentation and chooses an official standard such that taking the misrepresentation into account the de facto standard

choose the level of conservatism within the limits set by the accounting standards by, for example, choosing fair value instead of historical cost accounting for financial assets and liabilities. Finally, even in the absence of accounting choices, the degree of conservatism as reflected in accounting standards can differ from the degree of conservatism of actual accounting reports due to management's incentives to manipulate accounting reports (e.g., Dye, 2002; Chen and Zhang, 2007). Despite these elements of choice, we discuss conservatism in the context of mandatory disclosure/disclosure regulation because (i) conservatism often requires a mechanism that allows managers to credibly commit to withholding good news⁵⁵ or to commit to an accounting information system that implements a higher degree of verification for gains than for losses and regulation can serve as such a commitment mechanism; and (ii) conservatism characterizes several accounting standards in practice.

Even though the concept of conservatism seems intuitive, the informational properties of conservative accounting numbers are less straightforward than they appear.⁵⁶ For instance, current models differ in whether they consider a conservative information system as one in which financial reports that contain good news are more informative than reports that contain bad news, or vice versa. In Guay and Verrecchia (2006), Gow (2008), Caskey and Hughes (2009) and Göx and Wagenhofer (2009), more conservative accounting corresponds to reports of low earnings/asset values being more informative than high earnings/asset values. In contrast, in Chen and Zhang (2007) and Gigler et al. (2009), more conservative accounting corresponds to high reports being more informative than low reports. Of course, whether information systems that generate high reports that are more informative than low reports are considered to be conservative or aggressive has implications for the interpretation of the models' predictions. In our view, obtaining a better understanding of the informational properties of conservative accounting numbers requires joint consideration of conservatism and aggregation, another salient feature of accounting. The reason is that ignoring good news when such news lacks verifiability can reduce the informativeness of accounting reports. This is always true when gains and losses are reported separately. However, when gains and losses are aggregated, less informative gains offset more informative losses such that the aggregate report may overall be less informative when gains are recognized than when gains are not recognized.

Whether conservatism as a feature of financial reporting systems is desirable depends on what accounting numbers are used for, i.e., on the specific decision context (Demski, 1973). Watts (2003a, 2003b) argues that conservative accounting provides more useful information in cases in which contracts are designed to make agents' payoffs asymmetric relative to the firm's value/earnings (e.g., debt contracts and executive compensation contracts). While it seems intuitively appealing that conservatism enhances the use of accounting information for contracting purposes, theoretical models do not uniformly support this argument. For instance, Gigler et al. (2009) derive conditions when conservatism reduces the efficiency of debt contracts. The main reason why these findings contradict common perception is that (debt) contracts are endogenous and will be designed differently when the accounting system is either more or less conservative (Gigler et al., 2009; Gow, 2008). However, some other models predict, consistent with common intuition, that conservative accounting provides more useful information for contracting purposes. For instance, Caskey and Hughes (2009) study a setting in which shareholders have post-contracting discretion in project selection and find that conservative accounting can help mitigate the stewardship problem between debtholders and shareholders.

Whether conservative accounting standards are desirable from a social welfare perspective is an open question even if conservatism increases the usefulness of accounting information for contracting purposes. The reason is twofold. First, conservatism may cause accounting information to be less useful for valuation purposes because there is likely to be a trade-off between timeliness and verifiability of accounting information. Second, conservatism is likely to have additional indirect implications for the corporate information environment through firms' earnings management decisions and voluntary disclosure decisions. For example, Gigler and Hemmer (2001) show that firms with relatively more conservative accounting are less likely to make timely voluntary disclosures. Evaluating the extent to which conservatism is a desirable feature of accounting regimes requires a comprehensive perspective that considers these indirect effects of conservatism on firms' information environments and, ultimately, on firms' ability to generate cash flows.⁵⁷

4.1.2.2. Fair value accounting and hedge accounting. Continuing the theme that the importance of accounting stems from its effects on agents' economic choices and their implication for cash flow distributions, we next consider two forms of "neutral" accounting: (1) historical cost accounting that is agnostic of all changes in value (i.e., without the lower-of-cost-or-market

(footnote continued)

is efficient. Related, Dye and Sridhar (2004) derive conditions under which reports that aggregate "soft" information with "hard" information are more informative than when soft and hard information are reported separately.

⁵⁵ See, e.g., Göx and Wagenhofer (2009) and the discussion in Section 3.1.5.

⁵⁶ Clearly, downward biased asset values or earnings are insufficient to characterize the informational properties of a conservative accounting system because biased reports do not necessarily affect the information that the reports convey. Consider the following example: assume that the value of an asset is distributed uniformly between $A - 10$ and $A + 10$ where A is unknown to outsiders and that "conservative" accounting reports the lowest possible value (i.e., $A - 10$) while "neutral" accounting reports expected value (i.e., A). In this case, the two standards are informationally equivalent and contracts can provide the same incentives and allocation of property rights independent of the accounting standard that has been implemented.

⁵⁷ Suijs (2008) provides a justification of conservative accounting standards in the absence of debt contracts based on risk-sharing between generations of investors. In a model of overlapping generations of risk-averse investors, he finds that risk-sharing among generations is best achieved by an information system for which accounting reports conveying bad news are more informative than accounting reports conveying good news. The reason is that if bad news reports are more informative, the variance of future cash flows conditional on bad news reports is lower, leading to a lower risk-premium in the firm's stock. This reduces the variability in stock price, and as a result, also reduces the ex-ante risk premium.

rule) and (2) fair value accounting that reflects all changes in value. While historical cost accounting and fair value accounting both treat good news and bad news symmetrically, they differ in terms of their informational properties. When accounting numbers affect agents' real decisions, historical cost and fair value accounting may lead to very different outcomes.

[Allen and Carletti \(2008\)](#) and [Plantin et al. \(2008\)](#) compare the two versions of neutral accounting and study their implications for capital markets. The models highlight the possibility of decreasing prices forcing sales that drive prices down even further. These downward spirals of prices have gained much attention in the recent economic crisis. The models, as well as the recent developments in capital markets, have illustrated implications of accounting numbers for firms' actual cash flows (i.e., "real effects") and emphasized the importance of SFAS 157 excluding prices that are driven by forced transactions as a basis for mark-to-market accounting.

[Reis and Stocken \(2007\)](#) compare the effects of historical cost and fair value measurement applied to a specific asset category, namely inventory, in a duopoly in which each competitor reports the value of its inventory (under either historical cost or fair value measurement). Because production costs are random, the rival can perfectly infer the other firm's production volume when inventory is reported at fair value but not when it is reported at historical cost. As a result, firms can better coordinate their prices and obtain higher expected profits when inventory is measured at its fair value. The model also illustrates one of the challenges of fair value accounting. In settings of imperfect competition, the fair value depends on the firms' strategic choices and on the strategic interaction among competitors. Determination (and auditing) of fair values therefore requires detailed knowledge of all aspects of firms' competitive environments.

As a final example of specific accounting standards and their implications for firms' cash flow distributions, we consider accounting for hedge transactions. Accounting for hedge transactions is related to fair value accounting insofar as marking the derivative position of the hedge to market can reveal firms' exposure to the underlying risk. Alternatively, hedge accounting standards can provide the option not to adopt fair-value accounting for the hedge position such that investors learn only a firm's aggregate risk exposure but not the exposure due to hedges. However, when hedge accounting standards regulate whether hedge-related income has to be included in Net Income or in Other Comprehensive Income (e.g., SFAS 133) but do not change the information revealed by financial statements, theoretical models often stall. The models studying hedge accounting, therefore, only consider accounting standards that alter the information disclosed to the public.

In the context of accounting for hedge transactions, accounting information is primarily used to evaluate management ability ([DeMarzo and Duffie, 1995](#)), to value the firm ([Sapra, 2002](#)), or to assess future demand ([Kanodia et al., 2000; Hughes et al., 2002](#)). When alternate hedge accounting standards reveal different information, they can lead to different economic decisions because management's utility is linked to the information revealed. Economic effects are likely to comprise management's decision to hedge underlying risk exposures (e.g., [DeMarzo and Duffie, 1995](#)) as well as management's production decisions (e.g., [Kanodia et al., 2000; Hughes et al., 2002; Sapra, 2002](#)). [Kanodia et al. \(2000\)](#), [Hughes et al. \(2002\)](#), and [Sapra \(2002\)](#) have significantly enhanced our understanding of hedge accounting standards by capturing salient real effects of alternative hedge accounting standards. In particular, these models allow the hedge accounting standard to affect both firms' risk management strategy and production decisions at the same time.⁵⁸ As a result, the social desirability of hedge disclosure depends on the social costs of production distortions compared to the social costs of risk management distortions. Whether regulation mandating the disclosure of future contracts is necessary depends on whether the privately informed firm benefits from its information being public. If the firm's current shareholders/management were to benefit from the information being public, hedge accounting standards are unlikely to have real effects because management would choose to voluntarily disclose its information (assuming it can credibly do so) even in the absence of disclosure regulation. However, if mandatory disclosure were to reduce the social costs from the firm's own distorted production or risk management decisions, disclosure regulation can improve social welfare.

4.1.3. Summary of models of disclosure regulation and avenues for future research

Most theoretical research advances have been made in identifying rationales for disclosure regulation and comparing the effect of different accounting standards (e.g., conservative versus neutral accounting) on risk-sharing and operating decisions in specific environments. Despite this progress, the question of why disclosure regulation is so pervasive remains largely unanswered. We conjecture that this is, at least partly, explained by the normative nature of the question, the difficulty in designing tractable models that capture both firms' financial and real decisions, and the context-specific nature of models' predictions. Further analysis of accounting standards and disclosure regulation is important for two related reasons. Corporate disclosures have the potential to significantly affect countless operating and financing decisions and predicting such effects is a complex task when multiple strategic players interact. For instance, intuitively, it may seem that more precise information is always desirable. But more information is not always desirable when strategic players interact. [Kanodia et al. \(2005\)](#) illustrate that outcomes can be worse with one kind of information asymmetry than with multiple kinds of information asymmetries. This yields important considerations for both standard setters and theorists because conclusions drawn from a model might depend critically on what (combination of) imperfections are considered (see also [Plantin et al., 2008; Hemmer, 2008](#)).

⁵⁸ In contrast, earlier studies did not consider the effect of hedge accounting standards on firms' production choices (e.g., [DeMarzo and Duffie 1995; Melumad et al., 1999](#)).

To improve our understanding of disclosure regulation, research must obtain further insights into three related aspects of mandatory disclosure:

Effect of diversity among firms: The constraining impact of uniform disclosure standards on diverse firms must be considered. Naturally, it is easier to derive optimal disclosure standards in an economy of identical and stable firms. However, in practice, firms differ and change over time (with respect to their underlying economics and the materiality threshold used to determine disclosure). In order to improve our understanding of accounting standards, it is important that we consider how optimal disclosure regulation is designed when such regulation applies to a diverse set of firms.

Effects of disclosure regulation on operating and financing decisions: Because interdependencies among firms' disclosure and operating and financing decisions are too numerous to capture in one model, studying disclosure regulation requires that we identify the most important aspects of economic decisions that are interrelated with firms' disclosure policies. For instance, if inventory were no longer measured using historical costs but fair values, firms' strategic interactions with competitors would be affected (Reis and Stocken, 2007) and firms may choose to outsource less. Moreover, investors (in their role as principals) may change the incentive structure in response to the new information environment and market participants may change their decision to acquire information (which in turn will affect various other real decisions). While one could arbitrarily extend the list of interdependencies between disclosure regulation and economic decision making, new models must identify the most important interactions in order to provide insights into first-order effects that can be tested empirically.⁵⁹

Effect of disclosure regulation on different stakeholders: Studying the welfare effect for different stakeholder groups will provide some insight into what kind of disclosure regulation is desirable to fulfill regulators' objectives.⁶⁰ For instance, if regulators are particularly concerned about less sophisticated investors, analyzing the welfare effects of disclosure for different groups of investors will provide further insight into the social desirability of disclosure regulation.⁶¹ One of the main challenges in such an analysis will be to design information structures that are reasonably descriptive of less sophisticated investors' informational disadvantage compared to institutional/sophisticated investors. In addition, while models will be able to illustrate situations that are more or less likely to benefit from specific disclosure regulation, most settings will involve trade-offs that need to be quantified empirically. Theoretical models that can guide empirical tests will, therefore, assist in improving our understanding of the desirability of accounting standards.

4.2. Recent empirical evidence on the economic consequences of disclosure regulation

Since the turn of the century, two major disclosure regulations were passed. In 2000, Congress passed Regulation Fair Disclosure (Reg. FD), mandating that firms cannot disclose material information selectively. In July 2002, Congress passed the Sarbanes–Oxley Act of 2002 (SOX), considered the most far reaching securities legislation since the Securities Acts of 1933 and 1934. We discuss the empirical evidence on each of these regulations below.

4.2.1. Regulation fair disclosure

By prohibiting managers from disclosing and providing material information to select capital market professionals, financial analysts, and/or institutional shareholders, Reg. FD was intended to "level the playing field" among investors and increase the confidence in public capital markets.⁶² In one of the first studies evaluating the impact of Reg. FD, Heflin et al. (2003) find no evidence of an increased return volatility around earnings announcements, a decrease in the "speed" with which the pre-announcement stock price converges to the post-earnings announcement levels, or significant deterioration in analyst forecast accuracy. These results contradict the criticism that Reg. FD would drastically reduce the level of information available to capital market participants. In contrast, Wang (2007) reports that after the passage of Reg. FD, firms with lower information asymmetry and higher proprietary costs do, in fact, reduce or eliminate issuing earnings guidance. However, Bushee et al. (2004) provide evidence that firms' disclosures remain constant or even increase after the passage of Reg. FD. Examining the sign of information disclosed, Kothari et al. (2009) find that, on average, firms have reduced the withholding of bad news relative to good news after the passage of Reg. FD.

The empirical evidence on other aspects of Reg. FD is mixed as well. Gintschel and Markov (2004) report a significant reduction in the price impact of analyst earnings forecasts and stock recommendations, suggesting that information production by financial analysts changed around Reg. FD. Their evidence leads them to conclude that Reg. FD has been effective in curtailing selective disclosures. Mohanram and Sunder (2006) find that individual financial analysts appear to reduce coverage for well-followed firms but increase coverage of firms that were less followed prior to the passage of Reg. FD. Analysts who had preferential links with firms that they covered, such as analysts from large brokerage houses, tend to have greater forecast accuracy pre-Reg. FD. However, these analysts are unable to sustain their forecasting superiority in the

⁵⁹ This interdependency has also implications for empirical studies. When accounting standards change management's real (including hedging) decisions and investors' risk-sharing abilities, association studies that examine the correlation of stock prices with asset values computed under alternative accounting standards are unlikely to resolve the question of which standard is more desirable (Kanodia, 1999).

⁶⁰ As discussed in Section 4.1, regulators' objective might be to maximize social welfare or to maximize their own utility (presumably from redistributing wealth among different groups of stakeholders).

⁶¹ For instance, the Securities Exchange Act of 1934 mentions "investor protection," and recent regulations in the U.S. (e.g., Regulation Fair Disclosure, the Sarbanes–Oxley Act) aim to "level the playing field" between informed/sophisticated and uninformed/unsophisticated investors.

⁶² Reg. FD does not apply to credit rating agencies as discussed in Jorion et al. (2005).

post-Reg. FD environment, suggesting a leveling of the information playing field among financial analysts. Overall, Mohanram and Sunder's results reflect a trend towards greater reliance on idiosyncratic information discovery on part of the financial analysts in the post-Reg. FD period.

The findings in the above studies need to be interpreted with caution due to at least two confounding factors. First, there was a significant reduction in analyst coverage and research funding following the Global Settlement in 2003. Second, the financial analyst and investment bank industries underwent numerous mergers and acquisitions during this time period (for a detailed discussion, see Wu and Zang, 2009).

There is also conflicting evidence on whether Reg. FD led to a decrease in information asymmetry among investors. Early studies, such as Bushee et al. (2004), Gintschel and Markov (2004), Eleswarapu et al. (2004) and Chiayachantana et al. (2004), provide evidence of a decrease in bid-ask spreads after Reg. FD. Recent papers find the opposite. For example, Sidhu et al. (2008) suggest that the adverse selection component of the bid-ask spread has increased after the passage of Reg. FD. Sidhu et al. (2008) argue that Reg. FD has curtailed the flow of information from firms to public capital markets and that private information becomes longer-lived. Thus, they predict an increase in the adverse selection component of the bid-ask spread. Consistent with this assertion, they find an increase in the adverse selection cost component of the bid-ask spread of approximately 36% for a sample of NASDAQ stocks in the period surrounding the implementation of Reg. FD. Based on this evidence, they conclude that Reg. FD failed to achieve one of its desired ex-ante objectives in that this regulation has led to an increase in the expected cost of information asymmetry.

Jorion et al. (2005) compare the impact of Reg. FD on credit rating agencies that are exempted from the restrictions of Reg. FD to those of equity analysts. They find that relative to earnings forecasts, the credit rating changes have become more informative in the post Reg. FD period. This evidence is consistent with the market assuming that firms changed the avenue of private information dissemination to adhere to the regulations of Reg. FD.

Duarte et al. (2008) document no change in the cost of capital for AMEX and NYSE firms and a small increase in the cost of capital for NASDAQ firms following Reg. FD. In contrast, using ex-ante measures of the cost of equity capital (i.e., implied cost of capital), Chen et al. (2010) find that the cost of equity capital declines in the post-Reg. FD period relative to the pre-Reg. FD period, on average, for a broad cross-section of U.S. firms. They also find that the decrease in the cost of equity capital post-Reg. FD is concentrated in medium and large firms but is not significant for small firms.

Francis et al. (2005a, 2005b) re-examine the effects of Reg. FD on measures of public information (returns volatility and trading volume) and analyst information (forecast dispersion, forecast accuracy, and the informativeness of analyst reports) using American Depository Receipts (ADRs) that are traded in the U.S. but are exempt from the regulation. Their results suggest that contemporaneous events and not Reg. FD affected the availability of public information. However, their evidence implies that the informativeness of analyst reports declined for U.S. firms compared to ADRs. Based on their findings, Francis et al. (2006) conclude that only the decrease in analyst report informativeness can be uniquely attributed to Reg. FD, consistent with the findings of Jorion et al. (2005).

Overall, these studies suggest that while Reg. FD may have leveled the playing field, it also is likely to have reduced the private information available to financial analysts. However, there were numerous institutional changes that occurred during the same period, such as the reduction in analyst coverage and mergers and acquisitions in the investment banking industries (see Wu and Zang, 2009). Thus, it unclear whether the observed effects in these studies are due to Reg. FD per se or these confounding factors.

4.2.2. Sarbanes–Oxley Act of 2002

Following a number of highly publicized governance failures that raised concerns about the integrity of the accounting information provided to investors, Congress passed SOX on July 30, 2002. The head of the AICPA commented that SOX "contains some of the most far-reaching changes that Congress has ever introduced to the business world" including an unprecedented (partial) shift in the regulation of corporate governance from the states to the federal government. Although SOX contains sweeping changes, the consequences of the law and subsequent regulatory changes have yet to be ascertained.

Zhang (2007) reports that U.S. firms experienced a statistically significant negative cumulative abnormal return around key SOX legislative events. In contrast, Jain and Rezaee (2006) document a positive (negative) abnormal return at the time of several legislative events that increased (decreased) the likelihood of the passage of SOX. The latter result is consistent with the notion that SOX's benefits outweigh its costs to shareholders. However, they also find that the market reaction is more positive for firms that are more compliant with the provisions of SOX prior to its enactment. In a related study, Li et al. (2008) examine stock price reactions to legislative events surrounding SOX, and focus on whether such stock price effects are related cross-sectionally to the extent firms had managed their reported earnings. The results indicate significantly positive abnormal stock returns associated with SOX events, and the analyses reveal evidence of a positive relation between SOX event stock returns and the extent of earnings management. Li et al. interpret their results as consistent with investors' anticipating that SOX would constrain earnings management and enhance the quality of financial statement information, particularly for those firms who had managed their earnings in the past.

What can we then conclude given these conflicting findings? The main differences in the results documented in the above studies relate to research design choices, in particular the specific dates that are treated as being key "SOX related event dates." Zhang (2007) claims that Jain and Rezaee (2006) examine events leading to SOX, but those events are only a subset of events that are examined in her study. Further, she argues that the market responds only to the unexpected portion of the

overall news. Thus, if the final rules reveal lower compliance costs for firms than previously expected, one will observe positive abnormal returns around such announcements, even though the investors will consider these final rules to be costly. Based on these reasoning, [Zhang \(2007\)](#) examines the cumulative abnormal returns around all the SOX events, not just the final legislative ones examined by [Jain and Rezaee \(2006\)](#).⁶³ Further, Zhang argues that the cross-sectional tests in Jain and Rezaee provide little support for their hypothesis that SOX was beneficial, although she provides little evidence for these claims. To be sure, a more positive market reaction for firms that are more compliant with the provisions of SOX prior to its enactment merely indicates that at least for some firms, the implementation and compliance costs imposed by SOX are non-trivial.

In the end, the main difference between [Zhang \(2007\)](#) and these two studies is that Zhang does not include the date of July 30, 2002, the presidential approval date, as a major SOX related event. Both [Li et al. \(2008\)](#) and Jain and Rezaee (2006) find a significant positive cumulative return for July 29–July 31. Zhang argues that these positive returns are likely explained by the passage of the Trade Act or the Homeland Security bill in the House. She argues that most, if not all, of the significant positive return on July 29 was unlikely related to SOX. As such, the positive return on this date should not be a part of any test of the market reaction to SOX.

[Cohen et al. \(2008\)](#) document that accrual-based earnings management increased steadily from 1987 until the passage of SOX in 2002, followed by a significant decline after the passage of SOX. Conversely, the level of real earnings management activities declined prior to SOX and increased significantly after the passage of SOX. Together, these findings suggest that firms switched from accrual-based to real earnings management methods after the passage of SOX. This evidence has implications for the effect of mandatory changes introduced by SOX on the overall financial reporting environment of publicly traded firms in the U.S.⁶⁴

4.2.3. Summary of the economic consequences of recent disclosure regulation and avenues for future research

Overall, the empirical evidence with regards to the effect of both Reg. FD and SOX are somewhat mixed. However, most of the empirical papers emphasize the existence of both costs and benefits to firms as well as to other constituents, substantially increasing our understanding of how to address and examine the important question of what are the economic consequences of changes in U.S. capital market regulation. However, some unanswered questions still remain with regards to the underlying economics of capital market regulations:

1. Why is disclosure regulation present in advanced and developed economies such as the U.S.? What are the specific market failures in the U.S. capital markets that cause regulation and sweeping changes in corporate governance policies?
2. Does disclosure regulation address the identified market failures and externalities?
3. What are regulators' objectives and incentives? The political process underlying regulation, especially in the U.S., is an important determinant of the final rules and outcomes.
4. What are the aggregate costs associated with capital market regulations? While regulations are likely to have economic benefits, how do these benefits compare to the expected costs of the regulation? Are there instances where the costs outweigh the desired benefits? A recent example is SOX – was this regulation too costly from a social welfare perspective? Additional evidence and refinements to research design choices are needed to address these important issues.

4.3. Disclosure and reporting of non-GAAP numbers and supplementary information

Research of disclosure of non-GAAP accounting numbers examines the relative informativeness and persistence of alternative performance measures and evaluate their usefulness to capital market participants. We begin this section by discussing the incentives to disclose non-GAAP accounting numbers.

4.3.1. Disclosure of non-GAAP numbers

Companies' quarterly and annual earnings announcement press releases generally include detailed disclosures in addition to bottom-line earnings per share. Firms use supplemental disclosures to explain and provide detailed analysis of current reported earnings to investors. Firms regularly disclose full or partial balance sheets, income statements and/or cash flow statements, segment reporting information, and other financial statement details (e.g., [Chen et al., 2002](#); [Francis et al., 2002](#)). In addition, firms have also been increasingly supplementing the disclosures of traditional earnings numbers calculated based on GAAP with modified and adjusted figures that deviate from GAAP by excluding certain line items from the income statement.

The literature identifies two reasons managers report non-GAAP earnings. First, managers can attempt to influence analysts' assessment of performance by excluding expenses and certain charges, obscuring the firms' true performance and allowing them to meet or beat analyst forecasts (e.g., [Bowen et al., 2005](#); [Brown and Caylor, 2005](#)). This behavior has been

⁶³ [Li et al. \(2008\)](#), however, also exclude certain important dates around SOX from their analysis.

⁶⁴ Recent papers examine issues related to changes in internal control deficiencies around SOX. See [Dechow et al. \(2010\)](#) for a discussion and critique of this research.

referred to as *opportunistic* non-GAAP earnings disclosures (e.g., Lougee and Marquardt, 2004; Easton, 2003). This type of behavior has been a concern for regulators and standard setters, eventually leading to new regulation that we discuss below.

A potential example of managers' opportunistic behavior is provided by Bowen et al. (2005) who examine the relative emphasis placed on non-GAAP measures within the earnings press release. They find that firms emphasize the metric that portrays the most favorable firm performance. This relates to an earlier study by Schrand and Walther (2000) that documents that managers have incentives to strategically choose an earnings benchmark from a prior period. The evidence in that paper shows that managers strategically lower the prior-period earnings benchmark against which current-period reported earnings are compared in quarterly earnings announcements through their decisions to separately report the components of prior-period earnings. This strategy allows managers to discuss the most favorable change in net income over the comparable quarter of the prior year.

Second, firms may also disclose non-GAAP earnings to communicate more effectively permanent earnings net of what they regard as transitory items, thus better communicating the firms' true long-run performance. For example, Bradshaw and Sloan (2002) and Lougee and Marquardt (2004) provide evidence that investors find non-GAAP earnings more informative compared to GAAP figures, particularly when the informativeness of GAAP earnings is low.

Numerous studies have examined the over-time changes of the properties of GAAP and non-GAAP numbers. For example, Landsman and Maydew (2002) document that the information content of quarterly earnings announcements, measured by abnormal trading volume and abnormal stock return volatility around earnings announcements, has increased in the past 30 years. Francis et al. (2002) examine three competing explanations for the Landsman and Maydew (2002) findings: increases in the absolute amount of unexpected earnings at earnings announcements, increases in the intensity of investors' average reaction to unexpected earnings, and an increase over time in the amount of concurrent disclosures in firms' earnings announcements press releases. Francis et al. (2002) conclude that the expanded concurrent disclosures in firms' earnings announcements press releases, in particular the inclusion of detailed GAAP based income statement information, explain the increased informativeness of quarterly earnings announcements over time. However, Collins et al. (1997, 2009) show that the increased inclusion of "Street" earnings is responsible for the observed increase in the informativeness of earnings over time, thus providing an alternative explanation for the Landsman and Maydew (2002) findings.

Most studies use the actual earnings reported by commercial forecast data providers such as I/B/E/S to proxy for "Street" (i.e., non-GAAP) earnings (e.g., Bradshaw and Sloan, 2002; Brown and Sivakumar, 2003; Doyle et al., 2003).⁶⁵ However, as Bhattacharya, N. et al. (2003), Bhattacharya, U. et al. (2003), Bradshaw (2003) and Easton (2003) note, I/B/E/S earnings are different from pro forma earnings that managers report in press releases. "Pro forma earnings" refers to the general term used for modified earnings measures that deviate from GAAP. Indeed, Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) document significant differences between I/B/E/S earnings (reflecting exclusions made by I/B/E/S) and pro forma earnings (reflecting exclusions made by managers). We discuss this issue in more detail below.

Several studies investigate the informativeness and relevance of both GAAP and non-GAAP earnings numbers over time. Bradshaw and Sloan (2002), for instance, report that over the past twenty years there has been a significant increase in the frequency and magnitude of instances where I/B/E/S and GAAP earnings differ. In addition, they also report a significant increase in the difference between the earnings response coefficients (ERCs) for GAAP and I/B/E/S earnings. This finding is consistent with either (1) investors increasingly relying on "Street" earnings, as more transitory components are excluded to arrive at a more informative earnings figure, or (2) investors having become increasingly fixated on "Street" earnings, as managers opportunistically exclude more negative earnings components in an effort to realize higher valuations. In a related study, Brown and Sivakumar (2003) document that "Street" earnings are more predictive of future earnings, have a higher association with stock prices, and have a higher correlation with abnormal stock returns.

With the growing prominence of pro forma earnings as alternative summary measures of financial performance, researchers have become increasingly interested in examining properties of pro forma earnings relative to GAAP earnings and I/B/E/S earnings. In one of the first studies on this topic, Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) examine whether market participants perceive pro forma earnings to be more informative and more persistent than GAAP operating earnings. They contribute to this line of research in a meaningful way by analyzing a sample of 1,149 actual earnings announcements in which managers disclose a pro forma earnings number that deviates from GAAP. Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) show that the pro forma earnings per share numbers differ significantly from earnings per share based on either GAAP or I/B/E/S earnings. In addition, the authors find that pro forma earnings are more persistent and more informative than GAAP operating earnings. However, they also document that I/B/E/S earnings are more informative than pro forma earnings.

In his discussion of Bhattacharya, N. et al. (2003), Bhattacharya, U. et al. (2003), and Bradshaw (2003, p. 323) concludes that: sample selection and the definition of the independent variables used in the informativeness and persistence test "inhibit what we can infer regarding the relative informativeness or persistence among these earnings measures." Specifically, as noted in Bradshaw (2003), Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) sample selection criteria are biased towards a sample in which the difference between pro forma and I/B/E/S earnings is large.

⁶⁵ Exceptions that instead use pro forma earnings figures collected from press releases include Bhattacharya, N. et al. (2003), Bhattacharya, U. et al. (2003), Lougee and Marquardt (2004), and Johnson and Schwartz (2005).

Second, and more importantly, Bradshaw notes that all the tests in Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) use the same expectation variable, based on I/B/E/S earnings. As a result, the regression used in Bhattacharya, N. et al. (2003) and Bhattacharya, U. et al. (2003) suffers from a classic error-in-variables problem, biasing the results in favor of the informativeness of I/B/E/S earnings.

A related study that investigates the informational properties of pro forma earnings is Doyle et al. (2003). Using I/B/E/S earnings as a proxy for pro forma earnings as reported by management, Doyle et al. (2003) conclude that the market does not appear to appreciate the future cash flow implications of the excluded expenses; rather, the market appears to be systematically fooled by firms' use of pro forma earnings. However, similar to Bradshaw's (2003) critique of Bhattacharya, N. et al. (2003), Bhattacharya, U. et al. (2003), and Easton (2003) points out that I/B/E/S earnings cannot be used as a proxy for pro forma earnings reported by management given the difference between these two performance measures. In summary, the debate over whether investors are better informed by non-GAAP figures or pro forma earnings numbers is still not settled (see also Berger, 2005).

Using an experimental setting, Frederickson and Miller (2004) show that earnings announcements that included non-GAAP earnings (which, consistent with the evidence of Lougee and Marquardt, 2004 and Johnson and Schwartz, 2005 exceeded the corresponding GAAP earnings) lead non-professional investors (i.e., MBA students) to value the underlying securities higher than when only (the lower) GAAP earnings were disclosed. In contrast, the valuations of professional investors (i.e., analysts) were not affected by the inclusion of pro forma earnings. How these different interpretations of GAAP and non-GAAP earnings manifest in price is an open empirical question.

4.3.2. Discussion of the empirical evidence: research design issues

Bradshaw (2003), Berger (2005), Easton (2003), and Abarbanell and Lehavy (2007) discuss research design problems associated with some of the specific studies discussed above. Specifically, as mentioned above (i.e., Bradshaw, 2003), it is generally argued that the GAAP versus "Street" literature is plagued by measurement errors caused by a mismatch between the definitions of realized and expected earnings. Two specific measurement errors have been noted: (1) the *I/B/E/S Adjustment Error*, which arises because I/B/E/S uses different definitions for actual and forecasted earnings for the pre-1992 period, and (2) the *GAAP Expectation Error*, which arises because researchers use I/B/E/S earnings forecasts as a proxy for GAAP earnings expectations.

Building on the above, Cohen et al. (2007b) document a downward bias in "Street" ERCs arising from an inconsistency between the I/B/E/S definition of actual and forecasted earnings (i.e., *I/B/E/S Adjustment Error*) in the early 1990s, before I/B/E/S undertook a regime shift to correct the error, and (2) a downward bias in GAAP ERCs arising from using I/B/E/S forecasts to proxy for GAAP earnings expectations (i.e., *GAAP Expectation Error*). Their findings suggest that future research must consider measurement errors in GAAP and "Street" earnings surprises when analyzing GAAP and "Street" ERCs, at a minimum performing robustness tests and checking whether the documented results are sensitive to using only post-1992 data.

To the extent there has been a temporal change in the correspondence between analysts' forecasts and the actual earnings reported on analyst forecast databases, researchers using this data must be cognizant of the properties of the data and how these properties affect research designs and inferences. As an example of how analyst forecast data might inadvertently affect inferences drawn by researchers using this data, consider recent investigations of the changing time-series properties of analysts' forecast errors (e.g., Matsumoto, 2002; Brown, 2001; Brown and Taylor, 2005). In these studies, forecast errors are calculated based on forecasts and actual earnings available on forecast databases. Over the past several decades, these data suggest an overall decline in the level of analyst optimism measured as an attenuation of historically systematic negative forecast errors.

Such evidence might be interpreted as an overall decline in the optimism of financial analysts, possibly due to downward guidance efforts by management (i.e., forecasted earnings per share has declined relative to actual earnings per share). However, as Bradshaw (2003) and Cohen et al. (2007a, 2007b) note, an alternative explanation for the decline in observed analyst forecast optimism is that the decline is attributable to increased efforts by the forecast data providers to ensure a correspondence between the earnings being forecasted and the actual earnings adjusted by them and tracked on their databases. Commercial data providers like I/B/E/S clearly have incentives to monitor actual earnings on their databases to increase the accuracy of that data, which would minimize forecast errors calculated from that data. It is plausible that the growth in the market's focus on earnings expectations has heightened these incentives.

Determining the exact quarterly earnings announcement date is another important issue that needs to be addressed. Recent evidence suggests that in certain cases the I/B/E/S report date is different from the Compustat report date.⁶⁶ For example, DellaVigna and Pollet (2009) report that the earlier of the I/B/E/S and Compustat dates is the most accurate date. A related issue is the need to control for the expected earnings announcement date as prior studies document that the stock market response is conditioned on deviations from the expected report date (e.g., Bagnoli et al., 2002; Cohen et al., 2008).

A limitation of the research design used in the studies examining the consequences of the SEC's regulatory intervention (which is inherent in virtually all research focusing on regulatory events) is the alignment of event and calendar time. In addition, it is challenging to identify a control group of firms that has not been affected by these regulatory changes to evaluate the effects of the SEC's interventions.

Until early 2003, no regulatory agency held the authority to monitor the disclosures firms included in their earnings announcements. While corporate managers often claim non-GAAP earnings disclosures help them convey permanent

⁶⁶ DellaVigna and Pollet (2009) document that when the two dates differ; there is only a one-day error between these two dates in most cases.

earnings, there has been much concern that managers also use non-GAAP earnings to opportunistically portray their performance. Section 401(b) of SOX (Public Law 107–204) directs the SEC to establish rules regulating “pro forma” (i.e. non-GAAP) earnings disclosures. Accordingly, the SEC proposed, in November 2002, and implemented in March 2003, new non-GAAP earnings disclosure rules. The new rules include Regulation G, amendments to Item 10 of Regulation S-K, and the addition of Item 12 to Form 8-K.⁶⁷

Some recent studies examine issues related to the nature of earnings announcement press releases in the new reporting environment and evaluate the economic consequences of Regulation G. Using a sample of firms disclosing pro forma earnings, Brown et al. (2008) find little change in earnings announcement timing in the pre- versus post-regulatory periods. In contrast, Pawlewicz (2009) reports that post-Regulation G, firms issued less timely earnings announcements. He also finds that investor reactions to the news contained in quarterly earnings announcements increased significantly after Regulation G. One potential interpretation of this result is that investors view earnings announcement disclosures to be more reliable and credible in the post-Regulation G period. These two studies seem to document conflicting results given differences in research design choices, mainly related to sample composition. Brown et al. (2008) base their analysis on a sample of actual press releases that contain a manager-adjusted pro forma figure whereas Pawlewicz (2009) analyzes the universe of all quarterly earnings announcements available on the intersection of COMPUSTAT and I/B/E/S.

Other related studies document an increase in the quality of both manager-adjusted and I/B/E/S-adjusted earnings information after this recent regulatory intervention. For example, Heflin and Hsu (2008) find that these recent regulations produced (1) modest declines in the frequency of special and other item exclusions from reported earnings, (2) a decline in the magnitude of the excluded item, (3) a modest decline in the probability that disclosed earnings figure meets or beats analysts' forecasts, and (4) a decline in the association between stock returns and forecast errors. The authors interpret their findings to suggest that, while the recent regulations reduced firms' use of non-GAAP earnings disclosures to improve performance perceptions, they also reduced firms' willingness to use non-GAAP earnings to convey permanent earnings.

In an earlier study, Marques (2006) addresses related issues. She examines the disclosure of non-GAAP financial measures under three different regimes: before the first SEC warning, between the warning and the adoption of Regulation G, and in the post Regulation G era. Using the quarterly press earnings releases of all firms included in the S&P500 index, she documents a significant decrease in the frequency of non-GAAP reporting after the SEC's intervention. She also finds that the value-relevance of non-GAAP earnings varies across reporting regimes within her sample. Since Marques (2006) includes all press releases from 2001 to 2003 for the S&P 500 index in her sample, the final sample is, by construction, biased toward the largest firms and limited in size, potentially limiting the generalizability of her results and inferences. In summary, Marques (2006) and Heflin and Hsu (2008) document that fewer managers release non-GAAP earnings in their earnings announcements press releases and that fewer managers are using non-GAAP earnings numbers to meet analyst forecasts.

Kolev et al. (2008), motivated by the empirical evidence in Marques (2006) and Heflin and Hsu (2008), address the costs and benefits of recent regulation changes more directly by examining the effect of the SEC's intervention on the relative quality of the exclusions from non-GAAP earnings. Kolev et al. (2008) define “high quality” exclusions as those that are more transitory; i.e., the “appropriate” items that are excluded from non-GAAP earnings. Overall, they find that there has been a significant increase in the quality of exclusions from non-GAAP earnings following the regulatory events governing non-GAAP reporting. While they document that the exclusions are still not perfectly transitory in the post-regulation period, they conclude that the SEC's intervention appears to have had the desired effect of mitigating the opportunistic use of non-GAAP earnings numbers. However, as with the research evaluating the effects of SOX, some caution is warranted as one cannot draw specific causal statements from the above results. These studies add to the growing literature on the consequences of disclosure regulation, a literature that Healy and Palepu (2001, p. 412) characterized in their survey paper as “virtually nonexistent.”

4.3.3. Summary of the disclosure and reporting of non-GAAP numbers and supplementary information and avenues for future research

Much progress has been made towards understanding firms' disclosure and reporting incentives of non-GAAP numbers and supplementary information and the subsequent consequences. The evidence presented in the studies we reviewed in this section is helpful in evaluating the over-time properties and trends, especially the informativeness and usefulness of non-GAAP earnings and supplementary information, in shaping the overall corporate reporting environment.

The introduction and implementation of new non-GAAP earnings disclosures rules, including Regulation G, amendments to Item 10 of Regulation S-K, and the addition of Item 12 to Form 8-K provide opportunities for future research. We encourage researchers to use the new SEC reporting regimes to study whether the information content and usefulness of periodic reports (i.e., 10-Ks and 10-Qs) changed as a result of the more detailed and expansive timely 8-K disclosures. A recent study by Lerman and Livnat (forthcoming) takes a step in this direction and examines the market reactions to 8-Ks filed under the new

⁶⁷ Regulation G mandates that public disclosures containing a non-GAAP earnings number (1) must contain the most directly comparable GAAP number, (2) must contain a clearly understandable quantitative and detailed reconciliation of the non-GAAP number to the most directly comparable GAAP number, and (3) may not present non-GAAP earnings in ways that mislead investors. In addition, Item 12 of Form 8-K requires that companies file a Form 8-K within 5 business days of any public disclosure of annual or quarterly operating results. The form must include the text of the public disclosure and, if the public disclosure contains a non-GAAP financial measure, the 8-K must (1) present the most directly comparable GAAP measure with equal or greater prominence, (2) disclose the reasons why management believes the non-GAAP measure provides investors useful information, and (3) describe whether and how management uses the non-GAAP measure.

SEC regime.⁶⁸ This type of evidence is informative to both researchers and regulators, especially given the on-going debate on disclosing and emphasizing non-GAAP numbers in earnings announcements. Future research can expand on this type of analysis and apply the natural language techniques discussed in Section 3 to better understand how capital markets react to and process the detailed information provided on Form 8-K. However, as our discussion in Section 3 suggests, the distinction between what is regarded as mandatory disclosures and disclosure of voluntary supplementary information is crucial in evaluating the effects of the new rules implemented by the SEC.

5. Analyst reports

Both buy- and sell-side analysts forecast firms' earnings, cash flows, and/or revenues, and provide price targets and make stock recommendations. Reflecting the empirical research, our review primarily focuses on sell-side analysts (i.e., analysts employed by brokerage houses, independent research institutes, or investment-banking firms). We structure our discussion of the research around the decisions an analyst makes:

- whether to follow a firm (coverage); how many firms to follow;
- how much information to acquire/produce;
- whether and when to issue or revise a report;
- what kind of report to issue (e.g., forecasts of financial statements items, target price, stock recommendations or a combination thereof);⁶⁹ and
- whether and to what extent to issue a report that diverges from or is less precise than the analyst's private signal or beliefs.

We have adopted this approach to emphasize the endogenous nature of the corporate information environment, the central point of our survey. Section 5.1 reviews the analytical work investigating these decisions, while Section 5.2 discusses the empirical evidence.

5.1. Models of analysts' reports

Analysts decide whether to follow a firm, whether to issue earnings forecast or a stock recommendation, and when to release a forecast. These choices are likely to reveal information because sell-side analysts have incentives to communicate strategically and face relatively limited regulation regarding their communication with investors. Therefore, investors can infer information not only from the analyst's forecast itself but also from the fact that the analyst decided to follow a particular firm or from the timing of his forecast. Our analysis in Section 2 is consistent with this informational role of analysts; we find that, in our sample, analyst forecasts provide 22% of the accounting-based information considered.

Investors also know not to take analysts' forecasts at face value when analysts have incentives (and the opportunity) to bias their forecasts. Instead, they rationally anticipate analysts' equilibrium bias on average and make adjustments accordingly. To correctly infer the information contained in analysts' reports, investors therefore need to be aware of analysts' incentives. The incentives that models have focused on include:

- Maximize the analyst's reputation. For instance, analysts can signal their type by selecting a specific report. Often the analyst's type corresponds to the precision of his private information (e.g., Trueman, 1994; Graham, 1999; Welch, 2000) or other aspects of his information acquisition process (e.g., timeliness of information production in Trueman, 1990). Analysts' incentive to maximize forecast accuracy is often tied to such reputational concerns.
- Optimize the receivers' reaction to their reports. For instance, analysts have incentives to maximize the trading volume in the stocks they cover (e.g., Jackson, 2005; Cowen et al., 2006; Beyer and Guttman, forthcoming). Similarly, they are likely to take into account the impact of their forecasts on their relation with management (to obtain investment banking business or to obtain access to private information) by issuing favorable (e.g., Lim, 2001) or beatable (e.g., Richardson et al., 2004) earnings forecasts.
- Maximize the value of the forecast to investors. Investors that receive the analysts' reports before they are publicly released (see, e.g., Irvine et al., 2007; Guttman, 2010) possess private information and may trade upon it.⁷⁰

⁶⁸ Lerman and Livnat (forthcoming) observe that the newly required 8-K items constitute over half of all filings and that most firms disclose the required items within the new shortened period (four business days). The evidence suggests that all disclosed items (old and new) are associated with abnormal volume and return volatility around both the event and the SEC filing dates, and some items have significant return drifts after the SEC filings. In addition, they find that the information content of periodic reports has not diminished by the more expansive and timely 8-K disclosures under the new guidance. One possible interpretation of this finding is that investors may use periodic filings to interpret the effects of material events that had been disclosed earlier.

⁶⁹ Few models have analyzed analysts' decision whether to issue earnings forecast, stock recommendations, target prices, or another report. In practice, different reports are likely to provide different information. For instance, forecasts of financial statement items provide different information than target prices because target prices combine the forecasts of financial statement items with measures of cost of capital. Similarly, target prices provide different information than stock recommendations. In particular, stock recommendations consider whether the expected return implied in the difference between target price and the current stock price exceeds the firm's required cost of equity capital. These interdependencies may seem to suggest that analysts' ultimate task is to issue stock recommendations while forecasts and price targets are merely supporting input factors (Schipper, 1991). Anecdotal evidence, however, suggests that analysts' issue, for example, earnings forecasts without accompanying stock recommendations.

⁷⁰ Obviously, analysts face tradeoffs among those objectives—by issuing forecasts "late" they can improve the accuracy of their forecasts, but possibly lower their relevance.

Most of the models surveyed assume that analysts' payoffs are linked to one or several of these incentives. Of course, we expect models' predictions to vary depending on what we assume analysts' incentives to be. While there is some limited empirical evidence on analysts' incentives (see Section 5.2), there is no consensus on the objective function analysts' face, or why the market for analyst services exists. Thus, the theoretical models discussed in this section would benefit from a better understanding of analysts' and their employers' incentives.

5.1.1. Analysts' decision to initiate coverage

The first decision that analysts make is whether to follow a firm. When their incentives are tied to trading volume, analysts are likely to initiate coverage for firms for which investors are likely to react strongly to their forecasts. Hayes (1998) predicts that analysts' incentives to initiate coverage are strongest for stocks they expect to perform well.⁷¹ The reason is that risk-averse investors hold a larger position in firms for which the analyst provides a forecast. For firms that are expected to perform well, this implies that investors will buy more shares (resulting in more trade) while for firms that are expected to perform poorly, investors will sell less shares (resulting in less trade due to short-sale constraints).

Whether it is profitable for the analyst to follow a firm also depends on the precision of publicly available information. Fischer and Stocken (2008) show that, in a cheap-talk type model between an analyst and an investor (whose trading decision affects the analyst's payoff), the analyst stops following a firm when the public information is sufficiently precise. This leads to the paradoxical result that additional public information may actually reduce the total amount of information available if it causes the analyst to drop coverage.

In Fischer and Stocken (2008), the analyst's information production depends on the precision of public information, while the information publicly available does not depend on the analyst's information production. This one-sided dependency is appropriate when public information is provided by (largely) non-strategic sources but less so when public information is provided by strategic players. For instance, when management benefits from increased analyst following, management voluntarily discloses information so as to attract analyst following. Mittendorf and Zhang (2005) and Arya and Mittendorf (2007) analyze this kind of two-sided dependency between the information provided by management and analysts. Arya and Mittendorf (2007) assume that the firm's management benefits from the information provided by the analyst and vice versa. In contrast, Mittendorf and Zhang (2005) assume that the analyst's forecast constraints management's ability to issue optimistic earnings guidance.

These models illustrate how analysts might consider firms' future prospects and the precision of publicly available information in their decision to follow a firm. Firms' future prospects (Hayes, 1998) and the precision of publicly available information (Mittendorf and Zhang, 2005; Arya and Mittendorf, 2007; Fischer and Stocken, 2008) affect analysts' decision to cover a firm because they determine analysts' expected future payoffs from following the firm. An analyst's decision to initiate coverage is also likely linked to his ability to generate precise information, investors' perception of his ability to do so, and opportunities for the analyst to signal his ability to investors.

5.1.2. Timing of analysts' reports

Intuitively, an analyst's decision of when to issue a forecast is influenced by a trade-off between timeliness and precision, and is therefore influenced by the amount of new information the analyst received since he last issued a report and the amount of information the analyst expects to receive in the future.⁷²

Analysts' strategic timing of their forecast release has obtained only limited attention in the theoretical literature, however. To the best of our knowledge, Gul and Lundholm (1995) and Guttman (2010) are the only two models of analysts' decision of when to issue a forecast. Gul and Lundholm (1995) focus on the effect of timing decisions on the dispersion of analysts' forecasts. They show that analysts' forecasts are more similar to each other when analysts can choose the timing of their forecasts than when the timing is exogenous. Guttman (2010) focuses on the extent to which analysts' forecasts are clustered in time.⁷³ In his model, an analyst's payoff depends on the precision of his private information relative to the precision of investors' information at the time when he releases his forecast such that the timing of a forecast does not reveal any information to investors or other analysts. Nevertheless, there is a strategic interaction among analysts because the precision of investors' information increases following a forecast, reducing the payoff of the other analyst that has not yet issued his forecast. Guttman (2010) predicts that when analysts are relatively similar in terms of the precision of their private information (both initially and over time), they issue their forecasts simultaneously. When analysts are sufficiently different, they issue their forecasts at the same time they would have issued it if no other analysts were present.

While Gul and Lundholm (1995) and Guttman (2010) provide important insights into analysts' timing decisions, numerous open questions remain unanswered. For instance, analysts do not just issue a single forecast. Instead, they issue a forecast and revise it later on. How do analysts' incentives and the ability to revise their forecasts influence their timing of their initial forecast? So far, we do not know much about analysts' consecutive timing choices. Moreover, empirical evidence suggests that analysts face different incentives to release positive versus negative news in a timely manner (e.g., O'Brien et al., 2005). If the decision of when to release a report depends on the news analysts possess, then these timing choices would be informative to investors. Models that consider such issues are likely to provide further insights into properties of analysts'

⁷¹ See also Brennan and Hughes (1991).

⁷² Of course, other incentives (see our discussion in Section 5.1) may also influence analysts' decision of when to issue a forecast.

⁷³ In Guttman (2010), in addition to public information, analysts' private information also increases over time depending on their abilities.

reports as well as into the kind of information investors can infer from (the absence of) analysts' reports and, as a result, into the stock market reaction to analysts' reports.

5.1.3. Bias in analysts' reports

Analysts are not bound to fully and truthfully report their private information. Conceptually, there are two basic types of distortion: (1) the report is distorted in a deterministic manner without reducing the informational value; and (2) the report includes additional noise such that it is less informative than the analyst's private information.

Models consider analysts' incentives to distort their reports to curry favor with management (Lim, 2001), to improve forecast accuracy anticipating managements' reporting strategy (Beyer, 2008), or to maximize trading commissions (Beyer and Guttman, forthcoming). In equilibrium, analysts bias their forecasts because they cannot credibly commit not to do so, even if investors can perfectly infer the analysts' bias and private information in equilibrium.⁷⁴ In reality, we are unlikely to observe distortions that do not reduce the information content of reports. The reason is that users of analysts' reports rarely have sufficient information about analysts' incentives to fully anticipate the distortion.⁷⁵ As such, investors make inferences based on the analysts' report not only about firms' fundamentals but also about analysts' incentives to bias their reports.

Morgan and Stocken (2003) explicitly model investors' need to make inferences not only about the fundamental value of the risky asset but also about analysts' incentives. They show that in such a cheap-talk setting the analyst is not able to fully communicate his private information.⁷⁶ Moreover, categorical ranking systems (such as buy, hold, and sell recommendations) arise endogenously and the extent to which information can be credibly conveyed may be asymmetric (bad news can be credibly conveyed but good news cannot).

Analysts might also not be able to credibly communicate all their information when their incentives are partially misaligned with investors' incentives. That is, investors' uncertainty about analysts' incentives or the misalignment between analysts' and investors' objectives can prevent analysts from credibly communicating all their private information and consequently lead to a loss of information (e.g., Fischer and Stocken, 2001, 2008; Morgan and Stocken, 2003). The misalignment in incentives might even cause the precision of the information investors can infer from analysts' reports to be lower when the precision of the analyst's information is higher (Fischer and Stocken, 2001).

But even if the analyst were to receive relatively precise private information and has the means to communicate it, he might choose not to do so and instead (i) disclose only a noisy version of his private information (e.g., Admati and Pfleiderer, 1986; Lizzeri, 1999); (ii) ignore or discount his private information (herding) because of career concerns (e.g., Trueman, 1994; Graham, 1999); and (iii) bias his forecasts because of incentives to curry favor with management (e.g., Lim, 2001) or incentives to increase the investment banking business or trading commissions of his employer (e.g., Beyer and Guttman, forthcoming). The findings of prior empirical work that analyst earnings forecasts are historically overly optimistic (e.g., O'Brien, 1988) and the relative scarcity of hold and sell recommendations (e.g., Womack, 1996; Barber et al., 2006) has been used to support the claim that analysts' outputs are affected by these incentives.

5.1.4. Summary of models of analysts' reports and avenues for future research

The previous sections summarized a set of models covering several of the key decisions analysts face: coverage of a firm, precision of private information acquired, timing of the analysts' reports and whether and to what extent to bias their reports. In addition, the models illustrate that analysts (are assumed to) face a wide variety of incentives including issuing accurate forecasts, signaling the accuracy of their private information, maximizing trade in the stocks they cover, or currying favor with management. Of course, different incentives give rise to different analyst behavior, different equilibrium characteristics of analysts' reports, and different investor responses to those reports. As a result, understanding analysts' incentives is essential to understanding analysts' reports.

To understand analysts' incentives, one would ideally start with their overarching objectives such as to maximize their personal utility over multiple periods (potentially including reputational or career concerns). These overarching objectives would then provide incentives for analysts to reduce their expected forecast errors, to increase the value of their forecasts to investors, or to increase the amount of trade that occurs following the release of analyst forecasts. Similarly, analysts' compensation ideally is derived in an attempt to coordinate behavior through equilibrium mechanisms. Sell-side analysts are

⁷⁴ Suppose it is costless for the analyst to distort forecasted earnings upwards by 10 cents/share but it is prohibitively costly to distort earnings beyond the 10 cents/share. Further, suppose the analyst's payoff is linked to the firm's share price which is assumed to be m times the true economic earnings as inferred by investors. First, observe that truthful reporting is not an equilibrium. If the analyst truthfully reported his private expectations, $r=x$ where r is the reported earnings and x is the true economic earnings, and investors formed their beliefs consistent with that reporting strategy, investors would price the firm at $m \times r$. But then the analyst is better off forecasting $r=x+10$ because investors would overprice the firm by $m \times 10$. Hence, truthful reporting cannot be part of an equilibrium. Instead, in equilibrium the analyst forecasts $r=x+10$ and investors correctly infer that the analyst's true expectations about the firm's earnings are $r-10$ and price the firm at $m(r-10)$. The forecast bias does not mislead investors and does not reduce the amount of information investors can infer from the forecast.

⁷⁵ To illustrate the impact of investors' uncertainty about analysts' incentives on the information they can infer from a forecast, we extend our simple example from the previous footnote. Suppose for some analysts it is costless to distort their forecast upwards by 10 cents/shares while for other analysts it is costless to distort their forecast upwards by 12 cents/shares. Then, investors can no longer perfectly infer an analyst's bias but can only infer the average bias. As a result, investors are no longer able to infer x from r but can infer only a noisy version of x from r .

⁷⁶ Similar to cheap-talk models, loss of information results from analysts' ability to bias their forecasts in costly state falsification models when investors are uncertain about analysts' incentives to bias their report (Beyer and Guttman, forthcoming).

employed by brokerage houses, independent research institutes, or investment-banking firms. Hence, analysts' incentives are partly determined by their compensation contracts. The type of compensation contracts offered to analysts depends on their employers' demand – both in scope and scale – for analysts' services.⁷⁷ While it is plausible that employers offer contracts that align analysts' incentives with their own, it is also unlikely that employers offer contracts that are capable of fully aligning analysts' incentives with their own due to analysts' risk-aversion and analysts' other incentives such as reputational concerns. Developing models that consider the derived demand for analyst services as well as the resulting optimal compensation contract to offer analysts is a fruitful area of research to gain insights into analysts' decisions.

5.2. Empirical evidence on analysts' reports

Following the approach we used to survey the analytical work on analysts' reports, we structure our discussion of the empirical literature around the decisions analysts make. Section 5.2.1 surveys the empirical literature on analysts' decision to follow a firm. We discuss the empirical evidence on analysts' decisions of when to issue a report in Section 5.2.2, what kind of report to issue in Section 5.2.3, and whether to bias their report in Section 5.2.4.

5.2.1. How does the analyst choose the firms to follow?

Analysts (and/or their employers) routinely make initiation, continuation, and termination decisions. Hong and Kubik (2003) report that in their sample drawn from I/B/E/S over 1983–2000, approximately 26% of an analyst's portfolio consists of newly added stocks each year. Not surprisingly, stock price changes are associated with those decisions (see, e.g., Gleason and Lee, 2003; Kecskés and Womack, 2008). Increased analyst following is also associated with increased liquidity in the firm's stock (Roulstone, 2003) and lower cost of raising equity capital (Bowen et al., 2008). These findings, however, do not indicate that all firms would be better off by increasing their analyst following. What researchers observe is the equilibrium trade-off between the costs and benefits, both for firms and analysts (see Section 3.1.2 and Fields et al., 2001). Further, the direction of causality, that is, whether analyst following leads to changes in liquidity or changes in cost of capital for firms, or vice versa, is not clear.

Most of the early empirical work in this area relates to the relation between the level or the change in analyst following and firm characteristics in an attempt to assess the effects of the benefits and costs of following the firm. Bhushan (1989) documents that the degree of analyst following is positively related to institutional holdings, firm size, return variability, and the association between the firm's return and the market return, and negatively related to insider holdings and the number of lines of business of the firm.⁷⁸ If firm size proxies for the amount of public information available for a firm, these findings are inconsistent with the theoretical predictions from Fischer and Stocken (2008) that additional public information causes analysts to drop coverage. Bhushan's results, however, are consistent with models in which managers disclose information to attract analyst following (e.g., Arya and Mittendorf, 2007).

Extending Bhushan (1989), O'Brien and Bhushan (1990) examine analysts' decisions to follow a firm simultaneously with institutions' decisions to hold shares of that firm's stock. They find that the year-to-year change in analyst following is higher for firms who experience a decline in return volatility, who operate in industries with regulated disclosures, and who belong to industries with an increasing number of firms. They also document that analyst following increases more for firms with smaller prior analyst following, although this finding may be purely mechanical.⁷⁹ They interpret these results as consistent with analysts' trading off the costs and benefits of gathering information. Specifically, the benefit is greatest in firms with little competition from other analysts and with high investor interest (an indirect proxy for the amount of trades generated) and the cost is lower where there are numerous firms in the same industry (so industry common knowledge can be applied to more firms) and the firms are regulated to provide additional information over and above GAAP.

Bae et al. (2008) analyze the effects of differences in accounting standards between a firm's home country and an analyst's home country. They find that both analyst following and forecast accuracy is negatively related to the extent to which generally accepted accounting principles differ between the firm's and the analyst's home countries. Drawing conclusions from such cross-country studies is difficult because other institutions vary with the country's information environment. Thus, differences in these institutional features across countries are correlated with differences in accounting standards.

Lang and Lundholm (1996) investigate the association between the informativeness of firms' disclosures and analyst following and the properties of analyst earnings forecasts. Controlling for other determinants, they document a positive association between analyst following and ratings of firms' disclosures from the *Report of the Financial Analysts Federation Corporation Information Committee* (see also Healy et al., 1999; Hope, 2003a, 2003b; Lang et al., 2004).^{80,81} To provide

⁷⁷ This requires further insight into the role of sell-side analysts as part of investment banks' business model.

⁷⁸ In contrast to Bhushan (1989), Rock et al. (2001) show that the number of institutional investors is negatively related to the degree of analyst following using an econometric model based on count distributions.

⁷⁹ In the extreme, a firm with no prior analyst following can only experience increases in analyst following.

⁸⁰ Characteristics of the analysts following the firm also appear to be associated with the quality of the firm's disclosures. For example, Li et al. (2009) document that coverage by All-Star analysts is associated with higher management forecast frequency and the issuance of management forecasts that are more specific, less biased, and less inaccurate. While these results complement those in Lang and Lundholm (1996) that analysts prefer to follow firms with enhanced information environments, the direction of causality is again unclear.

⁸¹ Lang and Lundholm (1996) also document that analyst earnings forecasts are more accurate and less disperse and the volatility in forecast revisions is lower for firms with higher disclosure ratings (see also Hope, 2003a, 2003b). They interpret these findings as suggestive that investors have more accurate beliefs and less asymmetry in these beliefs about future performance for firms with more disclosure. However, the forecast accuracy and dispersion results

additional evidence on the direction of causality, they examine the correlation between changes in disclosure ratings and changes in the lead and lag number of analysts. The results from this analysis are mixed.⁸² They conclude that there is limited evidence that changes in the informativeness of firms' disclosures lead to changes in analyst following. This result raises the question of whether managers are able to attract analyst following by increasing disclosures, a feature of several analytical models on analyst following (e.g., Arya and Mittendorf, 2007).

Using a simultaneous equation model, Alford and Berger (1999) document that forecast accuracy and analyst following are endogenously determined, with greater accuracy associated with higher analyst following.⁸³ They interpret this result as suggesting analysts' private information complements, rather than substitutes for, factors that increase the certainty about the firm's future performance. They also find that stocks with more trading volume have higher analyst following, consistent with the notion that analysts follow stocks where there is a potential to earn higher brokerage commissions (see also Hayes, 1998). Taken together, these findings suggest that brokerage commissions, through its direct effect on analyst following, indirectly have a positive effect on forecast accuracy. This conclusion, however, assumes that trading volume does not proxy for some other construct, like disagreement among investors.⁸⁴

Barth et al. (2001a, 2001b) find results consistent with their predictions that analysts have a greater potential for profitable private information acquisition in firms with high degree of information asymmetry, thereby leading to more profitable recommendations and higher trading commissions. In a related study, Kirk (2008) documents that firms that have greater information uncertainty and less visibility are more likely to hire a research firm.^{85,86}

Despite the numerous empirical studies documenting the association between the degree of analyst following and firm characteristics, we still do not know the factors that analysts consider when making this decision, and how the incentives faced by the analyst and/or the composition of the analyst's portfolio of followed firms shape this decision. Moreover, the role of the firm's existing information environment is unclear; specifically, there is conflicting evidence from theoretical and empirical studies on whether firms are able to attract analyst following through additional voluntary disclosures. Finally, evidence on the interplay between the information provided by sell-side security analysts and other information intermediaries (such as debt analysts) is limited.⁸⁷ Empirical evidence on these issues would also further our understanding of information environment of firms.

5.2.2. When does the analyst issue a report?

Empirically, it is often difficult to distinguish between the analyst's decision to follow a firm and whether/when to issue the initial report. Most of the empirical work focuses on the association of firm characteristics and the level of analyst following, and does not directly investigate the endogenous decision of an analyst to start or discontinue coverage of a given firm through issuing a report, or when to revise a previously issued report. This lack of empirical evidence mirrors the limited number of theoretical models on this topic. Given the importance of analyst forecasts in revising investor expectations (see Section 2), additional evidence on these timing decisions is warranted.

One notable exception to this is McNichols and O'Brien (1997) who examine the association between analysts' decisions to issue a report and their assessments of firms' future performance.⁸⁸ Based on the assumption that it is more costly for analysts to issue negative reports (due to concerns about investment banking business, access to management, and/or trading commissions), they predict that analysts are more likely to issue reports for firms for which they hold more favorable beliefs.⁸⁹ They document that the recommendations of stocks for which analysts recently initiated (discontinued) coverage are more (less) favorable than stocks for which coverage is continuing and that these assessments are reflected in future performance (see also Das et al., 2006).

(footnote continued)

may be a consequence of the following results due to the association between accuracy / dispersion of the consensus forecast and the number of forecasts in the consensus forecast.

⁸² The general insignificance of the lead-lag results raises questions of whether the observed changes are merely reversion to the mean.

⁸³ Using a Tobit model which allows them to include firms with zero analyst following in the analysis, Branson and Pagach (2005) find that the number of analysts following a firm is positively related to earnings persistence but negatively related to earnings predictability after controlling for firm size (as measured by share price and number of shares outstanding).

⁸⁴ Alford and Berger (1999) do not directly test if trading volume is associated with forecast accuracy (see O'Brien, 1999).

⁸⁵ That is, firms that are younger, smaller, have greater dependence on intangible assets, are engaging in mergers or acquisitions, have more growth opportunities, more volatile stock returns, have low share turnover, lower levels of institutional ownership and lower levels of sell-side analyst following are more likely to hire a research firm.

⁸⁶ He also shows that paid-for analysts issue significantly more optimistic stock recommendations and less accurate earnings forecasts relative to sell-side analysts.

⁸⁷ Recent work has begun to examine the determinants of and market reaction to sell-side debt research, and the interplay between debt and equity reports (see, e.g., Johnston et al., 2009). Although this review focuses on sell-side security analysts, debt research is an important element of the firm's information environment. Moreover, examining the properties of reports issued by debt analysts and the incentives they face may allow researchers to triangulate the explanations offered for sell-side security analysts' coverage decisions and optimism.

⁸⁸ Discussing Gu and Xue (2008), Lys and Sunder (2008) argue that entry-exit decisions by independent analysts have a disciplining effect on non-independent analysts.

⁸⁹ This self-selection argument differs from the explanation investigated by other work in which these incentives lead analysts to optimistically bias the various elements of the reports issued. Rather, self-selection maintains that analysts rationally form their beliefs and truthfully report them but choose to issue public recommendations only when they hold favorable views about the future performance of the firm (see Francis, 1997).

Using a hazard model for recommendations, O'Brien et al. (2005) find that "affiliated" analysts (those whose employers have an investment banking relationship with the followed firm) are slower to downgrade from Buy to Hold recommendations, but are quicker to upgrade from Hold to Buy recommendations, than unaffiliated analysts.⁹⁰ Affiliated analysts are also less likely to drop coverage than unaffiliated analysts. These findings hold for both across-firm and within-analyst analyses, and suggest that investment banking ties provide incentives for analysts to delay negative news and accelerate positive news.

5.2.3. How do analysts choose what kind of report to issue?

Our analysis in Section 2 indicates that for the average firm, analyst forecasts account for 6.14% of the quarterly return variance. Indeed, Brown et al. (1985), Givoly and Lakonishok (1979), and Gonedes et al. (1976), among others, document a significant market reaction to analyst forecast revisions. Further, Stickel (1995) and Womack (1996) find a significant association between the excess returns around the issuance of a recommendation and the level of the recommendation; and Brav and Lehavy (2003) show that target prices are significantly associated with event-period excess returns.⁹¹

In addition, each of these types of forecasts (earnings forecasts, stock recommendations, and target prices) are incrementally informative in explaining price movements. For example, Asquith et al. (2005) document that revisions in earnings forecasts, stock recommendations, and target prices each contain incremental explanatory information for excess returns surrounding reports issued by *Institutional Investor* All-American team members (see also Francia and Soffer, 1997; Brav and Lehavy, 2003). Moreover, measures for the other information included in the report, such as the strength of written arguments, also have significant explanatory power.⁹²

Despite the evidence indicating the significant market reaction to the items in the analyst report, we do not have a clear understanding of analysts' decisions to report information in certain formats in general and the role of investors' demand for analysts' reporting decisions in particular. What evidence we do have is primarily descriptive. For example, focusing on target prices, Bradshaw (2002) analyzes analyst reports for a random sample of 103 companies and finds that approximately two-thirds contain a target price. He documents that the incidence of target prices being included in the report is increasing with the favorability of the stock recommendation (see also Brav and Lehavy, 2003). DeFond and Hung (2003) document that during 1993–1999, 7% of earnings forecasts on I/B/E/S are accompanied by a cash flow forecast, but that this percentage increases over time. In addition, they find that analysts are more likely to issue a cash flow forecast for firms with large accruals, high earnings volatility, high capital intensity, and poor financial health.

Asquith et al. (2005) provide descriptive evidence on the elements contained in analyst reports issued by *Institutional Investor* All-American team members over 1997–1999. All analyzed reports contain a stock recommendation, and virtually all also contain an earnings forecast for the current and subsequent year. However, earnings forecasts beyond the subsequent year are relatively rare, with only 22.7% of reports containing these forecasts. Forecasts of other financial statement information are also not frequently present, with 28.5% containing income statement forecasts, 5.1% containing balance sheet forecasts, and 17.1% containing statement of cash flow forecasts. Less than 10% of all reports contain either geographic, product, or segment information. Price targets are present in 72.6% of reports, and like Bradshaw (2002) and Brav and Lehavy (2003), are more common in the subsample of favorable recommendations.

While it is likely that some of the decisions to forecast only a limited subset of information (e.g., only issuing an earnings forecast without an accompanying recommendation or vice versa) are made by the brokerage house employing the analyst, given the heterogeneity in the data in the issuance of these items, it seems implausible that brokerage house requirements account for all of the variation.

This decision to forecast only a subset of firms' fundamentals is even more puzzling given the recent findings that analysts rely on some of these measures (e.g., earnings forecasts) to forecast others (e.g., recommendations). Considering four possible valuation models, Bradshaw (2004) finds a strong association between analysts' stock recommendations and long-term growth projections and valuations based on the price-earnings-to-growth model.⁹³ These results suggest that analysts rely on valuation heuristics in incorporating their earnings forecasts into their stock recommendations. Loh and Mian (2006) document that analysts who issue more accurate earnings forecasts also issue more profitable stock recommendations (see also Ertimur et al., 2007). They interpret this evidence as implying that accurate analysts have better inputs to use in their models of stock valuations, which in turn leads to more profitable stock recommendations. Call et al. (2009) find that analysts' earnings forecasts issued together with cash flow forecasts are more accurate than those not accompanied by cash flow forecasts. Their results suggest that analysts' earnings forecasts reflect a better understanding of the implications of current

⁹⁰ They also find little evidence suggesting that affiliation affects the speed of upgrades from Buy to Strong Buy recommendations or downgrades from Strong Buy to Buy recommendations.

⁹¹ In contrast, Givoly et al. (2009) find that analysts' forecasts of cash flows are of limited information content and are only weakly associated with stock returns. Consistent with this finding, their evidence suggests that cash flow forecasts are a naïve extension of analysts' earnings forecasts and as such provide limited information on expected changes in working capital.

⁹² There is extensive research documenting cross-sectional variation in the market's reaction to analyst reports conditional on characteristics of the firm, the brokerage house, and the analyst (see, e.g., Bonner et al., 2007, 2003; Clement and Tse, 2003; Gleason and Lee, 2003; Mikhail et al., 1997; Jacob et al., 1999; Mikhail et al., 2004; Michaely and Womack, 1999; Park and Stice, 2000; Stickel, 1992). With the exception of the evidence relating to the decisions analyst face, we omit discussion of this line of work from this review.

⁹³ Bradshaw finds little association between recommendations and valuations based on residual income models, suggesting that analysts do not rely on present value models to incorporate their earnings forecasts into their stock recommendations. This finding is consistent with the descriptive evidence in Asquith et al. (2005) that over 99% of analysts mention using earnings multiples, while only 13% report using discounted cash flow models.

earnings for future earnings when they are accompanied by cash flow forecasts. Given these recent findings, more research on analysts' selection of the information included in their reports (as well as the format selected) using both analytical and empirical approaches is needed to better understand analysts' reporting decisions.

5.2.4. Do analysts distort their reports?

Researchers have investigated whether the analysts' incentives explain the optimistic bias in analyst forecasts. For example, in a setting where analysts issue earnings forecasts but not stock recommendations, Francis and Philbrick (1993) document a monotonic relation between the degree of earnings forecast optimism and the level of stock recommendation. Their findings are consistent with analysts issuing more optimistic earnings forecasts when the accompanying stock recommendation is more negative.

By contrast, Eames et al. (2002) find that earnings forecasts are optimistic for buy recommendations and pessimistic for sell recommendations, after controlling for the level of earnings. This finding is inconsistent with the pattern that would be expected if analyst bias were driven by an incentive to maintain good relations with management. One explanation for these contradictory findings is the different sample of analysts examined. Francis and Philbrick (1993) use Value Line data in their investigations. This database is well suited for their study because a separate group within the organization prepares the timeliness ranks, the basis for their stock selection strategy, and these ranks are included in the reports prepared by analysts. Further, Value Line is not a brokerage or an underwriter, and thus Value Line analysts do not face any incentives to generate revenue for their employer. This contrasts with the sample of analysts on the Zacks Investment Research database used by Eames et al. (2002).

Das et al. (1998) document that earnings forecasts are more optimistic for firms whose earnings follow a less predictable time-series pattern for a sample of Value Line analysts over 1989–1993. While they interpret this evidence as suggesting that as earnings become less predictable, analysts issue more optimistic forecasts to ensure access to management's private information, Eames and Glover (2003) indicate that this finding is due to the omission of the level of earnings. That is, when the level of earnings is included in the regression model, there is no significant association between the analyst forecast error and earnings predictability.

Dugar and Nathan (1995) document that while forecasts issued by affiliated analysts are more biased, they are not less accurate than those issued by unaffiliated analysts. This result suggests that there is an implicit limit on the degree to which analysts are willing to bias their forecasts to please management. They also find that affiliated analysts issue more favorable stock recommendations than unaffiliated analysts. Lin and McNichols (1998) document that growth forecasts and stock recommendations made by lead and co-underwriter analysts are significantly more favorable than those made by unaffiliated analysts (see also Dechow et al., 2000; Hunton and McEwen, 1997; Michaely and Womack, 1999).

Barniv et al. (2009) and Chen and Chen (2009) find an increase in the association between analysts' stock recommendations and earnings forecasts after numerous regulations were enacted between 2000 and 2003 to enhance the independence of analysts' research. Chen and Chen (2009) find that this increase is greater for the stocks recommended by analysts with greater potential investment-banking-related conflicts of interest. While these findings are consistent with these regulations enhancing analysts' independence, Barniv et al. (2009) find that stock recommendations continue to be negatively related to future returns after these regulations. Moreover, as discussed in Bradshaw (2009), the attribution of what regulation, if any, effected the association between analysts' earnings forecasts and stock recommendations is unclear.

While this evidence is consistent with analysts facing incentives not to report their true beliefs, the use of indirect tests and the failure to control for the endogeneity in this environment call these conclusions into question. For example, firms may condition their choice of underwriter on how favorable the analysts employed at that brokerage house are towards the firm (see, among others, Kothari, 2001). Further, inferences may be dependent on the (often implicit) distributional assumptions and/or the specifics of the objective function. For example, Gu and Wu (2003) document that analysts forecast errors are consistent with analyst minimizing mean absolute errors rather than mean squared errors. Their research shows that when the distribution of earnings is skewed, researchers will conclude that analyst forecasts are biased even when analysts rationally and unbiasedly report their true beliefs (see also Abarbanell and Lehavy, 2003; Cohen and Lys, 2003).⁹⁴

Finally, while analysts may issue biased forecasts, prior research documents that analysts' earnings forecasts are more accurate than time-series model forecasts (e.g., Brown et al., 1987), which bounds the bias in analyst forecasts. Further, the claim that analysts face incentives to be optimistic to maintain access to management relies on two implicit assumptions. First, it assumes that managers provide private information to favored analysts. Reg. FD, however, has reduced managers' ability to provide such information. Second, it assumes that managers prefer optimism. However, optimistic earnings forecasts are also more difficult to meet or beat which is a key objective of managers (e.g., Burgstahler and Dichev, 1997; Brown, 2001; Kasznik and McNichols, 2002; Bartov et al., 2002; Graham et al., 2005).

Recent studies have attempted to reconcile these findings by examining the intertemporal pattern in analyst bias. Relying on work by Richardson et al. (2004), Ke and Yu (2006) predict that managers prefer forecasts that are initially optimistic but then are revised down to be pessimistic before the earnings announcement, thereby creating a positive earnings surprise.⁹⁵

⁹⁴ Louis et al. (2010) contend that if analysts do not adjust for the effects of conservatism, the initial forecast will be biased even in the absence of the effects documented by Gu and Wu (2003).

⁹⁵ This assumption is consistent with the results in Hutton (2005). Using a proprietary dataset from National Investor Relations Institute, she identifies firms that reviewed analysts' earnings models (presumably as a means to privately guide analyst earnings forecasts) prior to Reg. FD. She documents that

Studying the period 1983–2000 before the implementation of Reg. FD, they document that analysts who issue an initial optimistic forecast followed by a pessimistic forecast before the earnings announcement are more accurate and are less likely to experience turnover. This effect is more pronounced for firms with heavy insider trading and lower earnings predictability, and is present regardless of whether the analyst's employer provides investment banking services. They interpret their results as consistent with analysts' biasing their forecasts to obtain information from management. Libby et al. (2008) provide evidence consistent with this conclusion: in an experimental setting, they find that analysts exhibit this optimistic-to-pessimistic pattern and this effect is significantly stronger when analysts have a good relationship with management.

Recent work has also attempted to provide more direct evidence on analysts' incentives by analyzing what determines their performance evaluation at firms and obtaining explicit measures of these incentives. Various measures of performance have been examined in the literature. Early work focused on the determinants of being named to the *Institutional Investor* All-Star list, which is claimed to be directly tied to analyst compensation. An example of this line of work is Stickel (1992) who documents that *Institutional Investor* All-Star analysts issue more accurate earnings forecasts than other analysts.

Analyzing analyst job changes, Mikhail et al. (1999) find a higher probability of turnover (an indirect measure of performance) for analysts' whose forecast accuracy is lower than that of their peers. Further, neither the absolute nor the relative profitability of stock recommendations is significantly associated with the probability of turnover. Consistent with their findings, Hong et al. (2000) find that analysts that issue the least accurate earnings forecasts are the most likely to leave the I/B/E/S database ("termination") and the least likely to move to a larger brokerage house ("promotion") (see also Wu and Zang, 2009). This effect of forecast inaccuracy is most pronounced for analysts with low levels of experience. Controlling for forecast accuracy, they document that inexperienced analysts are more likely to be terminated and less likely to be promoted when they issue forecasts that deviate significantly from the consensus.

Controlling for forecast accuracy, Hong and Kubik (2003) show that analysts who issue optimistic earnings forecasts relative to the consensus are more likely to move to a top tier brokerage house, identified each year by *Institutional Investor* as having the most All-American analysts.⁹⁶ Moreover, the turnover decisions of affiliated analysts depend less on accuracy and more on optimism than those of unaffiliated analysts. However, one concern with the affiliation results is that they do not control for any endogeneity between the selection of the investment bank and properties of analyst forecasts. Moreover, potential errors in identifying promotions and industry turnover using the I/B/E/S database noted by Wu and Zang (2009) apply to this study as well as Hong et al. (2000).

Groysberg et al. (2008) obtain a proprietary dataset of analysts' salary and bonus compensation from 1988 to 2005 at one large financial institution. Using this direct measure of analyst performance, they find that analysts' compensation is positively associated with *Institutional Investor* rankings, coverage of a current investment banking client of the brokerage house, and the aggregate trading volume of the firms they cover. However, they do not find any systematic evidence that analysts' compensation is directly related to earnings forecast accuracy or recommendation profitability.⁹⁷ This conflicts with prior evidence that turnover, another (coarse and more extreme) measure of analyst performance, is associated with relative forecast accuracy. One potential explanation for this apparently conflicting evidence is that relative forecast accuracy is associated with the performance of analysts' across brokerage houses, but to be employed at the one top-tier brokerage house they examine, the analyst must be highly accurate (see Clement, 1999).

In contrast to research examining the direct determinants of analyst performance evaluation, other work has investigated whether there is evidence that intentionally biased earnings forecasts and/or stock recommendations result in increases in their employer's share of investment banking business or trading volume, or improved access to management. Overall, this work provides little evidence of analysts' being able to garner investment banking business for their firm by being optimistic. Krigman et al. (2001) document that approximately 30% of firms conducting an initial public offering between 1993 and 1995 and a seasoned equity offering within three years of the date of its IPO changed underwriters between these two events. After controlling for the size of the issuers (as measured by the expected proceeds from the IPO), they find that the firms that changed underwriters raised significantly fewer proceeds than expected in their IPO. These firms were also less likely to be covered by high quality analysts as the lead underwriter of their IPO. They do not find any statistical difference in the degree of analyst forecast bias between the firms that change and those that did not change underwriters, suggesting that optimism is not an important determinant of the selection of the underwriter. Consistent with this finding, survey evidence suggests that obtaining a more prestigious underwriter and gaining access to more or improved coverage by analysts were the two key factors leading firms to change underwriters (see also Dunbar, 2000; Clarke et al., 2007).

Ljungqvist et al. (2006) directly examine whether analysts' stock recommendations influence the likelihood that their brokerage house employer attracted an underwriting mandate for a sample of 16,625 U.S. debt and equity offerings between

(footnote continued)

guided analyst forecasts are more pessimistic, but also more accurate, than unguided forecasts. Further, while unguided analysts revise their analyst earnings forecasts downwards typically only in the presence of negative quarterly earnings news, guided analysts do so even when the majority of quarterly earnings news is positive.

⁹⁶ Their results are not sensitive to using two alternative measures of brokerage house status, the number of analysts employed and the Carter–Manaster rankings of investment banking hierarchy. They also document similar results using an alternative measure of performance evaluation, namely being assigned to cover "important" stocks within their brokerage house employer.

⁹⁷ The association of these factors with the analyst's compensation generally holds in a within-analyst time-series analysis as well as in a sample obtained from a different financial institution.

1993 and 2002. Using a simultaneous equation framework, they model the likelihood that an investment bank receives a firm's underwriting business as a function of the level and change in its analyst's stock recommendation relative to other analysts, controlling for the reputation of the investment bank's analyst (All-Star status, relative forecast accuracy, and experience), the investment bank's reputation within the debt and equity markets, its lending capacity, and the strength of its relationship with the issuer. They also model the analyst's recommendation behavior as a function of the pressure to bias the recommendation (as proxied by various measures the investment bank's expected underwriting profits) and the analyst's career concerns (as proxied by All-Star status, relative forecast accuracy, and experience). To address the selection issue, they model the probability that the investment bank's analysts cover the issuing firm as a function of the strength of the investment bank's relationship with the firm, the investment bank's reputation, and firm characteristics. They find that an analyst's aggressive recommendations do not increase the probability that the investment bank wins the deal. Rather, across both equity and debt deals, the key determinant of the selection of the underwriter is the investment bank's relationship with the issuing firm (as measured by prior deals and lending relationships). Overall, they find little evidence to suggest that investment banks bias their research to earn investment banking deals, but rather suggest that a reputation for accurate and unbiased research is critical to maintain the investment bank's role as a credible information intermediary.

Using a sample of 216 instances in which all-star analysts switch investment banks between 1988 and 1999, Clarke et al. (2007) investigate whether all-stars continue following the same stocks and whether they become more optimistic about the stocks they do cover based on the investment banking relationship between the firm and the brokerage house hiring the analyst. Although they document that the analyst is significantly more likely to continue following a firm when his new employer has a prior investment banking relationship with that firm, they do not find any evidence that analysts change their level of forecast or recommendation optimism following a job change, even for firms with which their new employer has a prior investment banking relationship. Overall, they conclude that there is no evidence that issuing optimistic earnings forecasts or recommendations affects investment banking deal flow.

Cowen et al. (2006) examine the association between forecast and recommendation optimism and the business activities used to fund analyst research. They classify analyst employers into four groups: (1) full-service banks that fund research through underwriting and distributing new issues and trading activities; (2) syndicate banks that fund research through fees from distributing new issues and trading activities; (3) brokerage firms that fund research only through trading activities and do not provide any underwriting services; and (4) pure research firms that sell their research. If analysts provide optimistic research to attract lucrative underwriting business to their firms, then analysts working at full-service banks should issue the most optimistic forecasts and recommendations. Analyzing data from 1996 to 2002, they find, however, that analysts working at full-service banks are less optimistic than analysts working at other firm types; further, they find that analysts working at brokerage firms issue the most optimistic forecasts and recommendations. This observed lower optimism on the part of analysts at full-service banks appears to be at least partly attributable to reputational concerns. In particular, analysts at the six largest Wall Street banks that dominate the underwriting market have less optimistic forecasts and recommendations than analysts working at other investment banks, syndicates, or brokerage firms. Overall, their findings suggest that trading incentives, and not underwriting business, are an important factor underlying analyst optimism.

Relatedly, Jacob et al. (2008) document that earnings forecasts issued by analysts employed by firms that offer investment banking business are more accurate than those issued by analysts employed by firms that do not offer underwriting services. Further, they find that affiliated analysts issue more accurate forecasts than unaffiliated analysts (see also Clarke et al., 2008). These findings are inconsistent with the claim that the quality of research issued by analysts employed by investment banks is inferior. Rather, their results suggest that the greater accuracy of analysts employed by investment banks is due to those firms hiring more experienced and higher quality analysts (perhaps in part due to their resource advantage, see Boni and Womack, 2002) and these analysts having greater access to private information from management.

In contrast, Agrawal and Chen (2008) find that more favorable recommendations (relative to the consensus recommendation) are associated with a larger share of the securities firm's revenue being obtained from investment banking and brokerage business. This finding holds after controlling for the size of the company followed, brokerage house size, analyst award status, analyst experience, and number of firms followed.

Thus, overall, there is at best mixed evidence supporting the effect of investment banking incentives on analysts' decision to distort their reports. Ignoring for the moment the selection issues discussed by Kothari (2001), the lack of widespread evidence that investment banking incentives alone account for the observed (skewed) distribution of earnings forecasts and stock recommendations is perhaps not surprising when one considers how infrequently these conflicts arise. Hong and Kubik (2003) report that in their sample, approximately 3% of an analyst's portfolio consists of stocks with an underwriting relationship with the analyst's brokerage house.

There is evidence, however, suggesting that both trading commissions and access to management play a role in analysts' favorable stock recommendations, but not in their optimistic earnings forecasts. Chen and Matsumoto (2006) examine whether managers provide more information to analysts who issue more favorable stock recommendations. They indirectly investigate this question by examining the relative forecast accuracy of analysts before and after recommendations are issued, and attribute any increase in relative forecast accuracy to management-provided information. They find that the increase in relative forecast accuracy is greater for analysts issuing more favorable stock recommendations (as measured by upgrading their prior recommendation or issuing a more favorable recommendation than the outstanding consensus recommendation) than for analysts issuing less favorable stock recommendations after controlling for forecast age and

forecast frequency.⁹⁸ They provide corroborating evidence by examining the frequency of earnings forecasts that are issued in isolation or in conjunction with other earnings forecasts. They assume that when an analyst issues a forecast on a day when no other analyst issues a forecast, this forecast is more likely a response to private information. They document that a greater proportion of the subsequent earnings forecasts made by analysts who issue more favorable recommendations are made in isolation compared to the earnings forecasts made by analysts who issue less favorable recommendations.

[Mayew \(2008\)](#) documents that the likelihood of an analyst asking questions during a conference call is increasing in the favorableness of the analyst's recommendation, particularly for All-Star analysts. Although non All-Star analysts are less likely to participate if they have less favorable recommendations or if they downgrade their recommendation, this effect does not hold for All-Star analysts. He also documents that the likelihood of participating is higher for more accurate analysts, more experienced analysts, and analysts who issue forecasts more frequently and cover fewer companies and industries. He interprets these results as suggesting that managers discriminate among analysts based on how favorable their views are about the firm. This conclusion, however, assumes that analysts who do not hold favorable views would like to participate in the call but are somehow restricted from doing so, that analysts who are able to ask questions experience some benefit that other analysts (who are able to listen to the open call including the question and answer period) do not, and that managers are strategically selecting which analysts to allow to ask a question.

The contention that analysts face incentives to follow a firm and bias their earnings forecasts and stock recommendations to generate trading commissions for their employer assumes that there is a relation between the analyst's coverage decisions and outputs and the share of trading volume his employer obtains. Using a unique dataset of trades of the largest 100 companies from the Toronto stock exchange over 1993 to 1994 in which the identity of the brokerage house is identified, [Irvine \(2001\)](#) documents that brokerage volume is higher in stocks that are covered by an analyst employed at the brokerage house than in uncovered stocks. [Irvine \(2004\)](#) finds that forecasts that deviate more from the consensus ("bold" forecasts) are associated with increases in the analyst's employers' share of the trading in the stock in the two weeks after the forecast is released. He finds no evidence that forecast bias is associated with the brokerage house's share of trading volume. Further, he finds that favorable stock recommendations are associated with larger increases in the brokerage house's share of trading volume of covered firms. Consistent with these results, [Jackson \(2005\)](#) finds evidence suggesting that analysts who issue optimistic stock recommendations generate more trade for their brokerage firms based on a sample from the Australian equity market over 1992–2002.⁹⁹

While most of the literature focuses on the effects of incentives on analyst reports, recent empirical research suggests that the observed optimistic reports are not entirely due to incentives. These findings include: (a) forecast bias is unrelated to the brokerage house's share of trading volume ([Irvine, 2004](#)), (b) forecast bias is negatively related to proxies for conservatism ([Louis et al., 2010](#)), and (c) individuals not subject to these economic incentives, such as market analysts ([Darrough and Russell, 2002](#)), analysts employed at independent research firms ([Jacob et al., 2008](#)), and students ([Affleck-Graves et al., 1990](#)) are optimistic.

Investigating a cognitive-bias explanation for optimism, [Sedor \(2002\)](#) documents that optimism in analysts' annual earnings forecasts is attributable in part to their reaction to the detailed, causal narratives managers use to communicate their plans for increasing future firm performance (see also [Kadous et al., 2006](#)). Further, there is ample evidence suggesting that analysts do not fully and rationally incorporate all publicly available information (e.g., [Lys and Sohn, 1990; Abarbanell, 1991; Abarbanell and Bernard, 1992](#)). For example, the evidence in [Elgers et al. \(2003\)](#) and [Bradshaw et al. \(2001\)](#) suggests that analysts' earnings forecasts do not fully reflect the transitory nature of current-period accruals, resulting in predictable earnings forecast errors (see also [Barth and Hutton, 2004](#)). The evidence in [Louis et al. \(2010\)](#) is consistent with analysts not fully incorporating the effects of conservatism. [Zhang \(2006\)](#) finds that positive (negative) forecast errors are greater following good (bad) news, consistent with the effects of greater information uncertainty on the degree of under-reaction. [Hodder et al. \(2008\)](#) document both experimentally and empirically that the format and consistency of the sign of operating cash flows and operating accruals affects the forecast error and dispersion of business school students' cash flow forecasts.

While this omission of information may be intentional, the likelihood of that explanation is reduced by findings that certain characteristics of the information environment reduce this apparent inefficiency. For example, [Kimbrough \(2005\)](#) finds that the initiation of conference calls is associated with a significant reduction of the serial correlation in analyst earnings forecast errors. Further, [Markov and Tamayo \(2006\)](#) propose a rational learning-based explanation for the serial correlation in analysts' earnings forecast errors in which analysts are uncertain about the underlying parameters of the earnings generating process and learn rationally about these parameters over time. They provide evidence that is consistent with their rational learning-based explanation using simulation and actual analyst forecasts (see also [Mikhail et al., 2003](#)).

5.2.5. Summary of empirical research on analyst reports and avenues for future research

Most of the early empirical literature that examined analysts focused on properties of their forecasts, firm characteristics associated with analyst coverage, or the market reaction to their outputs. The literature has progressed to consider the analyst

⁹⁸ They find mixed evidence that this apparent superiority diminishes after Reg. FD. Namely, while there are no significant differences in the increase in relative forecast accuracy between favorable and unfavorable analysts after the passage of this act, there is also no significant difference before and after Reg. FD.

⁹⁹ Although [Jackson \(2005\)](#) documents a univariate association between earnings forecast optimism for a firm and the brokerage house's share of trading volume in that stock, this finding is not robust when recommendation optimism is included in the estimation.

as a market participant that both uses and provides information, and as a consequence, has begun to investigate the decisions the analyst faces, and the ramifications of these decisions on the firm's information environment. The biggest advancements have been in the investigation of how the incentives analysts face shape their decisions. Controlling for the endogeneity that is inherent in this setting, researchers have begun to provide more compelling evidence on the effects of these incentives on the outputs the analyst provides.

Despite this progress, the empirical literature is still mostly descriptive, and many fundamental questions remain unanswered. For example, the decision of when to add firms and which firms to add to an analyst's portfolio is not well understood. We do not know how the incentives faced by the analyst, the composition of the analyst's portfolio of followed firms, and/or the firm's existing information environment shape this decision. Research on the interplay between the information provided by sell-side security analysts, other information intermediaries (such as debt analysts), and firms' mandatory and voluntary disclosures is warranted.

Moreover, there is little insight in the literature into how analysts decide what items to include in their reports. Further, we do not fully understand why the practice of forecasting earnings (instead of, for example, prices) is so prevalent. One possibility is that this practice is driven by users' demands. That is, informed/sophisticated investors can infer analysts' private information only from an analysts' earnings forecast (but, for some reason, not a price forecast) to combine with their own information to form a superior forecast of firm value. It could also be that the prevalence of earnings forecasts is driven by the demands of firms. For example, given the regulation requiring managers to issue earnings figures, they may desire an earnings forecast to use as a benchmark to signal information to the market. Thus, the information analysts provide could be linked to, for example, the "meet-or-beat" phenomenon examined in the earnings management literature. However, to the best of our knowledge, the literature has not identified and analyzed the type of information that can be inferred from managers' beating analysts' forecasts that managers could not have conveyed in their earnings disclosures.

Understanding what role the demands of both investors and managers, along with the incentives analysts face, play in determining the decision to follow a firm and not simply when to issue a report but what to include in that report is an important avenue for future research to deepen our understanding of the development and effects of the corporate information environment.

6. Conclusions and directions for future research

We have focused on three aspects of the corporate information environment – voluntary firm disclosures, mandatory firm disclosures, and analysts' reports – to better understand how each contributes to the information available for valuation and stewardship purposes. Our empirical analysis in Section 2 indicates that of the sources of information we consider, voluntary management earnings forecasts (while not very frequent) explain the largest fraction of the variation in quarterly stock returns. However, the other disclosures do explain a significant (albeit smaller) fraction of the variation in quarterly stock returns. Moreover, our empirical analysis implicitly investigates one role for accounting-related information (firm valuation) and leaves unexamined the possibility that other items are more important for the stewardship role. Even limiting attention to the valuation role, concluding one aspect of the corporate information environment is more important than others is premature without an explicit consideration of the interdependencies between these various sources of information.

We conclude that one of the biggest challenges and opportunities facing researchers is considering the interactions among the various information sources. To date, little is known about the relations between firms' voluntary disclosure policies, mandatory disclosure requirements, and the information produced by security analysts. To examine these relations, researchers must consider the interactions between and among the objectives of firms, managers, regulators, analysts, investors, and other market participants as well as the incentives faced by these participants in determining the information environment observed in equilibrium. For example, developing a comprehensive theory of accounting choice involves understanding when and how accounting information is used as well as the incentives faced by regulators, managers, analysts, etc. Additionally, the empirical earnings management literature investigating managers' attempts to meet or beat outstanding expectations assumes that analysts do not (or cannot) undo any effects of earnings management. Despite this assumption being critical, the literature does not provide a satisfactory understanding of when and to what extent analysts and other information intermediaries are affected by managerial decisions or accounting characteristics, such as conservatism (see Louis et al., 2010). Moreover, the link between analytical and empirical work on the corporate information environment is weak at best. The analytical models examined are often very focused and detailed, more so than could reasonably be tested using empirical methods. In contrast, the empirical studies are often very broad (relative to analytical models), but lack the necessary in-depth analysis.

The reason this encompassing approach is so critical is that it can alter the conclusions drawn. For example, researchers examining a mandatory accounting change might conclude that the new standard provides less information. However, this conclusion is often based on tests that ignore any changes in voluntary disclosures and/or third-party production of information. Without considering the corporate information environment in its totality, it is impossible to conclude whether the overall corporate information environment was improved by the new accounting standard. This situation is akin to the early research in the analyst area, which did not consider the endogenous choice of which brokerage house the firm selects as the underwriter. This failure to model the choice of underwriter led researchers to conclude that affiliated analysts are more biased than unaffiliated analysts. This "self-selection" issue is also present, for example, in the research investigating

voluntary disclosures prior to debt and equity offerings, and it is particularly evident in the research linking information quality to the cost of capital.

Despite our (and the literature's) focus on sell-side security analysts as a key information intermediary, other information intermediaries are important in understanding the development of the overall corporate information environment. For example, rating agencies and debt analysts seem an important group of intermediaries to analyze, and more research in this area is warranted. This is especially the case in light of the recent financial crisis and its implications for the development of capital markets, both in the U.S. and internationally. This suggestion relates to a broader issue; although much of the research to date has focused on equity valuation, it is an economic fact that the debt markets are a significant part of any developed economy. As such, research should consider the role of debt markets in the firm's information environment; a step in this direction has been taken recently by DeFranco et al. (2009) and Johnston et al. (2009). We encourage more research investigating issues related to the development of the debt markets and their interactions with the equity markets when examining the valuation role of accounting information.

Another related problem is that some empirical research selectively focuses on aspects of the relevant theoretical work in motivating the hypotheses, designing the empirical tests, and interpreting the results. A good example is the empirical studies on the relation between information quality/information risk and the cost of capital discussed in Section 3.2. Specifically, although asset-pricing theory and numerous analytical models do not predict a significant relation between information quality and the cost of capital, several studies conclude that such a relation does exist even though those findings, and thus the implications for future research and standard setting, are driven by subjective research design choices. Clearly, empirical research should be motivated by sound economic motivation and theory. In addition, moving forward, empirical researchers should acknowledge competing theoretical predictions underlying their research questions and hypotheses and interpret them correctly (see the suggestions advanced in Hughes et al. (2007) discussed in Section 3.2) and also use appropriate and correctly specified research design methodologies (see the discussion in Core et al., 2008).

In the past decade, there have been advances made in certain aspects of the corporate information environment, notably the consequences of disclosure regulation and the economic consequences of financial reporting decisions. There is also some movement towards examining more comprehensive measures of the information environment, and we are seeing a resurgence of research that analyzes interaction between the politics of the standard-setting process and the information environment.¹⁰⁰ Despite this progress, it is surprising how little we still know about fundamental issues, such as the reasons for disclosure regulation in developed markets and the determinants of the format of this regulation, the purpose of accounting choices, the objective of managers in making voluntary disclosures and of analysts in issuing reports, and the interplay between these issues. Granted, considering all possible interactions is likely not feasible either analytically or empirically given existing techniques. However, moving in that direction is, in our opinion, the important next step in developing a richer understanding of the corporate information environment.

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¹⁰⁰ For a discussion of this literature, see Kothari et al. (2010).

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