

Experimental Economics and Empirical Testing of Discretionary Disclosure Theory

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This article surveys the empirical testing of discretionary disclosure theory. Currently, few studies achieve strict controlled tests of identifiable disclosure models. This occurs primarily because live stock market data fail to describe the analytical environment of discretionary disclosure. Traditional archival study precludes the identification of private information receipt and the observability of managerial disclosure action. Empiricists find it necessary to use experimentation as the primary methodology for this research. Experiments provide the ability to observe the dynamics of disclosure decisions, to control the information used in making disclosures, and to develop the empirical environment specified by theory.

Introduction

Although it is assumed that managers gain advantage by disclosing information with discretion, full disclosure theory suggests that it can be quite counter-productive to hide information from shareholders, creditors, government regulators, and other venture stakeholders. Without the perception that management is fully and fairly disclosing all relevant facts, the stakeholders' trust in management and the information it communicates decreases. When trust is lowered, stakeholders' perceptions of risk increase. If a venture is perceived to be riskier, stakeholders demand greater rewards for dealing with the venture (all other things being equal). For example, if a shareholder loses trust in the quality of information provided in a company's annual financial statements, full disclosure theory produces the prospective that the shareholder will only buy the company's stock at a discounted price. Similarly, if an IRS auditor believes that a company is not fairly disclosing information legitimately requested, the auditor will likely demand more detailed information, and higher levels of proof, before agreeing with the company on the legitimacy of other deductions. At the very least, this will cost the company more money in accountants' fees.

The prediction of full discounting, or full disclosure, was first derived (separately) by Grossman (1981) and Milgrom (1981). Managers use full disclosure of private information to maintain the value of the product they sell. When managers do not disclose, buyers or investors discount price to reflect their expectations of hidden information of low product quality.

Full disclosure forms the fundamental prediction for all models of the discretionary disclosure literature. Exceptions to full disclosure are explained by theory that derives partial disclosure thresholds. These thresholds introduce confounding factors that block the ability of stakeholders to employ full discounting, and enable managers to forego full disclosure. Different analytical environments derive various explanations for partial disclosures. Thus, tests of partial disclosure predictions differ among discretionary disclosure models. To parallel theory evolution, empirical testing begins with predictions of full disclosure and proceeds to models of partial disclosure.

Archival Studies

Traditional archival study presents many shortfalls to the investigation of discretionary disclosure models. Data collected from naturally occurring capital markets fail to satisfy the analytical assumptions of these models. Discretionary disclosure assumes that managers

disclose truthfully, and that disclosure is the only method used to reveal information. Disclosure is complete (the environment precludes managers from revealing only part of their private information), and all uninformed parties receive information simultaneously. Disclosure theory disallows managers from owning shares of the firms they direct. Investors enforce truthful disclosure without cost by class action suit. Although these assumptions simplify the analytical setting of disclosure theory, they complicate the search for appropriate real world proxies for theoretical variables.

The definition of the disclosure decision enhances the difficulty of finding appropriate measurements. The timing and observability of disclosures predicted by theory may not correspond to information release in security market data. Archival study cannot control the information set used by managers that make disclosure decisions. Timing of information flow is difficult to specify. Matching the manager's receipt of private information to the corresponding disclosure is often unachievable in archival data sets.

A severe criticism of archival study is the apparent "lack of fit" between live capital market settings and the analytical disclosure environment. King and Wallin (1991b) identify the differences between these two environments as follows: 1) the theory does not allow the manager to manipulate disclosures to earn trading profits, 2) the different types of stakeholders in the live disclosure environment can provide conflicting disclosure incentives to managers, and 3) the multi-period nature of real world securities markets can cause live traders to be more skeptical of disclosure. The economic gains of a single period environment (modeled by discretionary disclosure theory) could be quite different from those of an ongoing continuous market. Real world traders learn to discount disclosures through prolonged participation in securities markets, or are forced out of the markets by economic losses.

In spite of these difficulties, two archival studies provide partial support for discretionary disclosure theory. The first, McNichols (1988), presents evidence that supports the disclosure predictions of Verrecchia (1983) by studying the skewness of stock returns distributions at earnings and non-earnings announcement dates. Verrecchia (1983) shows that a cost of disclosure can preclude full discounting by investors, and therefore full disclosure by managers. Investors are unable to determine if the news is withheld because it is unfavorable or because of the cost the firm will bear by disclosing it. The uncertainty of investors allows the manager some discretion in his disclosure of information. The value of the information must exceed disclosure cost for the disclosure to occur. The cost allows partial disclosure to result and defines a disclosure threshold.

McNichols (1988) assumes that information received in non-announcement periods is due to discretionary manager disclosure. She compares stock return prediction errors in the period surrounding accounting earnings reports announcements (mandatory disclosure) with those of subsequent non-announcement periods (voluntary disclosure). She finds the following results: 1) stock return prediction errors observed at earnings dates are more negative than those of discretionary disclosure periods, 2) the symmetry of stock price revision at earnings dates differs from that at the non-earnings announcement dates, 3) the proportion of extreme negative to extreme positive stock price adjustments is greater at earnings report dates than at the non-earnings announcement periods, 4) the distribution of stock return prediction errors is less positively skewed in the period surrounding earnings report dates than in the subsequent non-announcement periods, and 5) that these skewed distributions illustrate a "truncation effect" that limits (or produces thresholds to) the voluntary disclosure of information.

McNichols (1988) supports the expected prediction that managers release good news before bad news. She concludes that managers announce more extreme bad news in mandatory earnings reports instead of discretionary disclosures. The truncation effect,

produced by skewness in the distributions of stock return prediction errors, lends empirical support to the existence of partial disclosure thresholds. Although one can not say that the disclosure threshold is driven by cost, the truncated distributions document observations of partial disclosure in real world capital market data.

The second archival study, Scott (1994), presents a direct investigation of disclosure cost, and its effect on discretionary disclosure. Scott tests predictions of voluntary disclosure by using financial statement announcement of defined benefit pension plan information. His hypotheses derive from two discretionary disclosure models. From the first, Verrecchia (1983), Scott tests the prediction that the incentive to disclose decreases as the cost of disclosure increases. Disclosure increases as the news becomes more favorable. The second model, Diamond (1985), explains voluntary disclosures through information cost savings. The firm commits to a policy of revealing relevant news to preempt private information search by investors.

Scott (1994) defines a voluntary (discretionary) disclosure to be an information release that exceeds mandatory pension asset and liability disclosure. Examples include pension plan details and type, persons covered, funding and investment of plan assets, the method of valuing pension assets, and the amortization of plan adjustment. Disclosure cost is represented by the variables of strike incidence, pay rate, and rate of return on assets per firm and industry. Labor expense indicators measure cost because labor is expected to react to pension plan disclosure. Trading volume, public issue, and significant owners test the information cost savings hypothesis.

Scott's (1994) findings are consistent with the proprietary cost theory of Verrecchia (1983). They lend marginal support to the information cost savings predicted by Diamond (1985). Managers appear to condition disclosures of defined benefit pension plans on the type of news. Disclosures increase with the favorableness of private information. Disclosure cost variables are negatively associated with defined benefit pension plan disclosures. Thus, Scott finds that increases in proprietary cost positively correlate with less disclosure. Scott attributes weak support for the information cost savings hypothesis to measurement error and poor definition of proxy variables.

Experimental Investigation

Experiments overcome several difficulties that researchers face in testing discretionary disclosure models. The experimenter can control the institutional environment that receives the disclosure. He can observe the manager's receipt and disclosure of private information. The experimenter defines and manipulates private information content, enforces the requirement of truthful disclosure, and sets the threshold of disclosure cost. He can delimit the information available to each market participant. Because the experimenter controls the environment used to test the theory and produce data, he reduces the speculation and explanation of unanticipated observations. He can avoid much of the "guesswork" that results when archival data appears influenced by confounding environmental factors. In experiments, the researcher creates specific institutional characteristics that closely follow the model's direction, and then evaluates the data generated by the laboratory environment.

Tests of the Prediction of Full Disclosure

The first experiments of discretionary disclosure models test the prediction of full disclosure. Full disclosure results when managers release all private information to uninformed parties. It occurs when disclosures are credible and shareholder verifications are costless. Theory predicts that managers employ full disclosure to maintain the value of the

product they sell and the company they manage. When information is withheld, the uninformed parties assume that the manager is hiding bad news. Thus, they discount the value attributed to the product. Full disclosure avoids unjustified value discounts by informing parties of the true information content of the manager's news. If the manager has bad news, the discounting of his product is justified. He continues to disclose information voluntarily if the information adds value to the otherwise 'fully discounted' amount. The prediction of full discounting, or full disclosure, (Grossman (1981) and Milgrom (1981)) is the cornerstone of discretionary disclosure literature. King and Wallin (1990), King and Wallin (1991b), and Forsythe, Lundholm & Rietz (1999) investigate the prediction of full disclosure in laboratory settings.

King and Wallin (1990), test the relative strength of two credibility mechanisms defined by discretionary disclosure theory. Either the presence of an anti-fraud rule mandating disclosure truthfulness, or the ex post verification of the disclosure by the receiving party, can make disclosure credible. King and Wallin predict that full disclosure occurs when the anti-fraud rule is in effect, independent of ex post verification. Results confirm their hypothesis.

King and Wallin (1990) use experimental markets of one privately informed seller with three buyers or investors. The seller holds an economic commodity or asset that pays a liquidating dividend at the end of the period. The asset is subject to three realization states (10%, 50%, 90%). These states comprise private information to the sellers. Buyers know only the distribution of these levels. Disclosure is costless. Sellers can disclose one realization state (a point estimate) or the entire distribution of states (in essence no disclosure). Sellers may be of high or low quality. Buyers submit bids to purchase the asset when they receive the disclosure. Bidding is based on a first price, sealed bid auction. Buyers learn true realization levels at the end of the period. The perfect anti-fraud rules and ex post verification form the experimental treatments. King and Wallin (1990) find that anti-fraud rules are sufficient to produce full disclosure. Sellers lie when the anti-fraud rule is not present, and buyers discount the value of the asset possessed by the fraudulent sellers.

King and Wallin (1991b) further perturb the assertion that credibility of disclosure produces full information release. In these experiments, the manager's private information consists of exact dividend values. King and Wallin enhance their original experiment (1990) by increasing the number of disclosure options available to the manager, and by measuring buyer response to knowledge of these options. Omitting the use of different quality sellers and the ex post verification mechanism simplifies the experiment. Managers can disclose true dividend values, paired values, ranges of potential dividend values (a subset of the dividend distribution), or the entire distribution of dividend values (no disclosure). If full discounting occurs, investors should value the asset at the lowest value the manager discloses.

King and Wallin (1991b) maintain the same experimental environment of the previous study (King and Wallin, 1990). Sellers learn the true liquidating dividend value of a one period asset. They decide whether to disclose it to buyers using one disclosure option available to them. Buyers know that the market privately informs all sellers. Disclosure is costless and constrained to be truthful by the anti-fraud rule. The experimenter reveals true realization of the asset at the end of the period. King and Wallin change the bidding structure from the first price sealed bid to a double auction for the trading of the asset. The double auction permits communication of information between buyers and sellers other than the disclosure.

Results show that in general sellers move to full disclosure and buyers adjust bidding strategies in response to sellers' disclosure strategy. However, in those markets where sellers have many disclosure options, and buyers have no knowledge of these options, full discounting does not result. King and Wallin (1991b) conclude that these results may provide insight why investors do not fully discount managerial disclosures in real world capital markets.

In contrast to the experiments of King and Wallin (1990, 1991b), Forsythe, et al. (1999) test the hypothesis of full discounting in a two-person game. In the game, either buyer or seller can make the first move, and choose initial price. The choice dictates the information set that is available to the other player. The player who moves first determines which branch of the game tree, (which set of strategies), is presented to the other player.

The seller in the game has private information about the true realization of an asset. Information consists of high, low, or medium state realization. The buyer knows *ex ante* the distribution of these realizations, and receives information concerning probabilities over states. The true quality of the asset is revealed at the end of the period. Seller disclosure options include no disclosure, credible disclosure subject to an anti-fraud rule, and any disclosure at all—called “cheap talk.” “Cheap talk” is not subject to the anti-fraud rule. Disclosures are costless. Full discounting predicts that buyers assume the lowest quality (lowest price) in the settings of no disclosure and “cheap talk.”

Forsythe, et al. (1999) find that full discounting explains buyer prices in games of no disclosure and disclosure subject to the anti-fraud rule. Interestingly, buyers appear to respond to “cheap talk,” and bid prices associated with high quality items during the last five periods of the game. Prices in the “cheap talk” games are 40% higher on average than the predicted low quality price of full discounting.

Tests of the Discretionary Disclosure Models

Contrary to the prediction of full disclosure, markets often observe that managers withhold or delay the release of private information. If the disclosure of information prevents full discounting, such nondisclosure appears unexplained. Discretionary disclosure models explain observations of nondisclosure by introducing confounding factors that block the ability of uninformed parties to discount price fully. These confounding factors cause disclosure thresholds. Buyers are unable to assume the lowest possible value because they are not certain that the withheld news is unfavorable. The disclosure threshold gives the manager disclosure discretion. He reveals private information only if the value of disclosure exceeds the threshold. If the benefit to disclosure does not exceed the threshold, he withholds.

The existence of disclosure thresholds enables partial disclosure and refines the prediction of full disclosure or full discounting. Partial disclosures can result when the information release entails a cost. If the value gained by disclosure does not exceed the cost, the manager will not disclose. Buyer uncertainty can also support a threshold of disclosure. If buyers are uncertain that the manager has received private information, they are unable to judge withheld news as unfavorable.

King and Wallin (1991b), and Forsythe, et al. (1999), reveal that market behavior can show exception to the full discounting of price in nondisclosure. Therefore, they investigate partial disclosures and disclosure thresholds. Because the factors driving partial disclosure vary depending upon the analytical environment, their experiments test specific disclosure models. King and Wallin (1991a) test the disclosure threshold that results from investor uncertainty regarding the existence of private information ((Dye, 1985) and (Jung and Kwon, 1988)). King and Wallin (1996) investigate disclosure delays that occur when the timing of private information receipt is unknown by investors ((Dye, 1985) and (Jung and Kwon, 1988)). King and Wallin (1995) test a disclosure threshold supported by the disclosure cost of lost profit due to opponent entry (Wagenhofer, 1990).

King and Wallin (1991a) test the partial disclosure prediction derived from the models of Dye (1985) and Jung and Kwon (1988). In these models, the disclosure threshold is supported

by investor uncertainty as to the private information endowment of the manager. The manager who is uninformed is unable to distinguish himself from the informed manager that is hiding unfavorable news. Investors cannot judge with certainty that the manager is hiding bad information, so they cannot fully discount the price of the firm.

King and Wallin (1991a) use markets of one manager/seller who offers an asset for sale with a liquidating dividend. The dividend is private information to the seller. Disclosure is costless. The seller is subject to an exogenous probability of being informed. Buyers may or may not have knowledge of this probability. If the seller receives private information, he may disclose it to the buyers as a point estimate disclosure. Buyers bid for the asset following a first price sealed bid auction.

Results support the prediction that the minimum disclosed dividend value rises with increases in ex ante probability that the seller is uninformed. This link lends support to the existence of partial disclosure, or disclosure threshold, predicted by Dye (1985) and Jung and Kwon (1988). However, the test fails to support specific point predictions of the models. The buyers' pricing of the asset is consistent with the seller's disclosure strategy, but seems unaffected by advance knowledge of the ex ante probability that the seller is uninformed. This suggests that buyers react rather than anticipate seller disclosure.

King and Wallin (1996) investigate the timing or delay of manager disclosure. The experiment tests further predictions from the models of Dye (1985) and Jung and Kwon (1988). The disclosure timing model predicts that managers can delay the disclosure of bad news when investors are unaware of the arrival time of private information. The longer the manager waits to reveal his information, the more investors interpret the news as unfavorable and discount the price. The manager derives disclosure discretion from the possibility that he remains uninformed until late in the period. Investors anticipate this disclosure strategy and decrease the price of the firm over time but are unable to discount price fully.

In these experimental markets, a single manager receives the liquidating dividend of his firm as private information. He may disclose a point estimate of the dividend to a set of four to six investors. These investors trade firm ownership rights in a computerized double auction bidding institution. Managers receive the dividend at random times during the period and investors are unaware of its receipt. Investors cannot distinguish between uninformed and informed managers until the end of the period when they know that information receipt took place. The manager cannot hold or trade assets, he can only observe market activity and issue a disclosure. Disclosure is costless.

Results provide qualitative support for the models as firm price decreases significantly over time of nondisclosure. Disclosures also agree with the results of archival studies (McNichols, 1988) that suggest that managers disclose good news without delay and wait to disclose bad news. Results are consistent with prediction as investors do not price the firm at the lowest possible value. Full discounting of firm price does not occur although investors know that managers receive information during the experimental period.

King and Wallin (1995) test a disclosure threshold that arises from cost of disclosure. This experiment uses the Wagenhofer (1990) model and definition of disclosure cost. Several discretionary disclosure models exist that define disclosure cost in different ways. In Wagenhofer, the cost of disclosure is profit lost when information release encourages an opponent to enter the firm's product market. Wagenhofer defines cost as proprietary due to its direct impact on firm profits. Managers disclose information only if the benefit to the firm exceeds the proprietary cost resulting from opponent entry.

In Wagenhofer (1990), the manager offsets the effect that disclosures have on investors and his opponent. The manager has incentive to disclose good news to capital markets to increase firm price. However, release of favorable news poses a risk of opponent entry and lost profit in the product market. If the opponent enters, the firm incurs an exogenously specified proprietary cost that reduces firm value. The balancing of conflicting firm incentives leads Wagenhofer (1990) to predict the existence of one full disclosure and two partial disclosure equilibria. Each predicted disclosure equilibrium derives from the range of dividend values of the firm and the level of exogenous proprietary cost.

In the experiment, a single seller offers an asset to a group of three buyers. The asset has a one period life. At the beginning of the period the seller receives the asset's true liquidating dividend as private information. He then decides whether to disclose the dividend value. The seller can disclose the gross (state contingent) dividend as a point estimate or make no disclosure. After disclosure the buyers bid for the asset using a second price sealed bid auction. The exogenous disclosure cost reduces the payment to the buyer who receives the asset. Buyers know the cost of opponent entry and that the seller receives the dividend. A computer program implements opponent entry and the resulting disclosure cost. Proprietary cost is fixed and exogenously specified by the experimenter.

Results support the partial disclosure equilibria of Wagenhofer (1990). The full disclosure equilibrium receives limited support as managers do not disclose all dividend values. Managerial disclosures react to the level of proprietary costs and support the existence of the predicted disclosure thresholds.

Conclusion

Managers may employ considerable discretion in financial information release to investors, creditors, governmental regulators and other stakeholders. These voluntary disclosures have implications as to appropriate compensation of observable managerial action and the amount of required disclosure in financial statements and annual reports. We can expect the release of favorable information that could increase stock price (such as novel new product additions or increases in predicted demand). Yet the market also receives many voluntary disclosures of bad news that managers would be motivated to hide. Good information can remain hidden as well.

Discretionary disclosure models provide answers to these questions that build on a premise of full disclosure. Partial disclosure results as researchers acknowledge confounding factors that may preclude full disclosure. The testing of these models has been problematic and the question is only partially answered. Ironically, the necessary analytical constraints used to develop the theory almost preclude its validation with empirical data. Without such validation, our understanding of discretionary disclosure remains limited. This survey has shown the preliminary nature of the empirical testing of discretionary disclosure. Studies appear to show conflicting results but the existence of partial disclosure thresholds is consistent in both archival and experimental tests. Full disclosure appears to have limited applicability, as we would expect.

Researchers should acknowledge the value experiments provide to testing discretionary disclosure theory. Experimentation allows us to fully describe the nature of the disclosure decision and the structure of the proposed analytical environment. Experiments reveal characteristics of disclosure discretion that have previously been unrecognized and unstudied. By incorporating these characteristics into new theory we can improve our understanding of manager disclosure actions.

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