THE IMPACT OF PRODUCT MARKET COMPETITION ON EARNINGS QUALITY

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THE IMPACT OF PRODUCT MARKET COMPETITION ON EARNINGS QUALITY

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

The objective of this dissertation is to examine the impact of product market competition on earnings quality. Based on a sample from the US manufacturing sector for the period 1996-2005, I find consistent evidence showing a negative relation between industry concentration and earnings quality. Addition test also confirms a negative relation between industry concentration and the precision of public and private information of analysts. These findings are consistent with the intuition that firms in concentrated industries tend to protect their competitive advantage and avoid political attention by creating a more opaque information environment. On the relation between industry homogeneity and earnings quality, I find mixed empirical evidence which leaves the role of competition in mitigating agency costs inconclusive. I also find limited empirical support linking competitive interaction to earnings quality. However, there is consistent evidence suggesting that industry homogeneity and competitive strategy help to moderate the negative impact of industry concentration on earnings quality.

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (Continued)

CHAPTER 1

INTRODUCTION

1.1 Motivation and Objectives

In his paper "*Annual Survey of Economic Theory: The Theory of Monopoly"* published in 1935, Sir John Hicks suggested that "the best of all monopoly profits is a quiet life" (Hicks 1935, 8). Since then, this dictum has been widely cited in the economics and industrial organization literature[1], particularly in the area of product market competition. By using industry concentration as a proxy for the level of competition, prior research has shown that this "quiet life" includes a higher level of managerial slack (Leibenstein 1966; Machlup 1967), lower management turnover (DeFond and Park 1999; Fee and Hadlock 2000), and lower idiosyncratic in stock returns (Gaspar and Massa 2006). Research on the impact of product market competition on accounting has focused mainly in the area of corporate disclosure policy (Clarke 1983, Gal-Or 1985, Darrough 1993, Ali Klasa and Yeung 2009a), as well as corporate governance mechanisms and managerial incentives (Schmidt 1997, Rennie 2006, Karuna 2007, Dhaliwal et al. 2008, Giroud and Mueller 2010).

Healy and Palepu (2001) point out that the demand for financial reporting and disclosure arises from information asymmetry and agency conflicts between managers and outside investors. Yet, a manager's motives for voluntary disclosure are affected by economic determinants and institutional settings, for example, corporate control contests, shareholder litigation, among others. Public disclosure of information can affect a disclosing firm negatively if market participants make strategic use of the information to their advantage, or if such disclosure renders the firm a political target. In the presence of such proprietary and political costs, firms

[1] Citation search using Google scholar has returned more than 200 articles containing the dictum.

tend to protect their competitive advantage by controlling the information to be voluntarily disclosed. However, empirical evidence so far is centered on the quantity aspect of disclosure, for example, frequency and horizon of forecasts (Ali Klasa and Yeung 2009a), number of segments to be reported (Harris 1998, Botosan and Stanford 2005), etc. There is limited, if any, empirical findings on the quality aspect of disclosure under the setting of product market competition.

Bushman and Smith (2001) point out that a fundamental objective of governance research in accounting is to provide evidence on the extent to which information provided by financial accounting systems mitigate agency problems due to the separation of managers and outside investors. Recent research has examined the role of product market competition in aligning managerial interests and documented that competition reduces agency costs (Karuna 2007, Dhaliwal et al. 2008, Giroud and Mueller 2010). The difference in the level of agency costs should be reflected in the quality of information provided by the managers through the financial reporting systems. However, limited, if any, evidence has been found in this respect.

The objective of this dissertation is to fill the above gaps by examining the impact of product market competition, as measured by industry concentration, industry homogeneity, and extent of competitive interaction, on the quality of accounting information. This complements prior research which focuses mainly on the impact of product market competition on the quantity of accounting information (Harris 1998, Botosan and Stanford 2005, Ali Klasa and Yeung 2009a). By looking into the quality of accounting information, I also examine the governance role of product market competition and its effect on quality of reported financial information. Finally, rather than just focusing on accounting information alone, this dissertation also explores the impact of product market competition on the precision of investors' and analysts' information. In Ali Klasa and Yeung (2009a), the authors examine the impact of competition on information quality by looking into the dispersion and volatility of analysts' forecasts. Here, I extend the analysis by looking into the private and public information environment of investors and analysts.

1.2 Sample and Results

My sample consists of 5,678 firm-years drawn from the US manufacturing sector, covering the period 1996 to 2005. Using earnings quality proxies from Francis et al. (1994; 1995), I find a consistent and significant negative relation between industry concentration and the following earnings attributes: accrual quality, predictability, smoothness, relevance, timeliness, and conservatism. This finding is consistent with the intuition that firms in concentrated industries tend to protect their competitive positioning by releasing earnings information of a lower quality. I also find consistent negative and significant relation between industry concentration and the precision of public and private information of investors and analysts. Again, this supports the notion that firms in concentrated industries tend to create a more opaque information environment to protect their competitive advantage. Sensitivity tests show that my findings are robust to different firm size and industry groupings.

I find mixed evidence on the relation between industry homogeneity and earnings quality. Findings are supportive of conflicting views in the literature regarding the impact of competition on agency costs, and are therefore not conclusive.

There is also limited evidence on the impact of competitive interaction on earnings quality. However, I find consistent evidence showing that industry homogeneity and competition strategy help to moderate the negative impact of industry concentration on the quality of accounting information as well as the private and public information of analysts and investors.

1.3 Contributions

This dissertation contributes to the literature in three ways. First, it provides evidence on the relation between competition and quality of accounting information. This is the first study which provides direct evidence that a positive relation exists between competition and various attributes of earnings quality. This finding supports the notion that firms from industries with less competition tends to create an opaque information environment in order to protect their competitive advantage from rivals and to avoid public and political sanctions.

Second, rather than just focusing on the quality of accounting information, this dissertation also documents the impact of competition on the precision of investors' private and public information. To the best of my knowledge, Ali Klasa and Yeung (2009a) is the only paper which also investigates the impact of competition on the information environment. They find that firms in more concentrated industries have more opaque information environments in the form of more dispersion in analysts' earnings forecasts; greater analyst earnings forecast errors; and a higher volatility of analyst forecast revisions. This dissertation extends the above analysis by testing a different dimension of the information environment, namely, the precision of public and private information of investors and analysts.

Finally, prior research has mainly used the level of industry concentration as the sole measure of competition. However, competition encompasses several dimensions. In this dissertation, I provide a direct test of the relation between competition and earnings quality based on three dimensions of competition: industry concentration, industry homogeneity, and strategic competition. I find different results when different competition measures are being tested and this provides additional support to Karuna (2007) that studies of competition should consider the multi-dimensional nature of competition. The use of industry concentration as the sole proxy for competition should be reconsidered.

1.4 Structure of Dissertation

This dissertation will proceed as follows. In Chapter 2, I will provide a literature review on selected motives for voluntary disclosure and their relations with product market competition. I will then proceed with the development of my testable hypotheses. In Chapter 3, I will introduce the research designs and empirical equations for my hypotheses, followed by variable definitions and measurements. Empirical findings will be discussed in detail under Chapter 4, and I will present results on addition and sensitivity tests in Chapter 5. Finally, I will discuss the limitations on this dissertation and conclusion will be drawn in Chapter 6.

CHAPTER 2

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Literature Review

2.1.1 Voluntary Disclosure

Financial reporting and disclosure are potentially important means for management to communicate firm performance and governance to outside investors. Demand for financial reporting and disclosure arises from information asymmetry and agency conflicts between managers and outside investors (Healy and Palepu 2001). Even in the absence of disclosure mandates or standards, firms benefit from more disclosure by reducing information asymmetry between firm managers and/or firm insiders, and firm shareholders (Verrecchia 2001). In the voluntary disclosure literature, at least three types of capital market affects for firms that make extensive voluntary disclosures have been identified: improved liquidity for their stock in the capital market, reductions in their cost of capital, and increased following by financial analysts[2].

Note, however, voluntary disclosure is not costless. In the unlikely situation in which auditing and accounting regulations work perfectly, managers' accounting decisions and disclosures communicate changes in their firm's business operation environment to outside investors. Practically, because accounting regulation and auditing are imperfect, managers make a tradeoff between decisions and disclosures to communicate their superior knowledge of firm's performance to investors, and to manage reported performance for contracting, political or corporate governance reasons. In the coming sections, I will review three complementary motives affecting the manager's voluntary disclosure decision through product market competition.

2 See Healy and Palepu (2001) for a review of these benefits.

2.1.2 The Proprietary Cost Motive

In the hypothetical world of perfect competition, economic theory predicts that both buyers and sellers have perfect information about the market, including price and quality of products. There is no information asymmetry between firms, and each firm is a price-taker in the sense that they cannot individually influence the price at which the product can be purchased or sold. There is no substantive role for financial disclosures and thus no demand for accounting or accounting regulation[3].

In a market with imperfect information, however, each firm's decision on pricing or production quantity can affect its own and rivals' profits. Such actions will induce pricing or production reactions from rivals that will in turn prompt further pricing or production adjustments and so on until an equilibrium is reached. This interaction is recognized by each firm and plays a crucial role in determining each firm's strategic choice. Faced with uncertain demand and cost structure of rivals, firms may exchange cost or demand information in order to better adapt their output and pricing decisions to uncertainty, while some may benefit by hiding their own private information. Consequently, managers' voluntary disclosure to investors may damage firms' competitive position by releasing relevant information to competitors. Such damages are termed proprietary costs by Verrecchia (1983). With the presence of proprietary costs, managers' decision on the appropriate level of disclosure involves the trade-off between the benefits of informing the capital market about firm value against the costs of aiding the rival. Prior research indicates that such decision is

3 See Watts and Zimmerman (1978; 1986), Holthausen and Leftwich (1983), and Fields et al. (2001).

affected by many factors, and one of these factors is the level of competition facing the firm[4].

Economic theory suggests that competition drives away abnormal profits. Formulated as early as 1934[5], the competitive environment hypothesis states that competition will eliminate all abnormal profits in the long run. It postulates that high profit margins are a strong incentive for new competitors to enter the market and lead to a reduction in profitability. Extensive research on the trend behavior of company profits over time is supportive of this mean-reversion phenomenon[6]. Since firms in competitive industry are associated with lower profitability, such firms are facing a lower level of proprietary costs. Darrough and Stoughton (1990) theoretically demonstrate that firms in highly concentrated industries have less incentive to make informative disclosure for fear of attracting competition, while firms in more competitive industries tend to provide more informative disclosure to discourage new entry.

Early empirical evidence examining the impact of proprietary costs on disclosure is mostly focused on segment reporting[7]. Harris (1998) estimates a logit model on management's decision to report operations in a given industry as a segment as a function of industry competition. She finds that operations in more competitive industries are more likely to be reported as industry segments, indicating that

4 Other factors include whether the firm is engaged in Cournot (quantity) or Bertrand (price) competition, whether the products involved are substitutes or complements, whether the private information to be disclosed is demand or cost, etc. See, for example, Darrough (1993); Vives (1984); Gal-Or (1985); and Li (1985).

5 See Schumpeter (1934).

6 See, for example, Mueller (p.5, 1990) and Roberts and Dowling (p. 1087, 2002).

7 Segment reporting and disclosures were originally mandated under FAS14. However, the standard provided for great latitude in the definition of a reportable segment. This effectively granted firms a high level of discretion on the disclosure of their segment information. FAS131 was issued in June 1997 to replace FAS14. The approach used in FAS131 is a "management approach", meaning that it is based on the way management organizes segments internally to make operating decisions and assess performance.

disclosure costs are decreasing in competition. In Botosan and Stanford (2005), they find that firms with "hidden" segments generally operate in industries which are profitable and with less competition. By withholding segment information, firms from these industries allow themselves to appear as if they were underperforming their rivals. They conclude that the decision to withhold segment information appears to be motivated by a desire to protect profits in concentrated industries.

Ali, Klasa and Yeung (2009a) show that firms in more concentrated industries have more interdependent investment strategies with rivals. Incumbents in such industries prefer less informative disclosure policies to avoid providing competitors with strategically useful information. Specifically, they find that firms in more concentrated industries offer less frequent earnings forecast; are less likely to make long-term forecasts; receive lower disclosure ratings from analysts; and have more opaque information environments. Their findings suggest that corporate disclosure policy is influenced by firms' attempts to avoid providing rivals with proprietary information.

2.1.3 The Agency Cost Motive

Agency conflicts between the principle and his agent give rise to agency cost, which is defined in Jensen and Mecking (1976) as the sum of (i) the monitoring expenditures by the principle; (ii) the bonding expenditures[8] by the agent; and (iii) the dollar equivalent of the reduction in welfare experienced by the principal due to divergence in agent's decisions. A growing body of literature seems to indicate

[8] Bonding expenditures are those costs incurred by the agent to expend resources to guarantee that he will not take certain actions which would harm the principal or to ensure that the principal will be compensated if he does not take such actions (Jensen and Meckling 1976).

that competition in product market aligns managerial incentives and reduces agency cost. In a highly competitive market, firms with inefficient productive inputs, e.g. high agency costs, are priced out and end up being liquidated. Managers facing bankruptcy constraints are “forced” to put in higher productive efforts. In a theoretical paper, Schmidt (1997) shows that an increase in competition provides a direct incentive for the manager to spend more effort in order to avoid the disutility of liquidation. Moreover, there is also an indirect effect as it becomes cheaper for the owner of the firm to induce a higher level of effort. As a result, the manager’s effort increases unambiguously. This threat-of-liquidation effect implies that the cost to implement a higher level of effort unambiguously decreases as competition becomes more intense.

In another theoretical paper, Hart (1983) shows that competition makes the performances of different firms interdependent. When the firms’ environments are correlated, not only can a firm’s manager be evaluated via his own performance, he can also be evaluated via the performance of those managers in other firms within the same industry. Similarly, Holmstrom (1982) and Nalebuff and Stiglitz (1983) note that competition increases the number of firms in an industry and these peer firms provide a basis for evaluating a firm’s performance. This improved flow of firm-specific information limits managerial ability to conceal their performance. Empirically, DeFond and Park (1999) document that the frequency of CEO turnover is positively related to the level of industry competition suggesting that relative performance evaluation serves as a useful mechanism for monitoring performance in more competitive industries.

A growing literature indicates that product market competition helps to mitigate agency problems by aligning managerial incentives, resulting in lower level of information asymmetry and the associated agency cost. Giroud and Mueller (2010) finds that the passing of business combination laws[9], which weaken corporate governance and create more opportunity for managerial slack, have led to significant drop in return on assets for those firms in industries with less competition. On the other hand, they report that the effect of the passing of the business combination laws on return on assets is close to zero in industries with high competition. Their results are consistent with the notion that competition mitigates managerial agency problems. Similarly, Chhaochharia et al. (2009) finds that firms in industries with less competition respond more positively to the announcement of the Sarbanes-Oxley Act.[10] These firms have significant efficiency gains (in terms of SG&A costs to sales and ratio of sales to assets) after the passage of the law than firms in industries with strong competition. Their findings show that product market competition aligns managerial incentives with those of the shareholders.

2.1.4 The Political Cost Motive

The political-cost motive (Watts and Zimmerman 1978) predicts that managers confronted with the possibility of politically-imposed wealth transfers will choose accounting strategies that reduce the likelihood or size of the transfer. Jones

[9] Business combination laws impose a moratorium on certain kinds of transactions, including mergers and asset sales, between a large shareholder and the firm for a period ranging from three to five years after the shareholder's stake has passed a pre-specified threshold. This moratorium hinders corporate raiders from gaining access to the target firm's assets for the purpose of paying down acquisition debt, thus making hostile takeovers more difficult and often impossible. The reduced fear of a hostile takeover means that an important disciplining device has become less effective and that corporate governance overall was reduced (Bertrand and Mullainathan 2003).

[10] The Sarbanes-Oxley Act was enacted in July 2002 largely in response to major corporate and accounting scandals involving several prominent companies in the United States. These scandals resulted in an unprecedented lack of confidence in the financial markets and a loss of public trust in corporate accounting and reporting practices. Section 404 of the Act, *Management Assessment of Internal Controls*, requires most publicly registered companies and their external auditors to report on the effectiveness of the company's internal control over financial reporting.

(1991) provides evidence that managers in the U.S. footwear industry used income-decreasing accruals to increase their likelihood of obtaining import protection and higher amount of protection granted. Han and Wang (1998) find that during the 1990 Persian Gulf crisis, petroleum refining firms in the United States used accruals to reduce reported earnings in order to avoid public attention and possible antitrust investigations by the Justice Department.

The antitrust laws of the United States prohibit monopolies or attempts to create a monopoly in any unregulated line of business[11]. In the past, the two agencies that enforce these laws, the Department of Justice and the Federal Trade Commission, have relied on accounting profits in prosecuting such antitrust violations. The agencies argued that high accounting rates of return were "excessive" and indicative of monopolistic power on the part of the firm. Based on the political cost motive, firms in less competitive industries are associated with higher political costs and managers in these firms will have more incentive to employ earnings management to reduce reported profits. Adopting a longitudinal approach that examines likely changes in firms' political costs over time, Cahan (1992) finds that managers adjust their discretionary accruals in response to monopoly-related antitrust investigations, supporting the political cost motive.

In summary, proprietary costs, agency costs, and political costs are the three complementary motives linking product market competition to quality of

[11] The Sherman Antitrust Act (1890) makes it a criminal offence to monopolize any part of interstate commerce. An unlawful monopoly exists when only one firm controls the market for a product or service, and it has obtained that market power, not because its product or service is superior to others, but by suppressing competition with anticompetitive conduct. In addition, the Clayton Act (1910) prohibits mergers or acquisitions that are likely to lessen competition.

accounting information. Generally speaking, firms from less competitive industries are associated with (i) higher proprietary costs as they enjoy higher profitability; (ii) higher agency costs as their management enjoys a higher level of slack and subject to less vigorous cost pressure; and (iii) higher political costs as they are more likely to attract public and political attention. These motives, either singly or jointly, provide management higher incentive to disclose accounting information which is of a lower quality. Based on these three motives, I will now proceed to develop the hypotheses for this dissertation.

2.2 Hypotheses Development

2.2.1 Industry Concentration and Quality of Accounting Information

Industry concentration refers to aspects of the distribution of firm size within a specific market or industry that have traditionally been used to characterize the degree of competitiveness in the market (Carranza 2008). Industrial organization theory suggests that the concentration of firms in a market is an important element of market structure and a determinant of competition[12]. Based on the assumption that concentration weakens competition by fostering collusive behavior among firms, high (low) industry concentration, other things being equal, is associated with low (high) level of competition.

Increased market concentration was found to be associated with higher prices and abnormal profits (Bain 1956; Brozen 1971a, 1971b; Demsetz 1973),

[12] Literature in this area is focused on the structure-conduct-performance paradigm in which tests of market power observe the structure of the market (e.g. concentration levels, number of firms) and relate this to the conduct (e.g. pricing policies) and performance (e.g. return on assets, return on equity) of firms. See Mason (1939, 1949), Bain (1951, 1956), and Chamberlain (1965).

resulting in higher proprietary costs to such firms. Ali, Klasa and Yeung (2009a) find consistent evidence that firms in more concentrated industries offer less informative disclosures in order to avoid providing rivals with strategically useful information. Harris (1998) and Botosan and Stanford (2005) show empirically that firms in concentrated industries control the quantity of accounting information to be revealed by hiding profitable segment information. Firms enjoying abnormal profits are also subject to a higher likelihood of public and political sanctions, and managers are found to use discretionary accruals to lower their earnings number (Cahan 1992). As an alternative to hidden profitable segments or earnings management techniques, firms may create a more opaque information environment in order to hide the true financial performance from their rivals and the general public. The above discussion leads to my first hypothesis as follows:

Hypothesis 1*: The higher the level of industry concentration, the lower the quality of accounting information.*

2.2.2 Industry Homogeneity and Quality of Accounting Information

An important mechanism through which product market competition reduces agency conflicts[13] is by facilitating relative performance evaluation (RPE) of managers. DeFond and Park (1999) report direct evidence on how RPE is affected by

[13] I am referring here to Type I agency conflicts between shareholders and managers. Product market competition reduces agency costs by aligning managerial interests with those of shareholders, and such reduction in agency costs should be reflected in better quality of reported accounting information. For Type II agency conflicts between block-holders and minority shareholders, alignment of their interests means that shareholders of concentrated-ownership firms may have less incentive to demand high-quality financial information because family member managers, who may also be influential shareholders, have access to family firms' private information. This alignment effect implies that concentrated ownership reduces the demand for quality financial reporting (Wong 2006).

product market competition which in turn affects CEO turnover. In particular, they document that the frequency of CEO turnover is positively related to the level of industry competition suggesting that RPE serves as a useful measure of performance evaluation in more competitive industries.

While industry concentration measures competition through market share, industry homogeneity measures competition through the degree of similarity of the operating environment of the market participants. An industry made up of firms which are very similar (different) in nature in terms of technology or product is referred as a homogeneous (heterogeneous) industry. As firms within a homogeneous industry are having similar cost structure or selling similar products, competition is, other things being equal, more pronounced in homogenous than heterogeneous industry[14].

Industry homogeneity captures the degree to which shocks to an industry affect all firms at the same time. Therefore, it is easier for shareholders of firms from homogeneous industries to extract information from the interactions in the market place. These informed interactions enable outside investors to learn about the true environment in which these firms operate, and then potentially allow them to act on this information to discipline insiders. Empirically, Parrino (1997) finds that homogeneous industries are associated with more precise relative performance measures and so it is easier for principals to identify poor agents, resulting in a higher likelihood of CEO turnover in those industries. Comparing with industries that are made up of heterogeneous firms, homogeneous industries are associated with an

[14] Industries of high homogeneity are referred as neck-and-neck sector in Aghion and Griffith (2005).

informational advantage to the shareholders[15] and, consequently, the use of RPE is more effective.

While RPE facilitates the monitoring of managers' performance and, thus, reducing agency costs and leading to higher quality of accounting information, there is an alternative view that product market competition raises agency costs as managers in competitive industries face a constant pressure of beating their peers, or at least not falling behind. This suggests that product market competition would heighten managers' career concerns and, hence, increase the propensity of managers to misreport (Rotemberg and Scharfstein 2003, Hermalin and Weisbach 2007, and Balakrishnan and Cohen 2009). Since RPE is more effective in homogeneous than heterogeneous industries, managers from firms in homogeneous industries will be subject to higher pressure and are more likely to manipulate accounting information, leading to higher agency costs.

Because existing literature provides competing and alternative predictions about the effects of industry homogeneity on earnings quality, the directional relation between industry homogeneity and earnings quality becomes an empirical question. As a result, my second hypothesis is non-directional as follows:

Hypothesis 2*: Industry homogeneity is systematically related to the quality of accounting information.*

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[15] Correlation test indicates that industry homogeneity is positively and significantly correlated with firms' reported number of business segments (0.0452, p-value = 0.0017). As such, another possible source of informational advantage associated with industry homogeneity may be coming from more business segment disclosure.

2.2.3 Competitive Strategy and Quality of Accounting Information

In oligopolistic industries, profits of individual firm as well as the overall industry depend on how firms interact with each other. Firm value, therefore, is not just a function of its own actions but also a function of the choices made by rivals. Firms can increase value by behaving strategically, that is, by committing to actions that will elicit favorable responses from rivals. Strategic interactions between firms in their product markets are classified as strategic substitutes or strategic complements (Bulow et al. 1985). A firm's decisions are called strategic complements (substitutes) when it adopts an aggressive (accommodating) strategy in view of its rival's aggressive action, leading to an increase (a drop) in its own marginal profits. Consequently, firms competing in strategic complements are facing a higher degree of competition than firms competing in strategic substitutes.

Regardless of the type of strategic interaction, firms' quality of accounting information is expected to be related to the extent of competitive interaction within their industries. Based on my prior discussion, when the extent of competitive interaction within an industry is intense, firms are subject to lower proprietary costs, agency costs, and political costs. There is less incentive for managers of these firms to create an opaque environment in order to avoid the attention of competitors and political sanctions. The lower level of agency costs should also be reflected in the quality of their financial statements. These lead to my third hypothesis as follows:

Hypothesis 3*: The higher the extent of competitive interaction within an industry, the higher the quality of accounting information.*

2.2.4 Interactions between Industry Concentration, Industry Homogeneity, and Strategic Competition

The above three hypotheses examine the impact of individual dimensions of competition on the quality of accounting information, without regard to the interactions between these different dimensions. Both industry concentration and industry homogeneity measure competition based on the market structure of firms within an industry. Specifically, industry concentration links competition to market share while industry homogeneity links competition to firms' operating environment. Competitive strategy measures competition based on the strategic interactions between market participants. For a given level of industry concentration, firms can well be operating in a very similar or different cost structure, or they can be very aggressive or accommodating towards rivals' actions. Based on the impact of competition on proprietary, agency, and political costs, for a given level of industry concentration, I would expect a higher level of accounting information quality for homogeneous industries over heterogeneous industries. Similarly, for a given level of industry concentration, I would expect a higher level of accounting information quality for firms competing in strategic complements over those competing in strategic substitutes. This gives rise to my following two hypotheses:

Hypothesis 4*: For a given level of industry concentration, firms from homogeneous industries will be associated with a higher level of accounting information quality than those from heterogeneous industries.*

Hypothesis 5*: For a given level of industry concentration, firms competing in strategic complements will be associated with a higher level of accounting information quality than those competing in strategic substitutes.*

This chapter provides a literature review on the impact of product market competition on proprietary, agency, and political costs. Based on these three motives, I have developed hypotheses predicting the impact of different dimensions of competition on the quality of accounting information. To the best of my knowledge, this is the first project examining different dimensions of competition on the quality of accounting information. This is also the first project in which impact of the interactions of different dimensions of competition on quality of accounting information is being examined. I will now proceed to discuss my research designs as well as the definition and measurement of the variables concerned in the next chapter.

CHAPTER 3

RESEARCH DESIGN, VARIABLE DEFINITION

AND MEASUREMENT

3.1 Research Design

3.1.1 Hypothesis 1 to Hypothesis 3

Tests of my first three hypotheses on the impact of the various dimensions of product market competition on the quality of accounting information are based on the following primary empirical equation:

$$EQ_{j,t} = \lambda_0 + \lambda_1 SIZE_{j,t} + \lambda_2 \sigma(CFO)_{j,t} + \lambda_3 \sigma(SALES)_{j,t} + \lambda_4 OPCYCLE_{j,t} + \lambda_5 NEGEARN_{j,t} + \lambda_6 LEVERAGE_{j,t} + \lambda_7 MB_{j,t} + \lambda_8 COMPETITION_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \mu_{j,t} \quad (1)$$

The dependent variable $EQ_{j,t}$ is the proxy for earnings quality for firm *j* in year *t* as represented by eight earnings attributes which will be discussed under Section 3.2.1. The test variable *COMPETITION* will be represented by proxies for different dimensions of competition. For Hypothesis 1, *COMPETITION* will be proxied by the industry concentration index (*HI-CENSUS*). For Hypothesis 2 and 3, *COMPETITION* will be represented by the industry homogeneity proxy (*HOMOGENEITY*) and the competitive strategy measure (*CSM*) respectively[16].

Following prior literature on the determinants of earnings and financial reporting quality, I include several innate factors and control variables to the above equation[17]. $SIZE_{j,t}$ is the log of firm *j*'s total assets in year *t*. $\sigma(CFO)_{j,t}$ is the standard deviation of firm *j*'s rolling ten-year cash flows from operations in year *t*. $\sigma(SALES)_{j,t}$

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16 Definition and measurement of the earnings attributes as well as the three competition proxies will be introduced in the coming sections.

17 Francis et al. (2004; 2005; 2006) separate determinants of earnings quality into innate and discretionary. Innate determinants are derived from business models and operating environments while discretionary determinants are associated with accounting choices, implementation decisions, managerial error, auditing, governance, and enforcement. As such, innate factors are more stable relative to factors that influence discretionary earnings quality. The inclusion of the innate determinants in the regression is to capture the influence of the test variable on the discretionary portion of earnings quality. See also Lang and Lundholm (1993; 1996), Dechow and Dichev (2002), and Cohen (2008).

is the standard deviation of firm *j*'s rolling ten-year sales revenues in year *t*. $OPCYCLE_{j,t}$ is the log of the sum of firm *j*'s days accounts receivable and days inventory in year *t*. $NEGEARN_{j,t}$ is firm *j*'s proportion of losses over the prior ten years in year *t*. $LEVERAGE_{j,t}$ is firm *j*'s total of long and short-term debt scaled by its market value of equity in year *t*. $MB_{j,t}$ is firm *j*'s market value of equity divided by its book value of equity in year *t*; $Yr\text{-}Dummies_{j,t}$ is the year dummy. $Ind\text{-}Dummies_{j,t}$ is an industrial dummy based on the 3-digit NAICS code.

My main variable of interest is *COMPETITION*, and based on the discussions in previous chapter, I expect its coefficient λ_8 to be negative when *COMPETITION* is proxied by industry concentration (Hypothesis 1) and positive when *COMPETITION* is measured by competitive strategy measure (Hypothesis 3). For Hypothesis 2, a positive (negative) λ_8 would indicate that industry homogeneity leads to a reduction (an increase) in agency costs, resulting in higher (lower) earnings quality. As for the control variables, I expect a negative coefficient for *SIZE* (λ_1) and *MB* (λ_7), and a positive coefficient for $\sigma(CFO)$ (λ_2), $\sigma(SALES)$ (λ_3), *OPCYCLE* (λ_4), *NEGEARN* (λ_5) and *LEVERAGE* (λ_6) as discussed in Dechow and Dichev (2002) and Francis et al. (2004).

3.1.2 Hypothesis 4 and Hypothesis 5

My next two hypotheses examine the impact of the interactions of industry concentration and industry homogeneity (Hypothesis 4); and industry concentration and competitive strategy (Hypothesis 5) on quality of accounting information. Tests on these two hypotheses are based on the following empirical equations:

$$EQ_{j,t} = \lambda_0 + \lambda_1 SIZE_{j,t} + \lambda_2 \sigma(CFO)_{j,t} + \lambda_3 \sigma(SALES)_{j,t} + \lambda_4 OPCYCLE_{j,t} + \lambda_5 NEGEARN_{j,t} + \lambda_6 LEVERAGE_{j,t} + \lambda_7 MB_{j,t} + \lambda_8 HI\text{-}CENSUS_{j,t} + \lambda_9 HOMO_{j,t} + \lambda_{10} HOMO*HI\text{-}CENSUS_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \mu_{j,t} \quad (2)$$

$$EQ_{j,t} = \lambda_0 + \lambda_1 SIZE_{j,t} + \lambda_2 \sigma(CFO)_{j,t} + \lambda_3 \sigma(SALES)_{j,t} + \lambda_4 OPCYCLE_{j,t} + \lambda_5 NEGEARN_{j,t} + \lambda_6 LEVERAGE_{j,t} + \lambda_7 MB_{j,t} + \lambda_8 HI\text{-}CENSUS_{j,t} + \lambda_9 CSMD_{j,t} + \lambda_{10} CSMD*HI\text{-}CENSUS_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \mu_{j,t} \quad (3)$$

For both Eq. (2) and (3), the dependent variable $EQ_{j,t}$ is the proxy for earnings quality for firm *j* in year *t* as represented by eight earnings attributes. Definition, measurement, and expected sign of the innate factors and control variables are the same as those under Eq. (1).

For Eq. (2), the testing variables are *HI-CENSUS*, *HOMO*, and the interaction variable *HOMO*HI-CENSUS*. *HOMO* is a dummy variable and has a value of one when the firm's industry homogeneity proxy (*HOMOGENEITY*) is above the sample median, and zero otherwise. Coefficient of *HI-CENSUS*, λ_8, measures the impact of industry concentration on earnings quality when *HOMO* is equal to zero, i.e. when industry homogeneity is low. Coefficient of the interaction term *HOMO*HI-CENSUS*, λ_{10}, measures the incremental effect of industry concentration on earnings quality when *HOMO* is equal to one, i.e. when industry homogeneity is high. Based on my prediction of Hypothesis 4, I will expect λ_8 to be negative and λ_{10} to be positive.

For Eq. (3), the testing variables are *HI-CENSUS*, *CSMD*, and the interaction variable *CSMD*HI-CENSUS*. *CSMD* is a dummy variable and has a value of one when the firm is competing in strategic complements, and zero when the firm is competing in strategic substitutes. Coefficient of *HI-CENSUS*, λ_8, measures the impact of industry concentration on earnings quality when *CSMD* is equal to zero, i.e. when the firm is competing in strategic substitutes. Coefficient of the interaction term *CSMD*HI-CENSUS*, λ_{10}, measures the incremental effect of industry concentration on earnings quality when *CSMD* is equal to one, i.e. when the firm is competing in strategic complements. Based on my prediction of Hypothesis 5, I will expect λ_8 to be negative and λ_{10} to be positive.

3.2 Variable Definition and Measurement

3.2.1 Earnings Quality

Francis et al. (2004) has identified seven attributes of earnings quality that have been widely applied in accounting research. They characterized those seven attributes as either "accounting-based" or "market-based" in order to capture differences in underlying assumptions about the function of earnings, which are, in turn, reflected in the way the attributes are measured. The accounting-based earnings attributes include accrual quality, earnings persistence, earnings predictability, and earnings smoothness. These four attributes take either cash or earnings (or some other measures that can be derived from these, such as accruals) as the reference construct, and are estimated using accounting data. The market-based attributes are value relevance, earnings timeliness, and earnings conservatism. These three attributes take returns or prices as the reference construct and rely on both accounting and returns data for their estimation. The accounting-based earnings quality measures assume that the function of earnings is to allocate cash flows to reporting periods via accruals, while market-based earnings quality measures assume that the function of earnings is to reflect economic income as represented by stock returns.

As indicated by Francis et al. (2006), earnings quality is a multi-dimensional concept, and as such, the choice of an earnings quality measure will depend on the research question posed. My first hypothesis here will use both accounting-based and market-based attributes as proxies for earnings quality. Prior research like LeRoy and Porter (1981), Campbell and Shiller (1988) and Vuolteenaho (2002) show that the ability to exercise market power and competition as natural hedges that smooth out cash flow fluctuations resulting from idiosyncratic cost shocks. This suggests that industry concentration has an impact on the quality of mapping between cash flows and accruals, and as such, the use of accounting-based attributes is appropriate. Fluctuation of cash flows, being an indication of riskiness, will also have a direct impact on firms' share prices and returns. This will ultimately affect the mapping between earnings and economic income. Therefore, I also include market-based attributes as proxies for earnings quality.

I use several earnings attributes adopted by Francis et al. (2004; 2005; 2006) as proxies for earnings quality. In defining these earnings attributes, I adjust their signs such that the results can be interpreted as *larger* values of the attribute indicate *more* favorable outcomes, i.e. higher earnings quality.

3.2.1.1 Accrual Quality

Accrual quality as a measure of earnings quality is based on the view that earnings that map more closely into cash flows are of better quality. Following Francis et al. (2005), my measure of accrual quality is based on the cross-sectional Dechow and Dichev's (2002) model, augmented with the fundamental variables from the modified Jones model, namely property, plant and equipment (*PPE*) and change in revenues (all variables are scaled by average assets):

$$TCA_{j,t} = \varphi_{0,j} + \varphi_{1,j}CFO_{j,t-1} + \varphi_{2,j}CFO_{j,t} + \varphi_{3,j}CFO_{j,t+1} + \varphi_{4,j}\Delta REV_{j,t} + \varphi_{5,j}PPE_{j,t} + \upsilon_{j,t} \qquad (4)$$

where $TCA_{j,t}$ = total current accruals for firm j in year t = $\Delta CA_{j,t}$ - $\Delta CL_{j,t}$ - $\Delta Cash_{j,t}$ + $\Delta STDEBT_{j,t}$;[18] $Assets_{j,t}$ = average total assets for firm j in year t and year t-1; $CFO_{j,t}$ = cash flow from operations for firm j in year t = Net income before extraordinary items (*NIBE*) less total accruals (*TA*); $TA_{j,t}$ = total accruals for firm j in year t = $\Delta CA_{j,t}$ - $\Delta CL_{j,t}$ - $\Delta Cash_{j,t}$ + $\Delta STDEBT_{j,t}$ - $DEPN_{j,t}$; $\Delta CA_{j,t}$ = change in current assets for firm j between year t-1 and year t; $\Delta CL_{j,t}$ = change in current liabilities for firm j between year t-1 and year t; $\Delta Cash_{j,t}$ = change in cash for firm j between year t-1 and year t; $\Delta STDEBT_{j,t}$ = change in debt in current liabilities for firm j between year t-1 and year t; $DEPN_{j,t}$ = depreciation and amortization expense for firm j in year t; $\Delta REV_{j,t}$ = change in revenues for firm j between year t-1 and year t; and $PPE_{j,t}$ = gross value of Property, Plant and Equipment for firm j in year t.

I estimate Eq. (4) for each industry group based on a SIC 3-digit classification with at least 10 firms in year t. Annual cross-sectional estimates of Eq.

[18] To be consistent with the majority of studies that require the calculation of total accruals, I adopt the indirect approach and calculate total accruals using information from the balance sheet and income statement.

(4) yield firm- and year-specific residuals, which form the basis for my accrual quality metric: $AccrualQuality_{j,t} = \sigma(v_j)_t$ is the standard deviation of firm j's residuals, $v_{j,t}$, calculated over years t-4 through t. In order to conform this variable to my ordering of attributes, I use the negative of the standard deviation, $AccrualQuality_{j,t} = -\sigma(v_j)_t$, so that larger (smaller) values of *AccrualQuality* correspond to better (poorer) accrual quality.

As explained in Francis et al. (2006), *AccuralQuality* as a measure of earnings quality is using cash from operations as the reference construct. Large (small) value of the measure corresponds to poor (good) accrual quality because there is more (less) precision about the mapping of current accruals into current, last-period and next-period cash flows. It is the variability of the residuals from Eq. (4) and not their magnitudes that drives the measure. Consequently, systematically large or small residuals in a regression of accruals on cash flows do not create an inference problem because the systematic component of the residual can be identified and adjusted. The standard deviation of a series of systematically large positive residuals may well be low, indicating that there is little inference problem. *AccrualQuality* is consistent with the view that high-mean, low-variance firms are associated with good earnings quality.

3.2.1.2 Earnings Persistence

This captures the effect of an earnings innovation, i.e. new information in earnings, on expected future earnings (Miller and Rock 1985, Kormendi and Lipe 1987). Earnings that are more persistent or sustainable are indicative of a firm's long-run earning ability (Penman 2001, p.376), and are referred as permanent earnings.

Transitory earnings are those generated by non-recurring events.[19] If reported earnings are sustainable, then reported earnings are likely to be a good predictor of expected permanent earnings. If reported earnings capture events that are not expected to recur in the future, then the measure is a poor predictor of expected permanent earnings (Stickney and Brown 1999, p.205). Following Francis et al. (2004), I measure earnings persistence as the slope coefficient estimate, $\Phi_{1,j}$, from an autoregressive model of order one (AR1) for annual split-adjusted earnings per share:

$$X_{j,t} = \Phi_{0,j} + \Phi_{1,j} X_{j,t-1} + \upsilon_{j,t} \qquad (5)$$

where $X_{j,t}$ is measured as firm j's net income before extraordinary items in year t divided by the weighted average number of outstanding shares during year t. For each firm-year, I estimate Eq. (5) using maximum likelihood estimation and rolling ten-year windows. This procedure yields firm- and year-specific estimates of $\Phi_{1,j}$, which capture the persistence of earnings. The measure, $Persistence_{j,t} = \Phi_{1,j}$, has a value close to 1 if earnings is highly persistent, and a value close to 0 if earnings is highly transitory.

3.2.1.3 Earnings Predictability

This captures the ability of past earnings to predict future earnings (Lipe 1990). An earnings number is of a higher quality if its current earnings information is more useful in predicting future earnings. Following Francis et al. (2004), my measure of earnings predictability is also derived from the firm- and year-

[19] Technically, permanent earnings is the portion of accounting earnings which maps directly to current prices via a multiple $1 + r^{-1}$, with r equals to the expected rate of return, while transitory accounting earnings maps directly to current prices via a multiple equal to 1 (Ramakrishnan and Thomas 1998).

specific AR1 models, and I use the square root of the error variance from Eq. (5) and then multiply by -1 to arrive at my measure, $Predictability_{j,t} = -\sqrt{\sigma^2(\hat{\upsilon}_j)}$. Large (small) values of *Predictability* imply more (less) predictable earnings.

3.2.1.4 Earnings Smoothness

This reflects the idea that managers use their private information about future income to smooth out transitory fluctuations and noise, thereby achieving a more representative and useful earnings number for the investors to assess the value of the firm (Chaney and Lewis 1995). To the extent that current earnings which are more representative of future earnings are of higher quality, smoother earnings indicate higher earnings quality. Francis et al. (2004) suggest that capital market participants reward smoother earnings streams with reduced costs of equity and debt capital. This finding is consistent with the view that earnings smoothness is desirable because it reflects higher quality financial reporting decisions. Following Francis et al. (2004), I define smoothness as the negative of the ratio of firm *j*'s standard deviation of net income before extraordinary items divided by beginning total assets, to its standard deviation of cash flows from operations divided by beginning assets, $Smoothness_{j,t} = -\sigma(NIBE_{j,t})/\sigma(CFO_{j,t})$. Standard deviations are calculated over rolling ten-year windows, and larger (smaller) values of *Smoothness* indicate more (less) earnings smoothness.

3.2.1.5 Value Relevance

This is based on the idea that accounting numbers should explain the information that is impounded in returns. Therefore, value relevance is the ability of one or more accounting numbers to associate with the variation in stock returns. Earnings with greater explanatory power are viewed as having a higher quality. In accounting research, e.g. Francis and Schipper (1999), Collins et al. (1997), Bushman et al. (2004), value relevance is based on the explained variability from the following regression of returns on the level and change in earnings:

$$RET_{j,t} = \delta_{0,j} + \delta_{1,j}EARN_{j,t} + \delta_{2,j}\Delta EARN_{j,t} + \xi_{j,t} \quad (6)$$

where $RET_{j,t}$ is 15-month return for firm *j* ending three months after the end of fiscal year *t*; $EARN_{j,t}$ is income before extraordinary items (*NIBE*) for firm *j* in year *t*, scaled by market value at the end of year *t*-1; and $\Delta EARN_{j,t}$ is change in *NIBE* for firm *j* in year *t*, scaled by market value at the end of year *t*-1. Again, Eq. (6) is estimated for each firm over rolling ten-year windows, and following Francis et al. (2004), my measure of relevance is based on the explanatory power of Eq. (6), $Relevance_{j,t} = R^2_{j,t}$.

Larger (smaller) values of *Relevance* imply more (less) value relevant earnings.

3.2.1.6 Earnings Timeliness

This captures the intrinsic lead-lag relation between earnings and returns (Gelb and Zarowin 2002). The issue of timeliness arises because certain economic events that cause revisions in market's expectations about future cash flows are not captured in current period's earnings but in future period's earnings, resulting in the non-contemporaneous association between returns and current earnings (Collins et al. 1994). Firms with more (less) timely earnings should have a stronger (weaker) relation between returns and current earnings. Following Basu (1997) and Francis et al. (2004), my measure of earnings timeliness is derived from the following reverse regressions, which use earnings as the dependent variable and returns measures as independent variables:

$$EARN_{j,t} = \alpha_{0,j} + \alpha_{1,j}NEG_{j,t} + \beta_{1,j}RET_{j,t} + \beta_{2,j}NEG_{j,t} \cdot RET_{j,t} + \varsigma_{j,t} \qquad (7)$$

where $NEG_{j,t}$ = 1 if $RET_{j,t}$ < 0 and 0 otherwise. All other variables are as previously defined. Eq. (7) is estimated on a firm- and year-specific basis, using rolling ten-year windows. Following Francis et al. (2004), my measure of timeliness is based on the explanatory power of Eq. (7), $Timeliness_{j,t} = R^2_{j,t}$. Larger (smaller) values of *Timeliness* imply more (less) timely earnings.

3.2.1.7 Earnings Conservatism

This reflects the differential ability of accounting earnings to reflect economic losses as opposed to economic gains (Basu 1997). In other words, earnings reflects bad news more quickly than good news. Watts (2003) argues that accounting conservatism is a desirable attribute of earnings because conservative reporting constrains managerial opportunistic behavior and offsets managerial biases with its asymmetrical verifiability requirement. By deferring earnings and understating cumulative earnings and net assets, conservatism constrains management's opportunistic payments to themselves and other parties. This leads to increase in firm value which is shared among all parties to the firm. As such, conservatism has improved efficiency in incentive mechanism designs. Here, I employ two measures of conservatism. Based on Eq. (7), my first measure of conservatism follows that of Basu (1997) and is the ratio of the coefficient on bad news ($\beta_{1,j}$+$\beta_{2,j}$) to the coefficient on good news ($\beta_{1,j}$), $Conservatism_{j,t}$ = ($\beta_{1,j}$+$\beta_{2,j}$)/$\beta_{1,j}$. Larger (smaller) values of *Conservatism* imply more (less) conservative earnings.

As pointed out by LaFond and Watts (2008) and Khan and Watts (2009), the above Basu measure of conservatism obscures the timing of changes in the conservatism of financial reports of individual firm by assuming the firm's operating characteristics to be stationary. However, changes affecting a firm's financial reporting conservatism are likely to be both time- and firm-specific. As such, I follow Khan and Watts (2009) and employ *C-SCORE* as my second measure of conservatism. *C-SCORE* measures the incremental timeliness of bad news each year and is a linear function of firm-specific characteristics each year:

$$C\text{-}SCORE_j = \lambda_1 + \lambda_2 SIZE_j + \lambda_3 MB_j + \lambda_4 LEV_j \tag{8}$$

where $SIZE_j$ is the natural log of market value of equity of firm *j*; MB_j is the market-to-book ration of firm *j*; and LEV_j is leverage for firm *j*, defined as long-term and short-term debts deflated by market value of equity.

Empirical estimators of λ_1 to λ_4 under Eq. (8) are constant across firms but vary over time, and are estimated from the following annual cross-sectional regressions:

$$\begin{aligned} X_j = \beta_1 + \beta_2 D_j + R_j\,(\mu_1 + \mu_2 SIZE_j + \mu_3 MB_j + \mu_4 LEV_j) \\ + D_j R_j\,(\lambda_1 + \lambda_2 SIZE_j + \lambda_3 MB_j + \lambda_4 LEV_j) \\ + (\delta_1 SIZE_j + \delta_2 MB_j + \delta_3 LEV_j + \delta_4 D_j SIZE_j + \delta_5 D_j MB_j + \delta_6 D_j LEV_j) + \varepsilon_j \end{aligned} \tag{9}$$

where X_j is net income before extraordinary items for firm *j*, scaled by lagged market value of equity; D_j is a dummy variable equal to 1 when $R_j < 0$ and equal to zero otherwise; R_j is annual returns for firm *j* obtained by cumulating monthly returns starting from the fourth month after the firm's fiscal year end.

C-SCORE varies across firms through cross-sectional variation in the firm-year characteristics (size, market-to-book ratio, and leverage), and over time through inter-temporal variation in λ_1 to λ_4, and the firm-year characteristics. Conservatism is increasing in the *C-SCORE*.

3.2.2 Industry Concentration

Industry concentration is measured using the Herfindahl index[20] (*HI*) which is equal to the sum of the squared market shares of all firms in the market:

$$HI_i = \sum_{j=1}^{n} S_{ji}^2 \tag{10}$$

where S_{ji} is market share of firm *j* in industry *i* and there are *n* firms in the industry. The market share of firms can be measured by many different variables, with total sales or total assets the most popular. When the market share is measured in decimal terms, the index has a value range of 1/*n* to 1. The more the number of firms in an industry, the lower is the value of the index, ceteris paribus. The *HI* gives much heavier weight to firms with large market shares than firms with small shares as a result of squaring the market shares. This feature of the *HI* corresponds to the theoretical notion in economics that the greater the concentration of output in small

20 The Herfindahl index exhibits the desirable properties of a concentration index as laid down by Encaoua and Jacquemin (1980). See Tirole (1988).

numbers of firms (a high *HI*), the greater the likelihood that, other things being equal, competition in a market will be weak. On the contrary, if concentration is low, reflecting a large number of firms with small market shares (a low *HI*), competition will tend to be vigorous (Rhoades 1993).

When calculating the above Herfindahl index or other concentration measures, researchers opt to use data from Compustat which covers only public firms. A growing number of studies[21] have argued that such Compustat-based measures are subject to sampling bias due to the exclusion of private firms which often account for a non-negligible percentage of industry sales. In view of this, Ali, Klasa and Yeung (2009b, hereafter referred as "AKY") compile a Censes-based industry concentration measure using U.S. Census data, which covers all public and private firms. The resulting Census-based measure has correlations of only 13% with the corresponding Compustat-based concentration measures. Upon investigation, they found that industries with high Compustat-based measures are experiencing poor growth, resulting in a few large public firms and relatively few private firms. Consequently, there are only a few companies in the Compustat database for the declining industry, resulting in high Compustat-based industry concentration values. Such high concentration values are, in fact, proxies for industry decline rather than actual concentration of an industry.

AKY also show that Census-based concentration measures are positively related to industry price-cost margins and to firm size measures such as net sales, total assets, and market capitalization. They show that such relations do not hold when Computat-based industry concentration measures are used. Based on the

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[21] See, for example, Mackay and Phillips (2005), Campello (2006), and Akdogu and Mackay (2008).

medium number of private and public firms for each quintile in an industry, AKY observe a significant drop in the number of firms between the highest and lowest quintiles of Census-based industry concentration measures during the sample period. In contrast, this number changes very little if Compustat-based industry concentration measures are used instead. As such, they conclude that only the Census-based industry concentration measures are consistent with theoretical predictions that more-concentrated industries that should be more oligopolistic are populated by fewer and larger firms that enjoy higher price-cost margins due to their greater market power.[22]

To measure industry concentration, I use data on the Herfindahi index collected from the *Census of Manufacturers* publications provided by the U.S. Census Bureau. The Herfindahl index is calculated for 6 digit NAICS industries within the manufacturing sector.[23] Since the *Census of Manufacturers* is published only during years when a U.S. Census takes place, I use the U.S. Census data for a given year as a proxy for industry concentration not only for that year but also for the five-year window surrounding the year in which a census takes place. Using data from the 1997 and 2002 U.S. Censuses, my Census-based Herfindahi index (*HI-CENSUS*) covers a sample period of 1995 to 2005.

[22] Ali, Klasa and Yeung (2009b) document that the significant relations of Compustat-based industry concentration measures with the dependent variables of several important prior studies are not obtained when U.S. Census measures are used. Unreported robustness check using Compustat-based Herfindahi index produce inconsistent and insignificant results across multiple tests in this study.

[23] The sample covers firms with 6-digit North American Industry Classification System (NAICS) codes between 311111 and 339999.

3.2.3 Industry Homogeneity

In terms of competition, an industry which comprises of firms very similar in nature, technology or products is quite different from an industry comprising many dissimilar firms. Studies on industrial organization suggest that, for a given level of concentration, industries with similar firms tend to exhibit a higher level of competition. Following Parrino (1997), my proxy for industry homogeneity, *HOMOGENEITY*, measures the correlation among firms' common stock returns within the two-digit SIC industries. A measure based on changes in stock prices is a natural choice for an industry homogeneity proxy because a firm's stock price reflects the present value of its residual cash flow. If the firms in an industry employ similar production technologies and compete in similar product markets, news concerning changes in factors, such as economic conditions or technological shocks, will tend to affect their cash flows, and therefore their stock prices, in a similar manner. *HOMOGENEITY* is the average of the partial correlation coefficient ($r_{R_{jt},R_{it}|R_{mt}}$) for all firms within a 2-digit SIC industry from the following regression:

$$R_{jt} = \beta_0 + \beta_1 R_{it} + \beta_2 R_{mt} + \varepsilon_{jt} \tag{11}$$

where R_{jt} = stock return for firm j in industry i for month t; R_{it} = equally-weighted stock return for industry i in month t; and R_{mt} = equally-weighted stock return for market in month t. The partial correlation coefficient ($r_{R_{jt},R_{it}|R_{mt}}$) measures the strength of the linear relationship between firm returns and industry returns after controlling for the effects of market returns. The higher the value of *HOMOGENEITY*, the more homogeneous is the firm within the industry.

3.2.4 Strategic Competition

Strategic competition captures how competitors react when one competitor changes a tactical variable such as price or quantity (Besanko, Dranove and Shanley, 2000). The nature of such competitive interaction – whether competition is aggressive or accommodating – affects the wealth of the firms and value of their shares. This nature of competitive interaction can be operationalized by constructing an empirical measure of the responsiveness of a firm's profits to changes in rivals' revenues. Our measure is positive or negative, depending on whether competition is in "strategic complements" (aggressive competition) or in "strategic substitutes" (accommodating competition). Strategic substitutes and strategic complements differ fundamentally in the way they interact with their rivals. Kedia (2006) provides the following intuitive example. Consider the case of a duopoly with firm *j* and firm *k* competing in quantity. Suppose the rival, firm *k*, experiences a firm-specific cost shock that causes it to decrease output. Strategic substitutes respond to this decrease in the rival's output by increasing their own output. Strategic complements respond to this decrease in rival's output by decreasing their own output. Both strategic substitutes and strategic complements would like to commit to actions that induce the rival to reduce output. To induce the rival to reduce its output, strategic substitutes commit to increasing their output. Strategic complements on the other hand, behave exactly the opposite. To induce the rival to reduce its output, they commit to a less aggressive output strategy.

According to Bulow et al. (1985), whether competition is in strategic substitutes or complements is determined by the sign of the change in marginal profits of each firm with respect to changes in output of its own and competitors'. When the change in marginal profits is negative, competition is said to be in strategic substitutes; when the change is positive, competition is said to be in strategic complements. Formally, a positive (negative) cross-partial derivative of a firm's value with respect to its own and its rivals' operating strategies, $\partial^2 V_1 / \partial c_1 \partial c_2$, where V_1 is firm 1's value, and c_1 and c_2 denote the operating choices of a firm and its competitor, corresponds to competition in strategic complements (substitutes).

In constructing an empirical proxy for the effects of firms' actions on their rivals, firms' strategies can take on many forms and the most common examples of operating strategies are quantities and prices. However, Compustat reports neither quantities nor prices. Another choice is firm's sales, but sales number in itself is not a strategic variable. Thus, in order to base the proxy for the extent of competitive interaction on firms' sales, one needs to show that regardless of whether the competition is in quantities or in prices, the sign of the cross-partial derivative of a firm's profit with respect to its own and its rival's sales is the same as the sign of the cross-partial with respect to its own and its rival's quantities (prices) in the case of quantity (price) competition. Lyandres (2006) proves mathematically that the sign of the cross-partial derivative of a firm's profit with respect to its own quantity (price) and its rivals' quantity (price), $d^2\pi_1/dq_1dq_2$ ($d^2\pi_1/dp_1dp_2$), is the same as the sign of the cross-partial derivative of its profit with respect to its own and its rival's sales, $d^2\pi_1/dS_1dS_2$. As such, Lyandres establishes that the cross-partial derivative of a firm's profit with respect to its own and its rival's sales is a valid measure of the nature of product market competition. If $d^2\pi_1/dS_1dS_2$ is positive (negative), then firms compete in strategic complements (substitutes) within an industry.

Using time series data, Sundaram et al. (1996) construct a measure of responsiveness of firm's profit to changes in their competitors' actions, which is directly related to the cross-partial derivatives of firms' values with respect to their own and their rivals' strategies. In order to determine the stand-alone effect of the change in rival's operating strategy on firm's value and operating strategy, Lyandres (2006) estimates an implied profit and implied sales for each firm that would have been observed if the only change over time was in the firm's value function, while the firm's rivals' sales were held constant. He assumes that the shock to each firm's profitability can be approximated by the average shock to the industry's profitability. He measures the change in the industry's profitability as a change in the average profit margin of all firms operating in the industry. He then adds this change to the firm's previous year's profit margin in order to calculate the firm's implied profit margin, which is used in estimating the firm's implied sales and implied profit. Following procedures as outlined in Lyandres (2006), I first perform a time-series regression for each firm in my sample as follows:

$$\frac{S_{j,t+1} - S_{j,t}}{S_{j,t}} = \alpha_j + \beta_j \left[\frac{\pi_{j,t+1}}{S_{j,t+1}} - \frac{\pi_{j,t}}{S_{j,t}} \right] + \varepsilon_{j,t} \tag{12}$$

where $S_{j,t+1}$ and $S_{j,t}$ are sales in two consecutive years for firm j, and $\pi_{j,t+1}$ and $\pi_{j,t}$ are its profits in these years. The estimated coefficients of the regression are then applied back to Eq. (12) to derive the firm's implied sales, $\tilde{S}_{j,t}$, in each year:

$$\tilde{S}_{j,t} = S_{j,t} \left[1 + \hat{\alpha}_j + \hat{\beta}_j \left[\frac{\overline{\pi}_{t+1}}{S_{t+1}} - \frac{\overline{\pi}_t}{S_t} \right] \right] \tag{13}$$

where $\overline{\pi}_{t+1} / S_{t+1}$ and $\overline{\pi}_t / S_t$ are industry average profit margins in two consecutive years, and $\hat{\alpha}_j$ and $\hat{\beta}_j$ are the estimates of the intercept and slope from Eq. (12). The implied profit, $\tilde{\pi}_{j,t}$, can be obtained by multiplying the implied sales in Eq. (13) and the implied profit margin as follows:

$$\tilde{\pi}_{j,t} = \tilde{S}_{j,t}\left[\frac{\pi_{j,t}}{S_{j,t}} + \left[\frac{\overline{\pi}_{t+1}}{S_{t+1}} - \frac{\overline{\pi}_{t}}{S_{t}}\right]\right] \tag{14}$$

The change in a firm's sales caused by the change in its rivals' combined sales is:

$$\Delta\tilde{S}_{j} = S_{j,t+1} - \tilde{S}_{j,t} \tag{15}$$

And the change in a firm's profit caused by the change in the firm's rivals' sales is:

$$\Delta\tilde{\pi}_{j} = \pi_{j,t+1} - \tilde{\pi}_{j,t} \tag{16}$$

The *CSM* measure that I use to estimate the cross-partial derivative of firm *j*'s profit with respect to its strategy and its rivals' strategy is:

$$CSM = corr\left[\frac{\Delta\tilde{\pi}_{j}}{\Delta\tilde{S}_{j}}, \Delta S_{k}\right] \tag{17}$$

where $\Delta\tilde{\pi}_{j}$ is the implied change in the profit of firm *j* between two consecutive years; $\Delta\tilde{S}_{j}$ is the implied change in the sales of firm *j* between two consecutive years; and ΔS_{k} is the change in the firm's product market rivals' combined sales between the two years. The *CSM* in Eq. (17) can be thought of as the correlation between the ratio of the change in a firm's value and the change in its operating strategy and the change in the firm's rivals' operating strategy. Following Sundaram et al. (1996) and Lyandres (2006), I define a firm's profit as operating profit, and rivals' sales as the combined yearly sales of all other firms in the firm's two-digit SIC industry. I calculate the correlation in Eq. (17) for each firm in my sample using all available time-series observations[24], and then obtain mean *CSM* for each two-digit SIC industry for each year, which is assigned to all firms operating in that industry during that year. Recall that my Hypothesis (3) is examining the impact of the extent of competitive

[24] The correlations in Eq. (17) are calculated only for firms with at least 10 observations of the changes in implied profit and implied sales.

interaction on earnings quality. Following Lyandres (2006), the extent of competitive interaction, *Abs(CSM)*, is measured as the absolute value of *CSM*.

CHAPTER 4

EMPIRICAL FINDINGS

4.1 Sample and Descriptive Statistics

Stock returns and financial statement data are collected from the Center for Research in Security Prices (CRSP) and Compustat databases respectively. Analysts' earnings forecast data is collected from the I/B/E/S database. As shown in Table 1, my original sample consists of 12,098 firm-years drawn from the U.S. manufacturing sector, covering the period 1995 to 2005. However, in calculating *AccrualQuality* and *Persistence*, both attributes require the use of lead and lagged values, and as a result, my final sample covers the years 1996 to 2005. Since most of the earnings attributes are calculated over rolling firm-specific ten-year windows, a firm is included in the year *t* sample only if data are available in year *t*-9 through to year *t*. Consistent with prior literature, I winsorize the extreme values of the distribution at the 1 and 99 percentiles. To mitigate concerns that differences in sample composition drive comparisons across attributes, I further require that data on all eight attributes are available for each firm-year. In the end, a total of 4,989 firm-years satisfy these requirements.

The distribution of firms by year and by the 2-digit SIC codes of my final sample are presented under Table 1. The year 1997 has the highest number of firms (566) in my sample, while the year 2005 has the lowest (411). Roughly 22% (1,075) of the sample firm-years are coming from the electronic industry (SIC 36), and another 20% (1,008) from the instruments and related products industry (SIC 38). Together with the 820 firm-years from the industrial machinery and equipment industry (SIC 35), firm-years from these three industries alone represent over 58% of the total sample. I have included robustness tests to see if my regression results are driven by data from these three dominant industries alone, details and results of which are presented under Chapter 5. In my regression tests, I have added in year and industry dummies to control for the unobserved factors in a particular year and industry.

The financial summary of my sample is presented under Table 2. As my sample only covers firms in the manufacturing sector, most of them are large firms with mean (median) market value of \$5,292 (\$616) million and mean (median) total assets of \$3,036 (\$505) million. The above huge variations between mean and median values, together with the large standard deviations (19,896 millions in market value and 9,720 millions in asset value), indicate that the firm size of my sample is highly skewed. As such, I have included robustness test on the results between large and small firms under Chapter 5. Table 2 also reveals that most of the firms are having low *ROA* with mean (median) value of 0.028 (0.055) and high *MB* with mean (median) value of 3.466 (2.466). These reflect, respectively, the capital- and R&D-intensive nature of firms in the manufacturing sector[25]. *LEVERAGE* is low with mean (median) value of 0.288 (0.126), and is consistent with the finding that debt is not a favored form of finance for R&D-intensive manufacturing firms (Hall 1992).

Table 3 provides the descriptive statistics for the main and control variables. Mean and median values of the census-based Herfindahl index (*HI-CENSUS*) are 0.059 and 0.048 respectively. As explained under Section 3.2.2 of this dissertation, this index has a value range of 1/*n* to 1 (*n* being the number of firms in the industry), with 1 representing a pure monopoly. The value of 0.062 suggests that the sample represents rather competitive industries. My industry homogeneity proxy

[25] As pointed out by Chan et al. (2001), as a result of the expensing convention for R&D, some yardsticks commonly used by investors, such as price-earnings ratios and market-to-book ratios, may be misstated. In particular, many R&D-intensive companies may appear to be priced at unjustifiably high multiples. See also Lev and Sougiannis (1999) on the relationship between R&D and the market-to-book ratio.

(*HOMOGENEITY*) has a sample mean value of 0.190. This proxy is the average partial correlation coefficient between firm returns and industry returns after controlling for the effects of market returns. With a value range of -1 to 1, the value of 0.190 indicates that there is a week positive linear correlation between firm returns and industry returns across the industries in my sample, meaning that firms within my sample are mainly coming from industries which comprise of heterogeneous firms. As for the competitive strategy measure (*CSM*), the mean value of my sample of 0.013 is virtually the same as the one reported under Lyandres (2006). The *CSM* is basically a measure of responsiveness of firm's profit to changes in their competitors' actions, and so the value of 0.013 suggests that there is only marginal changes to firm's profit when there are changes in their competitors' strategies. With both the sample mean and median (0.186) being marginally positive, the number of firms in my sample competing in strategic complements is larger than the number of firms competing in strategic substitutes.

Turning to the earnings attributes, there are some variations on their distributions between my samples and those reported under Francis et al. (2004). For example, *AccrualQuality* has an absolute mean (median) of 0.044 (0.034) in my sample as compared to 0.026 (0.019) as reported under Francis et al., while *Persistence* has an absolute mean (median) of 0.310 (0.320) in my sample as compared to 0.482 (0.520) under Francis et al. I attribute these differences to the fact that my sample is made up of firms from the manufacturing sector only and that the sample firm size is skewed towards large firms. Dechow and Dichev (2004) find that firm size is positively related to accrual quality. Through more stable and predictable operations, large firms will exhibit less estimation errors when making accruals, resulting in higher accrual quality. Both Lev (1974, 1983) have documented that earnings volatility is positively related to the degree of capital intensity. Since manufacturing firms are more capital intensive, they are subject to a higher degree of lumpiness of fixed costs relative to demand fluctuations, resulting in higher earnings volatility. The measure of *Conservatism* has a mean (median) value of 1.38 (0.98) with standard deviation of 413. Similar to Francis et al. (2004), the large dispersion is driven by observations with small values of the denominator ($\beta_{1,j}$) of this variable, *Conservatism* = $(\beta_{1,j}+\beta_{2,j})/\beta_{1,j}$, which is the ratio of the coefficient on bad news to the coefficient on good news. As for *C-Score*, the sample mean and median of 0.116 and 0.108 are similar to those reported (0.105 and 0.097) in Khan and Watts (p.138, 2009). Unreported univariate tests of the above earnings attributes indicate that they are not normally distributed. To avoid distortion to my regression results, I run my regression tests based on the decile ranks of the earnings attributes, while actual values are used for the test and control variables.

For the innate factors, the sample mean values are 5.469 for *Size*, 0.082 for *σ(CFO)*, 0.104 for *σ(Sales)*, 5.03 for *OpCycle* (or 185 days), and 0.202 for *NegEarn*. In comparison, Francis et al. (2004) report mean values for their sample (1975-2001) of 5.57 for Size, 0.074 for *σ(CFO)*, 0.218 for *σ(Sales)*, 4.74 for *OpCycle* (or 114 days), and 0.14 for *NegEarn*. Based on economic intuition, firms in the manufacturing sector generally have longer operating cycle, lower profitability, and higher variation in cash flows than those of other non-manufacturing industries. I attribute the above differences to the fact that my sample consists only of firms from the manufacturing sector, whereas the sample of Francis et al. (2004) has a much wider coverage in terms of industrial sectors.

4.2 Correlations

Pearson correlations among the eight earnings attributes and their correlations with industry concentration, homogeneity, and competitive strategy measure are reported in Table 4. For the accounting-based earnings attributes, *Smoothness* exhibits positive correlations with *AccrualQuality* (0.2506, p-values < .0001) and *Predictability* (0.2064, p-values < .0001), while *Persistence* is positively correlated with *Predictability* (0.1168, p-values < .0001). For the market-based earnings attributes, only *Relevance* and *Timeliness* are correlated (0.6652, p-values < .0001) and the correlation being large in economic terms. As pointed out by Francis et al. (2004), the positive correlation between *Relevance* and *Timeliness* are expected given that their regressions have similar variables. Correlations between accounting-based and market-based attributes are all small in economic terms. For example, correlation between: *AccrualQuality* and *Relevance* is 0.0439 (p-values = 0.0019); *AccrualQuality* and *Timeliness* is 0.0742 (p-values < .0001); *AccrualQuality* and *C-Score* is -0.1887 (p-values < .0001); *Predictability* and *Relevance* is 0.0984 (p-values < .0001); *Predictability* and *Timeliness* is 0.1077 (p-values < 0.0001); *Smoothness* and *Relevance* is 0.1380 (p-values < 0.0001); and *Smoothness* and *Timeliness* is 0.1723 (p-values < 0.0001). These correlation statistics suggest relatively little overlap between accounting-based and market-based attributes, and is consistent with the view that the two sets of earnings attributes are built on divergent views about the purpose of accounting. Moreover, the correlations across the different measures, with the exception of *Relevance* and *Timeliness*, are not strong in economic terms as to indicate any attribute subsumes another.

For the three dimensions of product market competition, *HI-CENSUS* is positively correlated with *HOMOGENEITY* (0.0771, p-values < 0.0001) and negatively correlated with the *CSM* (-0.0404, p-values = 0.0043). Again, none of the correlation is significant in economic terms, meaning that the three constructs are measuring different aspects of competition. On the correlations between the three dimensions of product market competition and the earnings attributes, significant negative correlations exist between *HI-CENSUS* and most of the earnings attributes – *AccrualQuality* (-0.0635, p-values = <.0001); *Predictability* (-0.0791, p-values < .0001); *Smoothness* (-0.1289, p-values < .0001); *Relevance* (-0.0720, p-values < .0001); *Timeliness* (-0.0616, p-values < .0001); and *C-Score* (-0.0471, p-values = 0.0009). This negative association indicates that firms in concentrated industries tend to have lower earnings quality and is consistent with my first hypothesis. *Homogeneity* is positively correlated with *AccrualQuality* (0.1530, p-values < .0001) and *Smoothness* (0.0567, p-values < .0001), but negatively correlated with *Predictability* (-0.1413, p-values < 0.0001) and *C-Score* (-0.0915, p-values < 0.0001). These preliminary findings provide mixed support of my Hypothesis 2 which predicts a positive relation between *HOMOGENEITY* and earnings quality. Finally, *CSM* does not tend to be significantly correlated with any earnings attributes. However, these univariate correlations should be interpreted with caution as they may be subject to omitted variables bias.

4.3 Regression Results

4.3.1 Industry Concentration and Earnings Quality

My test on Hypothesis 1 is based on the regression of earnings attributes on the censes-based industry concentration index, *HI-CENSUS*, together with the innate and control variables plus year and industrial dummies (Eq. (1) under Section 3.1.1). Regression results are reported under Table 5 and I will discuss briefly the findings on the control variables.

When *AccrualQuality* is the dependent variable, almost all the coefficient estimates on the innate factors and control variables are highly significant and with the correct sign. For example, the coefficient on *SIZE* is 0.31 (*t*-statistic = 13.73), indicating that the larger the firm, the higher the accrual quality. Coefficients on *σ(CFO)* and *σ(SALES)* are -10.30 (*t*-statistic = -7.85) and -3.18 (*t*-statistic = -6.58) respectively, meaning that the greater the magnitude of cash flow and sales volatility, the lower the accrual quality. Coefficients on *OPCYCLE* (-0.57, *t*-statistic =-7.06) and *NEGEARN* (-1.73, *t*-statistic = -10.98) are also negative, indicating that the longer the operating cycle and the greater the frequency of reporting negative earnings, the lower the accrual quality. All these relations are consistent with those hypothesized and documented in Dechow and Dichev (2002). *LEVERAGE* and *MB* have a coefficient of 0.30 (*t*-statistic = 4.13) and -0.02 (*t*-statistic = -1.56) respectively, both with the correct sign as expected.

When other earnings attributes are used as the dependent variable, coefficient estimates on the innate factors are less consistent. For example, when *Persistence* is the dependent variable, the coefficient on *SIZE* and *σ(SALES)* is -0.09

(*t*-statistic = -3.55) and 2.70 (*t*-statistic = 4.82) respectively, indicating that the smaller the firm size, or the higher volatility of sales, the more persistent is earnings. When *Predictability* is the dependent variable, the coefficient on *SIZE* and *σ(SALES)* is -0.89 (*t*-statistic = -43.99) and 4.09 (*t*-statistic = 9.04) respectively, meaning that the smaller the firm size or the greater volatility of sales, the more predictable is earnings. These findings are counter-intuitive. In testing the importance of the innate factors in explaining earnings attributes, Francis et al. (2004) estimate regressions of each attribute on the innate factors. Their results show that the innate determinants explain most cross-section variation in *AccrualQuality* (55 percent), as compared to 15 percent, 24 percent, and 33 percent for *Persistence*, *Predictability*, and *Smoothness*, respectively. The ability of the innate factors to explain the market-based earnings attributes is even lower – 5 percent or less. They view the results as indicating that innate factors explain a potentially significant amount of the variation in the accounting–based attributes and little or no variation in the market-based attributes. My findings on the coefficient estimates for the innate factors are supportive of this view.[26]

Turning to the main variable of interest, *HI-CENSUS*, its coefficient estimates are quite consistent across the different earnings attributes. When *AccrualQuality* is the dependent variable, *HI-CENSUS* has a coefficient of -2.14 (*t*-statistic = -2.91), meaning that the more concentrated is the industry, the lower the accrual quality. When *Persistence* is the dependent variable, *HI-CENSUS* has a coefficient of -1.62 (*t*-statistic = -1.86), meaning that the more concentrated is the

[26] While the innate determinants do not explain much variation in the market-based attributes, they are included in the regressions to capture the influence of the test variable on the discretionary portion of earnings quality.

industry, the less persistence is earnings[27]. When *Predictability* is the dependent variable, *HI-CENSUS* has a coefficient of -2.21 (*t*-statistic = -2.84), meaning that the more concentrated is the industry, the less predictable is earnings. When *Smoothness* is the dependent variable, *HI-CENSUS* has a coefficient of -6.15 (*t*-statistic = -7.81), meaning that the more concentrated is the industry, the less smooth is earnings. When *Relevance* is the dependent variable, *HI-CENSUS* has a coefficient of -2.78 (*t*-statistic = -3.28), meaning that the more concentrated is the industry, the less relevant is earnings. When *Timeliness* is the dependent variable, *HI-CENSUS* has a coefficient of -1.94 (*t*-statistic = -2.40), meaning that the more concentrated is the industry, the less timely is earnings. Finally, when *Conservatism* is the dependent variable, *HI-CENSUS* has a coefficient of -2.00 (*t*-statistic = -2.23), meaning that the more concentrated is the industry, the less conservative is earnings[28]. The above findings are supportive of my Hypothesis 1 which predicts that firms in more concentrated industry are associated with a lower level of earnings quality. To the extent that the industry concentration measure is an appropriate measure for competition, these results are consistent with the idea that firms in less competitive industries tend to create an opaque information environment due to high proprietary costs of disclosure.

[27] The finding here that a high level of competition (as represented by lower concentration) is associated with more persistent earnings, while supportive of my Hypothesis 1, contradicts with the findings in Lev (1983) and Baginski et al. (1999). Both these studies argue and find that decreased competition leads to market share stability, resulting in more persistent earnings. Note that both these studies adopt barrier-to-entry, while this study uses industry concentration, as proxy for competition. See also Stigler (1963), Kamerschen (1968), and Mueller (1977).

[28] The finding here on the relation between industry concentration and conservatism is consistent with that of Dhaliwal et al. (2008).

4.3.2 Industry Homogeneity and Earnings Quality

My test on Hypothesis 2 is based on the regression of earnings attributes on *HOMOGENEITY* together with the innate and control variables plus year and industrial dummies (Eq. (1) under Section 3.1.1). Regression results are presented under Table 6. Coefficient estimates on the control variables are similar to those reported under Table 5 in terms of magnitude and signage. When *AccrualQuality* is the dependent variable, those coefficient estimates on innate and control variables are almost all significant and in the correct sign: 0.30 (*t*-statistic = 13.23) for *SIZE*, -10.36 (*t*-statistic = -7.80) for *σ(CFO)*, -3.16 (*t*-statistic = -6.46) for *σ(SALES)*, -0.52 (*t*-statistic = -6.38) for *OPCYCLE*, -1.78 (*t*-statistic = -11.28) for *NEGEARN,* 0.31 (*t*-statistic = 4.30) for *LEVERAGE*; and -0.02 (*t*-statistic = -1.29) for *MB*. Again, when other attributes are the dependent variables, the coefficient estimates are less consistent.

Turning to the main variable of interest, *HOMOGENEITY*, I find mixed evidence on its relation with different earnings attributes. When *AccrualQuality* is the dependent variable, *HOMOGENEITY* has a coefficient of 2.85 (*t*-statistic = 2.50), meaning that the more homogeneous is the industry, the higher the accrual quality. When *C-Score* is the dependent variable, *HOMOGENEITY* has a coefficient of 1.44 (*t*-statistic = 2.35), meaning that higher industry homogeneity is associated with more conservative earnings. These are supportive of the argument that industry homogeneity reduces agency costs through better monitoring of managers' performance, resulting in higher quality of accounting information. However, when the dependent variable is *Predictability*, the coefficient of *HOMOGENEITY* has a value of -5.217 (*t*-statistic = -4.51). Similarly, when the dependent variables are

Smoothness and *Timeliness*, their estimated coefficients are -3.01 (*t*-statistic = -2.51) and -2.68 (*t*-statistic = -1.98) respectively. These findings are supportive of an alternative view that product market competition raises agency costs as managers in competitive industries are subject to more intense career concerns and, hence, more likely to misreport. Overall speaking, my findings on the relation between industry homogeneity and quality of accounting information are not conclusive.

4.3.3 Competitive Interaction and Earnings Quality

My test on Hypothesis 3 is based on the regression of earnings attributes on *Abs*(*CSM*) together with the innate and control variables plus year and industrial dummies (Eq. (1) under Section 3.1.1). Regression results are presented under Table 7. Coefficient estimates on the control variables are similar to those reported under Table 5 and 6 in terms of magnitude and signage. When *AccrualQuality* is the dependent variable, those coefficient estimates on innate and control variables are almost all significant and in the correct sign: 0.30 (*t*-statistic = 13.63) for *SIZE*, -10.33 (*t*-statistic = -7.81) for *σ(CFO)*, -3.23 (*t*-statistic = -6.65) for *σ(SALES)*, -0.56 (*t*-statistic = -6.98) for *OPCYCLE*, -1.76 (*t*-statistic = -11.18) for *NEGEARN,* 0.31 (*t*-statistic = 4.29) for *LEVERAGE*; and -0.02 (*t*-statistic = -1.57) for *MB*. Again, when other attributes are the dependent variables, the coefficient estimates are less consistent.

Turning to the main variable of interest, *Abs*(*CSM*), I find mixed evidence on its relation with different earnings attributes. When *Relevance* is the dependent variable, *Abs*(*CSM*) has a coefficient of 0.92 (*t*-statistic = 3.09), meaning that the more competitive interaction between firms within an industry, the more relevant is earnings. When *Timeliness* is the dependent variable, *Abs*(*CSM*) has a coefficient of 0.80 (*t*-statistic = 2.67), meaning that higher competitive interaction is associated with more timely earnings. These findings are supportive of my Hypothesis 3 which predicts a positive relation between competitive interaction and quality of accounting information. Coefficient estimates for *AccrualQuality* (0.136), *Persistence* (0.214), *Predictability* (0.084), *Smoothness* (0.327), and *C-Score* (0.164) are all in the expected positive sign but not statistically significant. Coefficient estimate for *Conservatism* has a value of -1.029 (*t*-statistic = -3.48) and is contradictory to the prediction of my Hypothesis 3. Overall speaking, the above findings provide limited support to my Hypothesis 3.

4.3.4 Interactions between Industry Concentration and Industry Homogeneity

My test on Hypothesis 4 is based on the regression of earnings attributes on *HI-CENSUS*, *HOMO* (a dummy variable with value of one when *HOMOGENEITY* is above sample median, zero otherwise), and the interaction term *HOMO***HI-CENSUS* (Eq. (2) under Section 3.1.2). Regression results are presented under Table 8.

With the interaction term in the empirical equation, *HI-CENSUS* measures the impact of industry concentration on earnings quality when *HOMO* is zero, i.e. when industry homogeneity is below sample median. Similar to those reported under Table 5, I find consistent coefficient estimates on *HI-CENSUS* across different earnings attributes: -6.84 for *AccrualQuality* (*t*-statistic = -4.46), -3.20 for

Persistence (*t*-statistic = -1.76), -6.76 for *Predictability* (*t*-statistic = -4.46), -7.28 for *Smoothness* (*t*-statistic = -4.88), -10.30 for *Relevance* (*t*-statistic = -6.90), and -5.14 for *Timeliness* (*t*-statistic = -3.21). All these support the notion that highly concentrated industries are associated with lower level of earnings quality when industry homogeneity is low.

Coefficient estimate for the interaction term *HOMO***HI-CENSUS* measures the differential impact of industry concentration on earnings quality when *HOMO* equals to one, i.e. when *HOMOGENEITY* is above sample median, meaning that industries are highly homogeneous. Consistent coefficient estimates for this interaction term are found: 6.58 for *AccrualQuality* (*t*-statistic = 3.79), 5.74 for *Predictability* (*t*-statistic = 3.05), 10.36 for *Relevance* (*t*-statistic = 5.72), and 4.67 for *Timeliness* (*t*-statistic = 2.50). For the other earnings attributes, no significant coefficient estimates are found. The significant and positive coefficient estimates indicate that, for a given level of industry concentration, firms from homogeneous industries are associated with a higher level of earnings quality than those from heterogeneous industries. In other words, industry homogeneity helps to mitigate the negative impact of industry concentration on quality of accounting information. This is consistent with my prediction under Hypothesis 4.

4.3.5 Interactions between Industry Concentration and Competition Strategy

My test on Hypothesis 5 is based on the regression of earnings attributes on *HI-CENSUS*, *CSMD* (a dummy variable with value of one when *CSM* is positive, zero otherwise), and the interaction term *CSMD**HI-CENSUS* (Eq. (3) under Section 3.1.2). Regression results are presented under Table 8.

With the interaction term in the empirical equation, *HI-CENSUS* measures the impact of industry concentration on earnings quality when *CSMD* is zero, i.e. when firms are competing in strategic substitutes. Similar to those reported under Table 5, I find consistent coefficient estimates on *HI-CENSUS* across different earnings attributes: -2.36 for *AccrualQuality* (*t*-statistic = -2.30), -5.80 for *Smoothness* (*t*-statistic = -5.38), -6.79 for *Relevance* (*t*-statistic = -6.21), -4.44 for *Timeliness* (*t*-statistic = -3.89), and -3.27 for *Conservatism* (*t*-statistic = -2.58). All these support the notion that highly concentrated industries are associated with lower level of earnings quality when firms are competing in strategic substitutes.

Coefficient estimate for the interaction term *CSMD**HI-CENSUS* measures the differential impact of industry concentration on earnings quality when *CSMD* equals to one, i.e. when firms are competing in strategic complements. Here, I find a positive coefficient estimate for the interaction term when Relevance is the independent variable (8.19, *t*-statistic = 5.00). Similarly, I also find positive coefficients when *Timeliness* (4.95, *t*-statistic = 3.09) and *C-Score* (1.23, *t*-statistic = 1.65) are the independent variables. These significant and positive coefficient estimates indicate that, for a given level of industry concentration, firms competing in strategic complements are associated with a higher level of earnings quality than those competing in strategic substitutes. In other words, competition strategy helps to mitigate the negative impact of industry concentration on quality of accounting information. This is consistent with my prediction under Hypothesis 5.

4.4 Summary of Findings

The evidence presented above supports my Hypothesis 1 that firms in concentrated industries are associated with lower earnings quality. To the best of my knowledge, this is the first direct evidence on the relation between competition from industry concentration and various attributes of earnings quality. Prior research tends to examine the effect of competition on just one single dimension of earnings quality, e.g. accrual quality or persistence. Here, I examine the impact of industry concentration on different attributes of earnings quality and find consistent results across these different attributes. This finding is consistent with the intuition that firms in concentrated industries tend to protect their competitive advantage or/and avoid political and public attention through opaque disclosure.

My empirical findings provide mixed evidence for Hypothesis 2. Specifically, I find a positive relation between industry homogeneity and *AccrualQuality* as well as *C-Score*, supporting the argument that competition leads to lower agency costs through more effective monitoring mechanism. However, I also find a negative relation between industry homogeneity and *Predictability*, *Smoothness* and *Timeliness*, supporting the argument that managers under competitive pressure are more likely to misreport. As for Hypothesis 3, I find a positive relation between the extent of competitive interaction and *Relevance* as well as *Timeliness*, providing limited support linking competitive interaction to earnings quality.

On the interaction between the various measures of competition, I find evidence supportive of both Hypothesis 4 and 5. In particular, given a level of industry concentration, there is a positive differential impact on earnings quality associated with competition from industry homogeneity and strategic complements. In other words, industry homogeneity and competitive strategy help to moderate the negative impact of industry concentration on earnings quality. This provides the first piece of evidence examining the impact of interaction of competitive measures on quality of accounting information.

CHAPTER 5

ADDITIONAL AND SENSITIVITY TESTS

5.1 Introduction

So far, I have examined the impact of various dimensions of product market competition on earnings quality. However, earnings (or accounting information in general) constitute only a small portion of information that investors used to assess their portfolio. In a recent paper, Ball and Shivakumar (2008) conclude that the average quarterly earnings announcement is associated with approximately 1% to 2% of total annual information. They further point out that increase in information during earnings-announcement windows in recent years is due only in part to increased concurrent releases of management forecasts - substantial information is released in management forecasts and in analysts forecast revisions prior to earnings announcements. Given that industry and firm-specific information can be filtered to the public through different channels, and to the extent that product market competition does have an impact on earnings quality, such impact should not be limited to accounting information alone. In this chapter, I will examine the impact of product market competition on the information quality of informed investors and analysts.

5.2 Information Quality

The information environment of a firm is made up of both private and public information. Prior studies have demonstrated that the quantity and quality of both private and public information has a role in affecting a firm's required return[29].

[29] See, for example, Easley and O'Hara (2004).

My proxies for the quality, i.e. precision[30], of public and private information to investors are drawn from Barron et al. (1998), whose model (hereafter referred as the "BKLS model") relates properties of the analysts' information environment to the properties of their forecasts. By private information, the BKLS model is referring to information that is observed by individual analyst and distributed independently of all other variables. Public information is represented by the common prior. The intuition underlying the BKLS model is that the forecast dispersion and error relate to the common and idiosyncratic components of error in analysts' forecasts in different ways. The common error component arises from the error in public information that analysts rely upon, while the idiosyncratic error component arises from error in which the private information analysts rely upon. Similar to Botosan, Plumlee and Xie (2004), I assume that analysts' information environments are similar to those of informed investors. Also, consistent with the BKLS model, I assume that information observed by more than one analyst is common to all and that private information is unique to a given analyst.

The BKLS model shows that when analysts' private information is of equal precision, the precisions of analysts' public (h) and private information (s) can be expressed in terms of the observable forecast dispersion (D), squared error in the mean forecast (SE), and the number of forecasts (N):

[30] The potential usefulness of information, i.e. its quality, is concerned about the distributional characteristics of an uncertain event and determined, in part, by the variance of its noise term. Information of a higher quality is associated with a smaller variance of the noise term. An infinite variance will render the information useless for valuing the risky asset. See, for example, Holthausen and Verrecchia (1988), Subramanyam (1996), and Verrecchia (1990; 2001).

$$h = \frac{SE - \frac{D}{N}}{\left[(SE - \frac{D}{N}) + D \right]^2} \tag{18}$$

$$s = \frac{D}{\left[(SE - \frac{D}{N}) + D \right]^2} \tag{19}$$

where SE = expected squared error in the mean forecast; D = expected sample variance in forecasts; and N = number of forecasts. Following Baron, Byard and Kim (2002), I substitute the *ex post* realized dispersion ($\hat{D}$) and squared error in these analysts' mean forecast ($S\hat{E}$) for the *expected* dispersion (D) and squared error in the mean forecast (SE) in the above Eq. (18) and (19). The *ex post* measures are calculated as follows:

$$S\hat{E}_{j,t} = (A_{j,t} - \overline{F}_{j,t})^2 \tag{20}$$

$$\hat{D}_{j,t} = \frac{1}{N_{j,t} - 1} \sum_{i=1}^{N} (F_{i,j,t} - \overline{F}_{j,t})^2 \tag{21}$$

where $S\hat{E}_{j,t}$ = observed squared error in the mean forecast among analysts' last consensus forecasts for firm *j* in year *t*; $\hat{D}_{j,t}$ = observed dispersion among analysts' last consensus forecasts for firm *j* in year *t*; $A_{j,t}$ = actual earnings for firm *j* in year *t*; $F_{i,j,t}$ = last consensus forecast from analyst *i* for firm *j* in year *t*; $\overline{F}_{j,t}$ = mean of analysts' last consensus forecasts for firm *j* in year *t*; and $N_{j,t}$ = number of analysts' last consensus forecasts for firm *j* in year *t*. Following Barron, Byard and Kim (2002), in the event that $S\hat{E} - \hat{D} / N < 0$, I include only $S\hat{E}$ in the numerator of Eq. (18)

above to avoid the value of public information (h) from turning into negative[31]. To make the measures cross-sectionally comparable, I scale both the ex post realized dispersion ($\hat{D}$) and squared error in the mean forecast ($S\hat{E}$) by the absolute actual earnings per share.

5.3 Research Design

Similar to the tests on my five hypotheses, I examine the impact of product market competition on firm's information quality through the following regression equations:

$$IQ_{j,t} = \beta_0 + \beta_1 SIZE_{j,t} + \beta_2 LEVERAGE_{j,t} + \beta_3 MB_{j,t} + \beta_4 COMPETITION_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \varepsilon_{j,t} \quad (22)$$

$$IQ_{j,t} = \beta_0 + \beta_1 SIZE_{j,t} + \beta_2 LEVERAGE_{j,t} + \beta_3 MB_{j,t} + \beta_4 HI\text{-}CENSUS_{j,t} + \beta_5 HOMO_{j,t} + \beta_6 HOMO{*}HI\text{-}CENSUS_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \varepsilon_{j,t} \quad (23)$$

$$IQ_{j,t} = \beta_0 + \beta_1 SIZE_{j,t} + \beta_2 LEVERAGE_{j,t} + \beta_3 MB_{j,t} + \beta_4 HI\text{-}CENSUS_{j,t} + \beta_5 CSMD_{j,t} + \beta_6 CSMD{*}HI\text{-}CENSUS_{j,t} + Yr\text{-}Dummies_{j,t} + Ind\text{-}Dummies_{j,t} + \varepsilon_{j,t} \quad (24)$$

For Eq. (22) to (24), the dependent variable $IQ_{j,t}$ is the information quality for firm j in year t as proxied by the BKLS model; $SIZE_{j,t}$ is natural log of firm j's market capitalization in year t; $LEVERAGE_{j,t}$ is firm j's total of long and short-term debt scaled by market capitalization in year t; $MB_{j,t}$ is firm j's market capitalization divided

[31] According to Barron, Byard and Kim (2002), this approximation is valid when $N > 8$. In our sample, the mean of N is 7.85 for firms with $SE - D/N < 0$. As such, I do not expect this approximation to introduce significant bias.

by book value of equity in year *t*. $Yr\text{-}Dummies_{j,t}$ is a year dummy; and $Ind\text{-}Dummies_{j,t}$ is an industrial dummy based on 3-digit NAICS code.

For Eq. (22), *COMPETITION* will be proxied by *HI-CENSUS*, *HOMOGENEITY* and *Abs*(*CSM*) as per definitions and measurements under Section 3.2.2 to 3.2.4. The coefficient on *COMPETITION*, β_4, measures the impact of different proxies of competition on information quality. Based on my previous discussion of Hypothesis 1 and 3, I would expect a negative relation between *IQ* and *HI-CENSUS*, i.e. $\beta_4 < 0$, and a positive relation between *IQ* and *Abs*(*CSM*) , i.e. $\beta_4 > 0$. As for the relation between *IQ* and *HOMOGENEITY*, I have no prior expectation. For Eq. (23) and (24), β_4 measures the impact of industry concentration on information quality when industry homogeneity is low (*HOMO* = 0) or when firms are competing in strategic substitutes (*CSMD* = 0). Coefficient on the interaction term, β_6, measures the differential impact of industry concentration on information quality when industry homogeneity is high (*HOMO* = 1) or when firms are competing in strategic complements (*CSMD* = 1). Based on my previous discussion on Hypothesis 2 and 3, I would expect β_4 to be negative and β_6 to be positive.

In the above regressions, I have also included firm size, leverage, and market-to-book ratio as control variables. Prior studies suggest that firms that are larger in size or having a higher growth potential to have more analysts coverage, and more information is available about these firms (Atiase 1985; Barron et al. 2002). I will therefore expect β_1 and β_3 in the above empirical equations to be significantly positive. Financial distress as proxied by the level of leverage is also linked to dispersion in analysts' earnings forecasts (Avramov et al. 2009). I will therefore expect β_2 to be negative.

5.4 Empirical Findings

5.4.1 Descriptive Statistics

Descriptive statistics on the information quality variables are reported under Table 10. As the unreported estimated values of h and s are highly skewed, I follow Gu (2005) and use their square roots as information quality variables: $\sqrt{h}$ = public information quality, $\sqrt{s}$ = private information quality, and $\sqrt{h+s}$ = total information quality. The estimated quality of public information has a mean (median) of 22.08 (10.03), private information quality has a mean (median) of 21.79 (9.88), and total information quality has a mean (median) of 37.26 (22.02). Again, to control for outliers and skewness of my sample distribution, I run my regression tests using the decile ranks of the information quality variables while actual values are used for the test and control variables.

5.4.2 Regression Results

5.4.2.1 Industry Concentration and Information Quality

Results of regression of information quality proxies on *HI-CENSUS* and the control variables are presented under Table 11 (Eq. (22) under Section 5.3). On the control variables, when $\sqrt{h}$ is the dependent variable, coefficient estimates for *SIZE* and *LEVERAGE* are 0.41 (*t*-statistic = 18.94) and -0.43 (*t*-statistic = -6.45) respectively, meaning that the larger the firm size, or the lower the level of leverage, the better the quality of firms' public information. When $\sqrt{s}$ is the dependent variable, coefficient estimates for *SIZE* and *LEVERAGE* are 0.47 (*t*-statistic = 22.18) and -0.29

(*t*-statistic = -4.43) respectively, meaning that the larger the firm size, or the lower the level of leverage, the better the quality of firms' private information. These findings are consistent with expectations. Coefficient for *MB* is -0.02 (t-statistic = -2.02), indicating that the lower the growth opportunities, the better the private information quality. While this finding is counter-intuitive, the magnitude of the coefficient is small in economic terms. Finally, when $\sqrt{h+s}$ is the dependent variable, coefficient for *SIZE* is 0.56 (*t*-statistic = 27.18), meaning that the larger the firm size, the better the quality of total information. Coefficient for *LEVERAGE* is -0.56 (*t*-statistic = -8.74), meaning that the lower the level of leverage, the better the quality of total information. As for *MB*, its coefficient is 0.029 (*t*-statistic = 2.82), indicating that the higher the growth opportunities, the better the quality of total information. Overall speaking, the coefficient of *MB* indicates that growth opportunities do not have a material economic impact on any proxy for information quality.

Turning to *HI-CENSUS*, when $\sqrt{h}$, $\sqrt{s}$, and $\sqrt{h+s}$ are the dependent variables, its coefficients are -2.44 (*t*-statistic = -3.22), -1.23 (*t*-statistic = -1.64), and -2.85 (*t*-statistic = -3.93) respectively. These findings indicate that higher industry concentration is associated with lower public, private, and total information quality. This is supportive of the argument that firms from highly concentrated industries create an opaque information environment to avoid attention from competitors and political sanctions. To the best of my knowledge, this is the first direct test on the impact of industry concentration on information quality as proxied by analysts' forecast precision.

5.4.2.2 Industry Homogeneity and Information Quality

Results of regression of information quality proxies on *HOMOGENEITY* and the control variables are presented under Table 12 (Eq. (22) under Section 5.3). Coefficient estimates for the control variables are similar to those reported under Table 11 in terms of magnitude and signage. When $\sqrt{h}$ is the dependent variable, coefficient estimates for *SIZE* and *LEVERAGE* are 0.41 (*t*-statistic = 19.21) and -0.41 (*t*-statistic = -6.16) respectively, meaning that the larger the firm size, or the lower the level of leverage, the better the quality of firms' public information. When $\sqrt{s}$ is the dependent variable, coefficient estimates for *SIZE* and *LEVERAGE* are 0.48 (*t*-statistic = 22.41) and -0.28 (*t*-statistic = -4.20) respectively, meaning that the larger the firm size, or the lower the level of leverage, the better the quality of firms' private information. These findings are consistent with expectations. Coefficient for *MB* is -0.03 (t-statistic = -2.67), indicating that the lower the growth opportunities, the better the private information quality. While this finding is counter-intuitive, the magnitude of the coefficient is small in economic terms. Finally, when $\sqrt{h+s}$ is the dependent variable, coefficient for *SIZE* is 0.57 (*t*-statistic = 27.86), meaning that the larger the firm size, the better the quality of total information. Coefficient for *LEVERAGE* is -0.53 (*t*-statistic = -8.27), meaning that the lower the level of leverage, the better the quality of total information.

Turning to *HOMOGENEITY*, when $\sqrt{h}$, $\sqrt{s}$, and $\sqrt{h+s}$ are the dependent variables, its coefficients are -4.89 (*t*-statistic = -4.74), -3.61 (*t*-statistic = -3.53), and -7.80 (*t*-statistic = -7.94) respectively. These findings indicate that higher industry homogeneity is associated with lower public, private, and total information quality, and are consistent with some of the findings in Section 4.3.2 when I examine the impact of industry homogeneity on earnings quality. The findings here seem to support the argument that managers under competitive pressure are more likely to manipulate information that is to be released.

5.4.2.3 Competitive Interaction and Information Quality

Results of regression of information quality proxies on *Abs*(*CSM*) and the control variables are presented under Table 13 (Eq. (22) under Section 5.3). Coefficient estimates for the control variables are similar to those reported under Table 11 and 12 in terms of magnitude and signage. As for *Abs*(*CSM*), I find positive and significant coefficient estimates when $\sqrt{h}$ (0.76, *t*-statistic = 3.11) and $\sqrt{h+s}$ (0.39, *t*-statistic = 1.65) are the dependent variables. Coefficient estimate when $\sqrt{s}$ is the dependent variable is -0.30 but not significant (*t*-statistic = -1.22). These findings indicate that higher competitive interaction is associated with higher information quality, and are generally consistent with the findings under Section 4.3.3 when I examine the impact of competitive interaction on earnings quality.

5.4.2.4 Interaction between Industry Concentration and Industry Homogeneity

Results of regression of information quality proxies on *HI-CENSUS*, *HOMO*, and the interaction term *HOMO*HI-CENSUS* are presented under Table 14 (Eq. (23) under Section 5.3). Similar to Table 11, I find consistent coefficient estimates on *HI-CENSUS* when $\sqrt{h}$ (-5.06, *t*-statistic = -3.54), $\sqrt{s}$ (-4.31, *t*-statistic =

-3.04), and $\sqrt{h+s}$ (-7.67, *t*-statistic = -5.63) are the dependent variables. These findings indicate that higher industry concentration is associated with lower public, private, and total information quality when industry is heterogeneous (*HOMO* = 0).

Turning to the interaction term *HOMO*HI-CENSUS*, I find consistent positive coefficient estimates when $\sqrt{h}$ (4.15, *t*-statistic = 2.45), $\sqrt{s}$ (4.55, *t*-statistic = 2.71), and $\sqrt{h+s}$ (7.37, *t*-statistic = 4.57) are the dependent variables. The significant and positive coefficient estimates indicate that, for a given level of industry concentration, firms from homogeneous industries are associated with a higher level of information quality than those from heterogeneous industries. In other words, industry homogeneity helps to mitigate the negative impact of industry concentration on information quality. The findings here are consistent with those reported under Section 4.3.4 when I examine the impact of the interaction of industry concentration and homogeneity on earnings quality.

5.4.2.5 Interaction between Industry Concentration and Competition Strategy

Results of regression of information quality proxies on *HI-CENSUS*, *CSMD*, and the interaction term *CSMD*HI-CENSUS* are presented under Table 15 (Eq. (24) under Section 5.3). Similar to Table 11, I find consistent coefficient estimates on *HI-CENSUS* when $\sqrt{h}$ (-2.54, *t*-statistic = -2.31), $\sqrt{s}$ (-1.43, *t*-statistic = -1.31), and $\sqrt{h+s}$ (-3.63, *t*-statistic = -3.46) are the dependent variables. These findings indicate that higher industry concentration is associated with lower public, private, and total information quality when firms are competing in strategic substitutes (*CSMD* = 0).

Turning to the interaction term *CSMD*HI-CENSUS*, I find consistent positive coefficient estimates when $\sqrt{h}$ (0.44, *t*-statistic = 0.29), $\sqrt{s}$ (0.36, *t*-statistic = 0.24), and $\sqrt{h+s}$ (1.66, *t*-statistic = 1.15) are the dependent variables. While these estimates are not significant in statistical terms, these positive coefficient estimates indicate that, for a given level of industry concentration, firms competing in strategic complements are associated with a higher level of information quality than those competing in strategic substitutes. In other words, competition strategy helps to mitigate the negative impact of industry concentration on information quality. The findings here are consistent with those reported under Section 4.3.5 when I examine the impact of the interaction of industry concentration and competition strategy on earnings quality.

5.5 Sensitivity Tests

Section 4.1 of this dissertation shows that my sample is highly skewed in terms of firm size, and also dominated by firms from three industries within the manufacturing sector. To check whether my test results are dominated by large firms, I re-run my tests on earnings quality (Eq. (1) to (3) under Section 3.1.1 and 3.1.2) by partitioning the sample into two groups based on their firm size: the "*LARGE*" ("*SMALL*") group is made up of firms whose asset values are above (below) the sample median. Results of the main test variables are reported under Table 16. A comparison of the coefficients of the various variables between the "*LARGE*" and "*SMALL*" groups indicates that my findings are not qualitatively affected by firm size.

Similarly, in order to check whether my test results are dominated by those firm-years from the three industries within the manufacturing sector (SIC35 - industrial machinery and equipment industry, SIC 36 - electronic industry, and SIC 38 - instruments and related products industry), I re-run my tests on earnings quality (Eq. (1) to (3) under Section 3.1.1 and 3.1.2) by partitioning the sample into two groups: "*3DI*" is made up of firm-years from SIC35, 36 and 38, while "*ROS*" is made up of firm-years from the rest of the sample. Results of the main test variables are reported under Table 17. Again, a comparison of the coefficients of the various variables between the "*3DI"* and "*ROS"* groups indicates that my findings are not qualitatively affected by industry groupings.

Finally, as mentioned under Section 4.1, distributions of the earnings attributes are skewed and not normally distributed. In particular, *Conservatism* is very much affected by extreme values. To ensure my regression results are not affected, I used decile ranks of earnings attributes in all my regression tests. Regression results using values instead of decile ranks of earnings attributes are now presented under Table 18 to 22. Except for *Conservatism*, coefficient estimates for all other earnings attributes are not qualitatively affected. Overall interpretations and conclusions of these regression tests are also not affected.

5.6 Summary of Findings

The evidence presented above in this chapter generally supports the findings as presented in Chapter 4. On top of earnings quality, this chapter shows that industry concentration has a boarder impact than just on earnings quality. Specifically, I present evidence showing that an increase in industry concentration is associated with lower precision of private and public information of investors and analysts. As such, this dissertation makes another contribution to the existing literature by providing evidence that the quality of both public and private information of informed investors and analysts will benefit from competition. Consistent with my findings in Chapter 4, I find that industry homogeneity and competition strategy help to mitigate the negative impact of industry concentration on the precision of private and public information of investors and analysts. Evidence on the impact of industry homogeneity on information quality seems to support the notion that managers under intense pressure tend to manipulate information released to investors and analysts. Finally, sensitivity tests also confirm the findings in Chapter 4 are robust to firm size and industry groupings.

CHAPTER 6

LIMITATIONS AND CONCLUSIONS

6.1 Limitations

In this dissertation, the census-based Herfindahl index is collected from the *Census of Manufactures* publications which cover both private and public firms from the US manufacturing sector. This is done to ensure that the index is a more accurate reflection of the actual market share of firms within an industry. Whether the empirical results I obtained here can be generalized to other non-manufacturing sectors is an open question.

Also, as discussed under Chapter 5, I follow the BKLS model in estimating the precision of private and public information to analysts or informed investors. One of the assumptions of the BKLS model is that information observed by more than one analyst is common to all and that private information is unique to a given analyst. This assumption is at odds with herding behavior. Herding occurs when analysts observe certain actions from other analysts and then publish new forecasts influenced by these observations. If analysts do exhibit herding behaviors, it will be difficult to separate the effects of public and private information, and its impact on the construct validity of the measures developed in the model is another open issue.

6.2 Conclusions

The objective of this dissertation is to examine the impact of product market competition on earnings quality. Based on a sample from the US manufacturing sector for the period 1996-2005, I find consistent evidence showing a negative relation between industry concentration and earnings quality. This finding is consistent with the intuition that firms in concentrated industries tend to protect their competitive advantage in choosing a disclosure policy that is of a lower quality. Sensitivity tests confirm that the above findings are robust to difference in firm size and industry groupings. Additional tests show that competition not only helps to improve earnings quality, but also helps to improve the precision of private and public information of investors and analysts.

I find mixed evidence on the relation between industry homogeneity and earnings quality. There are findings which support the view that industry homogeneity reduces agency costs and thus leads to higher reporting quality. There are also findings which support the alternate view that managers are subject to higher pressure under homogeneous industries, resulting in higher likelihood for them to misreport. Finally, there is consistent evidence indicating that industry homogeneity and competition strategy helps to moderate the negative impact of industry concentration on earnings quality as well as the information quality of investors and analysts.

Overall speaking, the above findings confirm that product market competition plays a major role in managers' voluntary disclosure decision. This reinforces the idea that a manager's motives for disclosure are influenced by the firm's economic determinants, institutional settings, as well as industry characteristics. In addition, competition is multi-dimensional in its relation to the incentive to disclose. Use of industry concentration as the sole proxy for competition should be re-considered.

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TABLE 1
Sample Description, 1996-2005

	Main Sample	Forecast Sample
Panel A: Number of firm-years		
Firm-years from Census of Manufacturers, 1995-2005	12,098	12.098
Less: Year 1995 used as lead values for variables	(1,346)	(1,346)
Firm-years from Census of Manufacturers, 1996-2005	10,752	10,752
Less: Missing data in earnings attributes / IBES	(5,763)	(5,012)
Firm-years in final sample	4,989	5,740
Panel B: Number of firms by year		
1996	556	729
1997	566	703
1998	523	677
1999	502	612
2000	477	554
2001	467	504
2002	477	477
2003	501	484
2004	509	500
2005	411	500
Total	4,989	5,740
Distinct	976	929
Panel C: Number of firms by 2-digit SIC		
20 – Food and kindred products	163	217
22 – Textile mill products	9	31
23 – Apparel and other textile products	88	108
24 – Lumber and wood products	-	30
25 – Furniture and fixtures	46	56
26 – Paper and allied products	74	108
27 – Printing and publishing	37	49
28 – Chemical and allied products	714	963
29 – Petroleum and coal products	59	122
30 – Rubber and miscellaneous plastic products	142	118
31 – Leather and leather products	71	71
32 – Stone, clay, and glass products	-	29
33 – Primary metal industries	157	234
34 – Fabricated metal products	170	160
35 – Industrial machinery and equipment	820	970
36 – Electronic and other electric equipment	1,075	1,135
37 – Transportation equipment	237	291
38 – Instruments and related products	1,008	933
39 – Miscellaneous manufacturing industries	119	115
Total	4,989	5,740

TABLE 2
Summary of Financial Information about Sample Firms, 1996-2005

	Mean	Std. Dev.	10%	25%	Median	75%	90%
Financial Variables							
Market value of equity ($mils)	5,292.2	19,896.7	76.3	185.5	615.8	2,419.2	9,113.3
Assets ($mils)	3,035.9	9,720.3	58.5	149.5	504.6	1,842.9	6,694.0
Sales ($mils)	3,001.2	10,990.7	46.4	144.3	516.2	1,812.6	6,594.0
ROA	0.028	0.154	-0.094	0.012	0.055	0.096	0.136
MB	3.466	3.635	1.118	1.624	2.466	3.855	6.472
Leverage	0.288	0.562	0	0.015	0.126	0.335	0.684
Earnings per share	1.006	1.702	-0.740	0.150	0.950	1.800	2.850

Sample description and variable definitions: The sample contains 5,678 firm-year observations over t = 1996-2005. The sample covers firms with 6-digit North American Industry Classification System (NAICS) codes between 311111 and 339999. *ROA* = return on assets; *Market-to-Book* = market value of equity divided by book value of equity; *Leverage* = total of long and short-term debt scaled by market value of equity.

TABLE 3
Descriptive Statistics on Key Variables, 1996-2005

	Mean	Std. Dev.	10%	25%	Median	75%	90%
HI-CENSUS	0.059	0.046	0.012	0.024	0.048	0.081	0.125
HOMOGENEITY	0.190	0.038	0.159	0.160	0.186	0.202	0.234
CSM	0.013	0.205	-0.232	-0.091	0.007	0.121	0.273
Earnings Attributes							
AccrualQuality	-0.044	0.035	-0.083	-0.054	-0.034	-0.023	-0.015
Persistence	0.310	0.406	-0.174	0.070	0.320	0.554	0.783
Predictability	-0.696	0.496	-1.376	-0.928	-0.573	-0.327	-0.191
Smoothness	-0.807	0.401	-1.318	-1.051	-0.760	-0.494	-0.340
Relevance	0.438	0.252	0.093	0.228	0.431	0.640	0.790
Timeliness	0.488	0.252	0.134	0.281	0.489	0.693	0.830
Conservatism	1.380	413.117	-9.189	-1.646	0.980	3.380	11.635
C-Score	0.116	0.101	-0.006	0.053	0.108	0.175	0.241
Innate Factors							
SIZE	5.469	1.850	3.110	4.006	5.404	6.775	7.961
σ(CFO)	0.082	0.075	0.026	0.041	0.064	0.101	0.153
σ(SALES)	0.104	0.083	0.027	0.045	0.081	0.137	0.213
OPCYCLE	5.030	0.457	4.480	4.761	5.032	5.315	5.561
NEGEARN	0.202	0.277	0	0	0	0.400	0.600

Variable definitions: *HI-CENSUS* is the Herfindahl index for 6-digit NAICS industries as reported by the *Census of Manufacturers* publications. *HOMOGENEITY* is the average of the partial correlation coefficient for all firms within a 2-digit SIC industry from the following regression: $R_{jt} = \beta_0 + \beta_1 R_{it} + \beta_2 R_{mt} + \varepsilon_{jt}$, where R_{jt} = stock return for firm *j* in industry *i* for month *t*; R_{it} = equally-weighted stock return for industry *i* in month *t*; and R_{mt} = equally-weighted stock return for market in month *t*. *CSM* is the average cross-partial derivative of firm *j*'s profit with respect to its strategy and its rivals' strategy for each 2-digit SIC industry for each year (refer to text on estimation). *AccrualQuality* = the negative of the standard deviation of firm *j*'s residuals from a regression of current accruals on lagged, current, and future cash flows from operations; *Persistence* = the slope coefficient of firm *j* from an AR1 model of annual earnings; *Predictability* = the negative of the square root of the error variance from firm *j*'s AR1 model of annual earnings; *Smoothness* = the negative of the ratio of firm *j*'s standard deviation of earnings before extraordinary items to the standard deviation of cash flows from operations; *Relevance* = adjusted R^2 from a regression of 15-month returns on the level and change in annual earnings before extraordinary items; *Timeliness* = adjusted R^2 from a reverse regression of annual earnings before extraordinary items on variables capturing positive and negative 15-month returns; *Conservatism* = ratio of the coefficient on bad news (negative returns) to good news (positive returns) in the reverse regression; *C-SCORE* = incremental timeliness of bad news each year (refer to text on estimation); *Size* = log of total assets; *σ(CFO)* = standard deviation of firm *j*'s rolling ten-year cash flows from operations; *σ(Sales)* = standard deviation of firm *j*'s rolling ten-year sales revenues; *OpCycle* = log of the sum of firm *j*'s days accounts receivable and days inventory; *NegEarn* = proportion of losses over the prior ten years.

TABLE 4
Correlations among Earnings Attributes, Industry Concentration, Industry Homogeneity and Competitive Strategy Measure

	AccrualQuality	*Persistence*	*Predictability*	*Smoothness*	*Relevance*	*Timeliness*	*Conservatism*	*C-Score*	*HI-CENSUS*	*HOMOGENEITY*	*CSM*
AccrualQuality	1.0000	0.0209	0.0181	0.2506	0.0439	0.0742	-0.0065	-0.1887	-0.0635	0.1530	-0.0015
		0.1407	*0.2024*	*<.0001*	*0.0019*	*<.0001*	*0.6452*	*<.0001*	*<.0001*	*<.0001*	*0.9135*
Persistence		1.0000	0.1168	-0.0096	0.0341	0.0327	-0.0046	0.0212	-0.0214	-0.0023	-0.0210
			<.0001	*0.4986*	*0.0159*	*0.0209*	*0.7481*	*0.1352*	*0.1310*	*0.8710*	*0.1378*
Predictability			1.0000	0.2064	0.0984	0.1077	-0.0057	0.2209	-0.0791	-0.1349	-0.0007
				<.0001	*<.0001*	*<.0001*	*0.6861*	*<.0001*	*<.0001*	*<.0001*	0.9611
Smoothness				1.0000	0.1380	0.1723	0.0168	-0.0663	-0.1289	0.0567	0.0202
					<.0001	*<.0001*	*0.2351*	*<.0001*	*<.0001*	*<.0001*	*0.1543*
Relevance					1.0000	0.6652	-0.0107	0.0413	-0.0720	0.0103	0.0160
						<.0001	*0.4510*	0.0035	*<.0001*	*0.4652*	*0.2602*
Timeliness						1.0000	0.0038	0.0314	-0.0616	0.0017	-0.0066
							0.7899	*0.0267*	*<.0001*	*0.9066*	*0.6405*
Conservatism							1.0000	-0.0038	-0.0079	-0.0054	-0.0267
								0.7914	*0.5775*	*0.7027*	*0.0589*
C-Score								1.0000	-0.0471	-0.0915	0.0099
									0.0009	*<.0001*	*0.4851*
HI-CENSUS									1.0000	0.0771	-0.0404
										<.0001	*0.0043*
HOMOGENEITY										1.0000	0.0175
											0.2156
CSM											1.0000

Refer to Table 3 for variable definitions. Pearson correlations are reported above and significance levels are shown in italics.

TABLE 5
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Concentration

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	8.384***	4.684***	6.953***	5.151***	8.682***	7.769***	5.132***	11.220***
	(18.55)	(8.81)	(14.97)	(11.37)	(16.76)	(15.27)	(9.67)	(46.19)
SIZE	0.308***	-0.092***	-0.894***	0.071***	-0.250***	-0.225***	-0.062**	-1.117***
	(13.73)	(-3.55)	(-43.99)	(3.29)	(-10.17)	(-9.22)	(-2.38)	(-97.96)
σ(CFO)	-10.299***	-1.656**	-5.291***	6.758***	0.571	-1.017*	0.002	-0.211
	(-7.85)	(-2.70)	(-5.09)	(8.65)	(0.84)	(-1.84)	(0.00)	(-0.78)
σ(SALES)	-3.180***	2.696***	4.094***	-3.577***	0.215	0.872	0.128	-1.145***
	(-6.58)	(4.82)	(9.04)	(-7.64)	(0.41)	(1.62)	(0.22)	(-4.92)
OPCYCLE	-0.567***	0.076	0.504***	0.182**	-0.377***	-0.175*	0.003	-0.111**
	(-7.06)	(0.82)	(6.14)	(2.26)	(-4.14)	(-1.98)	(0.03)	(-2.69)
NEGEARN	-1.727***	-0.486***	-2.715***	-4.564***	-2.665***	-2.579***	-0.575***	0.265***
	(-10.98)	(-2.84)	(-18.36)	(-31.28)	(-15.96)	(-15.69)	(-3.38)	(3.52)
LEVERAGE	0.301***	-0.257**	-0.429***	0.970***	-0.146*	0.010	-0.061	1.022***
	(4.13)	(-2.67)	(-5.72)	(10.91)	(-1.65)	(0.12)	(-0.66)	(16.13)
MB	-0.021	0.020	0.105***	-0.016	-0.037**	-0.018	-0.012	-0.099***
	(-1.56)	(1.27)	(7.92)	(-1.19)	(-2.41)	(-1.21)	(-0.81)	(-6.92)
HI-CENSUS	-2.142***	-1.623*	-2.212***	-6.145***	-2.782***	-1.939**	-1.999**	0.299
	(-2.91)	(-1.86)	(-2.84)	(-7.81)	(-3.28)	(-2.40)	(-2.23)	(0.80)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.345	0.013	0.310	0.239	0.078	0.073	0.008	0.825

Refer to Table 3 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 6
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Homogeneity

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	7.440***	4.010***	8.371***	5.722***	8.702***	8.455***	4.428***	10.814***
	(13.76)	(6.05)	(14.31)	(10.16)	(13.54)	(13.47)	(6.81)	(35.27)
SIZE	0.297***	-0.100***	-0.888***	0.064***	-0.255***	-0.223***	-0.070***	-1.120***
	(13.23)	(-3.84)	(-43.75)	(2.94)	(-10.35)	(-9.17)	(-2.70)	(-97.14)
σ(CFO)	-10.361***	-1.702***	-5.255***	6.717***	0.542	-1.009*	-0.049	-0.225
	(-7.80)	(-2.79)	(-5.09)	(8.73)	(0.79)	(-1.82)	(-0.06)	(-0.83)
σ(SALES)	-3.157***	2.710***	3.891***	-3.821***	0.128	0.747	0.133	-1.097***
	(-6.46)	(4.86)	(8.53)	(-8.06)	(0.24)	(1.38)	(0.23)	(-4.73)
OPCYCLE	-0.520***	0.109	0.433***	0.154*	-0.378***	-0.209**	0.038	-0.091**
	(-6.38)	(1.16)	(5.11)	(1.86)	(-4.05)	(-2.33)	(0.40)	(-2.15)
NEGEARN	-1.777***	-0.523***	-2.727***	-4.652***	-2.709***	-2.598***	-0.618***	0.263***
	(-11.28)	(-3.05)	(-18.53)	(-31.93)	(-16.29)	(-15.89)	(-3.64)	(3.51)
LEVERAGE	0.310***	-0.250**	-0.411***	1.008***	-0.130	0.024	-0.052	1.019***
	(4.30)	(-2.58)	(-5.37)	(11.30)	(-1.47)	(0.29)	(-0.56)	(16.03)
MB	-0.017	0.023	0.099***	-0.020	-0.037**	-0.021	-0.010	-0.097***
	(-1.29)	(1.42)	(7.41)	(-1.41)	(-2.44)	(-1.40)	(-0.65)	(-6.78)
HOMOGENEITY	2.848**	2.017	-5.217***	-3.013**	-0.551	-2.675**	2.053	1.436**
	(2.50)	(1.44)	(-4.51)	(-2.51)	(-0.42)	(-1.98)	(1.52)	(2.35)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.345	0.013	0.311	0.230	0.077	0.073	0.008	0.825

Refer to Table 3 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 7
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Competitive Interaction

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	8.253***	4.566***	6.827***	4.785***	8.391***	7.540***	5.198***	11.209***
	(18.27)	(8.57)	(14.66)	(10.58)	(16.10)	(14.77)	(9.80)	(46.15)
SIZE	0.304***	-0.095***	-0.898***	0.060***	-0.251***	-0.224***	-0.072***	-1.116***
	(13.63)	(-3.64)	(-44.60)	(2.76)	(-10.21)	(-9.21)	(-2.78)	(-96.97)
σ(CFO)	-10.331***	-1.684***	-5.322***	6.669***	0.503	-1.069**	0.013	-0.213
	(-7.81)	(-2.75)	(-5.08)	(8.78)	(0.73)	(-1.91)	(0.02)	(-0.79)
σ(SALES)	-3.229***	2.665***	4.041***	-3.721***	0.188	0.861	0.026	-1.129***
	(-6.65)	(4.77)	(8.87)	(-7.89)	(0.35)	(1.59)	(0.04)	(-4.88)
OPCYCLE	-0.563***	0.078	0.509***	0.196**	-0.375***	-0.174**	0.014	-0.113***
	(-6.98)	(0.85)	(6.19)	(2.42)	(-4.10)	(-1.97)	(0.15)	(-2.74)
NEGEARN	-1.764***	-0.515***	-2.753***	-4.670***	-2.719***	-2.618***	-0.600***	0.269***
	(-11.18)	(-3.01)	(-18.69)	(-32.04)	(-16.40)	(-16.05)	(-3.53)	(3.59)
LEVERAGE	0.311***	-0.251***	-0.417***	1.000***	-0.143	0.010	-0.035	1.018***
	(4.29)	(-2.60)	(-5.57)	(11.30)	(-1.63)	(0.12)	(-0.38)	(16.07)
MB	-0.021	0.020	0.105***	-0.017	-0.038**	-0.020	-0.011	-0.099***
	(-1.57)	(1.25)	(7.91)	(-1.21)	(-2.48)	(-1.29)	(-0.69)	(-6.95)
Abs(CSM)	0.136	0.214	0.084	0.327	0.915***	0.796***	-1.029***	0.164
	(0.58)	(0.72)	(0.33)	(1.26)	(3.09)	(2.67)	(-3.48)	(1.29)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.344	0.012	0.308	0.229	0.078	0.074	0.010	0.825

Abs(CSM) = absolute value of *CSM*. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 8
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Concentration and Industry Homogeneity

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	8.621***	4.108***	6.921***	5.392***	8.991***	8.005***	4.910***	11.161***
	(18.43)	(7.45)	(14.25)	(11.46)	(16.72)	(15.24)	(8.96)	(44.16)
SIZE	0.312***	-0.100***	-0.894***	0.075***	-0.245***	-0.221***	-0.065**	-1.118***
	(13.87)	(-3.86)	(-43.81)	(3.45)	(-9.93)	(-9.04)	(-2.50)	(-97.77)
σ(CFO)	-10.223***	-1.730***	-5.258***	6.804***	0.681	-0.954*	-0.045	-0.226
	(-7.81)	(-2.84)	(-5.05)	(8.65)	(1.01)	(-1.72)	(-0.06)	(-0.84)
σ(SALES)	-3.147***	2.794***	4.161***	-3.593***	0.278	0.885	0.136	-1.147***
	(-6.50)	(5.01)	(9.16)	(-7.67)	(0.53)	(1.64)	(0.23)	(-4.92)
OPCYCLE	-0.579***	0.124	0.514***	0.165**	-0.390***	-0.188**	0.018	-0.107***
	(-7.14)	(1.34)	(6.24)	(2.03)	(-4.24)	(-2.12)	(0.19)	(-2.59)
NEGEARN	-1.710***	-0.505***	-2.709***	-4.553***	-2.641***	-2.565***	-0.586***	0.262***
	(-10.90)	(-2.96)	(-18.29)	(-31.16)	(-15.82)	(-15.58)	(-3.44)	(3.47)
LEVERAGE	0.295***	-0.263***	-0.437***	0.970***	-0.157*	0.006	-0.060	1.023***
	(4.03)	(-2.71)	(-5.84)	(10.88)	(-1.79)	(0.07)	(-0.65)	(16.13)
MB	-0.021	0.023	0.106***	-0.017	-0.036**	-0.018	-0.012	-0.099***
	(-1.55)	(1.42)	(7.95)	(-1.24)	(-2.37)	(-1.22)	(-0.77)	(-6.91)
HI-CENSUS	-6.840***	-3.203*	-6.760***	-7.276***	-10.297***	-5.141***	-0.453	1.042
	(-4.46)	(-1.76)	(-4.11)	(-4.88)	(-6.90)	(-3.21)	(-0.27)	(1.49)
HOMO	-0.316***	0.424***	-0.094	-0.224*	-0.448***	-0.275**	0.220	0.067
	(-2.77)	(3.02)	(-0.77)	(-1.80)	(-3.35)	(-2.06)	(1.60)	(1.14)
HOMO*HI-CENSUS	6.583***	0.634	5.741***	2.027	10.359***	4.665**	-2.512	-1.092
	(3.79)	(0.30)	(3.05)	(1.15)	(5.72)	(2.50)	(-1.26)	(-1.30)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.347	0.018	0.312	0.239	0.084	0.074	0.009	0.825

HOMO = 1 when *HOMOGENEITY* > sample median; zero otherwise. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 9
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Concentration and Competitive Strategy Measure

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	8.169***	4.651***	6.718***	5.151***	8.891***	8.031***	5.116 ***	11.312***
	(17.93)	(8.65)	(14.35)	(11.24)	(16.97)	(15.57)	(9.53)	(45.81)
SIZE	0.310***	-0.093***	-0.897***	0.070***	-0.246***	-0.223***	-0.060 **	-1.117***
	(13.86)	(-3.56)	(-44.30)	(3.26)	(-10.01)	(-9.16)	(-2.30)	(-97.95)
σ(CFO)	-10.355***	-1.659***	-5.312***	6.763***	0.572	-0.983*	-0.018	-0.196
	(-7.93)	(-2.70)	(-5.12)	(8.66)	(0.84)	(-1.77)	(-0.02)	(-0.73)
σ(SALES)	-3.121***	2.691***	4.058***	-3.578***	0.249	0.912*	0.127	-1.131***
	(-6.48)	(4.81)	(8.95)	(-7.65)	(0.47)	(1.69)	(0.22)	(-4.85)
OPCYCLE	-0.553***	0.076	0.510***	0.181**	-0.379***	-0.184**	0.008	-0.115***
	(-6.91)	(0.83)	(6.23)	(2.25)	(-4.19)	(-2.08)	(0.08)	(-2.79)
NEGEARN	-1.705***	-0.486***	-2.719***	-4.567***	-2.651***	-2.582***	-0.563 ***	0.262***
	(-10.87)	(-2.84)	(-18.44)	(-31.35)	(-15.90)	(-15.74)	(-3.30)	(3.49)
LEVERAGE	0.289***	-0.257***	-0.428***	0.972***	-0.152*	0.013	-0.067	1.024***
	(3.96)	(-2.66)	(-5.70)	(10.92)	(-1.72)	(0.16)	(-0.73)	(16.19)
MB	-0.022*	0.020	0.104***	-0.016	-0.037**	-0.018	-0.013	-0.098***
	(-1.63)	(1.27)	(7.96)	(-1.19)	(-2.39)	(-1.16)	(-0.83)	(-6.90)
HI-CENSUS	-2.361**	-1.202	0.829	-5.800***	-6.788***	-4.441***	-3.268 ***	-0.335
	(-2.30)	(-0.93)	(0.81)	(-5.38)	(-6.21)	(-3.89)	(-2.58)	(-0.62)
CSMD	0.229**	0.062	0.448***	0.021	-0.477***	-0.445***	-0.060	-0.141**
	(2.15)	(0.48)	(4.08)	(0.18)	(-3.81)	(-3.58)	(-0.46)	(-2.59)
CSMD*HI-CENSUS	0.729	-0.847	-6.125***	-0.728	8.193***	4.954***	2.695	1.225*
	(0.50)	(-0.49)	(-4.09)	(-0.47)	(5.00)	(3.09)	(1.52)	(1.65)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.347	0.013	0.312	0.239	0.083	0.076	0.009	0.826

CSMD = 1 when *CSM* > 0; zero otherwise. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 10
Descriptive Statistics on Information Quality and Control Variables

	Mean	Std. Dev.	10%	25%	Median	75%	90%
Information Quality							
$\sqrt{h}$	22.078	54.479	0.173	2.685	10.025	24.159	46.046
$\sqrt{s}$	21.791	29.569	0	2.107	9.875	29.680	60.443
$\sqrt{h+s}$	37.257	58.450	2.994	8.955	22.018	47.958	84.984

Variable definitions: Information quality variables are based on the BKLS (1998) model. The precision of public information (h) and private information (s) are measured as follows:

$$h = \frac{SE - \frac{D}{N}}{\left[\left(1 - \frac{1}{N}\right)D + SE\right]^2}, \quad s = \frac{D}{\left[\left(1 - \frac{1}{N}\right)D + SE\right]^2}$$

where *SE* is the expected squared error in the mean forecast. *D* is the expected forecast dispersion, and *N* is the number of forecasts. Please refer to the text for estimation of *SE* and *D*. The precision of public information, *h*, can take on negative values when $SE - D/N < 0$. For these cases, I modify the measure by using *SE* in the numerator. Since the estimated values of *h* and *s* are highly skewed, their square roots are taken and used instead. Consequently, the public, private, and total information quality variables are measured as $\sqrt{h}$, $\sqrt{s}$, and $\sqrt{h+s}$ respectively. *Size* = natural log of firm *j*'s market capitalization; *Leverage* = firm *j*'s total of long and short-term debt scaled by market capitalization; and *MB* = firm *j*'s market capitalization divided by book value of equity.

TABLE 11
Results of Cross-Sectional Regression of Decile Ranks of Information Quality on Industry Concentration

	Dependent Variable		
	$\sqrt{h}$	$\sqrt{s}$	$\sqrt{h+s}$
Intercept	2.265***	2.027***	1.380***
	(9.49)	(8.56)	(6.05)
SIZE	0.406***	0.471***	0.557***
	(18.94)	(22.18)	(27.18)
LEVERAGE	-0.430***	-0.292***	-0.556***
	(-6.45)	(-4.43)	(-8.74)
MB	0.011	-0.022**	0.029***
	(1.03)	(-2.02)	(2.82)
HI-CENSUS	-2.442***	-1.232*	-2.851***
	(-3.22)	(-1.64)	(-3.93)
Year-dummies	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes
N	5,740	5,740	5,740
R^2	0.089	0.104	0.168

Refer to Table 3 and 8 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. **, *** are significant at the 0.05 and 0.01 level respectively.

TABLE 12
Results of Cross-Sectional Regression of Decile Ranks of Information Quality on Industry Homogeneity

	Dependent Variable		
	$\sqrt{h}$	$\sqrt{s}$	$\sqrt{h+s}$
Intercept	3.180***	2.729***	2.890***
	(9.91)	(8.58)	(9.46)
SIZE	0.413***	0.478***	0.571***
	(19.21)	(22.41)	(27.86)
LEVERAGE	-0.411***	-0.278***	-0.525***
	(-6.16)	(-4.20)	(-8.27)
MB	0.001	-0.029***	0.013
	(0.06)	(-2.67)	(1.30)
HOMOGENEITY	-4.891***	-3.608***	-7.802***
	(-4.74)	(-3.53)	(-7.94)
Year-dummies	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes
N	5,740	5,740	5,740
R^2	0.091	0.105	0.175

Refer to Table 3 and 8 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. **, *** are significant at the 0.05 and 0.01 level respectively.

TABLE 13
Results of Cross-Sectional Regression of Decile Ranks of Information Quality on Competitive Interaction

	Dependent Variable		
	$\sqrt{h}$	$\sqrt{s}$	$\sqrt{h+s}$
Intercept	1.960***	2.041***	1.149***
	(8.04)	(8.45)	(4.93)
SIZE	0.409***	0.465***	0.555***
	(18.98)	(21.74)	(26.89)
LEVERAGE	-0.430***	-0.294***	-0.558***
	(-6.45)	(-4.46)	(-8.76)
MB	0.007	-0.022**	0.025**
	(0.63)	(-2.09)	(2.44)
Abs(CSM)	0.763***	-0.297	0.387*
	(3.11)	(-1.22)	(1.65)
Year-dummies	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes
N	5,740	5,740	5,740
R^2	0.089	0.104	0.166

Abs(CSM) = Absolute value of *CSM*. Refer to Table 3 and 8 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. **, *** are significant at the 0.05 and 0.01 level respectively.

TABLE 14
Results of Cross-Sectional Regression of Decile Ranks of Information Quality on Industry Concentration and Industry Homogeneity

	Dependent Variable		
	$\sqrt{h}$	$\sqrt{s}$	$\sqrt{h+s}$
Intercept	2.519***	2.223***	1.765***
	(9.95)	(8.85)	(7.31)
SIZE	0.412***	0.477***	0.567***
	(19.15)	(22.36)	(27.61)
LEVERAGE	-0.424***	-0.290***	-0.549***
	(-6.36)	(-4.38)	(-8.64)
MB	0.009	-0.024**	0.026**
	(0.83)	(-2.19)	(2.48)
HI-CENSUS	-5.059***	-4.309***	-7.669***
	(-3.54)	(-3.04)	(-5.63)
HOMO	-0.394***	-0.328***	-0.615***
	(-3.08)	(-2.59)	(-5.05)
HOMO*HI-CENSUS	4.145**	4.545***	7.365***
	(2.45)	(2.71)	(4.57)
Year-dummies	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes
N	5,740	5,740	5,740
R^2	0.090	0.105	0.172

HOMO = 1 when *HOMOGENEITY* > sample median; zero otherwise. Refer to Table 3 and 8 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 15
Results of Cross-Sectional Regression of Decile Ranks of Information Quality on Industry Concentration and Competitive Strategy Measure

	Dependent Variable		
	$\sqrt{h}$	$\sqrt{s}$	$\sqrt{h+s}$
Intercept	2.094***	2.051***	1.303***
	(8.52)	(8.40)	(5.55)
SIZE	0.406***	0.471***	0.556***
	(18.95)	(22.17)	(27.17)
LEVERAGE	-0.436***	-0.292***	-0.561***
	(-6.55)	(-4.42)	(-8.82)
MB	0.010	-0.022**	0.028***
	(0.93)	(-2.01)	(2.76)
HI-CENSUS	-2.535**	-1.430	-3.627***
	(-2.31)	(-1.31)	(-3.46)
CSMD	0.293**	-0.047	0.114
	(2.48)	(-0.40)	(1.01)
CSMD*HI-CENSUS	0.444	0.356	1.660
	(0.29)	(0.24)	(1.15)
Year-dummies	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes
N	5,740	5,740	5,740
R^2	0.092	0.104	0.170

CSMD = 1 when *CSM* > 0; zero otherwise. Refer to Table 3 and 8 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 16
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Concentration, Industry Homogeneity, and Competitive Strategy Measure Partitioned by Firm Size

	Dependent Variable															
	AccrualQuality		***Persistence***		***Predictability***		***Smoothness***		***Relevance***		***Timeliness***		***Conservatism***		***C-Score***	
	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small
Equation (1)																
HI-CENSUS	-3.03	-2.08	-1.55	-2.17	-3.34	-1.98	-5.07	-6.88	-2.88	-3.45	-2.84	-1.84	-1.77	-2.14	0.29	0.31
	(-1.99)	(-2.64)	(-1.20)	(-1.92)	(4.52)	(3.07)	(-5.83)	(-7.92)	(-3.07)	(-3.82)	(-2.56)	(--2.22)	(-1.82)	(-3.99)	(0.65)	(0.57)
HOMOGENEITY	2.12	3.42	3.84	2.11	-6.08	-3.17	-3.24	-2.07	-0.52	-0.38	-3.77	-2.59	2.27	1.82	1.40	1.48
	(2.85)	(1.52)	(0.97)	(1.23)	(-5.29)	(-3.86)	(-2.33)	(-3.41)	(-0.72)	(-0.34)	(-2.05)	(-1.82)	(1.37)	(1.49)	(2.18)	(2.93)
Abs(*CSM*)	0.25	0.16	0.18	2.36	0.08	0.11	0.27	0.31	0.90	0.87	0.825	0.77	-1.00	-1.25	0.16	0.23
	(0.66)	(0.47)	(0.93)	(0.55)	(0.31)	(0.48)	(1.18)	(1.24)	(4.52)	(2.27)	(2.08)	(3.39)	(-4.58)	(-2.71)	(1.03)	(1.47)
Equation (2)																
Hi-CENSUS	-7.73	-6.04	-2.99	-4.52	-6.82	-6.45	-8.99	-4.19	-8.73	-9.71	-5.72	-5.50	-0.25	-0.37	1.08	0.85
	(-5.60)	(-4.28)	(-2.54)	(-1.07)	(-3.84)	(-4.51)	(-4.06)	(-5.23)	(-5.31)	(-8.67)	(-1.42)	(-3.51)	(-0.80)	(-0.09)	(1.12)	(1.60)
*HOMO*HI-CENSUS*	6.92	5.43	0.55	0.41	5.92	5.33	8.52	2.17	7.70	9.23	4.32	4.84	-1.43	-1.27	-0.94	-0.82
	(2.55)	(4.74)	(0.15)	(0.27)	(5.37)	(3.02)	(1.00)	(0.87)	(5.88)	(5.31)	(2.76)	(1.79)	(-1.87)	(-1.14)	(-1.03)	(-1.54)
Equation (3)																
HI-CENSUS	-2.44	-2.92	-1.50	-1.04	0.94	0.52	-7.89	-5.14	-5.92	-8.03	-4.02	-6.17	-2.85	-3.45	-0.38	-0.33
	(-3.95)	(-2.70)	(-0.54)	(-0.95)	(0.77)	(0.80)	(-4.32)	(-6.07)	(-8.20)	(-5.77)	(-3.41)	(-4.59)	(-4.07)	(-1.62)	(-0.74)	(-0.41)
*CSMD*HI-CENSUS*	0.99	0.75	-0.95	-0.45	-5.54	-7.17	-0.63	-0.94	9.20	6.41	3.75	5.08	2.75	2.02	1.03	1.78
	(0.37)	(0.92)	(-0.43)	(-0.19)	(-5.20)	(-4.14)	(-0.31)	(-0.72)	(4.75)	(6.18)	(2.42)	(2.64)	(1.46)	(1.88)	(1.17)	(1.93)

The "Large" ("Small") group is made up of firms from my sample with total assets above (below) the sample median. Refer to the text and Table 3 for specification of the above equations and variable definitions respectively. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses.

TABLE 17
Results of Cross-Sectional Regression of Decile Ranks of Earnings Attributes on Industry Concentration, Industry Homogeneity, and Competitive Strategy Measure Partitioned by Industry Group

	Dependent Variable															
	AccrualQuality		***Persistence***		***Predictability***		***Smoothness***		***Relevance***		***Timeliness***		***Conservatism***		***C-Score***	
	3DI	ROS	3DI	ROS	3DI	ROS	3DI	ROS	3DI	ROS	3DI	ROS	3DI	ROS	3DI	ROS
Equation (1)																
HI-CENSUS	-2.13	-1.95	-1.87	-1.91	-1.84	-3.12	-4.81	-5.10	-2.40	-3.34	-3.17	-1.99	-1.06	-2.25	0.74	0.09
	(-2.36)	(-1.72)	(-1.18)	(-2.04)	(4.00)	(3.04)	(-6.26))	(-4.20)	(-2.96)	(-2.87)	(-2.82)	(--2.15)	(-2.77)	(-3.19)	(0.40)	(0.78)
HOMOGENEITY	4.09	3.00	3.11	1.86	-5.18	-6.17	-3.82	-2..77	-1.25	-0.44	-1.56	-4.29	3.12	1.51	1.17	1.78
	(1.99)	(3.27)	(0.86)	(1.02)	(-3.88)	(-5.82)	(-2.04)	(-2.77)	(-0.22)	(-0.84)	(-1.55)	(-1.97)	(1.04)	(1.71)	(2.30)	(2.64)
Abs(*CSM*)	0.29	0.05	0.37	0.68	0.21	0.10	0.47	0.33	1.33	0.40	1.52	0.72	-0.46	-1.45	0.84	0.03
	(0.20)	(0.61)	(0.23)	(1.25)	(0.47)	(0.40)	(1.82)	(0.74)	(5.70)	(2.89)	(2.88)	(1.49)	(-2.18)	(-4.01)	(1.72)	(1.08)
Equation (2)																
Hi-CENSUS	-8.85	-4.29	-3.08	-4.62	-6.96	-4.37	-5.31	-8.21	-9.95	-12.31	-6.00	-4.53	-0.21	-0.77	1.31	0.97
	(-6.01)	(-3.08)	(-1.01)	(-2.88)	(-4.15)	(-5.09)	(-2.06)	(-3.30)	(-7.84)	(-7.00)	(-4.87)	(-2.03)	(-0.15)	(-0.31)	(1.52)	(1.87)
*HOMO*HI-CENSUS*	7.20	3.50	1.37	1.84	5.11	3.92	3.28	6.05	8.30	10.46	4.54	5.17	-0.03	-2.00	-0.88	-0.79
	(3.80)	(4.02)	(0.42)	(0.19)	(4.05)	(2.62)	(1.84)	(2.07)	(4.62)	(6.09)	(2.11)	(3.09)	(-1.07)	(-1.14)	(-2.04)	(-0.07)
Equation (3)																
HI-CENSUS	-3.01	-1.99	-2.04	-1.83	0.77	0.61	-4.95	-6.16	-4.03	-7.12	-4.52	-3.39	-4.79	-2.14	-0.82	-0.07
	(-1.12)	(-3.30)	(-1.57)	(-0.88)	(1.24)	(1.00)	(-6.59)	(-3.37)	(-7.85)	(-6.23)	(-4.08)	(-2.15)	(-1.97)	(-2.85)	(-0.94)	(-0.55)
*CSMD*HI-CENSUS*	1.05	0.63	-0.73	-1.45	-7.73	-5.98	-0.65	-1.34	6.94	9.77	5.07	4.01	4.14	2.17	1.88	0.91
	(0.64)	(0.32)	(-0.77)	(-0.41)	(-3.20)	(-6.84)	(-0.22)	(-0.71)	(3.25)	(6.84)	(3.87)	(2.26)	(1.84)	(1.12)	(1.47)	(1.83)

The "3DI" group is made up of firms from my sample with 2-digit SIC code 35, 36 and 38, while the "ROS" group is made up of firms from the rest of the sample. Refer to the text and Table 3 on the specification of the above equations and variable definitions respectively. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses.

TABLE 18
Results of Cross-Sectional Regression of Earnings Attributes on Industry Concentration

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	-0.010	0.265***	-0.407***	-0.673***	0.798***	0.771***	27.217	0.357***
	(-1.39)	(3.39)	(-4.95)	(-10.47)	(17.37)	(17.29)	(0.33)	(40.38)
SIZE	0.003***	-0.013***	-0.146***	0.012***	-0.022***	-0.020***	0.817	-0.038***
	(10.95)	(-3.49)	(-35.63)	(3.98)	(-10.32)	(-9.42)	(0.14)	(-89.13)
σ(CFO)	-0.214***	-0.155*	-0.817***	1.093***	0.052	-0.097**	12.574	-0.028***
	(-15.88)	(-1.78)	(-4.86)	(9.06)	(0.84)	(-1.96)	(0.19)	(-3.01)
σ(SALES)	-0.033***	0.338***	0.697***	-0.526***	0.036	0.081	-20.816	-0.026***
	(-4.52)	(4.15)	(9.06)	(-7.78)	(0.77)	(1.69)	(-0.34)	(-3.04)
OPCYCLE	-0.003**	0.020	0.111***	0.009	-0.032***	-0.014*	-5.175	-0.006***
	(-2.14)	(1.51)	(7.64)	(0.75)	(-3.93)	(-1.83)	(-0.42)	(-3.81)
NEGEARN	-0.019***	-0.072***	-0.501***	-0.601***	-0.233***	-0.227***	16.466	0.008***
	(-9.20)	(-3.09)	(-18.42)	(-26.26)	(-15.81)	(-15.70)	(1.51)	(2.68)
LEVERAGE	0.003***	-0.011	-0.064***	0.118***	-0.014*	0.001	9.594	0.052***
	(3.36)	(-0.43)	(-4.55)	(7.46)	(-1.80)	(0.13)	(1.17)	(11.41)
MB	-0.001*	0.001	0.021***	-0.002	-0.004***	-0.002	0.149	-0.003***
	(-1.76)	(0.57)	(9.88)	(-1.12)	(-2.77)	(-1.32)	(0.10)	(-6.37)
HI-CENSUS	-0.020**	-0.170	-0.431***	-0.790***	-0.238***	-0.170**	-75.080	-0.004
	(-2.37)	(-1.37)	(-3.22)	(-7.20)	(-3.20)	(-2.40)	(-0.42)	(-0.32)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.432	0.011	0.289	0.212	0.078	0.074	0.002	0.812

Refer to Table 3 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 19
Results of Cross-Sectional Regression of Earnings Attributes on Industry Homogeneity

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	-0.021**	0.179*	-0.061	-0.608***	0.796***	0.829***	15.917	0.342***
	(-2.39)	(1.89)	(-0.60)	(-7.88)	(14.02)	(15.07)	(0.24)	(29.42)
SIZE	0.003***	-0.014***	-0.144***	0.011***	-0.023***	-0.020***	0.602	-0.039***
	(10.59)	(-3.74)	(-35.46)	(3.63)	(-10.50)	(-9.39)	(0.10)	(-87.98)
σ(CFO)	-0.215***	-0.160*	-0.807***	1.087***	0.049	-0.096**	11.307	-0.028***
	(-15.81)	(-1.85)	(-4.86)	(9.14)	(0.79)	(-1.95)	(0.17)	(-3.08)
σ(SALES)	-0.033***	0.341***	0.651***	-0.557***	0.029	0.070	-22.053	-0.025***
	(-4.45)	(4.21)	(8.46)	(-8.12)	(0.62)	(1.46)	(-0.37)	(-2.88)
OPCYCLE	-0.003*	0.024*	0.094***	0.005	-0.032***	-0.017**	-4.612	-0.005***
	(-1.72)	(1.80)	(6.59)	(0.47)	(-3.83)	(-2.18)	(-0.39)	(-3.22)
NEGEARN	-0.020***	-0.076***	-0.503***	-0.613***	-0.237***	-0.229***	15.082	0.008**
	(-9.44)	(-3.26)	(-18.63)	(-26.84)	(-16.14)	(-15.90)	(1.38)	(2.57)
LEVERAGE	0.003***	-0.010	-0.061***	0.123***	-0.013	0.002	9.988	0.052***
	(3.49)	(-0.40)	(-4.17)	(7.75)	(-1.63)	(0.29)	(1.22)	(11.34)
MB	0.000	0.002	0.019***	-0.003	-0.004***	-0.002	0.182	-0.003***
	(-1.54)	(0.68)	(9.21)	(-1.30)	(-2.79)	(-1.50)	(0.12)	(-6.23)
HOMOGENEITY	0.033***	0.264	-1.256***	-0.358**	-0.035	-0.228**	25.503	0.050**
	(2.94)	(1.41)	(-5.13)	(-2.25)	(-0.30)	(-1.92)	(0.27)	(2.02)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.432	0.011	0.293	0.205	0.076	0.074	0.002	0.813

Refer to Table 3 for variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 20
Results of Cross-Sectional Regression of Earnings Attributes on Competitive Interaction

	Dependent Variable							
	AccrualQuality	***Persistence***	***Predictability***	***Smoothness***	***Relevance***	***Timeliness***	***Conservatism***	***C-Score***
Intercept	-0.011	0.256***	-0.435***	-0.725***	0.772***	0.751***	12.916	0.356***
	(-1.51)	(3.27)	(-5.28)	(-11.33)	(16.71)	(16.79)	(0.16)	(40.33)
SIZE	0.003***	-0.013***	-0.146***	0.011***	-0.022***	-0.020***	1.033	-0.038***
	(10.86)	(-3.58)	(-35.96)	(3.55)	(-10.35)	(-9.42)	(0.18)	(-88.16)
σ(CFO)	-0.214***	-0.157*	-0.823***	1.080***	0.046	-0.101**	9.375	-0.028***
	(-15.83)	(-1.81)	(-4.85)	(9.20)	(0.73)	(-2.04)	(0.14)	(-3.03)
σ(SALES)	-0.034***	0.333***	0.687***	-0.543***	0.034	0.080*	-19.627	-0.026***
	(-4.59)	(4.10)	(8.90)	(-7.97)	(0.73)	(1.67)	(-0.33)	(-3.03)
OPCYCLE	-0.003**	0.021	0.112***	0.010	-0.032***	-0.014*	-5.357	-0.006***
	(-2.10)	(1.53)	(7.68)	(0.88)	(-3.90)	(-1.83)	(-0.43)	(-3.82)
NEGEARN	-0.020***	-0.074***	-0.509***	-0.615***	-0.238***	-0.231***	14.657	0.008***
	(-9.35)	(-3.20)	(-18.76)	(-26.96)	(-16.25)	(-16.06)	(1.32)	(2.65)
LEVERAGE	0.003***	-0.010	-0.062***	0.122***	-0.014*	0.001	9.114	0.052***
	(3.52)	(-0.39)	(-4.40)	(7.70)	(-1.79)	(0.12)	(1.13)	(11.39)
MB	0.000*	0.001	0.021***	-0.002	-0.004***	-0.002	0.039	-0.003***
	(-1.74)	(0.56)	(9.87)	(-1.16)	(-2.84)	(-1.39)	(0.03)	(-6.41)
Abs(CSM)	-0.001	0.002	0.033	0.074**	0.084***	0.070***	63.987	0.005
	(-0.35)	(0.04)	(0.77)	(2.10)	(3.23)	(2.67)	(1.47)	(1.14)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.431	0.010	0.287	0.205	0.078	0.075	0.002	0.813

Abs(*CSM*) = absolute value of *CSM*. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 21
Results of Cross-Sectional Regression of Earnings Attributes on Industry Concentration and Industry Homogeneity

	Dependent Variable							
	AccrualQuality	*Persistence*	*Predictability*	*Smoothness*	*Relevance*	*Timeliness*	*Conservatism*	*C-Score*
Intercept	-0.010	0.201**	-0.412***	-0.647***	0.825***	0.791***	3.821	0.354***
	(-1.29)	(2.51)	(-4.83)	(-9.91)	(17.29)	(17.19)	(0.06)	(39.03)
SIZE	0.003***	-0.014***	-0.146***	0.013***	-0.022***	-0.020***	0.440	-0.038***
	(11.04)	(-3.74)	(-35.39)	(4.10)	(-10.08)	(-9.26)	(0.07)	(-88.60)
σ(CFO)	-0.213***	-0.162*	-0.811***	1.099***	0.062	-0.091*	6.372	-0.028***
	(-15.88)	(-1.87)	(-4.80)	(9.06)	(1.01)	(-1.86)	(0.10)	(-3.04)
σ(SALES)	-0.032***	0.351***	0.708***	-0.526***	0.042	0.082*	-22.014	-0.026***
	(-4.42)	(4.33)	(9.18)	(-7.77)	(0.89)	(1.71)	(-0.36)	(-2.97)
OPCYCLE	-0.003**	0.026***	0.113***	0.007	-0.033***	-0.015**	-3.816	-0.005***
	(-2.09)	(1.93)	(7.75)	(0.61)	(-4.04)	(-1.98)	(-0.34)	(-3.65)
NEGEARN	-0.019***	-0.073***	-0.500***	-0.600***	-0.231***	-0.226***	15.072	0.008**
	(-9.18)	(-3.19)	(-18.39)	(-26.18)	(-15.67)	(-15.59)	(1.35)	(2.64)
LEVERAGE	0.003***	-0.012	-0.066***	0.118***	-0.015**	0.001	9.985	0.052***
	(3.24)	(-0.47)	(-4.65)	(7.43)	(-1.94)	(0.09)	(1.20)	(11.39)
MB	-0.001*	0.002	0.021***	-0.002	-0.004***	-0.002	0.174	-0.003***
	(-1.70)	(0.69)	(9.87)	(-1.15)	(-2.72)	(-1.33)	(0.12)	(-6.35)
HI-CENSUS	-0.080***	-0.523**	-1.204***	-1.031***	-0.904***	-0.425***	236.778	-0.013
	(-4.86)	(-2.09)	(-3.95)	(-4.82)	(-6.89)	(-3.03)	(1.23)	(-0.52)
HOMO	-0.002	0.042**	-0.017	-0.028	-0.040***	-0.023**	27.167	0.002
	(-1.64)	(2.15)	(-0.82)	(-1.59)	(-3.38)	(-2.00)	(1.30)	(0.70)
HOMO*HI-CENSUS	0.077***	0.299	0.980***	0.372	0.917***	0.376**	-455.404	0.005
	(4.02)	(1.02)	(2.86)	(1.49)	(5.77)	(2.31)	(-1.74)	(0.17)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.434	0.015	0.291	0.213	0.084	0.075	0.002	0.813

HOMO = 1 when *HOMOGENEITY* > sample median; zero otherwise. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.

TABLE 22
Results of Cross-Sectional Regression of Earnings Attributes on Industry Concentration and Competitive Strategy Measure

	Dependent Variable							
	AccrualQuality	*Persistence*	*Predictability*	*Smoothness*	*Relevance*	*Timeliness*	*Conservatism*	*C-Score*
Intercept	-0.013*	0.259***	-0.446***	-0.673***	0.816***	0.794***	39.156	0.359***
	(-1.71)	(3.24)	(-5.36)	(-10.28)	(17.58)	(17.57)	(0.45)	(39.76)
SIZE	0.003***	-0.013***	-0.146***	0.012***	-0.022***	-0.020***	0.606	-0.038***
	(10.98)	(-3.51)	(-35.98)	(3.94)	(-10.18)	(-9.35)	(0.10)	(-89.07)
σ(CFO)	-0.215***	-0.156*	-0.821***	1.093***	0.052	-0.094**	16.451	-0.027***
	(-15.95)	(-1.79)	(-4.90)	(9.08)	(0.84)	(-1.90)	(0.25)	(-2.98)
σ(SALES)	-0.033***	0.337***	0.691***	-0.526***	0.039	0.085*	-19.174	-0.026***
	(-4.58)	(4.14)	(8.99)	(-7.78)	(0.83)	(1.77)	(-0.32)	(-2.99)
OPCYCLE	-0.003**	0.020	0.113***	0.009	-0.032***	-0.015**	-6.122	-0.006***
	(-2.06)	(1.51)	(7.72)	(0.73)	(-3.98)	(-1.94)	(-0.48)	(-3.85)
NEGEARN	-0.019***	-0.072***	-0.501***	-0.602***	-0.232***	-0.228***	14.795	0.008***
	(-9.13)	(-3.10)	(-18.53)	(-26.35)	(-15.76)	(-15.73)	(1.33)	(2.66)
LEVERAGE	0.003***	-0.011	-0.064***	0.119***	-0.014**	0.001	10.494	0.052***
	(3.24)	(-0.43)	(-4.57)	(7.47)	(-1.86)	(0.15)	(1.22)	(11.40)
MB	0.000*	0.001	0.021***	-0.002	-0.004***	-0.002	0.215	-0.003***
	(-1.81)	(0.56)	(9.91)	(-1.11)	(-2.75)	(-1.27)	(0.14)	(-6.35)
HI-CENSUS	-0.010	-0.083	-0.007	-0.722***	-0.579***	-0.407***	-6.545	-0.022
	(-0.93)	(-0.47)	(-0.04)	(-4.81)	(-6.08)	(-4.06)	(-0.12)	(-1.11)
CSMD	0.004***	0.013	0.069***	0.004	-0.041***	-0.040***	-9.266	-0.003
	(3.03)	(0.69)	(3.72)	(0.23)	(-3.71)	(-3.71)	(-0.46)	(-1.57)
CSMD*HI-CENSUS	-0.018	-0.175	-0.845***	-0.142	0.697***	0.472***	-159.311	0.034
	(-1.09)	(-0.70)	(-3.27)	(-0.66)	(4.83)	(3.36)	(-0.48)	(1.19)
Year-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4,989	4,989	4,989	4,989	4,989	4,989	4,989	4,989
R^2	0.433	0.011	0.291	0.213	0.082	0.077	0.002	0.813

CSMD = 1 when *CSM* > 0; zero otherwise. Refer to Table 3 for other variable definitions. White's (1980) heteroscedasticity-consistent *t*-statistics are shown in parentheses. *, **, *** are significant at the 0.10, 0.05 and 0.01 level respectively.